ITUPublications

International Telecommunication Union

# United Nations Activities on Artificial Intelligence (AI)

2022

# United Nations Activities on Artificial Intelligence (AI)

2022

## DISCLAIMER

*The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of ITU and of the Secretariat of the ITU, or CTBTO, FAO, IAEA, IFAD, ILO, IMF, IMO, IOM, OHCHR, Office of the Secretary-General's Envoy on Technology, UNAIDS, UNCTAD, UNDESA, UNDP, UNDPPA, UNECE, UNEP, UNESCO, UNFPA, UN Global Pulse, UN Habitat, UNHCR, UNICEF, UNICRI, UNIDIR, UNIDO, UNITAR, UNODA, UNODC, UNOOSA, UNRISD, UNU, UN Women, UNWTO, WFP, WHO, WIPO, WMO and World Bank Group, concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.*

*The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by ITU or CTBTO, FAO, IAEA, IFAD, ILO, IMF, IMO, IOM, OHCHR, Office of the Secretary-General's Envoy on Technology, UNAIDS, UNCTAD, UNDESA, UNDP, UNDPPA, UNECE, UNEP, UNESCO, UNFPA, UN Global Pulse, UN Habitat, UNHCR, UNICEF, UNICRI, UNIDIR, UNIDO, UNITAR, UNODA, UNODC, UNOOSA, UNRISD, UNU, UN Women, UNWTO, WFP, WHO, WIPO, WMO and World Bank Group in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.*

*All reasonable precautions have been taken by ITU to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader.*

*The opinions, findings and conclusions expressed in this publication do not necessarily reflect the views of ITU or CTBTO, FAO, IAEA, IFAD, ILO, IMF, IMO, IOM, OHCHR, Office of the Secretary-General's Envoy on Technology, UNAIDS, UNCTAD, UNDESA, UNDP, UNDPPA, UNECE, UNEP, UNESCO, UNFPA, UN Global Pulse, UN Habitat, UNHCR, UNICEF, UNICRI, UNIDIR, UNIDO, UNITAR, UNODA, UNODC, UNOOSA, UNRISD, UNU, UN Women, UNWTO, WFP, WHO, WIPO, WMO and World Bank Group or their membership.*

**ISBN**

978-92-61-37301-6 (Electronic version)
978-92-61-37311-5 (EPUB version)
978-92-61-37321-4 (Mobi version)

**Please consider the environment before printing this report.**

# Foreword

2022 was a watershed year for artificial intelligence.

We witnessed major advances in AI-powered robotics, quantum computing, and the emergence of generative AI tools moving human-like conversations into the mainstream.

What excites me most about this rapid evolution is AI's awe-inspiring potential to drive significant advances in so many fields – especially in making connectivity more meaningful and accessible to everyone. We're also seeing the industry quickly shift from hype to the implementation and maturity of AI-driven products and services.

But this warp-speed development leaves little space to reflect on AI's broader societal implications. Serious challenges and significant questions remain.

How will AI impact employment? Will it help or hinder our right to safe and secure digital spaces? Will it widen or narrow existing digital divides as we race against time to rescue the SDGs? It is imperative that we do not leave developing countries behind in the AI race.

All these uncertainties call for a clearer understanding of AI and how it might affect society. As the leading technology agency within the UN system, ITU is striving to build this understanding together with its sister agencies and bodies within the UN system.

That's exactly why this latest edition of the UN Activities Report on artificial intelligence couldn't be more important. This tool is for anyone looking to understand how the UN is working to leverage AI for the betterment of humanity.

In these pages, you will see UN entities wrestling with big questions about how to harness AI to help mitigate climate change, transform education, fight hunger, eliminate poverty, and so much more. It offers a glimpse of real progress towards achieving the SDGs, which we desperately need to get back on track.

This comprehensive collection of projects and initiatives also reflects the UN's ongoing commitment to ensure that AI is developed and deployed through multi-stakeholder collaboration. Nearly 40% of projects involve collaboration between UN entities, 25% with academia and governments, and 20% with the private sector.

I'm grateful to every UN sister agency and organization that contributed to this publication. With 40 UN entities sharing 281 activities – including 84 presented for the first time – this is truly a system-wide effort. Our shared objective is to harness AI's enormous potential while mitigating risks – with Our Common Agenda as our guide.

This goal goes beyond the UN, too. While AI can be a powerful catalyst for progress, it is up to the UN and tech communities to show the world that we can develop it responsibly and ethically.

I hope to see you in July 2023, when AI experts from all over the world will come to Geneva to share practical solutions to some of humanity's biggest challenges at the AI for Good Global Summit.

In the meantime, I'm confident you will find this resource useful in your own AI work – and that it can promote a more informed and constructive dialogue on a technology that is already transforming our shared digital future.

Doreen Bogdan-Martin
ITU Secretary-General

# Executive Summary

### Highlights

- *40 entities participated, 281 projects presented, 84 new projects.*
- *Strong focus continues to be maintained on SDGs 3 (Good Health and Well-being), 9 (Industry, Innovation and Infrastructure), 10 (Reduced Inequalities), 16 (Peace, justice and strong institutions) and 17 (Partnership for the Goals). In 2021, SDG 13 (Climate Action) featured among the top five SDGs and while focus remains consistent on it this year as well, the number of projects reporting work on SDG 16 (Peace, Justice and Strong Institutions) has increased bringing it to the top 5 SDGs being addressed by the projects submitted in 2022.*
- *More focus continues to be needed on SDGs 6 (Clean Water and Sanitation), 7 (Affordable and Clean Energy), 12 (Responsible consumption and production), 14 (Life Below Water) and 15 (Life on Land). In the 2021 edition, SDG 2 (Zero Hunger) was presented as an area requiring more focus. Progress seems to have been made in this respect, and SDG 12 (Responsible consumption and production) is now an area requiring greater attention.*
- *Multi-stakeholder collaborations continue to remain a priority for the UN system with:*
    - Almost 40% of projects collaborating with entities within the UN.
    - Almost 25% of projects featuring collaborations with the academia and government, and 20% collaborating with the private sector.
- *Consistent with the findings of the 2021 edition, software tools and reports are the most common outputs of UN AI projects, which can be used to address challenges impeding progress on the SDGs.*

Urgent action is needed to achieve the Sustainable Development Goals (SDGs) by 2030. With the potential to drive progress across all 17 SDGs, the use of Artificial Intelligence (AI) can help speed and scale interventions for this purpose.

Recognizing this, the different bodies, agencies, offices and departments of the UN system have been exploring ways to leverage the potential of AI to drive change and impact across their issue areas. In 2020, the UN System Chief Executives Board for Coordination (CEB) and its High-Level Committee on Programmes (HLCP) established the interagency working group on AI (IAWG-AI), co-led by ITU and UNESCO, to bring together UN system expertise on AI in support of the CEB and HLCP workstreams on the ethics of AI (led by UNESCO) and the strategic approach and road map for supporting capacity development (led by ITU), and the related gap analysis effort carried out by ITU, informed by the UN Activities on AI Report, to identify the gaps in UN AI-related activities in order to help the UN system prioritize strategic actions.

Since 2021, the IAWG-AI has successfully galvanized expertise from across the UN system as well as external stakeholder groups to advance the responsible development and use of AI in the UN, underpinned by ethics and human rights, while driving forward the 2030 Agenda on Sustainable Development. As part of the IAWG-AI, UNESCO and OICT have led the development of the Principles for the Ethical Use of Artificial Intelligence in the United Nations System, which were

based on UNESCO's Ethics of AI Recommendation and endorsed by the HLCP at its 43rd session and the CEB in 2022.

In 2022, the AI for Good platform, organized by ITU in partnership with 40 UN Sister Agencies and co-convened with Switzerland, has reached over 260,000 online views, including an 81,000-strong multi-stakeholder community involving 180+ countries and has consistently attracted broad based international media coverage, making it the leading action-oriented, global and inclusive United Nations platform on AI.

Recently, AI for Good has launched the Neural Network: an AI-powered community networking and content platform designed to help users build connections with innovators and experts, link innovative ideas with social impact opportunities, and bring the community together to advance the SDGs using AI. AI for Good Partners can showcase their work on the Neural Network through weekly live sessions, virtual exhibitions, networking features and interactive content. UN Partners have also created "poster boards" in the "UN SDG Zone" of the platform to virtually exhibit their work on AI, viewable by all Neural Network users, and open for interaction with users via the booth wall and smart matching system. The chapters of this Report are available on the respective poster boards of the UN entities as well. Future editions of the Report will see a further integration with the Neural Network, with an aim to provide a live-action version of the Report that can be updated by the contributors in real time.

Complementary to these efforts, ITU, the UN's specialized agency on telecommunications/ICTs, has been coordinating the compilation of an annual up-to-date directory since 2018 of all the AI-related projects, initiatives, events and processes that are being carried out within the UN system in the form of the UN Activities on AI Report.

**Methodology:**

- Projects were updated by each of the participating UN bodies and agencies based on the 2021 UN Activities on Artificial Intelligence Report.
- For 6 entities which were not able to provide updated inputs this year, projects from the 2021 edition have been incorporated in this Report.
- The compilation of submissions received this year has been harmonized and formatted for the purpose of reproduction in the Report.
- For the Executive Summary, select data points were extracted from the submissions to develop an analysis along 5 specific indicators: SDGs addressed, multi-stakeholder collaborations, types of projects, sectoral focus, and project status.
- All inputs received by December 2022 have been included in the Executive Summary analysis.

The Report is a joint effort between ITU and 46 UN agencies and bodies, all partners of AI for Good or members of the UN Interagency Working Group on AI. It presents cases and projects run by the UN system, in areas covering all 17 SDGs and ranging from smart agriculture and food systems to transportation, financial services, and healthcare. This Report is not intended to produce an exhaustive inventory of the UN system's work on AI. Rather, it is a tool to further collaboration and build common understanding around emerging AI technologies and solutions.

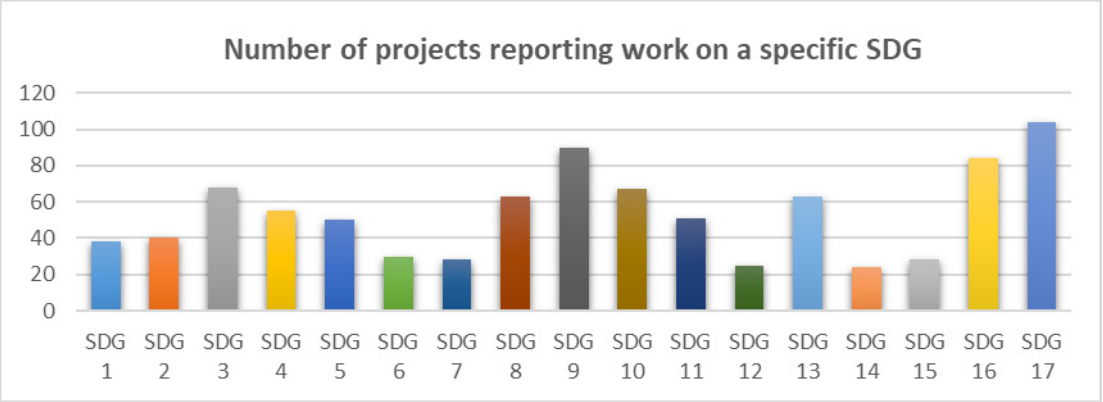
In the 2022 edition, 46 UN entities were engaged, 40 entities have sent updates, and 281 projects have been presented. A brief analysis of the key tracks and trends arising from the submissions is provided below to help provide an overview of the extensive work that is taking place within the UN system as well as to assist UN bodies and agencies to identify the areas which could benefit from increased interventions as they develop future projects.

With the increased number of projects submitted for the Report this year, along with the updates made to the existing ones, several changes can be seen across all the indicators on which these projects are analyzed in this section. There could be a number of reasons for these changes, apart from standard deviations occurring due to changes in personnel and the level of reporting annually. The increase in project numbers could signify the emphasis that is now being placed across the UN system on leveraging the potential of AI across several issue areas through concrete projects, while fluctuations on the key thematic priorities and SDGs could be a result of exercises such as this that allow entities to identify gaps in the work and design projects to fill those gaps. Future editions of the Report will aim to continue analyzing these trends to provide insight into the nature and status of the UN AI activities.

This Report is being released at the AI for Good Meeting on 16 March 2023 at WSIS Forum 2023. At the meeting, participants will discuss ongoing initiatives as well as opportunities to enhance the partnership for continued collaboration, cooperation, and coordination.

## Key tracks and trends

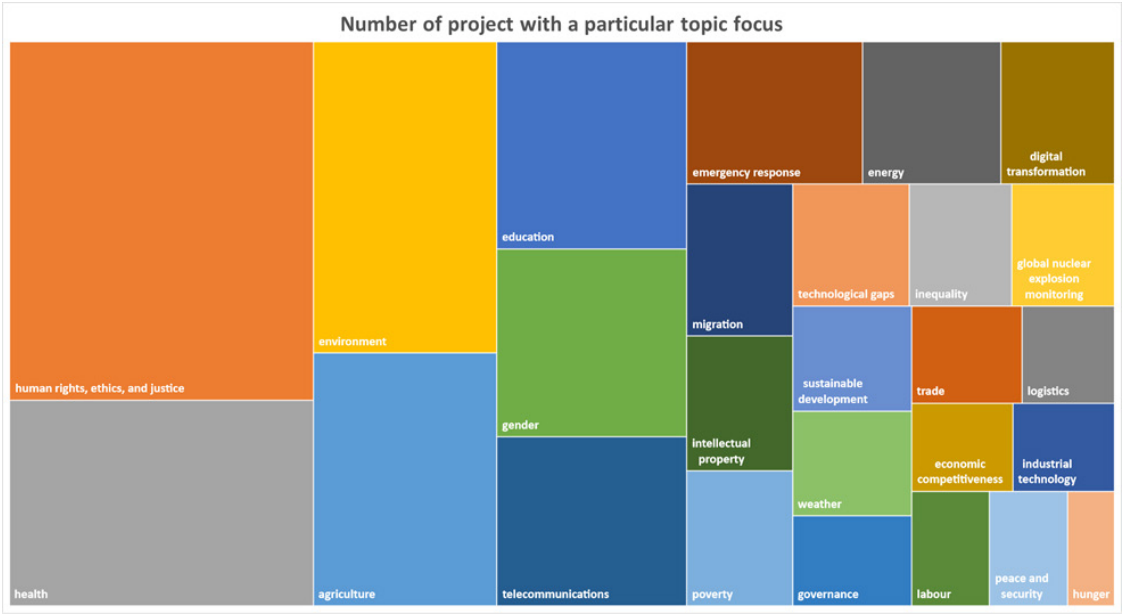
### 1. SDG Mapping




Over 85% of the projects have linked their projects with outcomes driving forward specific SDGs. Among them, the overwhelming majority address more than one SDG, signaling holistic, multidimensional projects.

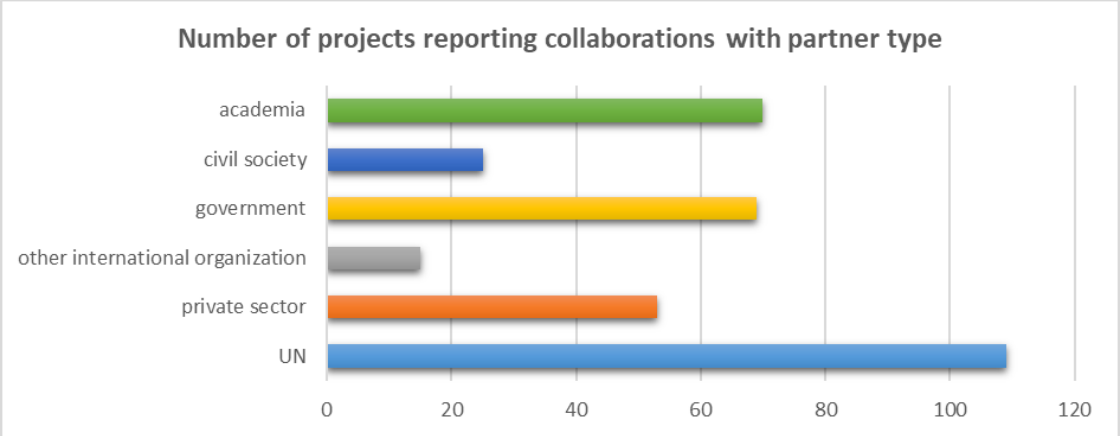
SDGs 3 (Good Health and Well-being), 9 (Industry, Innovation and Infrastructure), 10 (Reduced Inequalities), and 17 (Partnership for the Goals) continue to remain among the top five most common SDGs addressed by the UN AI initiatives. However, this year's edition reports that while focus on SDG 13 (Climate Action) remains consistent with the 2021 edition, there is an increase in the number of projects reporting on SDG 16 (Peace, Justice and Strong Institutions) bringing it up to the list of the top five most common SDGs addressed by projects this year. Focus on SDG 2 (Zero Hunger) has improved in this edition's reporting, while scope continues to remain for more targeted action to be taken across SDGs 6 (Clean Water and Sanitation), 7 (Affordable and Clean Energy), 12 (Responsible consumption and production), 14 (Life Below Water) and 15 (Life on Land).

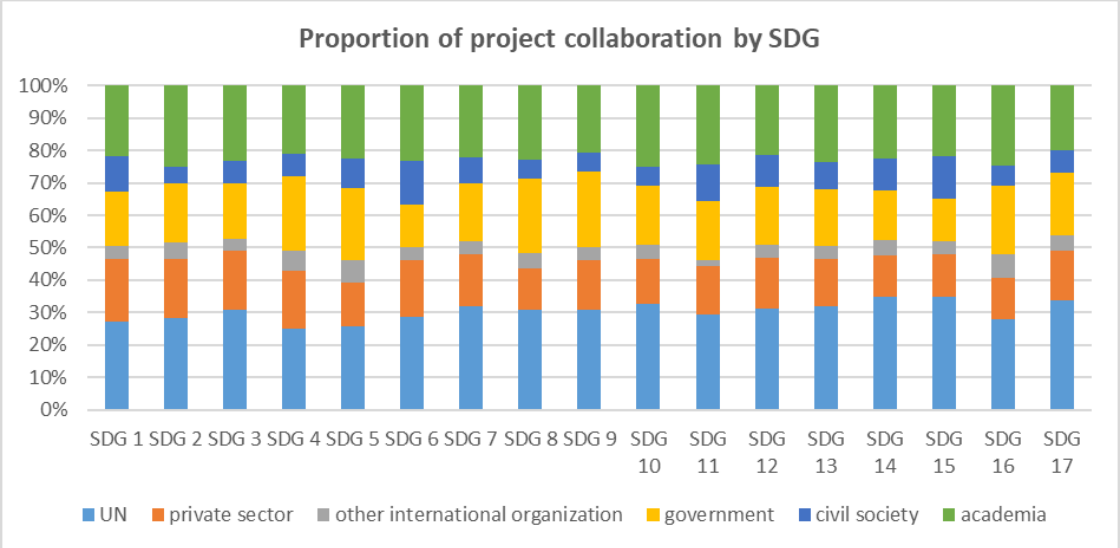
### 2. Project Subject Areas



In addition to the SDG mapping related to the overall outcome of the project, participants have also set out some of the issue areas within which their AI projects are operating. Nearly 84% of the projects reported their specific issue areas. In most cases, the projects are often reported as addressing multiple areas along with driving forward impact on multiple SDGs. There is an increase in reportage particularly on projects linked to human rights, ethics and justice, agriculture, and telecommunications, as compared to 2021 where "Digital Transformation" was tagged as a priority subject area. However, given the nature and status of the projects received, they would still broadly fall under the category of "Digital Transformation" although other more specific subject areas may have been indicated by the contributors in this edition. Several health-related projects have also been reported for addressing the COVID-19 pandemic.

### 3. Driving Multi-stakeholder Collaboration




Almost two-thirds of the UN projects have reported collaborations with the UN system, the private sector, governments, civil society, academia, or with another international organization, demonstrating the UN's focus on maintaining strong partnerships with internal and external stakeholders.

## 4. Reports and software tools to address challenges

Project Outputs by SDGs

(Doughnut size = number of projects)

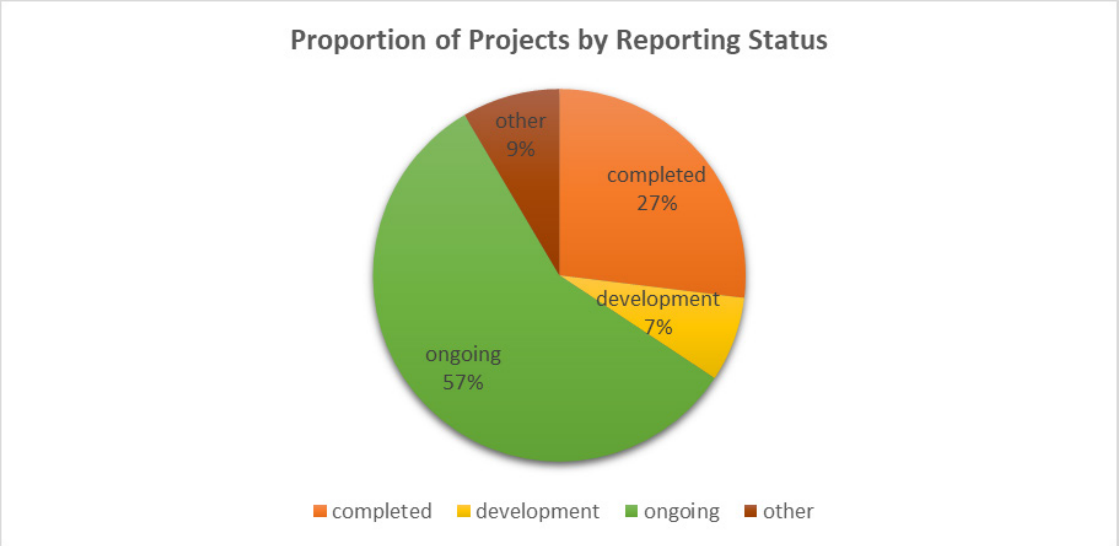
About 75% of the projects reported their project types or outputs this year. Among them, consistent with the findings of the 2021 edition, a significant number have focused on outcome-driven products and deliverables such as reports or software tools.

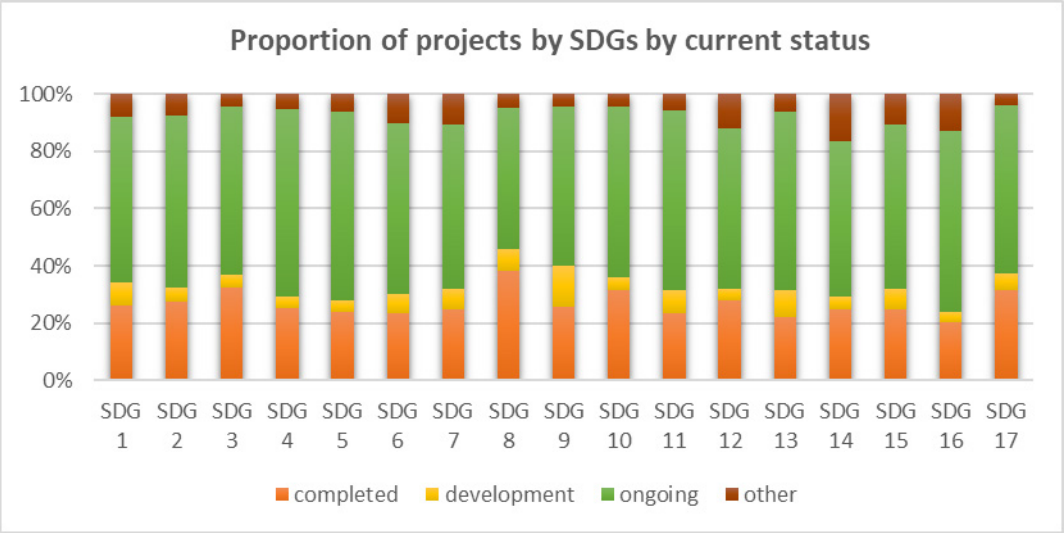
As of now, many of the current reports produced on AI relate to SDGs 10 (Reduced inequality) as compared to 2021's focus on SDG 8 (Decent Work and Economic Growth) and software tools relate to SDGs 3 (Good health and well-being) and 9 (Industry, Innovation, and Infrastructure), as compared to 2021's emphasis on SDGs 1 (No Poverty) and 2 (Zero Hunger). Focus on SDGs 16 (Peace, justice and strong institutions) and 17 (Partnership for the goals) remains strong across all the project outputs.

## 5. Looking forward

Project Status by SDG

About 92% of the projects reported their current status. Whereas a number of projects did not report specific end dates, or in some cases, the project duration.






In terms of status of the projects (in development, ongoing or completed), the majority of the reported UN AI projects are currently ongoing, with those related to SDG 8 (Decent work and economic growth) and SDG 17 (Partnership for the goals) reporting the most completed projects.

Of the projects in development, the majority feature software tools, working on topics such as the future of work, sustainable development, health research, and access to information.

# Table of contents

# Comprehensive Nuclear-Test-Ban Treaty Organization

## 1. Description of Activities on AI

The Comprehensive Nuclear-Test-Ban Treaty (CTBT) bans nuclear explosions on the Earth's surface, in the atmosphere, underwater and underground. The Treaty has a unique and comprehensive verification regime consisting of three pillars:

- The International Monitoring System (IMS) will, when complete, consist of 337 facilities worldwide to monitor the planet for signs of nuclear explosions. Around 90 percent of the facilities are already up and running.
- The International Data Centre (IDC) at the CTBTO's headquarters in Vienna acquires data from the IMS monitoring stations. The data are processed automatically, reviewed by human analysts and distributed to the CTBTO's Member States in both raw and analyzed form. On-site inspections (OSI) can be dispatched to the area of a suspected nuclear explosion if data from the IMS indicate that a nuclear test has taken place there. Inspectors collect evidence at the suspected site.

Artificial Intelligence (AI) is applied in all three pillars of the verification regime as outlined below.

### Project 1: To detect fall army worm damage using a mobile application

Classifying signals from seismic stations to determine their seismic phase based on features measured automatically. The features include amplitude, frequency content, particle motion parameters, etc. Manual data processing of signals from seismic stations is cumbersome thus the need to automate data processing at ICTBTO's International data center.

- Project Type (Status): Software project (Proof of concept)
- Project Domain: Global nuclear explosion monitoring
- AI Approach: Artificial Neural Networks (ANN) and Bayesian Classifiers
- Datasets: Automatic signals from the International Monitoring System (IMS), reviewed and corrected by human analysts.
- Related SDGs: SDG 16 – Peace, Justice and Strong Institutions
- Resources/Skills: Human experts to review and correct the signals from seismic stations of IMS
- Technology: Deep Learning
- Challenges: Improvement of the current system by retraining the existing ANNs on a per station basis and replacing the ensemble of ANN and Bayes Classifiers with a deeper ANN. Methods are being explored for seismic phase identification directly from the waveform signal. Further studies are being undertaken to determine if the use of additional information, such as the raw waveform data, during classification can further improve performance
- Reported as part of 2021 Compendium on UN AI Activities? Yes

### Project 2: Network Processing of detected signals to determine the events that have triggered them

Detection of events by on-site inspections for every signal detected is time consuming and expensive hence the need for network processing of signals detected at seismic, infrasound and hydro-acoustic stations in determining the events that have caused these signals to be observed.

- Project Type (Status): Software project (Deployment)
- Project Domain: Global nuclear explosion monitoring
- AI Approach: Rule-based
- Datasets: Signals detected at seismic, infrasound and hydro-acoustic stations of IMS
- Related SDGs: SDG 16 – Peace, Justice and Strong Institutions
- Challenges: Further research is being undertaken on the classification of radionuclide spectra by ANNs
- Reported as part of 2021 Compendium on UN AI Activities? Yes

### Project 3: NET-VISA (NETwork processing Vertically Integrated Seismic Analysis)

Improvement of the current rule-based system.

- Project Type (Status): Software project (Deployed)
- Project Domain: Global nuclear explosion monitoring
- AI Approach: Machine Learning + physics model. The theoretical underpinnings are based on the "Open Universe Probability Model"
- Datasets: Signals detected at seismic, infrasound and hydro-acoustic stations of IMS
- Related SDGs: SDG 16 – Peace, Justice and Strong Institutions
- Project Partners: University of California (developing NET-VISA software)
- Resource: Bayesian approaches. Knowledge of seismic, infrasound, and hydro data
- Challenges: Extending to stations without detailed history from which to derive priors.
- Reported as part of 2021 Compendium on UN AI Activities? Yes

### Project 4: Automatic triage

Distribute certain trouble tickets based on their content.

- Project Type (Status): Software project (Deployment)
- Project Domain: Global nuclear explosion monitoring
- Datasets: Signals detected at seismic, infrasound and hydro-acoustic stations of IMS
- Related SDGs: SDG 16 – Peace, Justice and Strong Institutions
- Reported as part of 2021 Compendium on UN AI Activities? Yes

### Project 5: Predicting failure at IMS stations

Predicting failure at IMS stations based on extensive State Of Health (SOH) parameters that are continuously collected and store.

- Project Type (Status): Software project (Deployed)
- Project Domain: Global nuclear explosion monitoring
- AI Approach: Statistical methods and rule-based system; Next approach: ANNs and Support Vector Machines (SVM).

- Datasets: IMS data and noble gas monitoring system SOH data.
- Related SDGs: SDG 16 – Peace, Justice and Strong Institutions
- Project Partners: Pacific National Northwest Laboratory (PNNL)
- Reported as part of 2021 Compendium on UN AI Activities? Yes

### Project 6: Seismic aftershock monitoring

Monitoring changes in the geological structures caused by a possible nuclear explosion and classifying "weak" detections produced to enable separation of noise from signals of interest (aftershocks).

- Project Type (Status): Software project (Testing)
- Project Domain: Global nuclear explosion monitoring
- AI Approach: AI-based technique and Self Organizing Map (SOM)
- Datasets: IMS raw waveform data
- Related SDGs: SDG 16 – Peace, Justice and Strong Institutions
- Project Partners: University of Stuttgart (developed AI-based technique)
- Reported as part of 2021 Compendium on UN AI Activities? Yes

### Project 7: Satellite monitoring for On Site Inspection (OSI)

The use of air-and-spaceborne multispectral imagery (MSIR) for classification and change detection in the inspection area, with the ultimate goal of limiting the search area and detecting features of interest.

- Project Type (Status): Software project (Ideation)
- Project Domain: Global nuclear explosion monitoring
- AI Approach: Pixel-based classification (unsupervised and supervised Machine learning), object-based classification (decision rules and fuzzy-logic) and Change detection techniques using Multivariate Alteration Detection (MAD)
- Datasets: Air and Space-borne multispectral imagery (MSIR)
- Related SDGs: SDG 16 – Peace, Justice and Strong Institutions
- Resource: GIS (Geographic Information Systems) operations
- Challenges: Timeframe during an 'On Sight Inspection (OSI)' (e.g. availability of imagery)
- Reported as part of 2021 Compendium on UN AI Activities? Yes

## 2. Related Sustainable Development Goals (SDGs)

SDG 16 – Peace, Justice and Strong Institutions

## 3. Relevant links

www.ctbto.org

Contact information

Megan Slinkard, Chief, Software Applications, International Data Center Division (Megan.Slinkard@ctbto.org)

# The Food and Agriculture Organization

Food and Agriculture Organization of the United Nations

## 1. Description of Activities on AI

### Project 1: Strengthening global access to agricultural information and knowledge (Hand-In-Hand Geospatial Platform)

- Project Description: Earth observation and geospatial IT play a critical role in the agricultural and related sectors. FAO has created the Hand-in-Hand Geospatial Platform that hosts data sourced from FAO, FAO partners in the public and private sectors including from across the UN, NGOs, government institutions, academia and space agencies. The platform has significantly increased the interoperability of FAO geospatial data as well as the cost-effective maintenance and sustainability of different FAO geospatial applications. Machine learning and AI are used in cutting edge quantitative remote sensing in agriculture; world class cloud computing capabilities; enabling unprecedented cross-sectoral knowledge discovery by integrating data on Soil, Land, Water, Climate, Fisheries, Livestock, Crops, Forestry, Trade, Social and Economics and much more.
- Project Type/Output: Dataset, Software tool
- Project Status: Ongoing
- Project Start Year: 2020
- Project End Year: 2025
- Project Domain: Agriculture
- Data Source: FAO projects data and relevant data from external data providers, covering all sub-disciplines of agriculture from animal health to trade/markets.
- Publicly Available Data: Yes
- Technology/Platform: Google Cloud Platform; TerriaJS; GeoNetwork; CKAN
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Updates: more datasets added or updated, new functions such as zonal statistics and remote sensing data products integrated.
- Related Sustainable Development Goals (SDGs): SDG 1 – No Poverty; SDG 2 – Zero Hunger; SDG 13 – Climate Action.
- Links and Multimedia:
    - https://www.fao.org/hih-geospatial-platform/en/
    - https://youtu.be/xKON7YWWXUI
- Lessons Learned: Data federation supported by standardization make a huge difference in data sharing. Open data sharing enables various users to contribute and get good results to solve identified problems.
- Contact information: Karl Morteo (karl.morteo@fao.org);Zhongxin Chen (zhongxin.chen@fao.org)

### Project 2: Crop phenology and crop calendar with remote sensing and GEO-AI

- Project Description: Crops phenology and crop calendars are essential to many agricultural applications. This project uses time-series satellite remote sensing data and auxiliary data to generate crop phenology data and crop calendar, with employing machine learning and GEO-AI. There are 2 phases of the project. First, algorithm development is committed in several pilot regions, and then global dataset will be produced.
- Project Type/Output: Dataset
- Project Status: Development
- Project Start Year: 2022
- Project End Year: 2023
- Project Domain: Agriculture
- Data Source: Satellite data, agricultural statistical data, landcover land use data and in-situ data
- Publicly Available Data: Yes
- Technology/Platform: Google Cloud Platform; Python
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 1 – No Poverty, SDG 2 – Zero Hunger, SDG 13 – Climate Action
- Contact information: Pengyu Hao (pengyu.hao@fao.org); Zhongxin Chen (zhongxin.chen@fao.org)

### Project 3: Global and Country ASIS (Agriculture Stress Index System)

- Project Description: The Agricultural Stress Index System (ASIS) monitors agricultural areas with a high likelihood of water stress/drought at global, regional and country level, using satellite technology. ASIS uses satellite-based remote sensing data to detect agricultural areas (cropland or grassland) with a high likelihood of water stress (dry spells and drought). It simulates the analysis that an expert in remote sensing would undertake and simplifies the interpretation and use of the data for non-technical users (not remote sensing experts).
- Project Type/Output: Dataset, Software tool
- Project Status: Complete
- Project Start Year: 2014
- Project End Year: 2016
- Project Domain: Agriculture
- Data Source:
    - https://www.fao.org/giews/earthobservation/access.jsp?lang=en
    - https://www.fao.org/giews/earthobservation/reference.jsp?lang=en
- Publicly Available Data: Yes
- Technology/Platform: GLIMPSE, SPIRITS
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 2 – Zero Hunger
- Partnership(s)/Collaborator(s):
    - UN Partners: European Commission Joint Research Centre (JRC)
    - Private Sector: Flemish Institute for Technological Research (VITO)
    - Academia: The University of Twente, Faculty of Geo-Information Science and Earth Observation (ITC)

- Links and Multimedia:
  - https://www.fao.org/giews/earthobservation/asis/index_2.jsp?lang=en
  - https://www.youtube.com/watch?v=QlW6qowJlU8
- Contact information: Yanyun Li (yanyun.li@fao.org), Mr. Oscar Rojas (oscar.rojas@fao.org)

### Project 4: FAO Data Lab

- Project Description: The Data Lab developed and implemented a new set of tools in order to assist FAO and all stakeholders in analysing how exactly COVID-19 is affecting food value chains and food security around the world. The tools use open-access resources, are updated daily and are complemented with useful visual representations. This way, raw data are enriched with additional value, consisting in the possibility of sorting information by relevance and carrying out semantic searches, according to the users' needs.
- Project Type/Output: Dataset
- Project Status: Ongoing Programme of work
- Project Start Year: 2019
- Project Domain: Agriculture, Trade, Food and Agricultural Statistics
- Data Source: Internet web scraping of prices' data, sentiment analysis data, social media data, Earth Observation satellite imagery, Government policies
- Publicly Available Data: Yes
- Technology/Platform: R, Jupyter, Python, running on the Google Cloud Platform
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 2 – Zero Hunger; SDG 12 – Responsible Consumption and Production
- Links and Multimedia: https://www.fao.org/datalab/website/web/home
- Contact information: Carola Fabi (Carola.Fabi@fao.org)

### Project 5: Detecting Fall armyworm through user submitted photos (FAMEWS)

- Project Description: Combines an online monitoring platform for mapping data collected by the FAMEWS mobile app whenever fields are scouted, or pheromone traps are checked for FAW. The platform provides a real-time situation overview with maps and analytics of FAW infestations at global, country and sub-country levels. The FAMEWS mobile app enables data collection of scouting data, which can be collected manually or through an image recognition model which provides immediate advice on FAW infestation. The global monitoring platform and the mobile app are designed to expand with the evolving needs of farmers, analysts and decision-makers. Both are accessible for free and are helping to reduce crop yield losses and minimize risk of further introduction and spread of FAW.
- Department/Division: Plant Production and Protection Division (NSP)
- Project Type/Output: Dataset
- Project Status: Ongoing
- Project Start Year: 2019
- Project End Year: 2022
- Project Domain: Agriculture
- Data Sources: Field scouting geo-referenced data, Pheromone traps data, Picture of FAW damage from the field.
- Link to Data:
  - https://app.powerbi.com/view?r=eyJrIjoiZDViYTBkMjctN2IyNi00NWM0LWJkOTUtNTQzN2NiY2NiZWM0IiwidCI6IjE2M2FjNDY4LWFiYjgtNDRkMC04MW

ZkLWQ5ZGIxNWUzYWY5NiIsImMiOjh9&pageName=ReportSection018d4484050280890bb1

- https://data.apps.fao.org/

- Publicly Available Data: Yes
- Technology/Platform: Google AI, TensorFlow
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 2 – Zero Hunger
- Partnership(s)/Collaborator(s):
  - Academia: Penn state University, USA (PlantVillage platform)
- Links and Multimedia:
  - www.fao.org/fall-armyworm/monitoring-tools/en/
  - http://www.fao.org/3/CA1089EN/ca1089en.pdf.
- Lessons Learned:
  - The most important challenge was promoting the adoption of the application and convincing FAO members to share their data.
  - The second challenge was the sustainability of the project as it is difficult to maintain and promotie the system without any financial support.
  - The accuracy of the collected data was also another challenge as it is crowed sourced data.
- Contact information: Maged Elkahky (maged.elkahky@fao.org)

### Project 6: FAO Digital Portfolio (FDP)

- Project Description: The project covers internal efforts to apply machine-learning and natural language processing to transform FAO project related data into global digital trends and insights as well as an organization' wide portfolio of products for reuse and reinvestment in future projects. Current effort is focused on taking FAO project descriptions as inputs and producing the related business and technology thematic areas the projects relate to as outputs.
- Department/Division: Digitalization and Informatics Division (CSI)
- Project Type/Output: Dataset
- Project Status: Ongoing
- Project Start Year: 2016
- Project End Year: 2025
- Project Domain: Agriculture, Business process improvement
- Data Source: FAO Project data including project metadata.
- Publicly Available Data: No
- Technology/Platform: Microsoft Power Platform, Azure, Python, Google Cloud Platform
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 2 – Zero Hunger
- Contact information: Paul Whimpenny (paul.whimpenny@fao.org); Sergio Bogazzi (sergio.bogazzi@fao.org)

### Project 7: iSharkFin (Identifying shark species from a picture of the fin)

- Project Description: iSharkFin is an expert system that uses machine learning techniques to identify shark species from shark fin shapes. Aimed at port inspectors, custom agents, fish traders and other users without formal taxonomic training, iSharkFin allows the identification of shark species from a picture of the fin. The iSharkFin follows an interactive process. Users only need to take a standard photo, select some characteristics of a fin and choose a few points on the fin shape; iSharkFin will then automatically analyze the information and identify the shark species from which the fin comes.
- Project Type/Output: Academic paper, Software tool
- Project Status: Completed
- Project Start Year: 2014
- Project End Year: 2019
- Project Domain: Agriculture
- Data Source: Database of images of shark fins
- Publicly Available Data: No
- Technology/Platform: The software is a net based Windows-desktop application that ships with a small SQLite data base information of shark species. The iSharkFin algorithm is built on a decision tree, that despite being one of the oldest methods in machine learning, is accurate and recommended before trying any more complex learning algorithm.
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 14 – Life Below Water
- Partnership(s)/Collaborator(s):
    - UN Partners: Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
    - Government: Government of Japan, National Oceanographic and Atmospheric Administration of the United States of America
    - Academia: University of Vigo (Spain)
- Links and Multimedia:
    - https://www.fao.org/ipoa-sharks/tools/software/isharkfin/en/
- Lessons Learned: From our experience with the shark fin ID identification tools, the proper photo collection and the number of training images represented the main impediment to the use of more complex algorithms.
- Contact information: Kim Friedman (Kim.Friedman@fao.org)

### Project 8: WaPOR (Water Productivity through Open access of Remotely sensed derived data)

- Project Description: WaPOR is FAO's portal to monitor Water Productivity through Open-access of Remotely sensed derived data. It assists countries in monitoring water productivity, identifying water productivity gaps, proposing solutions to reduce these gaps and contributing to a sustainable increase of agricultural production. At the same time, it considers ecosystems and the equitable use of water resources, which should lead eventually to an overall reduction of water stress. The WaPOR portal provides open access to key land and water variables (including reference and actual evapotranspiration, biomass, land cover, precipitation) in near – real time for the whole of Africa and the Near East, from 2009 to date, at a spatial resolution ranging between 30 and 250 meters.
- Project Type/Output: Dataset, Software tool
- Project Status: Ongoing

- Project Start Year: 2016
- Project End Year: 2025
- Project Domain: Agriculture
- Data Source: Geospatial Database with remote sensing data input. The database is publicly accessible, developed with open access data and open-source algorithms. It provides near real time information from 2009 to date.
- Publicly Available Data: Yes
- Technology/Platform: Google Cloud services, Python, Jupyter
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 2 – Zero Hunger; SDG 6 – Clean Water and Sanitation; SDG 13 – Climate Action
- Partnership(s)/Collaborator(s):
    - Government: Ministry of Foreign Affairs of the Netherlands
    - Private Sector: FRAME Consortium (eLEAF, VITO)
    - Civil Society: not for profit organizations in several project countries
    - Academia: IHE Delft, ITC Twente
- Links and Multimedia:
    - https://www.fao.org/in-action/remote-sensing-for-water-productivity/en/
    - https://wapor.apps.fao.org/
    - https://www.youtube.com/watch?v=ZX7SOhk97hA
    - https://www.youtube.com/watch?v=gA_t4HuFNhM
- Contact information: Livia Peiser (Livia.Peiser@fao.org), Jippe Hoogeveen (Jippe.Hoogeveen@fao.org)

## 2. Related Sustainable Development Goals

SDG 1, 2, 6, 12, 13, 14

## 3. Relevant Links

https://www.fao.org/home/en

Contact Information

CSI-Director (CSI-Director@fao.org)

# International Atomic Energy Agency

## 1. Description of Activities on AI

### Project 1: Artificial Intelligence for Accelerating Nuclear Applications, Science and Technology, Non-serial Publications, IAEA, Vienna (2022)

- Project Description: This publication provides a review of the current state of the art, and outlines challenges and identifies opportunities for accelerating nuclear applications, science and technology with AI. After the introduction and background information on AI and its use in the nuclear field, Chapter 2 provides a summary of the ethics of AI and nuclear technologies and of the use of AI in nuclear applications, science, power, radiation protection, security and safeguards verification.

  State of the art, priorities for future AI activities in the nuclear field and the IAEA's role to support their implementation are presented in the following Chapters. Chapter 3 addresses the ethical impact of the convergence of AI and nuclear technologies. Chapters 4–12 focus on the applications of AI in nuclear fields corresponding to IAEA's areas of work, including human health, food and agriculture, water and environment, nuclear data, nuclear physics, fusion, nuclear power, nuclear security and safeguards verification.
- Project Status: Completed
- Project Domain: Agriculture, Environment, Energy, Health, and Nuclear Science, Technology and Applications
- Related Sustainable Development Goals (SDGs): SDG 2 – No Hunger; SDG 3 – Good Health and Well-Being; SDG 6 – Clean Water and Sanitation; SDG 7 – Affordable and Clean Energy; SDG 9 – Industry, Innovation, and Infrastructure; SDG 13 – Climate Action; SDG 15 – Life on Land; SDG 16 – Peace, Justice and Strong Institutions; SDG 17 – Partnerships for the Goals
- Links and Multimedia:
  - *INTERNATIONAL ATOMIC ENERGY AGENCY, Artificial Intelligence for Accelerating Nuclear Applications, Science and Technology, Non-serial Publications, IAEA, Vienna (2022),* https://www.iaea.org/publications/15198/artificial-intelligence-for-accelerating-nuclear-applications-science-and-technology
- Contact information: Matteo Barbarino (m.barbarino@iaea.org)

### Project 2: AI for Atoms – the IAEA's knowledge-sharing platform for partnership on AI applications in the nuclear field

- Project Description: The IAEA provides interdisciplinary fora for professionals to discuss and foster collaboration on the use of AI in nuclear applications, science and technology and is committed to sharing knowledge and forging partnerships through its AI for Atoms platform. As part of this initiative, the IAEA cooperates with the International Telecommunication Union, the UN Interagency Working Group on AI and almost 40 other UN organizations to provide a solid foundation for accelerated sustainable development

with AI. The AI for Atoms platform provides information on the IAEA's activities on AI, featuring all related initiatives, news, publications and events.

- Project Status: Ongoing
- Project Domain: Agriculture, Environment, Energy, Health, and Nuclear Science, Technology and Applications
- Related Sustainable Development Goals (SDGs): SDG 2 – No Hunger; SDG 3 – Good Health and Well-Being; SDG 6 – Clean Water and Sanitation; SDG 7 – Affordable and Clean Energy; SDG 9 – Industry, Innovation, and Infrastructure; SDG 13 – Climate Action; SDG 15 – Life on Land; SDG 17 – Partnerships for the Goals
- Links and Multimedia:
  - *AI for Atoms:* https://nucleus-new.iaea.org/sites/ai4atoms/
  - *AI for Atoms| AI for Good webinars*: https://www.youtube.com/watch?v=pG6G1M4WfdM
- Contact information: ai4atoms@iaea.org

### Project 3: Ethics of Nuclear and AI Applications

- Project Description: With its potential to accelerate reaching the Sustainable Development Goals by 2030, the use of AI can also benefit the peaceful uses and applications of nuclear technology in different sectors, including human health, food production, water management and environmental protection.

  However, the convergence of AI and nuclear technologies could exacerbate existing ethical concerns in the disciplines as well as give rise to new concerns at their interface. Because both disciplines deal with risk and uncertainty and hold huge potential for both benefit and possible harm, there is a need for promoting awareness among practitioners about the ethical impact of the convergence of AI and nuclear science, technology, and applications, while creating mechanisms for robust dialogue with stakeholders.

  This project intends to explore path forward to an international and multi-stakeholder cooperation aimed at societally accepted and ethically informed decision-making on the use of AI tailored for the nuclear field.
- Project Status: Development
- Project Domain: Ethics of Nuclear and AI Applications
- Related Sustainable Development Goals (SDGs): SDG 17 – Partnerships for the Goals
- Contact information: Matteo Barbarino (m.barbarino@iaea.org)

### Project 4: AI for Fusion – accelerating fusion R&D with AI, through the creation of a platform and cross-community network for innovation and partnership

- Project Description: The IAEA has launched a 5-years Coordinated Research Project (CRP) on AI for Accelerating Fusion R&D (2022–2027) with the objective of accelerating fusion R&D with machine learning and AI, through the creation of a platform and cross-community network for innovation and partnership. The project will feature four work packages. These are:
  - **Real-time Magnetic Fusion Energy (MFE) System Behaviour Prediction, Identification & Optimization Using ML/AI Methods**: To accelerate fusion R&D by establishing a multi-machine database of experimental and simulation MFE data (adhering to FAIR/Open Science principles) for ML/AI-driven applications, and through increased access to knowledge and information of ML/AI methods for MFE.
  - **Inertial Fusion Energy (IFE) Physics Understanding through Simulation, Theory and Experiment Using ML/AI Methods**: To accelerate fusion R&D by establishing a

database of experimental and simulation IFE data (adhering to FAIR/Open Science principles) for ML/AI-driven applications, and through increased access to knowledge and information of ML/AI methods for IFE.

- **Feasibility of Magnetic Fusion and Inertial Fusion Image Database**: To determine the feasibility of an image database from MFE and IFE data (adhering to FAIR/Open Science principles) for ML/AI-driven applications with potential to accelerate fusion R&D.
- **Community Engagement & Workforce Development**: To accelerate community engagement and capacity building, as well as create and provide with access to knowledge and information in the area of ML/AI methods applied to fusion R&D.

IAEA CRPs support studies that are designed to lead to new knowledge and technologies, as well as adaptation of technologies and sharing of research results relevant to the development and the practical application of atomic energy for peaceful purposes. Participation is open to all IAEA Member States. Each CRP generally consists of 15–25 institutes that work in coordination for 3–5 years to acquire and disseminate new knowledge while also attending periodic meetings. The research takes place at participating institutes that have been selected in the CRP's research, technical and doctoral contracts, and research agreements.

For each contract or agreement, one institute staff member is designated as the responsible for the progress of the research work. The IAEA acts as the sponsoring and coordinating body, with an IAEA technical staff member assigned to lead each CRP as the project officer.

- Project Status: Ongoing
- Project Domain: Fusion Science
- Related Sustainable Development Goals (SDGs): SDG 9 – Industry, Innovation and Infrastructure
- Links and Multimedia:
  - *AI for Fusion*: https://nucleus.iaea.org/sites/ai4atoms/ai4fusion
  - *Towards fusion energy with the help of AI | AI for Good webinars*: https://www.youtube.com/watch?v=hjYWUPjsJ6k
- Contact information: Matteo Barbarino (m.barbarino@iaea.org)

### Project 5: AI to Assess Climate Impact on Global Lakes

- Project Description: Global warming is considered a major threat to Earth's lakes water budgets and quality. However, flow regulation, over-exploitation, lack of hydrological data, and disparate evaluation methods hamper comparative global estimates of lake vulnerability to evaporation. The stable isotope composition of 1,257 global lakes was analyzed using Artificial Intelligence techniques. It was found that in most of the lakes, this depends on precipitation and groundwater recharge subsequently altered by catchment and lake evaporation processes. Isotope mass-balance modelling shows that ca. 20 % of water inflow in global lakes is lost through evaporation and ca. 10 % of lakes in arid and temperate zones experience extreme evaporative losses >40 % of the total inflow. Precipitation amount, limpidity, wind speed, relative humidity, and solar radiation are predominant controls on lake isotope composition and evaporation, regardless of the climatic zone. The promotion of systematic global isotopic monitoring of Earth's lakes provides a direct and comparative approach to detect the impacts of climatic and catchment-scale changes on water-balance and evaporation trends. This project aims to establish a global network of isotopes in lakes (GNIL) to improve our

AI-based assessments. Current activities include the design of the database, the selection of variables and the assessment of global coverage. Stable water isotope assays provide a low-cost effective tool to study lake-catchment changes with regards to sample collection and analysis. Additionally, stable isotope data from lakes is fully comparative globally, thereby providing a competitive advantage under the current scenario of different international methods and approaches that are not easy to compare in time and scale and which result in the current lack of the comparable data for lakes and catchments.

- Project Status: Ongoing
- Project Domain: Environment, Water Resource Management
- Data Source: Satellite open-source data on climate, hydrology and lakes parameters and stable water isotopes data in global lakes. Link to data: *The data can be obtained by request at* https://nucleus-new.iaea.org/sites/ihn/Pages/GNIR.aspx.
- Technology/Platform: R programming, Isotope Hydrology Collaboration Platform
- Related Sustainable Development Goals (SDGs): SDG 6 – Clean Water and Sanitation, SDG 13 - Climate Action
- Contact information: Yuliya Vystavna (y.vystavna@iaea.org), Astrid Harjung (a.harjung@iaea.org)

### Project 6: Working Group on AI for Water and Environment

- Project Description: The Working Group (WG) on AI for Water and Environment – established in connection with the IAEA Technical Meeting on AI for Nuclear Technology and Application (2021) – aimed to promote and enable the use of isotopic techniques with AI tools for better management of water and environmental resources, as well as adaptation to climate change worldwide. Recognizing that with the increasing availability of data from satellites, unmanned airborne vehicles and sensor networks, there is a myriad of data available to couple and explore in conjunction with the IAEA's global isotope databases.

  The WG is a platform for scientists working with AI tools at the interface of isotope hydrology, water resources protection and management. This facilitates sharing of experiences in the use of machine and deep learning for hydrological and environmental modelling, challenges, and research opportunities to move forward. The WG aims to find synergies between isotope techniques, high-frequency or remote sensing, open-source resources, and AI to show how these can help inform policies to mitigate the world's water problems. Besides exchanging knowledge on current developments in the area that feed into research activities of the isotope hydrology section, the WG is working on a review paper to be submitted to a hydrological journal that showcases different applications of AI in isotope hydrology. In this paper, the WG intends to explore what role machine learning and big data can play in the advancement of isotope hydrology.
- Project Status: Ongoing
- Project Domain: Environment
- Technology/Platform: R programming
- Related Sustainable Development Goals (SDGs) SDG 6 – Clean Water and Sanitation, SDG 13 - Climate Action
- Contact information: Astrid Harjung (a.harjung@iaea.org), Yuliya Vystavna (y.vystavna@iaea.org)

### Project 7: AI Assistance for Non-Destructive Testing in Disaster Management

- Project Description: Over the past few decades, the world has witnessed many natural and man-made disasters such as earthquakes and explosions with varying degrees of destruction and attendant loss of lives. The enormous effect of these disasters on civil engineering structures constitutes the impetus for the deployment of Non-Destructive Testing (NDT) in the mitigation, preparedness, response and recovery stages of the

disaster management cycle. Recognising the potential of AI to assist NDT by improving testing accuracy, speed of both inspection and data processing, and reliability and facilitate the interpretation of disaster management results coupled with the need for the NDT emergency response centre to assist IAEA Member States in the event of a disaster, a Technical Meeting is being planned to bring together experts in this field to discuss and define areas of focus for action.

- Project Status: Development
- Project Domain: Industry and environment
- Related Sustainable Development Goals (SDGs): SDG 9 – Industry, Innovation and Infrastructure; SDG 11 – Sustainable Cities and Communities
- Contact information: Hannah Asamoah Affum (h.affum@iaea.org)

### Project 8: Working Group on AI for Human Health

- Project Description: The Working Group on AI for Human Health (WG-AI4HH) – established in connection with the IAEA Technical Meeting on AI for Nuclear Technology and Applications– focuses on possible approaches to the use of AI in specific human health domains. The WG-AI4HH is working on identifying the current and future support that should be provided to Member States in the field of AI applied to radiation oncology, nuclear medicine, medical imaging, medical physics and nuclear nutrition assessment. The potential and challenges of AI are investigated to ensure an informed, safe, ethically responsible and meaningful use of AI-based tools in the clinical environment. The working group is aware that quality of data and their curation is also fundamental to obtain reliable AI applications. Furthermore, the WG-AI4HH is monitoring trends of AI in health education to be eventually considered for education/training activities in the future. Furthermore, a new IAEA publication describing roles and responsibilities of, as well as educational and training needs for medical physicists using AI is being prepared.
- Project Status: Ongoing
- Project Domain: Health
- Related Sustainable Development Goals (SDGs): SDG 3 – Good Health and Well-Being
- Contact information: Yaroslav Pynda (y.pynda@iaea.org)

### Project 9: AI-assisted Contouring Skills in Radiotherapy

- Project Description: The IAEA is conducting a Coordinated Research Project on The Potential of E-learning Interventions for AI-assisted Contouring Skills in Radiotherapy (CRP E33046). The objective of the project is to investigate changes in inter-observer variation and bias after e-learning in delineation guidelines and the use of deep learning-based auto-segmentation of organs-at-risk in head-and-neck cancer. In recent years, AI-algorithms, namely deep learning-based algorithms, have improved auto-segmentation drastically. It is believed that AI-tools lower variation and increase the accuracy and compliance of plans, which improves the chance of cure. AI-tools may also make care more cost effective by reducing the human capacity required, which is important in our overstretched health systems. A wide palette of commercial deep learning-based auto-segmentation solutions are emerging with the promise of leveraging the aforementioned benefits. The selection and contouring of target volumes and organs-at-risk has become a key step in modern radiation oncology. Concepts and terms for definition of gross tumour volume, clinical target volume and organs at risk have been continuously evolving (e.g., through International Commission on Radiation Units and Measurements (ICRU) reports 50, 62, 78, 83) and have become widely disseminated and accepted by the European and international radiation oncology community. 102 participants from 23 IAEA Member States from 24 radiotherapy centers are taking part in the project.
- Project Status: Ongoing
- Project Domain: Health

- Related Sustainable Development Goals (SDGs): SDG 3 – Good Health and Well-Being
- Contact information: Kamal Akbarov (k.akbarov@iaea.org)

### Project 10: AI to Support Remediation of Radioactive Contamination in Agriculture

- Project Description: Remediation of radioactive contamination of farmland requires accurate soil data. In case of nuclear emergencies affecting food and agriculture, exchangeable potassium (Kex.) plays a major role. As potassium competes with radiocaesium in soil-to-plant transfer, it can help reduce the crop uptake of this major fallout radionuclide. Information on potassium content in the soil is essential for optimizing remediation of radioactive contamination. Through the international research network under the IAEA funded Coordinated Research Project D1.50.19 on '"Remediation of Radioactive Contaminated Agricultural Land", the Joint FAO/IAEA Centre of Nuclear Techniques in Food and Agriculture investigated how to predict exchangeable potassium in soil through Mid-Infrared Spectroscopy and Artificial Intelligence. In our study, which was finalized this year and is expected to be published soon, we show how this can be now achieved using a Convolutional Neural Network (CNN) model trained on a large Mid-Infrared (MIR) soil spectral library (40000 samples Kex determined with 1M NH4OAc, pH 7), compiled by the National Soil Survey Center of the United States Department of Agriculture. Using Partial Least Squares Regression as a baseline, we found that our implemented CNN leads to a significantly higher prediction performance of Kex. when a large amount of data is available (10000), increasing the coefficient of determination from 0.64 to 0.79, and reducing the Mean Absolute Percentage Error from 135% to 31%. Furthermore, in order to provide end-users with required interpretive keys, we implemented the GradientShap algorithm to identify the spectral regions considered important by the model for predicting Kex. Used in the context of the implemented CNN on various Soil Taxonomy Orders, it allowed (i) to relate the important spectral features to domain knowledge and (ii) to demonstrate that including all Soil Taxonomy Orders in CNN-based modeling is beneficial as spectral features learned can be reused across different, sometimes underrepresented soil orders.
- Project Status: Completed
- Project Domain: Food and Agriculture
- Related Sustainable Development Goals (SDGs): SDG 2 – Zero Hunger, SDG 3 – Good Health and Well-Being
- Contact information: Simon Kelly (s.kelly@iaea.org), Gerd Dercon (g.dercon@iaea.org)

### Project 11: AI to Assess and Use Marine Environmental Radioactivity

- Project Description: Levels of radionuclides in the marine environment can be influenced by a range of manmade inputs (e.g., nuclear accidents and authorised discharges from nuclear fuel cycle facilities), underlying biogeochemical conditions, and other dynamic such as climate change and sea level rise. On the other hand, the presence of radionuclides – both natural and artificial – in the marine environment offers a wealth of possibilities for the application of radiotracers for quantification of climate and ocean change. The IAEA Marine Radioactivity Information System (MARIS) has been maintained for many years to provide data underpinning related monitoring and research activities. MARIS is currently being redeveloped in order to offer improved support and possibilities to its user community, including for AI and ML applications. The planned improvements include adoption of Open Science principles, data management according to FAIR and/or GEO principles, improved API access and adoption of netCDF and related technologies, with all associated improvements in metadata provision and opening of access to a rich range of tools for accessing, analysing and visualizing data. The overall aim is to promote data re-use and to facilitate Open Science. Specifically for AI we foresee a range of possibilities incorporating marine modelling for prediction of inter alia transport, dispersion and settling rates for future and sparsely observed scenarios; visualisation of radionuclide

levels in four dimensions; time series analysis; improved radiotracer applications and reanalyses using combined datasets.

- Project Status: Ongoing
- Project Domain: Marine Environment, Climate and Ocean Change, Emergency Preparedness and Response, Radiological Environmental Impact Assessment
- Data Source: IAEA Marine Radioactivity Information System https://maris.iaea.org/
- Related Sustainable Development Goals (SDGs): SDG 14 – Life Below Water; SDG 13– Climate Action
- Contact information: Paul McGinnity (p.mc-ginnity@iaea.org)

### Project 12: Working Group on AI for Nuclear Power

- Project Description: The Working Group on AI for Nuclear Power – established in connection with the IAEA Technical Meeting on AI for Nuclear Technology and Application (2021) – aims at discussing the potential applications of AI, as well as the main opportunities for AI to have positive impact on the nuclear power industry. A wide range of applications of AI and machine learning were summarized in the technical report from the AI nuclear power working group meeting, held in October 2021. The advancements and applications in AI are expected across the spectrum of nuclear power project lifecycle, including R&D, engineering, construction, operation and maintenance (O&M) and decommissioning.

  During a Consultancy Meeting (2022), members of the Working Group and other experts, including representatives from regulators from two IAEA Member States, discussed the utilization of AI in nuclear power plants (NPPs) in operation today as well as designs being considered in the future. Focusing on operating plants, it emphasizes the desired context of existing design control, O&M, regulatory frameworks, processes and procedures. The aim would be to understand technological challenges, knowledge gaps, and resources required via collaborative effort among Member States, enabling development, demonstration, and application of explainable artificial intelligence (XAI) technologies in the current and future nuclear reactors, advancing the level of autonomy and plant modernization.

  Several challenges with respect to deployment were also identified. Observations associated with technological challenges, knowledge gaps, and resources requirements were collected for IAEA with the objective of accelerating progress, including both R&D phase as well as the transition from R&D to deployment. Based on these observations, a set of recommendations are developed as path forward. The working group serves as an effective platform to share these ideas and put forth the vision for possible activities in the area of AI for nuclear power.

  A Technical Meeting on AI and Its Recent and Near-term Deployment in Operating NPPs is being planned for 16–19 May 2023, Vienna, Austria, with the purpose of gathering and sharing Member States experience related to plans for near-term deployment of AI solutions in operating NPPs. The event is also expected to gather experience from solutions already being used at operating plants in the nuclear power sector.
- Project Status: Ongoing
- Project Domain: Energy
- Related Sustainable Development Goals (SDGs): SDG 7 – Affordable and Clean Energy; SDG 9 – Industry, Innovation, and Infrastructure; SDG 13 – Climate Action
- Links and Multimedia:
  - *IAEA Coordinated Research Project I31034 on Advancing the State-of-Practice in Uncertainty and Sensitivity Methodologies for Severe Accident Analysis in Water Cooled Reactors (2022–2026):* https://www.iaea.org/projects/crp/i31034

- Contact information: Tatjana Jevremovic (t.jevremovic@iaea.org), Nelly Ngoy Kubelwa (n.ngoy-kubelwa@iaea.org)

### Project 13: IAEA Technical Meeting on the Safety Implications of the Use of AI in Nuclear Power Plant

- Project Description: The purpose of the event is to collect current experiences in Member States on the use and application of AI techniques to support different aspects of the design, safety assessment and operation of Nuclear Power Plants; and to understand challenges related to safety demonstration and justification of AI applications. Ultimately, the information will be used to plan future work to develop and/or update IAEA guidance on AI.

  Further objectives of the event are:

  - To understand the regulatory approaches and challenges when evaluating AI applications.
  - To explore how the IAEA safety standards for design safety are or would be used for different AI applications. For example, independence between safety and non-safety control signals for the autonomous control system, software verification and validation for the AI-based safety-critical system, and human factors engineering guidelines for the operator support system.
  - To provide a common understanding of the safety implications of each type of AI application from the design phase to the operation phase of a nuclear power plant.

- Project Status: Development
- Project Domain: Nuclear Safety
- Related Sustainable Development Goals (SDGs): SDG 7 – Affordable and Clean Energy; SDG 9 – Industry, Innovation, and Infrastructure; SDG 13 – Climate Action
- Contact information: Yun Goo KIM (y.g.kim@iaea.org), Jorge Luis Hernandez (j.luis-hernandez@iaea.org)

### Project 14: Working Group on AI for Nuclear Security

- Project Description: A Working Group (WG) on Artificial Intelligence for Nuclear Security (AI4NS) – established in connection with the IAEA Technical Meeting on AI for Nuclear Technology and Application (2021) – discussed AI across different areas of nuclear security, including cyber and information security, forensics, detection, material security, and insider threats. During the WG sessions, 16 IAEA Member State experts led discussions on present uses and future opportunities for AI and related technology for nuclear security. The experts shared challenges, observations, and lessons learned in developing, using, and regulating AI technology; and discussed potential risks introduced or reintroduced by the use of AI techniques and technology. The need for more collaboration, investigation, and information exchange on the positive and negative impact and implications of AI in nuclear security was identified.

  The WG on AI4NS sessions were dedicated to the following thematic areas: anomaly detection; data analysis (flow, sensor, image); data integration; data management; defensive computer security (network) architecture; internet of things – cloud services; information protection; performance assessment; systems design analysis; threat analysis; training; vulnerability management; and adversarial AI.

  Expected outcomes and potential future work resulting from the WG on AI4NS sessions were:

  - Enable the exchange of information to support a common understanding of the design, implementation, and functionality of AI approaches while assuring they do not affect the capacity to provide adequate nuclear security.
  - Support Coordinated Research Projects to conduct research into specific AI applications for Member State identified Nuclear Security topical areas to understand issues with use, limitations, benefits, and vulnerabilities, and generate information/data for information exchange;
  - Demonstrate the impact of AI technologies to support resource efficiency within national nuclear security regimes;
  - Develop guidance on terminology and developing, training, testing, implementing, and regulating AI capabilities for nuclear security purposes;
  - Increase confidence in the utilization of AI technologies within Nuclear Security functions through a graded approach that supports defence in depth.

- As a result of the inputs received from the WG on AI4NS, the IAEA has actively sought the involvement of member institutes in the Coordinated Research Project (CRP) J02015 Facilitation of Safe and Secure Trade Using Nuclear Detection Technology; CRP J02017 Enhancing Computer Security for Radiation Detection Systems; the planned CRP on Nuclear Security Applications of Uncrewed Aerial, Ground, and Maritime Systems; a potential CRP on Applications of Artificial Intelligence and Machine Learning for Enhancing Radiation Detection and Physical Protection Systems and the scheduled 2023 Technical Meeting on Performance Testing and Specification of Spectroscopic and Energy Discrimination Algorithms Used for Nuclear Security.
- Project Status: Ongoing
- Project Domain: Nuclear Security, Cyber Security, Infrastructure, Data
- Related Sustainable Development Goals (SDGs): SDG 9 – Industry, Innovation, and Infrastructure
- Links and Multimedia:
  - *IAEA NUSEC for WG on AI4NS materials:* https://nusec.iaea.org/portal/ (also https://www.iaea.org/resources/databases/nusec)
- Contact information: Charles Massey (c.massey@iaea.org)

### Project 15: AI-Assisted Processing of Safeguards-relevant Information

- Project Description: The collection and evaluation of all safeguards-relevant information is one of the fundamental processes of safeguards implementations for the IAEA. The rapid increase in availability of large amounts of data and media types calls for new approaches to assist analysts in spotting "the signal in the noise". The following ongoing projects leverage unstructured data and latest deep learning technologies to further increase effectiveness and efficiency in safeguards processes:
  - **Computer-Assisted Ranking of Open Source Documents:** Modern Natural Language Processing (NLP) algorithms can assist the review and discovery of relevant open source information including science & technology publications and news articles by considering semantical and contextual information and therefore overcome the limitations of keyword-based searches. Results from proof of concepts demonstrated the potential to substantially reduce the workload of open source analysts and subject matter experts. An additional classification model categorizes documents based on technologies related to the nuclear fuel cycle to facilitate the consistency analysis

between validated open-source information and declared information and to support the assessment of the nuclear capabilities of a state.

- **Computer-Assisted Review of State Declarations in the Additional Protocol based on Textual Data:** The yearly review of Additional Protocol declarations involves a high degree of manual work, which can be assisted by modern NLP algorithms. The current proof of concept focuses on unstructured textual data, aiming to highlight new declared research activities, assist in the prioritization the verification of the provided stages of the nuclear fuel cycle, identify new collaborations between states and categorize research activities in order to support consistency checks with other safeguards-relevant information.
- **Computer-Assisted Review of State Declarations in the Additional Protocol based on Satellite Images:** The review of declarations involves many manual tasks to verify the consistency between state-declared information and other sources, including satellite imagery. To assess declarations completeness, a high number of facilities must be reviewed manually, e.g., to detect safeguards-relevant changes in facilities. A conducted proof of concept demonstrated that modern deep learning-based models are capable of detecting buildings in satellite images. The work is now extended to rank potential changes on nuclear sites.

- Project Status: Ongoing
- Project Domain: Safeguards Verification
- Data Source: For text-based applications internally collected documents are used, documents available in the International Nuclear Information System (INIS) repository, as well as externally available sources for science and technology publications or news articles. AI projects on satellite images use remote sensing data from various satellite imagery sources.
- Technology/Platform: Python is used as the main programming. NLP tasks are based on pre-trained BERT-based models, supervised and unsupervised machine learning methods. Deep learning applications on satellite images use convolutional neural networks (e.g., U-Net) and transformer-based neural networks. For model training and inference GPU hardware resources are available.
- Related Sustainable Development Goals (SDGs): SDG 16 – Peace, Justice and Strong Institutions
- Contact information: Paul Schneeweiss (p.schneeweiss@iaea.org)

### Project 16: Working Group on AI for Safeguards Verification

- Project Description: The Working Group on Artificial Intelligence for Safeguards Verification – established in connection with the IAEA Technical Meeting on Artificial Intelligence (AI) for Nuclear Technology and Application – focused on two different applications of AI in safeguards activities: verification of spent fuel and video surveillance. Using AI for spent fuel verification is extremely relevant to safeguards due to growing inventory of fissile material. Gamma spectroscopy and Cerenkov imaging data are utilized and numerical simulations supply training and test datasets for the models. These AI algorithms are interpretable and can be justified with physics. The accuracy for AI methods in spent fuel verification is sometimes on par with traditional instruments; however, the technology is not yet mature enough to make autonomous decisions.

  Implementing AI for video surveillance could allow for large productivity gains in safeguards. Surveillance is challenging and time-consuming and AI could help with these issues. Data is acquired from similar facilities under surveillance and from simulations/digital twins. Algorithms can be used for many different applications including object detection, object tracking, anomaly detection, and processing of open-source data.

Because of the consequences of missed events, improvements are needed to penalize false negatives.

- Project Status: Completed
- Project Domain: Safeguards Verification
- Data Source: For spent fuel verification, gamma spectroscopy and Cerenkov imaging data were used. Numerical simulations provided the training and test datasets. For surveillance, images and videos obtained from facilities under surveillance and from simulations or digital twins were used for AI training.
- Technology/Platform: Various environments/toolsets were discussed during the working group including Python.
- Related Sustainable Development Goals (SDGs): SDG 9 – Industry, Innovation, and Infrastructure and SDG 17 – Partnerships for the Goals
- Contact information: Dimitri Finker (d.finker@iaea.org)

## 2. Related Sustainable Development Goals

SDGs 2, 3, 6, 7, 9, 13, 15, 17

## 3. Relevant Links

https://www.iaea.org/

https://nucleus.iaea.org/sites/ai4atoms

Contact Information

Matteo Barbarino (m.barbarino@iaea.org)

# International Fund for Agricultural Development (IFAD)


## 1. Description of Activities on AI

### Project: Athena: Leveraging Artificial Intelligence and Big Data for IFAD 2.0

- Project Description: The ATHENA project seeks to unlock the potential of artificial intelligence and machine learning to accelerate knowledge generation and strengthen data-driven decision-making in IFAD. The project developed an AI toolbox with three main objectives: (1) systemize IFAD's portfolio to facilitate results measurement and institutional learning, (2) enhance knowledge management through deployment of AI/ML in IFAD ICT systems to make project results and lessons learned accessible and actionable for staff, and (3) predict performance and impact of IFAD projects to inform decision-making, optimize targeting, and maximize impact. The (AI) "tool box" contains:

    - *AI-based Intervention Dashboard*: a searchable dashboard that classifies IFAD's investment portfolio by project features, including interventions, outcomes, animal and plant products, among others using natural language processing (NLP);
    - *Lessons Learned Web App*: an application to search for relevant "lessons learned" as reported in previous projects to inform new designs reports;
    - *Trend analyses of strategic themes*: historical evidence of activities related to strategic topics, such as SDGs, food systems and ICT4D, to understand IFAD's support and allocation of resources to different activities historically;
    - *Project performance prediction model*: a framework for ex-ante prediction of project performance based on a set of project features to facilitate better design and early action throughout project implementation;
    - *Project impact prediction model*: a framework to predict the probability of a positive impact of IFAD-supported interventions using impact evaluation data;
    - *Project targeting optimization model*: framework and tool to identify beneficiary features to maximize project impact; and
    - *Covid-19 impact prediction model*: model to predict impact of the pandemic in IFAD's beneficiary countries.

    The tools developed by the project fill a gap within IFAD and the field by aiding and simplifying IFAD reporting, especially for more complex and data hungry thematic areas (i.e. food systems); leveraging under-utilized data resources, namely textual data buried in project reports; and enabling ex-ante data driven design and decision-making by closing the gap between policymakers and project evaluation and by translating data and project insights into actionable metrics. Together, these tools not only enhance IFAD's knowledge

management but also embed learning and data-driven decision-making into existing project design and implementation processes

- Department/Division: Programme Management Department (PMD)
- Project Type/Output: Report, Academic paper, Dataset, Seminar/meeting, Software tool
- Project Status: Complete
- Project Start Year: 2019
- Project End Year: 2021 (Projected)
- Project Domain: Agriculture, Poverty
- Data Source:
    - AI-based Intervention Dashboard: Corporate IFAD data on the investment portfolio (financing, sectors, and project type) and textual data from project reports
    - Lessons Learned App: Textual data from project reports
    - Trend analyses of strategic themes: Corporate IFAD data on the investment portfolio (financing, sectors, and project type) and textual data from project reports
    - Project performance prediction model: Corporate data on project performance ratings at design, during implementation, and at completion, corporate financing data and project features, and external open-source data on country-specific risk factors and characteristics from World Bank (WDI), IMF (WEO), and other sources.
    - Project impact prediction model: Household survey data from IFAD impact assessments
    - Covid-19 impact prediction model: Google Mobility data, Google Trends data, John Hopkins Coronavirus Resource Center data, and INFORM Covid- 19 risk data, containing data on movement and search prevalence as well as actual reported Covid-19 incidence and risk factors.
- Publicly Available Data: No
- Technology/Platform:
    - AI-based Intervention Dashboard: Python, AWS Elasticsearch & Kibana
    - Lessons Learned App: R Shiny
    - Trend analyses of strategic themes: Python, R
    - Project performance prediction model: Stata, R
    - Project impact prediction model: Stata, Python
    - Covid-19 impact prediction model: Python, R
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): All SDGs
- Partnership(s)/Collaborator(s):
    - Academia: several consultants from various academic institutions contributed to the project over the two years of its implementation. Please refer to the acknowledgments sections in the final reports.
- Links and Multimedia:
    - Phase 1 Report: https://www.ifad.org/en/web/knowledge/-/publication/accelerating-knowledge-generation-for-data-driven-decision-making

  - Phase 2 Report: https://www.ifad.org/en/web/knowledge/-/leveraging-artificial-intelligence-and-big-data-for-ifad-2.0-phase-2?p_l_back_url=%2Fen%2Fweb%2Fknowledge%2Fpublications

- Lessons Learned:
  - **Open-Source AI/ML**: Open- Source AI/ML and code transparency are essential elements that ensure that dashboards and apps can be updated in a real time fashion, when new data comes in as well as integrated with the organization's data ecosystem.
  - **Human element to improve algorithmic performance**: the human element is essential to improve the accuracy of algorithmic performance and overall quality of the models. In the case of the AI-based intervention dashboard, IFAD staff and domain experts have provided accurate taxonomies and training datasets that have fed the models, producing classifications that are "realistic".
  - **The complexity of IFAD project documentation** is a key challenge for models that require standardized data. Not only are project reports written in four different languages, but they also vary in format and length. Data processing requires the development of multi-lingual algorithms and sensitive data filtration strategies to ensure relevant text is extracted for analysis.
  - **Integration with existing ICT systems and business model**: Sustainable and sustained AI/ML and "big data" use cases require appropriate data repositories, server space, and secure data storage within the business model.
  - **Institutional buy-in and support for innovation**: Support and buy-in from key actors and a willingness to experiment is crucial to the successful adoption and integration of new data-driven tools for decision-making.
  - The next steps would include the following activities: users' validation and scaling-up of the algorithms and tools generated so that they can be integrated in existing IFAD systems (for automated reporting and briefs). Additionally, future phases of the project would also foresee additional work to explore and validate the prediction models by leveraging additional data sources and integrating additional cost data to predict return on investments.
- Contact Information: Alessandra Garbero, Phd., Lead Regional Economist, Near East, North Africa, Europe and Central Asia Division (NEN) (a.garbero@ifad.org)

## 2. Related Sustainable Development Goals

SDG 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17

## 3. Relevant Links

https://www.ifad.org/en/

Contact Information

Alessandra Garbero, Phd., Lead Regional Economist, Near East, North Africa, Europe and Central Asia Division (NEN) (a.garbero@ifad.org)

# International Labour Organisation

## 1. Description of Activities on AI

### Project 1: Algorithmic management in the logistics and healthcare sectors

- Project Description: This research explores how the algorithmic management practices that are often associated with platform work, such as rating systems, surveillance and control through tracking devices, online logging of work hours, the use of diverse forms of employment, etc. are being increasingly utilised by traditional companies in the logistics and healthcare sectors, thus leading to 'platformisation' of work. The project will look at the impact of such practices on work organisation, efficiency and working conditions in European (France, Italy) and non-European (India, South Africa) countries. It will also explore how the data that is collected through these practices is used by the firms, and who has control and rights over such data. The objective of this research is to understand the extent of the penetration of these practices in the logistics and healthcare sectors in both European and non-European countries, whether the experiences are similar or different, and the role of governments and social partners (workers' and employers' organisations) in addressing some of the challenges due to the rapid technological transformations. It will analyse whether the algorithmic management practices in the logistics and healthcare sectors leads to improved autonomy, flexibility, and working conditions for the workers. It will examine how the existing social and human rights standards are enforced in a context in which key employer functions are carried out by algorithms and are thus opaque. It will explore what public policies are required to address some of the challenges relating to worker surveillance, working conditions, thus ensuring greater transparency in the algorithms.
- Department/Division: Research Department
- Project Type/Output: Report/Academic paper/Seminar/meeting
- Project Status: Ongoing
- Project Start Year: January 2021
- Project End Year: December 2022
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Domain: Health, Human Rights, Logistics, Improving working conditions, Reducing inequalities
- Data Source: The project will adopt a case study approach and collect data from both workers and managers in enterprises in the logistics and healthcare sector in India and South Africa (non-European countries) and France and Italy (European countries).
- Publicly available data: No
- Related Sustainable Development Goals (SDGs): SDG 8 – Decent Work and Economic Growth; SDG 10 – Reduced Inequalities

- Partnership(s)/Collaborator(s):
    - Academia: In the process of deciding the academic partners in India and South Africa. This project is in collaboration with the Joint Research Centre, Seville of the European Commission.
- Relevant Links and Multimedia: https://www.ilo.org/employment/Whatwedo/Projects/building-partnerships-on-the-future-of-work/lang--en/index.htm
- Contact information: Uma Rani (amara@ilo.org)

### Project 2: Research on worker privacy and personal data protect

- Project Description: The ILO conducted a comparative legal study on the protection of the personal data of workers and their right to privacy in the light of the ILO Code of Practice on the protection of workers' personal data. It also conducted a preliminary analysis of the issues raised in relation to digital monitoring of workers and algorithmic management as they have grown in importance with the development of the digital economy and teleworking, including during the COVID-19 crisis. The outcome of this research will contribute to the preparation of the Tripartite Meeting of Experts on decent work in the platform economy to be held in 2022.
- Entity Name: INWORK
- Department/Division: WORQUALITY
- Project Type/Output: Other: Ongoing research
- Project Status: Ongoing
- Project Start Year: 2021
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Domain (field): Human Rights, Justice, Labour
- Publicly available data: Yes
- Related Sustainable Development Goals (SDGs): SDG 8 – Decent Work and Economic Growth
- Contact information: Martine Humblet (humblet@ilo.org)

### Project 3: Competency Profiling App (funded through the PROSPECTS partnership)

- Project Description: The number of international migrants and refugees is growing rapidly. Between 2000 and 2017, the number increased from 173 million to 258 million (an increase of almost 50%). To reap the benefits of migration, states need to enable migrants and refugees to integrate into the labour market and society through access to employment opportunities. One important factor that prevents this relates to the under-utilization of migrants' and refugees' skills in countries of destination and upon return. It is therefore vital not only to support governments in adopting policies and legislation that facilitates the access of migrant workers and refugees to the labour market but also to support them in developing and contextualizing technical solutions that may assist them to reduce the strain on public services whilst improving service delivery to the host-population.

  Therefore, the ILO Skills and Employability Branch is piloting a web-application in Kenya, Egypt and Lebanon

    - for 1500 refugees, migrants and host populations in developing countries
    - that allows individuals to capture and present their past experiences, skills and competences acquired both formally and informally.

  The multi-lingual and minimal text-typing methodology allows individuals to produce a profile of their skills and competencies summarized in a standardized Curriculum Vitae,

and in more detailed occupational competency profiles. Counsellors of employment services, UNHCR, NGOs or other service providers can also assist in filling in and completing the profile.

- Entity Name: HQ
- Department/Division: ILO Skills and Employability Branch
- Project Type/Output: Software tool/Application
- Project Status: Ongoing
- Project Start Year: 2020
- Project End Year: Ongoing pilot
- Project Domain: Education and training, Job and Employment
- Data Source: Individual level data is collected through implementing partners in Egypt, Kenya and Lebanon.
- The European System of Occupational Classifications ESCO, with more than 13.000 skills and 3000 occupations, is utilized as a reference framework for coding / classifying skills. An AI engine learns which skills tend to 'appear in combination' and prompts the right follow-up questions to the user / employment service provider.
- Technology/Platform: Testing and applying an AI-based competency profiling tool in Egypt, Kenya and Lebanon
- Related Sustainable Development Goals (SDGs): SDG 4 – Quality Education; SDG 8 – Decent Work and Economic Growth
- Partnership(s)/Collaborator(s):
  - UN Partners: under PROSPECTS
  - Government: ABA (Egyptian public employment services)
  - Private Sector: Project Partners: Skilllab (start-up that is developing the app)
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Contact information: Christine Hofmann (hofmann@ilo.org)

### Project 4: Digitalization of national TVET and skills systems: Harnessing technology to support LLL

- Project Description: The project explores the potential for digitalisation of different functions in TVET, skills development and Life--long learning systems. Digital transition of TVET and skill systems goes far beyond taking training products and services online.

  A holistic and coordinated approach to digitalisation should be taken that looks at each high-level function of a national skills system, and its potential for digitalisation.

  This report describes and updates the picture of digital vocational education and training, providing an overview of the issues surrounding digitalisation across the key functional areas of skills systems.

  It gives an introduction to key frameworks and tools; concrete examples of national initiatives, adaptable digitalisation models and practical guides; as well as providing initial guidance on implementation, to deploy a strategic approach to the digitalisation of national TVET and skills development systems at the country level.
- Department/Division: SKILLS Branch
- Project Type/Output: Report
- Project Status: Complete
- Project Start Year: 2021
- Project End Year: 2021
- Project Domain: Education and training
- Reported as part of 2021 Compendium on UN AI Activities? Yes

- Related Sustainable Development Goals (SDGs): SDG 4 – Quality Education; SDG 8 – Decent Work and Economic Growth
- Contact information: Karine Sonigo (sonigo@ilo.org )

### Project 5: The Skills Gap In Jordan And Impact On Unemployment

- Project Description: Mehnati provides a solution for labour market information. The initial conceptual idea was born in a project 'Applying the G20 Training Strategy Project' that was funded by the Russian Federation through ILO Jordan office. The goals was to bridge the employability gap and to promote development. The design of the concept was undertaken in close collaboration with all relevant stakeholders with the aim to offer a smooth and easy to use platform to Employers, Job Seekers and Training providers.

  Various national stakeholders including the chamber of industry, chemicals and garments sector skills councils as well as a number of training providers participated in the design of the concept. This process revealed the high need for the Mehnati platform in different sector and geographical places. Also, it revealed the need to cover various skill types, ranging from TVET, Modular bridge learning, and work readiness for digital gig based workers.

  To ensure that Mehnati learns from previous experiences and capitalizes on know-how achieved across various ILO projects, it will be implemented in phases or mini-projects, with the ultimate objective of creating value across the spectrum of ILO reach in different sectors and geographical places. Mehnati will be integrated into the national e-counselling platform Jordan has created with support of the ILO.
- Entity Name: RO Arab States
- Project Type/Output: Software tool
- Project Status: Development/Ongoing
- Project Start Year: 2020 (piloting)
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Domain: Education and training; Gender; Poverty
- Data Source: LMI, Training content, Employment opportunities
- Technology/Platform: This currently being specified. But the portal uses AI for the "job fit test", which helps automate some aspects of career counselling in the experience
- Related Sustainable Development Goals (SDGs): SDG 1 – No Poverty; SDG 4 – Quality Education; SDG 5 – Gender Equality; SDG 8 – Decent Work and Economic Growth; SDG 9 – Industry; Innovation, and Infrastructure; SDG 10 – Reduced Inequalities; SDG 17 – Partnerships for the Goals
- Contact information: Kishore Kumar Singh ( singhkk@ilo.org)

### Project 6: Online digital labour platforms in China: Working conditions, policy issues and prospects

- Project Description: Digital labour platforms have been proliferating in China since 2005, making China one of the world's largest platforms economies. This paper summarizes the results of an ILO survey, conducted in 2019, of workers' characteristics and working conditions on three major digital labour platforms. Using the survey data generated, it provides first-hand information on worker demographics, motivations, and experiences. This paper also compares the findings between the Chinese platforms and dominant Western platforms, the object of previous ILO studies. The paper concludes with a discussion about the need for institutional reforms and suggests some possible avenues for implementing policies to improve working conditions.
- Department/Division: WORQUALITY
- Project Type/Output: Working Paper
- Project Status: Complete

- Project Start Year: 2020
- End Year: 2021
- Project Domain: Human Rights, Labour
- Data Source: Economic data
- Publicly available data: Yes
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 8 – Decent Work and Economic Growth
- Relevant Links and Multimedia
    - https://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---travail/documents/publication/wcms_768699.pdf
- Contact Information: Martine Humblet (humblet@ilo.org)

### Project 7: Platform work and the employment relationship

- Project Description: This working paper analyses national and supranational case law and legislation about the employment status of platform workers. It does so by referring to the ILO Employment Relationship Recommendation, 2006 (No. 198). It finds that this Recommendation provides for a valuable compass to navigate the issues that emerge from the analysis of the existing case law and legislation about platform work.
- Department/Division: WORQUALITY
- Project Type/Output: Working Paper
- Project Status: Complete
- Project Start Year: 2020
- Project End Year: 2021
- Project Domain: Human Rights, Justice, Labour
- Data Source: Legal Information
- Publicly available data: Yes
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 8 – Decent Work and Economic Growth
- Links and Multimedia: https://www.ilo.org/global/publications/working-papers/WCMS_777866/lang--en/index.htm
- Contact information: Martine Humblet (humblet@ilo.org)

### Project 8: Digital Work in Eastern Europe: Overview of Trends, Outcomes, and Policy Responses

- Project Description: This paper presents the emergence and growth of digital labour markets in Eastern Europe over the period 1999-2019. It presents the profiles of digital workers, their working conditions and discusses how these are shaped by the business models of digital labour platforms.
- Entity Name: INWORK
- Department/Division: WORQUALITY
- Project Type/Output: Working Paper
- Project Status: Complete
- Project Start Year: 2021
- Project End Year: 2021
- Project Domain: Human Rights, Justice, Labour

- Data Source: Legal and economic data.
- Publicly available data: Yes
- Related Sustainable Development Goals (SDGs): SDG 8 – Decent Work and Economic Growth
- Relevant Links and Multimedia: https://www.ilo.org/wcmsp5/groups/public/---dgreports/---inst/documents/publication/wcms_794543.pdf
- Contact information: Martine Humblet (humblet@ilo.org)

### Project 9: How Do You Lip Read a Robot? – Recruitment AI has a Disability Problem

- Project Description: Information sharing webinar arising from discussion within ILO Global Business and Disability Network on the risks associated with using AI powered recruitment software, based on emerging evidence that it leads to the exclusion of candidates with different types of disabilities.
- Department/Division WORKQuality, Gender, Equality, Diversity and Inclusion Branch
- Project Type/Output: Seminar/ Meeting
- Project Status: Complete
- Project Start Year: 2021
- Project End Year: 2021
- Project Domain: Human Rights, Equality and non-discrimination, Employment
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 4 – Quality Education; SDG 8 – Decent Work and Economic Growth
- Relevant Links and Multimedia: https://youtu.be/ndA-Z_wJ31s
- Contact information: Stefan Tromel (tromel@ilo.org)

### Project 10: Tripartite Meeting of Experts on decent work in the platform economy

- Project Description: The ILO Centenary Declaration for the Future of Work, adopted on 21 June 2019, calls on all ILO Members to put in practice "policies and measures that ensure appropriate privacy and personal data protection, and respond to challenges and opportunities in the world of work to the digital transformation of work, including platform work". On 27 March 2021, at its 341st Session, the Governing Body decided "to request the Office to convene a tripartite meeting of experts on the issue of "decent work in the platform economy" in the course of 2022". This meeting is expected to take place in September 2022.
- Entity Name: INWORK
- Department/Division: WORQUALITY
- Project Type/Output: Seminar/Meeting
- Project Status: Ongoing
- Project Start Year: 2020
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Domain: Human Rights, Justice, Labour
- Data Source: Economic and legal data.
- Related Sustainable Development Goals (SDGs): SDG 8 – Decent Work and Economic Growth
- Contact information
- Name(s): Martine Humblet
- Email Address: humblet@ilo.org

### Project 11: Technical meeting on the impact of digitalization in the finance sector

- Project Description: At its 335th Session in March 2019, 1 the Governing Body of the International Labour Office endorsed a "Technical meeting on the impact of digitalization in the finance sector", which took place 24-28 January 2022.

  The purpose of the Meeting was to discuss challenges and opportunities relating to the impact of digitalization on the future of work in the financial sector, with particular focus on global trends and on policies, strategies and good practices to advance decent work in the sector.

  The discussion took place based on points for discussion, and the meeting resulted in agreed conclusions including recommendations for the Office and for the ILO constituents.
- Department/Division: SECTOR
- Project Type/Output: Seminar/meeting
- Project Status: Completed
- Project Start Year: 2019
- Project End Year: 2022
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Domain: Future of work, Decent work
- Related Sustainable Development Goals (SDGs): SDG 8 – Decent Work and Economic Growth
- Contact information: Margherita Licata (licata@ilo.org)

### Project 12: Issues paper for the Technical meeting on the future of decent and sustainable work in urban transport services

- Project Description: Urban passenger transport systems are crucial to the achievement of sustainable cities and communities and contribute towards a zero-carbon future. Yet, the industry is faced with disruption from the pandemic, a technological revolution, as well as with plummeting ridership and occupational safety and health challenges. The meeting discussed challenges and solutions relating to the future of decent and sustainable work in urban passenger transport operations and services, with the aim of adopting conclusions, including recommendations for future action.

  The document includes a section on technological innovation and AI, which emphasizes ITU's "AI for good" mandate. The paper aims to inform the meeting's discussion, highlighting the trends steering major sectoral changes and analysing how these impact employment, labour and social protection, and the sector's regulatory environment.
- Department/Division: SECTOR
- Project Status: Completed
- Project Start Year: 2020
- Project End Year: 2021
- Project Domain: Transport
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 3 – Good Health and Well-Being (3.6 Road Safety); SDG 11 – Sustainable Cities and Communities (11.2 Sustainable public transport)
- Links and Multimedia: https://www.ilo.org/sector/activities/sectoral-meetings/WCMS_726153/lang--en/index.htm , https://www.ilo.org/sector/activities/sectoral-meetings/WCMS_818255/lang--en/index.htm
- Contact information: Alejandra Cruz Ross (cruzross@ilo.org)

## 2. Related Sustainable Development Goals

SDGs 1, 3, 4, 5, 8, 9, 10, 11, 17

## 3. Relevant Links

www.ilo.org

Contact information

Ms Irmgard Nübler, Senior Economist (nubler@ilo.org)

# International Monetary Fund

## 1. Description of Activities on AI

**Project: Powering the Digital Economy: Opportunities and Risks of Artificial Intelligence in Finance**

- Project Description: This paper discusses the impact of the rapid adoption of artificial intelligence (AI) and machine learning (ML) in the financial sector. It highlights the benefits these technologies bring in terms of financial deepening and efficiency, while raising concerns about its potential in widening the digital divide between advanced and developing economies. The paper advances the discussion on the impact of this technology by distilling and categorizing the unique risks that it could pose to the integrity and stability of the financial system, policy challenges, and potential regulatory approaches. The evolving nature of this technology and its application in finance means that the full extent of its strengths and weaknesses is yet to be fully understood. Given the risk of unexpected pitfalls, countries will need to strengthen prudential oversight.
- Department/Division: Money and Capital Markets Department and Information and Technology Department
- Project Type/Output: White Paper
- Project Status: Completed
- Project Start Year: 2021
- Project End Year: 2021
- Project Domain: Finance
- Related Sustainable Development Goals (SDGs): SDG 8 – Decent Work and Economic Growth; SDG 10 – Reduced Inequalities
- Data Source: Many Sources
- Publicly available data: Yes
- Links and Multimedia: https://www.imf.org/en/Publications/Departmental-Papers-Policy-Papers/Issues/2021/10/21/Powering-the-Digital-Economy-Opportunities-and-Risks-of-Artificial-Intelligence-in-Finance-494717
- Technology/Platform: Research Paper
- Reported as part of 2021 Compendium on UN AI Activities? Yes

## 2. Related Sustainable Development Goals (SDGs):

SDGs 8 and 10

## 3. Relevant Links

www.imf.org

Contact information

EL Bachir Boukherouaa (eboukherouaa@imf.org)

# International Maritime Organization

## 1. Description of Activities on AI

### Project 1: Maritime Autonomous Surface Ships (MASS)

AI is part of the MASS functionality as the ship system (e.g. for collision avoidance) will have to learn from a large number of scenarios (Ship situations) to decide for the best anti-collision action to be taken. There will be many other AI applications for MASS. In this context, IMO developed a set of interim guidelines for the conduct of MASS trials, stipulating that trials should be conducted in a manner that provides at least the same degree of safety, security and protection of the environment as provided by the relevant instruments. IMO has also agreed on a road map for the development of a goal-based MASS Code which, as a first step, will be non-mandatory and be the basis for a mandatory MASS Code which is envisaged to enter into force on 1 January 2028.

- Project Type (Status): Framework/Strategy/Policy and Regulation (Development)
- Project Domain: Shipping
- AI Approach: AI as one of the drivers for enabling MASS operation; the IMO as the body responsible for regulating MASS, together with standard-setting organizations (e.g. ISO, IEC) , will need to consider safety and security aspects of AI systems used for MASS
- Related Sustainable Development Goals (SDGs): SDG 8 Decent work and Economic growth, SDG 9 Industry, Innovation and Infrastructure, SDG 11 Sustainable Cities and Communities, SDG 13 Climate Action, SDG 14 Life below Water
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Website (links): Autonomous shipping (imo.org)

### Project 2: Marine Environmental Protection

IMO under its Global Industry Alliance to support Low Carbon Shipping (Low Carbon GIA) is working towards promoting Just-In-Time (JIT) arrivals of ships through the use of ship and port specific data with an aim to reduce fuel consumption and GHG emissions at sea and in ports.

- Project Type (Status): Ideation
- Project Domain: Marine environmental protection
- Datasets: Port call data
- Related Sustainable Development Goals (SDGs): SDG 9 Industry, Innovation and Infrastructure, SDG 13 Climate Action
- Project Partners: –Members of the Low Carbon GIA, and other maritime stakeholders
- Reported as part of 2021 Compendium on UN AI Activities? Yes

### Project 3: Digital Review

IMO is undertaking a digital review, to ensure a future-viable IMO, as part of a broader Functional Review. The Secretariat aims to ascertain what is working well and what is not working well, what is needed and what is redundant, and to develop a digital strategy and roadmap for the next 5 years to ensure the Secretariat embraces digital opportunities in a way which will make it future viable with regards to digital access.

- Project Type (Status): Framework/Strategy/Policy (Development)
- Project Domain: Internal management
- AI Approach: Digital review
- Related Sustainable Development Goals (SDGs): SDG 9 Industry, Innovation and Infrastructure; SDG 13 Climate Action; SDG 14 Life below Water; SDG 16 Peace, Justice and Strong Institutions; SDG 17 Partnership for the Goals
- Reported as part of 2021 Compendium on UN AI Activities? Yes

### Project 4: Knowledge building

A seminar/workshop to strengthen knowledge of the maritime community/IMO staff, as well as delegates.

- Project Type (Status): Training (Ideation)
- Project Domain: Capacity building
- AI Approach: Events
- Reported as part of 2021 Compendium on UN AI Activities? Yes

### Project 5: AI for Sustainable Maritime Transport (AI-SMART)

A Possible collaboration with private sector and AI solution providers to enable developing countries to be prepared for AI related solutions in maritime.

- Project Type (Status): Ideation
- Project Domain: Shipping
- Partners: Possible collaboration with private sectors and AI solution providers
- Reported as part of 2021 Compendium on UN AI Activities? Yes

## 2. Related Sustainable Development Goals (SDGs)

SDGs 3, 8, 9, 11, 13, 14, 16 and 17

## 3. Relevant links

www.imo.org

Contact information

Ms Galuh Rarasanti, Senior Maritime Adviser (grarasan@imo.org)

# International Organization for Migration

## 1. Description of Activities on AI

### Project: Validating Humanitarian Data Analysis Through Collective Intelligence

- Project Description: Affected populations in humanitarian settings rarely provide feedback or validate the findings from data collection and analytical processes despite possessing context-specific knowledge relevant to humanitarian operations. This exploratory study pilots a novel form of collective intelligence (CI) that enables returnees in Iraq to validate and improve processes for the collection and analysis of data related to the conditions in their local area. In doing so, the CI methodology allows for more meaningful participation of affected populations than is typically afforded, as well as improving organizations' accountability to affected populations and transparency. Collecting data through digital channels, the initiative examines whether a larger and more diverse cross section of returnees could be engaged to validate findings resulting from key informant data collection. Using GPS technology, location-specific conclusions drawn from previous data collection activities are shared with affected communities to confirm or reject them and gather open-ended, qualitative input. The study finds that the demographics of respondents are more diverse than those of the pool of key informants. While the limited number of respondents in each location prevents the attainment of statistically significant results, some findings are nevertheless indicative of the potential of CI-based methods in evaluating and improving assessment tools by identifying areas of disagreement between key informants and CI participants across various indicators and demographic groups.

  Keywords: *key informant(s), collective intelligence (CI), humanitarian data collection, accountability to affected populations (AAP), participation revolution*
- Department/Division : Global Data Institute (GDI) – Displacement Tracking Matrix
- Project Type/Output: White Paper published on the IOM Publication Library
- Project Status: Completed
- Project Domain: Education, Gender, Health, Inclusion
- Related Sustainable Development Goals (SDGs): SDG 10 – Reduced Inequalities
- Link to Data: http://iraqdtm.iom.int/ReturnIndex
- Publicly available data: Yes
- Technology/Platform: HTML, CSS, and JavaScript for the frontend of the system.
  - Laravel 8 (PHP 7.4 and MySQL 8) for the back end of the system
  - Google Maps Services and GeoIP for the Geolocation of the interview.
  - Python (pandas, scipy, nltk, VADER) in Jupyter notebook for the sentiment analysis.
  - PowerBI for daily monitoring dashboard
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Partnership(s)/Collaborator(s):
  - Civil Society: NESTA – UK Innovation Fund (Donor

## 2. Related Sustainable Development Goals (SDGs):

SDG 10

## 3. Relevant Links

www.iom.int

Contact information

Robert Trigwell (rtrigwell@iom.int)

# International Telecommunication Union

## 1. Description of Activities on AI

### Project 1: AI for Good

- Project Description: AI for Good is the leading action-oriented, global & inclusive United Nations platform on AI. Its goal is to identify practical applications of AI to advance the United Nations Sustainable Development Goals and scale those solutions for global impact.

  The "digital bouquet of flowers" has been arranged into three streams (Learn, Build, Connect). For the complete list of service offerings, please visit this page. These service offerings are available for all UN partners to play an active role in moving the needle towards achieving the Sustainable Development Goals.

  AI for Good consists of an all year online program which in 2022 broadcast over 160 webinars, and the annual in-person AI for Good Global Summit (which did not take place from 2020 to 2022 due to Covid-19 but which will resume in 2023).

  The content of the online AI for Good platform is organized into the following "Discovery channels" (plus some other topics), which comprise of technical talks which dig deeper into thematic areas transformed by Artificial Intelligence/Machine Learning as well as into challenges of current AI/ML technology. Each "Discovery" episode dedicates in general one hour to one researcher to present their latest findings in one of the topic areas below:

  - AI for Earth and Sustainability Science
  - AI and Climate Science
  - AI for Manufacturing
  - Geospatial AI (GeoAI)
  - Machine Learning in 5G networks (ML5G)
  - Trustworthy AI
  - AI and Health
  - AI for Biodiversity
  - AI and Robotics

  The AI for Good Neural Network is an AI-powered smart matchmaking community platform that is designed to help users build connections with innovators and experts, link innovative ideas with social impact opportunities, and bring the community together to discuss AI applications for social good.

  Expanding on ITU's AI for Good programme, the Neural Network offers content and collaboration opportunities aligned to each of the 17 SDGs. Through the Neural Network, community members can connect to each other, receive personalized content, and pursue engagement aligned to their profiles, goals and needs.

  The smart matching mechanism – designed according to the principles of the Global Initiative in AI and Data Commons – connects AI innovators to anyone with an AI-related

problem, as a step towards globally scaled AI solutions. For example, it can generate matches for open data and AI algorithms, cloud storage and computing power, problem statements and expertise, funding and mentorships, domain transfer, SDG alignment, and more.

The solution is meant to stimulate unprecedented cooperation across borders and boundaries, foster impactful SDG-focused partnerships in the field of AI, and directly serve Goal 17: Revitalize the global partnership for sustainable development.

Join the Neural Network and build your profile to enable smart matching and personalized suggestions and discover 1000s of hours of on-demand content, networking features and virtual exhibitions, in addition to almost daily live sessions and interactive content.

**LEARN** – Design your personalized programme with smart content suggestions

**BUILD** – Take the smart-matching quiz to meet your future AI for Good partners

**CONNECT** – Join our networking sessions to meet world-class AI experts

The AI for Good Neural Network is open to all with an interest in how AI can positively impact the future of humankind. Join the AI for Good Neural Network to help build the future of AI. 15,000 people have joined the Neural Network in just over 1 year and continues to grow rapidly.

An onboarding tutorial video of how the Neural Network works can be viewed here: https://www.youtube.com/watch?v=KULDHdb8xvM

- Project Type: Platform/Event/Networking/Report/Meeting
- Project Status: Ongoing
- Project Start Year: 2017
- Reported as Part of 2021 Compendium on AI Activities? Yes
- Related Sustainable Development Goals (SDGs): All SDGs
- Partnership: Partnership: AI for Good is organized by ITU in partnership with 40 UN Sister Agencies, and co-convened with Switzerland. In addition, various universities and organizations support AI for Good.
- Project Website (links): https://aiforgood.itu.int/ ; https://aiforgood.itu.int/about-ai-for-good/discovery ; https://aiforgood.itu.int/neural-network/
- Contacts: Mr Reinhard Scholl (reinhard.scholl@itu.int); Mr Frederic Werner (frederic.werner@itu.int)

### Project 2: UN Activities on Artificial Intelligence

- Project Description: Since 2018, ITU has issued the annual "Compendium of UN Activities on Artificial Intelligence", aiming to introduce activities being carried out by the UN system. A joint-effort between ITU and 47 UN agencies and bodies, all partners of AI for Good or members of the Interagency Working Group on AI, the 2022 version of the report includes the collection of activity report from 40 UN agencies, providing details on UN agencies experiments with AI to improve their response to global challenges. It also includes additional analysis and summary to provide a comprehensive overview of the trends and tracks within the UN system.
- Project Type: Report
- Project Status: Ongoing
- Project Start Year: 2018
- Reported as Part of 2021 Compendium on AI Activities? Yes
- Related Sustainable Development Goals (SDGs): All SDGs
- Partnership: 40 UN entities
- Project Website (links):
    - 2018 Compendium https://www.itu.int/dms_pub/itu-s/opb/gen/S-GEN-UNACT-2018-1-PDF-E.pdf

  - 2019 Compendium https://www.itu.int/dms_pub/itu-s/opb/gen/S-GEN-UNACT-2019-1-PDF-E.pdf
  - 2020 Compendium https://www.itu.int/dms_pub/itu-s/opb/gen/S-GEN-UNACT-2020-1-PDF-E.pdf
  - 2021 Compendium https://www.itu.int/dms_pub/itu-s/opb/gen/S-GEN-UNACT-2021-PDF-E.pdf
- Contact Information: Sadhvi Saran (sadhvi.saran@itu.int), Jin Cui (jin.cui@itu.int)

### Project 3: Focus Group on Artificial Intelligence for Health (FG-AI4H)

- Project Description: The ITU-WHO Focus Group on Artificial Intelligence for Health (FG-AI4H), driven in close collaboration by ITU and WHO, is working towards the establishment of a framework and associated processes for the performance benchmarking of 'AI for Health' algorithms. The group is working on 20+ topic areas ("use cases") addressing health issues including breast cancer, neurodegenerative diseases, autism, vision loss, skin lesions, cardiovascular diseases, venomous snakebites and many more. An overview article was published in The Lancet - "WHO and ITU establish benchmarking process for artificial intelligence in health" – a weekly peer-reviewed general medical journal which is among the world's oldest, most prestigious and best known general medical journals. See also the Whitepaper for the ITU/WHO focus Group on Artificial Intelligence for Health.
- Project Status: Ongoing
- Project Start Year: 2018
- Reported as Part of 2021 Compendium on AI Activities? Yes
- AI Approach: Framework/Strategy/Methodology Formation
- Partnership: World Health Organization
- Project Website (links): https://www.itu.int/en/ITU-T/focusgroups/ai4h
- Contact Information: Simao Campos (simao.campos@itu.int), Bastiaan Quast (bastiaan.quast@itu.int)

### Project 4: Focus Group on AI for autonomous and assisted driving (FG-AI4AD)

- Project Description: The ITU Focus Group on AI for autonomous and assisted driving (FG-AI4AD) supports standardization activities for services and applications enabled by AI systems in autonomous and assisted driving. FG-AI4AD studied the behavioural evaluation of AI (when it is responsible for the dynamic driving task of a vehicle), in accordance with the 1949 and 1968 Convention on Road Traffic of the UNECE Global Forum for Road Safety.

  To build public trust it is fundamental that the performance of AI on our road meets, or exceeds, the performance of a competent and careful human driver. The FG aimed to create international harmonisation on the definition of a minimal performance threshold for these AI systems (such as AI as a Driver). This work has the potential to facilitate adoption of AI on our roads and aims to reducing road injuries, which are already the leading cause of death for children and young adults aged 5–29 years (more so than HIV and tuberculosis). In fact, AI can play a significant role to reduce 1.3 million road deaths and 25 million injuries (SDG 3.6) occurring each year, whilst also encouraging safe, affordable, accessible and sustainable transport systems (SDG 11.2). However, the widespread and socially acceptable deployment of AI on our roads is dependent upon technology achieving public trust. The Focus Group has raised attention from public and private entities and is becoming a popular forum for discussion. The Group concluded its activities in September 2022. During its mandate FG-AI4AD has developed three deliverables, which were transferred to ITU-T SG16 for further deliberation:

  - "Automated driving safety data protocol – Specification"

- "Automated driving safety data protocol – Ethical and legal considerations of continual monitoring g"
- "Automated driving safety data protocol – Practical demonstrators"

The Focus Group also pioneered the discussion on what is referred to as the "The Molly Problem". Participation is open; there are no membership requirements.

**AI for Road Safety initiative**: ITU, the UN Secretary-General's Special Envoy for Road Safety, and the Office of the UN Envoy on Technology launched the new **AI for Road Safety initiative** in October 2021 to promote an AI-enhanced "safe system" approach to reduce fatalities based on six pillars: road safety management, safer roads and mobility, safer vehicles, safer road users, post-crash response, and speed control.

The AI for Road Safety initiative is in line with the UN General Assembly Resolution (UN A/RES/74/299) on Improving global Road Safety, which highlights the role of innovative automotive and digital technologies, as well as in line with the UN Secretary General's roadmap on digital cooperation. The initiative also supports achieving the UN SDG target 3.6 to halve by 2030 the number of global deaths and injuries from road traffic accidents, and the SDG Goal 11.2 to provide access to safe, affordable, accessible and sustainable transport systems for all by 2030.

- Project Start Year: 2019
- Project End Year: 2022
- Reported as Part of 2021 Compendium on AI Activities? Yes
- Project Domain: Vehicles
- AI Approach: Framework/Strategy/Methodology Formation
- Project Website (links): https://www.itu.int/en/ITU-T/focusgroups/ai4ad
- Contact Information: Stefan Polidori (stefano.polidori@itu.int)

### Project 5: Focus Group on Environmental Efficiency for AI and other Emerging Technologies (FG AI4EE)

- Project Description: The ITU Focus Group on Environmental Efficiency for AI and other Emerging Technologies (FG AI4EE) is working to provide guidance on the environmentally efficient operation of emerging technologies. Additionally, this project seeks to study the impact of these technologies on the ecological/environmental feasibility of the broader ICT ecosystem by exploring AI, increasing automation and smart manufacturing. The group's work also supports ITU's ongoing research regarding the environmental requirements of IMT-2020 (5G) systems. FG-AI4EE has worked on over 20 deliverables which cover topics related to requirements, assessment, measurement and implementation guidelines concerning the environmental efficiency of AI and other emerging technologies. Participation is open; there are no membership requirements. The Group concluded its work in December 2022.
- Project Start Year: 2019
- Project End Year: 2022
- Reported as Part of 2021 Compendium on AI Activities? Yes
- Project Domain: Environment, Energy Efficiency
- AI Approach: Framework/Strategy/Methodology Formation
- Project Website (links): https://www.itu.int/en/ITU-T/focusgroups/ai4ee
- Contact Information: Charlyne Restivo, (charlyne.restivo@itu.int)

### Project 6: Focus Group AI for Natural Disaster Management (FG-AI4NDM)

- Project Description: The Focus Group on AI for Natural Disaster Management (FG-AI4NDM) capitalizes on the growing interest and novelty of AI in the field of natural

disaster management to help lay the groundwork for best practices in the use of AI for: assisting with data collection and handling, improving modelling across spatiotemporal scales, and providing effective communication.

- To achieve these objectives, FG-AI4NDM will develop a community of engaged stakeholders and experts and build on past progress made by ITU in this domain.
- Participation in the Focus Group is open to all interested stakeholders
- Project Start Year: 2020
- Reported as Part of 2021 Compendium on AI Activities? Yes
- Project Domain: Disaster Management
- AI Approach: Framework/Strategy/Methodology Formation
- Partnership: WMO and UN Environment
- Project Website (links): https://www.itu.int/en/ITU-T/focusgroups/ai4ndm
- Contact Information: Mythili Menon (mythili.menon@itu.int)

### Project 7: Focus Group on AI and IoT for Digital Agriculture (FG-AI4A)

- Project Description: To address the core challenges and opportunities within the agricultural sector, the Focus Group on Artificial Intelligence (AI) and Internet of Things (IoT) for Digital Agriculture (FG-AI4A), explores the potential of emerging technologies including AI and IoT in supporting data acquisition and handling, improving modelling from a growing volume of agricultural and geospatial data, and providing effective communication for interventions related to the optimization of agricultural production processes. The Focus Group will also examine key concepts, and relevant gaps in current standardization landscape related to agriculture, and will underscore the best practices and barriers related to the use of AI and IoT-based technologies within the agricultural domain.

  To achieve these objectives, FG-AI4A cooperates closely with FAO converging multiple stakeholders and experts from across the globe, serving as an open platform to explore the potential of AI and IoT to support innovative practices for agricultural production processes.
- Project Start Year: 2021
- Reported as Part of 2021 Compendium on AI Activities? Yes
- Project Domain: Agriculture, Smart Cities, Smart Communities, Sustainable Development
- AI Approach: Framework/Strategy/Methodology Formation
- Partnership: FAO
- Project Website (links): https://www.itu.int/en/ITU-T/focusgroups/ai4a
- Contact Information: Mythili Menon (mythili.menon@itu.int)

### Project 8: Focus Group on metaverse (FG-MV)

- Project Description: Recently, metaverse has become one disruptive area of innovation with great potential to change our economy, way of living and communicating and society. In this nascent phase of the metaverse, the industry has not converged towards common terms and definitions. The metaverse concept has attracted considerable public attention.

  The ITU-T Focus Group on metaverse was established in December 2022. The group analyses the technical requirements of the metaverse to identify fundamental enabling technologies in areas from multimedia and network optimization to digital currencies, Internet of Things, digital twins, and environmental sustainability.

  It also provides a collaboration platform for dialogue, for identifying stakeholders with whom ITU-T could collaborate, and for enabling the inclusion of non-members

to contribute to the technical pre-standardization work. The Focus Group work will be enriched with the identification of relevant use cases.

To stimulate global dialogue on metaverse, a series of ITU Forum on Embracing the metaverse will be held along with the Focus Group meetings.

- Department/Division: Telecommunication Standardization Bureau (ITU)
- Project Status: Ongoing
- Project Domain: Metaverse
- Project Start Year: 2022
- Reported as part of 2021 Compendium on UN AI Activities? No
- Related Sustainable Development Goals: Potentially all 17 SDGs
- Relevant Links and Multimedia:
    - FG-MV webpage: https://www.itu.int/en/ITU-T/focusgroups/mv
    - Press release: https://www.itu.int/en/mediacentre/Pages/PR-2023-01-19-TSB-Focus-Group-metaverse.aspx
    - ITU Forum on Embracing the metaverse: https://www.itu.int/en/ITU-T/ssc/Pages/1st-forum-metaverse.aspx
- Contact information: Cristina Bueti (cristina.bueti@itu.int)

### Project 9: Global Initiative on AI and Data Commons

- Project Description: The Global Initiative on AI and Data Commons is a program and collaborative platform to support the implementation of beneficial AI based solutions to accelerate progress towards the 2030 Sustainable Development Goals. A Roundtable on the Global Initiative on AI and Data Commons was convened at ITU headquarters on 30-31 January 2020, attended by around 100 participants (including AI specialists, data owners, and infrastructure providers from the private sector, academia, governments, UN agencies and standards bodies). The roundtable highlighted the need for the Global Initiative to maximize collaboration in order to:
    - Match problem owners with providers of solutions using AI and data;
    - Scale and sustain AI-based projects;
    - Make available and accessible capabilities, resources, datasets, know-how, guidelines, frameworks, standards as a common good.
- At the roundtable, two working groups (on repositories and on marketplaces) were established and one project was identified (Global AI services platform, initially introduced at an AI for Good Global Summit) to progress toward achieving the mission of the Global Initiative, summarized here. On 16 July 2020, as part of the AI for Good Webinar series, the Global Initiative launched the Global Data Pledge project to help identify, support and make available data as a common global resource.
- The Global Initiative on AI and Data Commons is now initiating a public collaborative effort named "Project Resilience". The vision, in the continuity of efforts towards AI for the common good, is to create a public AI service where a global community of innovators and thought leaders can enhance and utilize a collection of data and AI approaches both in the context of the current pandemic and for similar future challenges. The goal is to collaboratively design and build an open AI system that could inform and help tackle global decision-augmentation problems.
- Project Start Year: 2020
- Reported as Part of 2021 Compendium on AI Activities? Yes
- AI Approach: Framework/Strategy/Methodology Formation

- Project Website (links): https://www.itu.int/en/ITU-T/extcoop/ai-data-commons/Pages/default.aspx
- Contact Information: Martin Adolph (martin.adolph@itu.int)

### Project 10: AI/ML Competitions ("Challenges")

- **Project Description:** Since 2020, thousands of students and professionals are competing in the ITU AI/Machine Learning Challenges. In 2022, The ITU AI/ML Challenges were hosted in three(3) main themes: AI/ML in 5G Challenge, GeoAI Challenge, and tinyML Challenge. Through the Challenge, ITU encourages and supports the growing community driving the integration of AI/ML in networks and at the same time enhances the community driving standardization work for AI/ML, creating new opportunities for industry and academia to influence the evolution of ITU standards. Participants attempt to address the UN Sustainable Development Goals (SDGs) related problems using real-world data. In addition, participants will acquire hands-on experience in AI/ML in areas relevant to solving SDGs and compete for prizes, recognition, and certificates. These Challenges offer participants an opportunity to showcase their talent, test their concepts on real data and real-world problems. Participants are offered free computing resources (GPUs!) from ITU to train and optimize their machine learning models. The solutions can be accessed in several repositories on the Challenge GitHub: https://github.com/ITU-AI-ML-in-5G-Challenge.

  Most of the solutions submitted to the Challenge are innovative as well as improvements with respect to the baselines. To share the solutions with the larger community, every-year, ITU issues a call for papers for a special issue on AI and machine learning solutions in 5G and future networks of the ITU Journal on Future and Evolving Technologies (ITU J-FET). In this special issue, hosts (i.e., the originators of the problem statements) and participants of the ITU Challenge submit their solutions and learnings for publication. This special issue is dedicated to exploration of Artificial Intelligence and Machine Learning in 5G and future networks as well as enabling technologies and tools in networks.
- Project Type/Output: Datasets, Code, Papers, Standards

  "AI Challenges" are competitions where a "host" defines a problem statement and provides a dataset. Anyone in the world is invited to solve this problem statement using machine learning.
- Project Status: Ongoing
- Project Start Year: 2020
- Project End Year: each competition has a 12-months cycle.
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project updates: The ITU AI/Machine Learning in 5G Challenge is running for the 4th year in 2023. GeoAI and tinyML challenges are planned to run for the 2nd time in 2023.
- Project Domain: Agriculture, Environment, Energy, Gender, Health, Poverty, Telecommunications, and Weather
- Data Source: Data sets provided are real data, synthetic data or openly available data. Data for the ITU AI/Machine Learning in 5G Challenge use network data, i.e., data which occur in a communications network. Data for the GeoAI Challenge can be any data with a location component, be it satellite data, data from social media, or underwater data.
- Links to the challenges:
  - https://aiforgood.itu.int/about/aiml-in-5g-challenge/
  - https://aiforgood.itu.int/about-ai-for-good/geoai-challenge/
  - https://aiforgood.itu.int/about-ai-for-good/tinyml-challenge/
- Data is publicly available: Yes

- Technology/Platform: To solve the problem statements, any of the above environments or toolsets can be used.
- Related Sustainable Development Goals (SDGs): All the SDGs
- Partnerships:
    - UN Partners: UN partners are UNGGIM (United Nations Global Geospatial Information Management) Academic Network,UN Open GIS (Geographic Information System) Initiatives, FAO, UNICEF, and IAEA
    - Private Sector: see https://aiforgood.itu.int/about/aiml-in-5g-challenge/ for private and academic partners of the ITU AI/Machine Learning in 5G Challenge
    - Academia: see https://aiforgood.itu.int/about/aiml-in-5g-challenge/ for private and academic partners of the ITU AI/Machine Learning in 5G Challenge
- Contact information: Thomas Basikolo (thomas.basikolo@itu.int); Andrea Manara for GeoAI (andrea.manara@itu.int)

### Project 11: United for Smart Sustainable Cities (U4SSC)

- Project Description: The United for Smart Sustainable Cities (U4SSC) is a global UN initiative coordinated by ITU, UNECE and UN-HABITAT. It currently involves 19 UN bodies. U4SSC is a global platform for smart cities stakeholders, which advocates for public policies to encourage the use of ICT to facilitate the transition to smart sustainable cities. The initiative aims to: Generate guidelines, policies and frameworks for the integration of ICTs and emerging technologies into urban operations, based on the SDGs, international standards and urban key performance indicators (KPIs); and help streamline smart sustainable cities action plans and establish best practices with feasible targets that urban development stakeholders are encouraged to meet. The topics of this phase of U4SSC include: city platforms, urban economic resilience at the city-level, innovative financing for smart and sustainable cities, procurement guidelines for smart cities, artificial intelligence in cities, metaverse in cities, digital transformation for people-oriented cities. In the context of the Thematic Group on AI in Cities, a deliverable is being developed to explore how AI-based innovations be effectively deployed in the urban domain, while laying forth a framework which encompasses the governance principles for successfully implementing AI in cities in line with the Sustainable Development Goals (SDGs) The initiative delivers policy guidelines and training materials through the work on specific outputs elaborated via regular e-meetings and one main meeting once per year. U4SSC stakeholders also elaborated a set of Key Performance Indicators (KPIs) for smart sustainable cities which includes 91 indicators (core and advanced) divided in the three dimensions of sustainable development: economy, environment, and society and culture. The indicators are fully aligned with the Sustainable Development Goals (SDGs) and serve as a tool for evidence-based decision making, self-assessments, progress monitoring and achieving the SDGs at the local-level. They are being implemented by 150 cities of different sizes and development worldwide.
- Department/Division: Telecommunication Standardization Bureau (ITU), Housing and Land Management, Forests, Land and Housing Division (UNECE), UN-HABITAT.
- Project Type/Output: Multi-agency partnership
- Project Status: Ongoing
- Project Domain: Sustainable urban development and digital transformation
- Project Start Year: 2016
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals: SDG 11 – Sustainable Cities and Communities; SDG 17 – Partnership for the Goal
- Partnerships:

- UN Partners: ITU, UNECE, UN Habitat, CBD, ECLAC, FAO, UNDESA, UNDP, UNECA, UNESCO, UNEP, UNEP-FI, UNFCCC, UNIDO, UNOP, UNU-EGOV, UN-Women, UNWTO and WMO

- Relevant Links and Multimedia: https://u4ssc.itu.int/
- Contact information: Cristina Bueti (cristina.bueti@itu.int), Gulnara Roll (gulnara.roll@un.org), Pontus Westerberg (pontus.westerberg@un.org)

### Project 12: Digital Transformation Webinar Series

- Project Description: Together with other United Nations agencies and programmes, ITU has been regularly organizing Webinars to explore the transcending impact of digital transformation across sectors to drive innovation, ensure sustainable growth and inclusion and respond to other global challenges.

  With over 20 Episodes, these webinars discuss topics related to cross-sectoral digital transformation, with aim of increasing collaboration with global stakeholders and knowledge-sharing, contributing to ITU-T standardization activities in accordance with the New Urban Agenda and the Sustainable Development Goals.

  The webinar series also helps showcase the activities of the ITU-T Study Groups, including ITU-T Study Group 20 on "Internet of things (IoT) and smart cities and communities (SC&C)".
- Department/Division: Telecommunication Standardization Bureau (ITU)
- Project Status: Ongoing
- Project Domain: Digital Transformation
- Project Start Year: 2021
- Reported as part of 2021 Compendium on UN AI Activities? No
- Related Sustainable Development Goals: All 17 SDGs
- Relevant Links and Multimedia:

  - DT Webinar Series: https://www.itu.int/cities/standards4dt/

- Contact information: Cristina Bueti (cristina.bueti@itu.int)

### Project 13: AI in radiocommunications

- AI could be used during the process of making and distributing television and radio content. It is now being used to optimise workflows for broadcasting programme making, to improve audio and visual quality evaluation, to efficiently utilize the frequency spectrum in television and radio distribution and recently even to create new programmes by mining archives as well as automatically targeting content to specific audiences or individuals.

  For example, AI is being used for extracting content from vast archives; automatically localising content for international distribution; and generating access services such as captioning, audio description, text to speech and signing far faster and far more accurately than could be achieved in the past.

  AI could be used for spectrum management and radio monitoring activities.

  For example, deploying machine learning technology for methodologies for assessing or predicting spectrum availability; introducing big data processing and other AI technologies in the automation of spectrum management and radio monitoring activities.
- Project Domain: Communication
- Reported as Part of 2021 Compendium on AI Activities? Yes
- AI Approach: Framework/Strategy/Methodology Formation
- Project Website (links): https://www.itu.int/en/action/ai/emerging-radio-technologies/Pages/default.aspx

- Contact Information: Ruoting Chang (ruoting.chang@itu.int)

## 2. Related Sustainable Development Goals

All SDGs

## 3. Relevant Links

https://www.itu.int/en/action/ai/Pages/default.aspx

Contact Information

Mr Preetam Maloor, Head of Emerging Technologies Division (Preetam.maloor@itu.int)

# Office of the United Nations High Commissioner for Human Rights

## 1. Description of Activities on AI

### Project 1: Expert seminar on artificial intelligence and the right to privacy

Human Rights Council resolution 42/15 requested UN Human Rights to organize a one-day expert seminar to discuss how artificial intelligence, including profiling, automated decision-making and machine-learning technologies may, without proper safeguards, affect the enjoyment of the right to privacy. The seminar took place as a public online event over two half-days on 27/28 May 2020. One important area of discussion were the specific challenges for the right to privacy that the rapidly increasing use of AI brings about. The seminar also highlighted the key role that privacy plays in safeguarding other human rights affected by AI. It also articulated safeguards and processes that States, businesses and international organisations are required to put in place to promote and protect the right to privacy in the digital age.

- Project Type (Status): Full-fledged development (Framework/Strategy/Policy)
- Project Domain: Right to privacy
- AI Approach: Events
- Project Website (links): https://www.ohchr.org/EN/Issues/DigitalAge/Pages/SeminarArtificialIntelligence.aspx
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Contacts: Mr Scott Campbell, Senior Human Rights Officer (scott.campbell@un.org)

### Project 2: Report on artificial intelligence and the right to privacy

Human Rights Council resolution 42/15 also requested UN Human Rights to analyse the widespread use of artificial intelligence by States and businesses and their impact on the enjoyment of the right to privacy, as well as economic, social and cultural rights. The report calls for a ban on AI applications that are incompatible with international human rights law, and for moratoriums to be imposed on the sale and use of high-risk AI systems, including a ban on remote biometric systems, unless and until adequate safeguards are put in place to protect human rights. The report recommends that States and businesses conduct human rights due diligence throughout the entire life cycle of AI systems.

- Project Type (Status): Report (Report)
- Project Domain: Freedom of peaceful assembly, freedom of expression, right to privacy, economic, social and cultural rights
- Project Website (links): www.undocs.org/A/HRC/48/31

- Reported as part of 2021 Compendium on UN AI Activities? No
- Contacts: Mr Scott Campbell, Senior Human Rights Officer (scott.campbell@un.org)

### Project 3: Report on the right to privacy in the digital age

As a follow-up to the report on artificial intelligence and the right to privacy, published in September 2021, UN Human Rights will present a report examining recent trends and challenges regarding the right to privacy and clarifying related human rights principles, safeguards and best practices.

- Project Type (Status): Report (Report)
- Project Domain: Right to privacy
- Project Website (links): The report will become available here: https://www.ohchr.org/en/privacy-in-the-digital-age
- Reported as part of 2021 Compendium on UN AI Activities? No
- Contacts: Mr Scott Campbell, Senior Human Rights Officer (scott.campbell@un.org)

### Project 4: Expert consultation and report on 1) the practical application of the Guiding Principles on Business and Human Rights on the activities of technology companies; and 2) technical standard-setting and human rights

Human Rights Council resolution 47/23 requested UN Human Rights to convene two expert consultations, to discuss the relationship between human rights and technical standard-setting processes for new and emerging digital technologies and the practical application of the Guiding Principles on Business and Human Rights (UNGP) on the activities of technology companies, and to submit two reports. A virtual expert consultation was held on 7 and 8 March 2022 to discuss the practical application of the Guiding Principles on Business and Human Rights to the activities of technology companies, focusing on 1) the State duty to protect human rights; 2) the role of the UNGPs in tech policy and regulation; 3) the corporate responsibility to protect human rights; and 4) access to remedy. The report demonstrates the value and practical application of the UNGPs in preventing and addressing adverse impacts on human rights related to technology companies and provides a set of recommendations for States, technology companies, regional and international organizations, civil society, and the United Nations. The expert consultation and report on technical standard-setting and human rights will be completed in 2023.

- Project Type (Status): Event and report on the practical application of the UNGPs (concluded in 2022) / Event and report on human rights and technical standard-setting (to be completed in 2023)
- Project Domain: Human rights
- Project Website (links): https://www.ohchr.org/en/business-and-human-rights
- Reported as part of 2021 Compendium on UN AI Activities? No
- Contacts: Mr Scott Campbell, Senior Human Rights Officer (scott.campbell@un.org)

### Project 5: Report on peaceful protests and new technologies

In its resolution 38/11, the Human Rights Council requested the United Nations High Commissioner for Human Rights to prepare a thematic report on new technologies, including information and communications technology (ICT), and their impact on the promotion and protection of human rights in the context of assemblies, including peaceful protests. The report,

presented at the 44th session of the Human Rights Council highlights not only the character of new digital technologies as enablers of the enjoyment of human rights but also delves into issues linked to various surveillance technologies, including AI-based surveillance (such as facial recognition) of organizers of and participants in peaceful assemblies. Among other recommendations, it calls for a moratorium on the use of facial recognition in the context of peaceful assemblies.

- Project Type (Status): Report (Report)
- Project Domain: Freedom of peaceful assembly, freedom of expression, right to privacy
- Project Website (links): www.undocs.org/A/HRC/44/24
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Contacts: Mr Scott Campbell, Senior Human Rights Officer (scott.campbell@un.org)

### Project 6: B-Tech Projectdeploying and using new technologies

UN Human Rights has launched the B-Tech Project which develops authoritative guidance and resources to enhance the quality of implementation of the United National Guiding Principles on Business and Human rights with respect to a selected number of strategic focus areas in the technology space. It focuses on the following thematic areas, all of which touch upon important aspects of the development, deployment and use of AI: (1) Addressing Human Rights Risks in Business Models; (2) Human Rights Due Diligence and End-Use; (3) Accountability and Remedy; and (4) A Smart Mix of Measures: Exploring regulatory and policy responses to human rights challenges linked to digital technologies.

- Project Type (Status): Full-fledged development (Framework/Strategy/Policy)
- Project t Domain: Human rights
- Project Website (links): https://www.ohchr.org/EN/Issues/Business/Pages/B-TechProject.aspx
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Contacts: Mr Scott Campbell, Senior Human Rights Officer (scott.campbell@un.org)

### Project 7: Development of UN system-wide guidance on human rights diligence in the context of developing, deploying and using new technologies

In his Roadmap for Digital Cooperation, the Secretary-General asked UN Human Rights to develop UN System-Wide Guidance on Human Rights Due Diligence for Digital Technology Use (A/74/821) to support all UN entities to implement and strengthen human rights due diligence (HRDD) policies, processes and practices for the use (including development, acquisition and sharing) of digital technologies. The guidance provides a practical introduction to HRDD to assist each entity in developing, implementing and strengthening its HRDD for digital technology use, as well as actions to get started and strengthen HRDD over time.

- Project Type (Status): In development, scheduled completion by end of 2022 (Guidance)
- Project Domain: Human rights
- Reported as part of 2021 Compendium on UN AI Activities? Yes (updated)
- Contacts: Mr Scott Campbell, Senior Human Rights Officer (scott.campbell@un.org)

### Project 8: United Nations Hub for Human Rights and Digital Technology

As part of the implementation of the UN Secretary-General's Call to Action for Human Rights, UN Human Rights launched the UN Hub for Human Rights and Digital Technology, which provides a central repository of authoritative guidance from various UN human rights mechanisms on the application of human rights norms to the use and governance of digital technologies, including artificial intelligence.

- Project Type (Status): Website (website)
- Project Domain: Human rights
- Project Website (links): www.digitalhub.ohchr.org (beta version)
- Reported as part of 2021 Compendium on UN AI Activities? No
- Contacts: Mr Scott Campbell, Senior Human Rights Officer (scott.campbell@un.org)

### Project 9: Co-lead of implementation of the data protection pillar of the UN Data Strategy

In June 2016, the Secretary-General presented the UN Data Strategy for Action by Everyone, Everywhere. Data Protection and Privacy is one of the priority areas in the strategy. OLA, EOSG and UN Human Rights are the co-leads of the implementation of this priority area).

- Project Type (Status): Full-fledged development (Framework/Strategy/Policy)
- Project Domain: Human rights, Data protection
- Project Website (links): https://www.un.org/en/content/datastrategy/
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Contacts: Mr Scott Campbell, Senior Human Rights Officer (scott.campbell@un.org)

### Project 10: Universal Human Rights Index

The Universal Human Rights Index (UHRI) is designed to facilitate access to human rights recommendations issued by three key pillars of the United Nations human rights protection system: the Treaty Bodies established under the international human rights treaties as well as the Special Procedures and the Universal Periodic Review (UPR) of the Human Rights Council. Many of these outputs have been manually tagged for eight years. We have used this training dataset to build a natural language classifier, using a neural network, to create recommendations for how outputs should be classified.

- Project Type (Status): Proof of concept (Software product)
- Project Domain: Human rights
- AI Approach: Software application
- Datasets: Universal Human Rights Index
- Related Sustainable Development Goals: All SDGs
- Project Partners: HuriDocs, Danish Institute for Human Rights
- Membership or Secretariat-driven: Secretariat-driven
- Project Website (links): https://uhri.ohchr.org/en
- Resources/Skills: Natural language processing, software development
- Technology: PyTorch
- Challenges: Data quality and consistency in the tagging of training data is key. We are redeveloping the model on the basis of improved training data, with more consistent tagging.

- Contacts: Mr Scott Campbell, Senior Human Rights Officer (scott.campbell@un.org)

### Project 11: Digital Image Verification and Classification Project

In the past, human rights investigations faced challenges in gathering sufficient data, but with the advent of portable consumer technologies the challenge has evolved. The amount of data is not such a pressing issue, but filtering information to create useful evidence is a challenge. The recent experience of the Commission of Enquiry on the protests in Gaza or the current experience of the Commission of Enquiry on the Syrian Arab Republic are instructive. Both initiatives have received huge quantities of video and image data from networks of informants, a big challenge to authenticate, classify and analyse into useful evidence. This project works to address this need by further developing existing open source tools, available to the human rights ecosystem, and creating an internal instance for conducting the same analysis on confidential information.

- Project Type (Status): Full-fledged development (Software product)
- Project Domain: Human rights
- AI Approach: Further development of an existing software application
- Datasets: DEFACTO: Image and Face Manipulation Dataset
- Related Sustainable Development Goals: All SDGs, especially SDG 16 – Peace, Justice, And Strong Institutions
- Project Partners: Information Technologies Institute of the Centre for Research and Technology Hellas (ITI-CERTH)
- Membership or Secretariat-driven: Secretariat-driven
- Project Website (links): https://www.invid-project.eu/
- Resources/Skills: Forensic image analysis and classification. Software development
- Technology: PyTorch
- Challenges: Video tampering detection is computationally expensive, and we are looking for more efficient ways to perform this task.
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Contacts: Mr Scott Campbell, Senior Human Rights Officer (scott.campbell@un.org)

## Human Rights Council, Advisory Committee

### Project 12: Report of the Advisory Committee of the Human Rights Council on New and Emerging Digital Technologies and Human Rights (A/HRC/47/52)

Pursuant to the adoption by the Human Rights Council resolution "New and emerging digital technologies and human rights" (A/HRC/RES/41/11) at the forty-first session, the Advisory Committee presented a report on the impacts, opportunities, and challenges of new technologies with regard to the promotion and protection of human rights, including mapping of relevant existing initiatives by the United Nations (UN) and recommendations on how human rights opportunities, challenges, and gaps arising from new technologies could be addressed by the Human Rights Council and its special procedures and subsidiary bodies in a holistic, balanced, and pragmatic manner. The report addresses a range of issues linked to the use of AI and notes that AI decision-making, even when unintended, may result in discriminatory outcomes if the decision-making is based on biased algorithms. It highlights that a rigorous human rights due diligence of automated decision-making tools is necessary.

- Project Type (Status): Full-fledged development (Report)

- Project Domain: Human rights
- Project Website (links): https://www.ohchr.org/en/hr-bodies/hrc/advisory-committee/thematic-reports
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Contacts: Mr Eric Tistounet, Chief, Human Rights Council Branch (eric.tistounet@un.org); Mr Scott Campbell, Senior Human Rights Officer (scott.campbell@un.org)

## Special Procedures of the Human Rights Council

### Project 13: Human Rights Council report of the Special Rapporteur on contemporary forms of racism, racial discrimination, xenophobia and related intolerance on Racial discrimination and emerging digital technologies: a human rights analysis (A/HRC/44/57)

The Special Rapporteur analyses different forms of racial discrimination in the design and use of emerging digital technologies, such as AI, and focuses in particular on the structural and institutional dimensions of this discrimination. She also outlines the human rights obligations of States and the responsibility of corporations to combat this discrimination.

- Project Type (Status): Full-fledged development (Report)
- Project Domain: Human rights
- Project Website (links): https://www.undocs.org/A/HRC/44/57
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Contacts: Ms Beatriz Balbin Chamorro, Chief, Special Procedures Branch (beatriz.balbin@un.org);
  Mr Scott Campbell, Senior Human Rights Officer (scott.campbell@un.org)

### Project 14: Human Rights Council report of the Special Rapporteur on contemporary forms of racism, racial discrimination, xenophobia and related intolerance on racial and xenophobic discrimination and the use of digital technologies in border and immigration enforcement (A/HRC/48/76)

The Special Rapporteur highlights how digital technologies, including AI systems, are being deployed to advance xenophobic and racially discriminatory ideologies which have become prevalent. The report also links the trends in immigration surveillance whereby AI-driven predictive models are prone to creating and reproducing racially discriminatory feedback loops.

- Project Type (Status): Full-fledged development (Report)
- Project Domain: Human rights
- Project Website (links): www.undocs.org/A/HRC/48/76
- Reported as part of 2021 Compendium on UN AI Activities? No
- Contacts: Ms Beatriz Balbin Chamorro, Chief, Special Procedures Branch (beatriz.balbin@un.org);
  Mr Scott Campbell, Senior Human Rights Officer (scott.campbell@un.org)

### Project 15: Human Rights Council report of the Special Rapporteur on the rights of persons with disabilities (A/HRC/49/52)

Pursuant to the Human Rights Council resolution 44/10, the Special Rapporteur provides a study on artificial intelligence and the rights of persons with disabilities. The Special Rapporteur examines the opportunities and the risks posed by artificial intelligence technology to the enjoyment of the human rights of persons with disabilities, and emphasizes that the practical benefits of artificial intelligence may be realized once their human rights risks are sufficiently addressed.

- Project Type (Status): Full-fledged development (Report)
- Project Domain: Human rights
- Project Website (links): www.undocs.org/A/HRC/49/52
- Reported as part of 2021 Compendium on UN AI Activities? No
- Contacts: Ms Beatriz Balbin Chamorro, Chief, Special Procedures Branch (beatriz.balbin@un.org);
  Mr Scott Campbell, Senior Human Rights Officer (scott.campbell@un.org)

### Project 16: Human Rights Council report of the Special Rapporteur on extreme poverty and human rights on the non-take-up of rights in the context of social protection (A/HRC/50/38)

The Special Rapporteur notes that automation of benefits, by reducing administrative complexity for potential recipients, can reduce "non-take-up", a phenomenon where social protection benefits often go unused even though they are designed to protect individuals throughout their lives. At the same time, the Special Rapporteur highlights that automation carries risks of exclusion for the most vulnerable groups, including people unregistered at birth, undocumented migrants, individuals without a fixed address, or informal workers.

- Project Type (Status): Full-fledged development (Report)
- Project Domain: Human rights
- Project Website (links): www.undocs.org/A/HRC/50/38
- Reported as part of 2021 Compendium on UN AI Activities? No
- Contacts: Ms Beatriz Balbin Chamorro, Chief, Special Procedures Branch (beatriz.balbin@un.org);
  Mr Scott Campbell, Senior Human Rights Officer (scott.campbell@un.org)

### Project 17: UN General Assembly report of the Special Rapporteur on extreme poverty and human rights on digital welfare states and human rights (A/74/493)

In the context of greater digitization of social protection and assistance systems and the increasing role played by automated decision-making through the use of algorithms and artificial intelligence in such systems, the Special Rapporteur warns of a digital welfare dystopia and recommends that rather than obsessing about fraud, cost savings, sanctions, and market-driven definitions of efficiency, the starting point should be on how welfare budgets could be transformed through technology to ensure a higher standard of living for the vulnerable and disadvantaged.

- Project Type (Status): Full-fledged development (Report)
- Project Domain: Human rights
- Project Website (links): www.undocs.org/A/74/493

- Reported as part of 2021 Compendium on UN AI Activities? No
- Contacts: Ms Beatriz Balbin Chamorro, Chief, Special Procedures Branch (beatriz.balbin@un.org);
  Mr Scott Campbell, Senior Human Rights Officer (scott.campbell@un.org)

## Human Rights Committee

### Project 18: General comment No. 37, Article 21: Right of peaceful assembly

The General Comment No. 37 on the right of peaceful assembly was adopted on 23 July 2020 during the 129th online session of the Human Rights Committee. The General Comment addresses extensively question linked to the use of digital technologies, including AI-based tools, both by organizers of and participants in assemblies and state authorities.

- Project Type (Status): Full-fledged development (Other)
- Project Domain: Human rights
- Project Website (links): https://www.ohchr.org/EN/HRBodies/CCPR/Pages/GCArticle21.aspx
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Contacts: Ibrahim Salama, Chief, Human Rights Treaties Branch (ibrahim.salama@un.org);
  Scott Campbell, Senior Human Rights Officer (scott.campbell@un.org)

## Committee on the Rights of the Child

### Project 19: Committee on the Rights of the Child - General Comment No. 25: Children's rights in relation to the digital environment

The General Comment No. 25 on children's rights in relation to the digital environment was adopted on 2 March 2021 during the 131st session of the Human Rights Committee. The General Comment lays out how States parties should implement the Convention in relation to the digital environment and provides guidance on relevant legislative, policy and other measures to ensure full compliance with their obligations under the Convention and the Optional Protocols in light of the opportunities, risks, and challenges in promoting, respecting, protecting and fulfilling all children's rights in the digital environment.

- Project Type (Status): Full-fledged development (Other)
- Project Domain: Human rights
- Project Website (links): https://www.ohchr.org/EN/HRBodies/CRC/Pages/GCChildrensRightsRelationDigitalEnvironment.aspx
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Contacts: Ibrahim Salama, Chief, Human Rights Treaties Branch (ibrahim.salama@un.org);
  Scott Campbell, Senior Human Rights Officer (scott.campbell@un.org)

## Committee on the Elimination of Racial Discrimination

### Project 20: Committee on the Elimination of Racial Discrimination: General comment No. 36: preventing and combating racial profiling by law enforcement officials

The General Comment No. 36 on preventing and combating racial profiling by law enforcement officials was adopted on 17 December 2020 during the 102nd session of the Human Rights

Committee. The General Comment focuses on algorithmic decision-making and AI in relation to racial profiling by law enforcement officials, and has observed that the increasing use of new technologies, including AI, has the potential to deepen racism, racial discrimination, xenophobia and other forms of exclusion. focuses on algorithmic decision-making and AI in relation to racial profiling by law enforcement officials.

- Project Type (Status): Full-fledged development (Other)
- Project Domain: Human rights
- Project Website (links): https://www.ohchr.org/EN/HRBodies/CERD/Pages/GC36.aspx
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Contacts: Ibrahim Salama, Chief, Human Rights Treaties Branch (ibrahim.salama@un.org); Scott Campbell, Senior Human Rights Officer (scott.campbell@un.org)

## 2. Related Sustainable Development Goals (SDGs)

SDGs 1, 2, 3, 7, 9, 10, 11, 13, 16 and 17

## 3. Relevant Links

https://www.ohchr.org/EN/pages/home.aspx

Contact Information

Mr. Scott Campbell (scott.campbell@un.org)

# The Joint United Nations Programme on HIV/AIDS (UNAIDS)

## 1. Description of Activities on AI

### Project: Global AIDS Monitoring and use of AI

- Project Description: Currently, the Global AIDS Monitoring (GAM) data collection is done through an online reporting platform, and the data are published in the annual Global AIDS Report and on AIDSinfo data visualization platform. Much of this work includes manual processing: data entry (country rapporteurs), data management and organization, validation and presentation/visualization (strategic information department, SID).

  While the new UNAIDS strategy and targets outline far more detailed and broader data framework, it is anticipated that the burden on collecting, validating and analyzing the data is likely to increase both for country rapporteurs and UNAIDS. It is necessary to explore new ways of automating the data collation from publicly accessible sources and platforms, reducing the reporting burden on countries. Furthermore, with the increase in data, iterative yet fast cross-analysis and learning are required to identify issues such as inequities in services and affected communities, as well as the role of societal enablers affecting peoples access to the services they need.

  Collecting data via GAM online reporting tool is currently the primary data acquisition mechanism for GAM. The data submitted through the platform, by the authorities from different countries, have to be inspected by experts of UNAIDS and partner organizations to ensure the correctness of information reported in GAM. Often the direct data collection is complemented by analysis of existing reports and journal articles. This requires searching and reading the requested pieces of information from lengthy documents within many different repositories. An intelligent search functionality implemented with state-of-the-art NLP AI models becomes an invaluable assistant.

  The following AI-functionalities are required for GAM processes: prefilling GAM online reporting tool fields with specific automatically retrieved information; helping UNAIDS experts to quickly find the relevant information from auxiliary sources to validate the reported data; extracting the tables from various PDF documents to UNAIDS internal repository to enable efficient search with predefined keywords.
- UN Entity Name: UNAIDS
- Entity Name: UN Joint Programme on HIV and AIDS
- Department/Division: Strategic Information Department
- Project Type/Output: Dataset, The AI is intended to be used to improve data validation process and to enrich the dataset on AIDS.
- Project Status: Ongoing
- Project Start Year: 2021
- Projected End Year: 2022
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project updates: Project has started in September 2021 with an inception phase where the case scenarios and the applied methodologies are described, and the AI summarizer content is defined. The inceptions phase IDs completed by end October and the next

step is to implement it for the selected datasets. Several pilot runs of AI searches to fill specific data gaps. The searches returned many results but few were useful for real-time tracking of the HIV epidemic.

- Project Domain: Health
- Data Source: Aggregate data on health and HIV related issues.
- Link to data: https://aidsinfo.unaids.org
- Technology/Platform: Apache Solr or Elastic Search, coupled with a language model, e.g. BERT or GPT-2. Other technologies applicable for retrieving information from documents are AI-models for text (OCR, optical character recognition) extraction and table extraction.
- Related Sustainable Development Goals (SDGs): SDG 3 – Good Health and Well-Being ; SDG 10 – Reduced Inequalities
- Contact information: Taavi Erkkola (erkkolat@unaids.org)

## 2. Related Sustainable Development Goals

SDG 3, 10

## 3. Relevant Links

https://www.unaids.org/en

Contact Information

Keith Sabin (SabinK@unaids.org)

# United Nations Conference on Trade and Development

## 1. Description of Activities on AI

### Project 1: Industry 4.0 for inclusive development

- Project Description: The world is at the beginning of a new technological revolution based on industry 4.0 technologies such as artificial intelligence, robotics and the Internet of things. In addition, the impact of and response to the coronavirus disease (COVID-19) pandemic have accelerated the dissemination of such digital technologies. At its twenty-fourth session, in May 2021, the Commission on Science and Technology for Development (CSTD) selected "Industry 4.0 for inclusive development" as one of its two priority themes for the 2021–2022 intersessional period. This priority theme is relevant with regard to Sustainable Development Goal 9 on industry, innovation and infrastructure. To contribute to a better understanding of this theme and to assist CSTD in its deliberations at its twenty-fifth session, the CSTD secretariat has prepared this study based on relevant literature and country case studies contributed by CSTD members. The study builds in particular on the analysis and empirical evidence in two recent United Nations publications, namely Technology and Innovation Report 2021: Catching Technological Waves – Innovation with Equity , which examines how the development and diffusion of frontier technologies affect and are affected by socioeconomic inequalities; and Industrial Development Report 2020: Industrializing in the Digital Age of the United Nations Industrial Development Organization, Which focused on the emergence and diffusion of the advanced digital production technologies of industry 4.0 and their impact on the industrialization process in developing countries. Questions addressed in this study include: How can developing countries take advantage of the window of opportunity presented by industry 4.0 for technological upgrading and economic catch-up? What can Governments do to ensure that industry 4.0 does not increase inequality? What is the role of international cooperation in facilitating this process?
- Department/Division: Technology, Innovation and Knowledge Development Branch/ Division of Technology and Logistics
- Project Type/Output: Publication
- Project Status: Completed
- Project Start Year: 2021
- Project End Year: 2022
- Reported as part of 2021 Compendium on UN AI Activities? No
- Project Updates: Project was completed.
- Project Domain: Telecommunications; Inequalities; Sustainable development; Technological gaps
- Data Source: Contributions from member states and the UN System..
- Publicly available data: Yes.
- Related Sustainable Development Goals (SDGs): SDG 8 – Decent Work and Economic Growth; SDG 9 – Industry, Innovation, and Infrastructure; SDG 10 – Reduced Inequalities; SDG 17 – Partnerships for the Goals

- Links and Multimedia: https://unctad.org/webflyer/industry-40-inclusive-development;
- Contact information: Clovis Freire, (freire@un.org)

### Project 2: Frontier technology adoption in developing countries: A measurement framework and proposed questionnaire

- Project Description: The report aims to present a measurement framework for collecting and interpreting information on the adoption of new and emerging technologies, including artificial intelligence, by business sector firms in developing countries. The report provides guidelines for both manufacturing and service sector firms. It does not cover non-market oriented public sector enterprises (health, education, public administration), although it does cover government-controlled or owned enterprises operating in market-oriented business sectors. Nor does the report address the specific conditions of agriculture – which in most developing countries is dominated by smallholders and would require a survey framework adapted to their specific conditions. It does, however, cover agro-industry (food products, beverages, and tobacco). The report recommends collecting information on the adoption and use of new technologies at the level of the establishment, local business unit or site as opposed to the level of the enterprise or enterprise group. In many cases, and especially for micro and small enterprises (MSEs), the establishment and enterprise levels will be the same. The report does not address adoption at the levels of sectors, regions, or nations though it may be possible in some cases to aggregate data to estimate adoption patterns at a higher level.
- Department/Division: Technology, Innovation and Knowledge Development Branch/ Division of Technology and Logistics
- Project Type/Output: Publication
- Project Status: Completed
- Project Start Year: 2021
- Project End Year: 2022
- Reported as part of 2021 Compendium on UN AI Activities? No
- Project Updates: Project was completed.
- Project Domain: Telecommunications; Inequalities; Sustainable development; Technological gaps
- Data Source: N/A.
- Publicly available data: N/A.
- Related Sustainable Development Goals (SDGs): SDG 8 – Decent Work and Economic Growth; SDG 9 – Industry, Innovation, and Infrastructure; SDG 10 – Reduced Inequalities; SDG 17 – Partnerships for the Goals
- Links and Multimedia: https://unctad.org/system/files/official-document/dtlstict2021d5_en.pdf;
- Contact information: Clovis Freire, (freire@un.org)

### Project 3: Firm-level survey on the adoption of frontier technologies in Ghana

- Project Description: Frontier technologies are transforming production systems, economic and social interactions and determining competitiveness domestically and globally. Developing countries must make effort to harness frontier technologies for socio-economic and sustainable development. They need to put in place the necessary policies and strategies to ensure that frontier technologies, including Artificial Intelligence (AI), Internet of Things (IoT), big data, 3D printing, nanotechnology, robotics and others, are effectively adopted in the economy and society. However, policy formulation and strategizing for adoption of frontier technologies must be evidence-based. Yet, there is a lack of information on the patterns of adoption and use of frontier technologies in the productive sectors of the developing countries (Lorenz and Kraemer-Mbula, 2021).

In line with UNCTAD's mandate to assist developing countries with technology and innovation policy formulation, a pilot study was conceptualized to provide data on the firm-level adoption of frontier technologies in Ghana. This survey was designed to be carried out also in South Africa and Tunisia. The overall goal of the firm-level survey is to gather data from firms on the adoption of frontier technologies in the productive sectors of the economy.

- Department/Division: Technology, Innovation and Knowledge Development Branch/ Division of Technology and Logistics
- Project Type/Output: Survey
- Project Status: Completed
- Project Start Year: 2021
- Project End Year: 2022
- Reported as part of 2021 Compendium on UN AI Activities? No
- Project Updates: Project was completed.
- Project Domain: Telecommunications; Inequalities; Sustainable development; Technological gaps
- Data Source: firm-level survey.
- Publicly available data: The data will be make available at the UNCTAD website.
- Related Sustainable Development Goals (SDGs): SDG 8 – Decent Work and Economic Growth; SDG 9 – Industry, Innovation, and Infrastructure; SDG 10 – Reduced Inequalities; SDG 17 – Partnerships for the Goals
- Links and Multimedia:
- Contact information: Clovis Freire, (freire@un.org)

### Project 4: Side event on "AI strategies for inclusive and sustainable development" at Twenty-fifth annual session United Nations Commission on Science and Technology for Development (CSTD), 29 March 2022

- Project Description: The objective of the side event was to discuss the formulation and implementation of national strategies for promoting the deployment of AI in productive sectors and the development of AI capabilities for inclusive and sustainable development. The side event will seek to address the following questions: How governments have approached the formulation of their national AI Strategies? How these strategies have promoted the development of capabilities in AI? How they seek to ensure that AI does not increase inequalities? What are the governance mechanisms adopted to implement the AI strategy? What is the role of international cooperation in supporting national AI strategies?
- Department/Division: Technology, Innovation and Knowledge Development Branch/ Division of Technology and Logistics
- Project Type/Output: Meeting
- Project Status: Completed
- Project Start Year: 2022
- Project End Year: 2022
- Reported as part of 2021 Compendium on UN AI Activities? No
- Project Updates: Project was completed.
- Project Domain: Telecommunications; Inequalities; Sustainable development; Technological gaps
- Data Source: N/A.
- Publicly available data: N/A

- Related Sustainable Development Goals (SDGs): SDG 8 – Decent Work and Economic Growth; SDG 9 – Industry, Innovation, and Infrastructure; SDG 10 – Reduced Inequalities; SDG 17 – Partnerships for the Goals
- Links and Multimedia: https://unctad.org/meeting/25th-cstd-side-event-ai-strategies-inclusive-and-sustainable-development ;
- Contact information: Clovis Freire, (freire@un.org)

## 2. Relevant Sustainable Development Goals (SDGs)

SDGs 8, 9, 10 and 17

## 3. Relevant Links

www.unctad.org

Contact Information

Mr. Angel González Sanz, Chief, Technology, Innovation and Knowledge Development Branch/Division of Technology and Logistics , Division on Technology and Logistics (angel.gonzalez-sanz@un.org)

# United Nations Department of Economic and Social Affairs

## 1. Description of Activities on AI

### Project 1: Use of Complex Network Mappings Development for Digital Government

- Project Description: The United Nations E-Government Survey is produced every two years and is a flagship publication of UN DESA. It presents the ranking of e-government development across 193 United Nations Member States by assessing e-government development according to a quantitative composite index based on Online Service, Telecommunication Infrastructure, and Human Capital Indices. It provides decision makers with information that enables them to identify their areas of strengths and challenges, as well as suggested options on how best to move ahead.

  In 2022, UN DESA hired a consultant to conduct a pilot study using the science of complex systems to expand the analysis of factors affecting countries' e-government development beyond income level and test a complex network analysis model to address possible inequalities and biases adherent to rankings and find as yet unidentified similarities and differences between the Member States. The following section provides details on methodology of complex networks model used for the UN DESA pilot study conducted by Roberto Bellotti, Professor in Applied Physics and Director of the Physics Department of the University of Bari, Italy. More detailed information on the study and its findings is available on UNDESA Egovknowledge base.

  The data set used for the analysis consisted of 305 World Development Indicators (WDIs) relating to health, economy, society and environment and 214 SDG indicators characterizing the general development level of each Member State. The SDG indicators have acquired a decisive role in the characterization of the 193 UN Member States as they allow to represent the general conditions for development of each nation in a multifaceted way, providing additional and complementary information to the WDIs, especially in strategic areas relevant to EGDI: access to electricity, mobile networks coverage, and the number of fixed internet broadband subscriptions, to name a few. Selection of indicators followed the criteria of data availability, consistency, and non-redundancy. The reference year for data is 2020, with missing values filled up with data from 2019 and 2018 to represent a snapshot of the current situation.
- Entity Name: Digital government Branch.
- Department/Division: DESA – Division for Public Institutions and Digital Government
- Project Type/Output: Report/Academic paper/Software tool/Seminar/meeting
- Project Status: Development
- Project Start Year: 2019
- Project End Year: Continuous
- Reported as part of 2020 Compendium on UN AI Activities? Yes
- Project Domain: This is a cross-cutting project covering most fields, as it is about effective Governments and Public Institutions, Digital transformational and Digital Development for sustainable development.
- Data Source:

  - World Development indicators (WDI) – World Bank Group
  - E-government Development Index (EGDI) – UN-DESA
  - Link to data: https://publicadministration.un.org/egovkb/en-us/Data-Center; https://databank.worldbank.org/source/world-development-indicators

- Publicly available data: Yes
- Technology/Platform: Python: libraries on machine learning and complex network analysis
- Related Sustainable Development Goals (SDGs): SDG 8 – Decent Work and Economic Growth, 9 – Industry, Innovation and Infrastructure, 10 – Reduced Inequalities, and 16 – Peace, Justice and Strong Institutions
- Partnership(s)/Collaborator(s):
  - Academia: University of Bari – Italy - Department of Physic Scientific Partner
- Links: https://publicadministration.un.org/en/Research/UN-e-Government-Surveys; https://www.nature.com/articles/s41598-020-74964-3 -Scientific publication as starting point for this pilot project.
- Lessons Learned: Grouping the countries into four development clusters using complex network analysis enables to reinterpret the level of e-government development of the UN Member States and their E-Government Development Index (EGDI) ranking considering their starting conditions, as well as their mutual similarities and differences. By comparing the countries EGDI values both within the same cluster, and between different clusters it is possible to identify top-of the-class countries, whose performance goes beyond the expectations based on their development status, and room-for-improvement countries, that have the potential to reach their cluster peers in the EGDI ranking by increasing their efforts. For top-of-the-class countries their EGDI values are above the 75th percentile of the cluster they belong to, and, at the same time, they are above the 25th percentile of at least one development cluster above. By the same token, for room-for-improvement countries the EGDI values are below the 25th percentile of the cluster they belong to and, at the same time, are below the 75th percentile of at least one developed cluster below.

  The study also identified the benchmark countries, regarded as the best cases compared to the rest of the world, and trailing countries, which would need specific support to improve their condition in areas relevant for EDGI ranking. Benchmark countries are characterized by an EGDI values above the 75th percentile of the distribution within cluster I, while trailing countries have EGDI values falling below the 25th percentile of the distribution within cluster IV. I.
- Contact information: Vincenzo Aquaro (aquaro@un.org) & Deniz Susar (susar@un.org)

### Project 2: Fast-evolving technologies in e-government: Government Platforms, Artificial Intelligence and people

Chapter 5 - The Future of Digital Government: Trends, Insights and Conclusions, within the United Nations E-Government Survey 2022 discusses evolving technologies and new approaches in digital government. It covers cognitive government, agile and adaptive government, seamless government.

- Project Type (Status): Other (Other)
- Project Domain: UN E-Government Survey 2022
- AI Approach: Publication
- Related SDGs: All SDGs, specifically SDG 16 Peace, Justice and Strong Institutions
- Membership or Secretariat-driven: Both
- Project Website (links): https://publicadministration.un.org/egovkb

- Resources/Skills: The need for data is nothing new but the ways in which data are created and used have changed dramatically in recent years, bolstered by the revolution in data technologies and the proliferation of applications of different types and forms of data, including small and big data, real-time data and geospatial data. The current COVID-19 pandemic also reinforces the centrality of data -- how governments and businesses handle data, as it turns out, is a crucial part of their pandemic response. Learn more about open government data development, policy and institutional trends on government data sharing, exchange and interoperability, as well as data security, privacy and ethics; and recommendations on national data leadership and data governance framework.
- Technology: Publication
- Challenges: Developing indicators to measure how AI is used in public administration
- Contacts: Vincenzo Aquaro (aquaro@un.org) & Deniz Susar (susar@un.org)

### Project 3: National and Local Surveys of Digital Government Branch

To prepare for the production of United Nations E-Government Surveys, the Digital Government Branch conducts a national survey called Member States Questionnaire (MSQ) at the national level, and a city level survey called Local Government Questionnaire (LGQ) at city level. Both surveys include questions on artificial intelligence;

National Level

- Does the national e-government strategy make specific reference to the use of new/ emerging technologies such as artificial Intelligence (AI), robotics, blockchains, 5G and Internet of Things (IoT)? *

Local Level

- Do you have a specific city/municipality strategy on the following new technologies? (e.g., Artificial Intelligence, IoT, Blockchain, Smart City, 5G, Virtual/Augmented Reality, Robotics, 3D Printing)
- Does your city/municipality strategy plans for the use of big data analytics in their decision-making processes? Please explain further and provide links.
- Project Type (Status): Other (Other)
- Project Domain: UN E-Government Survey 2022
- AI Approach: Publication
- Related SDGs: All SDGs, specifically SDG 16 Peace, Justice and Strong Institutions
- Membership or Secretariat-driven: Both
- Project Website (links): https://publicadministration.un.org/egovkb
- Technology: Publication / Data
- Challenges: Developing indicators to measure how AI is used in public administration
- Contacts: Vincenzo Aquaro (aquaro@un.org) & Deniz Susar (susar@un.org)

### Project 4: TFM findings on the impacts of rapid technological change on the SDGs

New and rapidly changing technologies, such as artificial intelligence, robotics and other automation technologies hold great promise for making accelerated progress towards the Sustainable Development Goals, but also pose formidable challenges in all of the SDG dimensions. Against this background, the UN General Assembly has called upon the TFM in

repeated resolutions to present their updated findings to the Annual Multi-stakeholder Forum on Science, Technology and Innovation for the SDGs.

- Project Type (Status): Research/Study paper (Recurring event)
- Project Domain: New technologies, including AI
- AI Approach/Activity: Findings are crowdsourced from TFM partners and scientific and technological communities, through calls for inputs (policy briefs and research papers), leveraging institutional networks, university partnerships and meetings. In particular, a series of UN expert group meetings on AI since 2016 have provided a convergent series of general policy recommendations, upon which recommendations for specific issues elaborate.
- Datasets: Scientific data provided by contributors and volunteers. Database under development
- Related SDGs: SDG 17 Partnerships for the Goals
- Project Partners: DESA, IATT, 10-Member Group, TFM partners, Universities
- Project Website (links): https://sustainabledevelopment.un.org/tfm
- Resources/Skills: Mainly volunteer work; knowledge of technologies developments, sustainable development models and pathways.
- Technology: UN platform
- Challenges: Key challenges have been the vast scope of the exercise, limited resources, and large expectations. However, a series of lessons-learnt have been identified and important support provided to various reports. Present work in 2020 focuses on the environmental impacts of AI.
- Contacts: Mr Richard A Roehrl, Senior Economic Affairs Officer (roehrl@un.org)

### Project 5: Exploring the impacts of new Internet applications and AI on the global energy system

New Internet applications and especially AI technologies have become a rapidly increasing source of energy demand but have also greatly shaped the opportunities for smart and cleaner energy systems. This project reviews what is known and what might be potential policy responses to these trends in the future.

- Project Type (Status): Research/Study paper (Ongoing)
- Project Domain: AI and Energy
- AI Approach/Activity: Desk study and expert surveys
- Datasets: (Under development)
- Related SDGs: SDG 7 Affordable and Clean Energy, SDG 9 Industry, Innovation and Infrastructure, SDG 17 Partnerships for the Goals
- Project Partners: DESA, IATT, 10-Member Group, Other experts
- Project Website (links): https://sustainabledevelopment.un.org/tfm
- Resources/Skills: Expert knowledge, volunteer work, and scientific networking skills. UNDESA 38 United Nations Activities on Artificial Intelligence (AI)
- Challenges: A key challenge has been the identification of work that exists in fragmented forms in various disciplines and both in academia and private sector. Hence, interdisciplinary expert surveys are key to their identification. Furthermore, a common technical terminology is needed.
- Contacts: Mr Richard A Roehrl, Senior Economic Affairs Officer (roehrl@un.org)

### Project 6: IEEE/UN Event series

Training and outreach event on technology, policy, ethics and engagement of AI and other new technologies.

- Project Type (Status): Event (Concept note)
- Project Domain: New technologies, including AI: technology, policy, ethics and engagement
- AI Approach/Activity: Webinar series
- Datasets: IEEE datasets
- Related SDGs: SDG 17 Partnerships for the Goals
- Project Partners: DESA, IEEE, TFM partners
- Resources/Skills: Expert knowledge.
- Contacts: Mr Richard A Roehrl, Senior Economic Affairs Officer (roehrl@un.org)

### Project 7: Long-term AI and technology scenarios for the SDGs

Long-term technology scenarios are routinely used to explore feasible technology pathways to tackle big global challenges, such as climate change and biodiversity. While an increasing number of them assume significant new opportunities due to AI, most of them do not make any effort to quantify these effects in both positive and negative terms. This initiative aims to explicitly account for AI and potential future AI technology developments based on existing technology development data. It also provides inputs for the mandated discussions of long-term future scenarios and the impact of current trends in the high-level segment of ECOSOC each year.

- Project Type (Status): Research/Study paper (Recurring event)
- Project Domain: AI scenarios
- AI Approach/Activity: Scenario analysis
- Datasets: Various scientific and technological data sources
- Related SDGs: SDG 7 Affordable and Clean Energy, SDG 13 Climate Action, 17 Partnerships for the Goals
- Project Partners: DESA, TFM partners
- Project Website (links): https://undocs.org/e/2020/60
- Resources/Skills: Scenario analysis, technology change, AI techs
- Technology: Various scenario models
- Challenges: A challenge is the linking to the national level and national level AI scenarios (where they exist)
- Contacts: Mr Richard A Roehrl, Senior Economic Affairs Officer (roehrl@un.org)

### Project 8: Guidebook on AI ethics for government and development practitioners

While there are hundreds of publications and proposed AI ethics frameworks and codes of conduct by scientific and engineering communities, as well as an UNESCO initiative on AI ethics, little practical United Nations Activities on Artificial Intelligence (AI) 39 guidance exists for governments and development practitioners, especially guidance that is fully based on a balanced scientific and technological understanding. The guidebook aims to fill this gap.

- Project Type (Status): Report (Ongoing)
- Project Domain: AI ethics

- AI Approach/Activity: Collaborative product developed by academics working on AI ethics with practical experience
- Related SDGs: SDG 9 Affordable and Clean Energy, SDG 16 Peace, Justice and Strong Institutions, SDG 17 Partnerships for the Goals
- Project Partners: DESA, TFM partners
- Challenges: A key challenge is the translation of technical specificities into practical, easy understandable guidance for practitioners.
- Contacts: Mr Richard A Roehrl, Senior Economic Affairs Officer (roehrl@un.org)

### Project 9: TFM online platform

The TFM online platform was mandated to provide a single-entry point for technology information.

- Project Type (Status): Software project (Deployed)
- Project Domain: Online platform for information on technologies and SDG knowledge
- AI Approach/Activity: Gateway to networks of curated SDG-related technologies and knowledge from UN and non-UN resources
- Related SDGs: All SDGs
- Project Partners: DESA, OICT, UNCTAD, 10-Member Group, and an increasing number of other partners (see website)
- Project Website (links): https://tfm2030connect.un.org/
- Challenges: Further development of content and operational support work.
- Contacts: Ms Stephanie Rambler, Sustainable Development Officer (rambler@un.org)

### Project 10: Guidebook to resources on AI strategies (supplement to the IATT Guidebook on STI roadmaps for the SDGs)

While there is an increasing number of AI strategies and an exponentially increasing number of publications on AI, government officials and development practitioners alike could benefit from a trusted, curated and annotated list of written resources on the various aspects of AI.

- Project Type (Status): Report (Ongoing)
- Project Domain: Curated listing of AI publications
- AI Approach/Activity: Curated and annotated list of publications on the various aspects of AI, in support of STI roadmaps for the SDGs
- Related SDGs: SDG 17 Partnerships for the Goals
- Project Partners: DESA, IATT
- Challenges: Curation and selection of most important publications and other resources on the various aspects of AI strategies.
- Contacts: Mr Wei Liu, Sustainable Development Officer (liuw@un.org)

### Project 11: FAO-UNSD project using satellite data and farm surveys to estimate crop statistics

The project aims to identify crops, map crop areas and estimate crop yield using satellite data and farm surveys.

- Project Type (Status): Software product (Development)
- Project Domain: Agriculture

- AI Approach/Activity: Supervised Machine Learning uses random forests and support vector machines – Datasets: Satellite data and Farm surveys
- Related SDGs: SDG target 2.4
- Project Partners: FAO
- Membership/Secretariat-driven: Driven by UNSD and FAO
- Resources/Skills: We work with highly skilled data scientists, statisticians and computer engineers of international and national statistical agencies.
- Technology: UN Global Platform, https://marketplace.officialstatistics.org/earth-observation
- Challenges: While providing service through a Cloud-based environment, the biggest challenge is still making the tools and applications useful to national statistical agencies in developing countries by lowering the entry level of required technological knowledge.
- Contacts: Mr Ronald Jansen, Chief of Data Innovation and Capacity Branch, Statistics Division (jansen1@un.org)

### Project 12: Estimating Port Calls using AIS vessel tracking data

The project aims to identify ships which are entering and leaving a port (by vessel type) using AIS vessel tracking data AIS data are real-time data of ship positioning. This is obtained as a global feed.

- Project Type (Status): Software product (Development)
- Project Domain: Maritime Transport
- AI Approach/Activity: Supervised Machine Learning uses random forests to estimate vessel types and carrying capacities
- Datasets: AIS vessel tracking data (https://comtrade.un.org/data/cache/AISdashboardMethodology.pdf)
- Related SDGs: SDG target 9.1
- Project Partners: UNCTAD, University of Oxford, ONS (UK)
- Membership/Secretariat-driven: Driven by UNSD – Project Website (links): https://marketplace.officialstatistics.org/ais-weekly-port-calls;
- Resources/Skills: We work with highly skilled data scientists, statisticians and computer engineers of international and national statistical agencies, and research institutes.
- Challenges: UN Global Platform, see https://marketplace.officialstatistics.org/ais-data.
- Contacts: Mr Markie Muryawan, Chief of Trade Statistics Section, Statistics Division (Muryawan@un.org, +1 212 963 3083) United Nations Activities on Artificial Intelligence (AI) 41

### Project 13: LinkedSDG

A demo app that automatically extracts key concepts related to sustainable development from text documents and links them to the most relevant sustainable development goals, targets, indicators and series.

- Project Type (Status): Software product (Full-fledged development)
- Project Domain: SDG ontology – AI Approach/Activity: This uses Semantic Web technologies and ontologies, which is a subfield of AI and Computer Science research
- Datasets: Sustainable Development Goals Taxonomy (http://metadata.un.org/sdg/?lang=en)
- Related SDGs: All SDGs
- Project Partners: DESA - Division for Sustainable Development Goals

- Membership/Secretariat-driven: Driven by DESA – Project Website (links): http://linkedsdg.apps.officialstatistics.org/#/; https://sustainabledevelopment.un.org/LinkedSDGs/about
- Resources/Skills: Statisticians and computer engineers of DESA
- Technology: UN Global Platform
- Contacts: Mr Luis Gonzalez Morales, Chief of Web Development and Data Visualization Section, Statistics Division (gonzalezmorales@un.org, +1 212 963 0692)

## 2. Related Sustainable Development Goals (SDGs)

All SDGs

## 3. Relevant Links

https://www.un.org/development/desa/en/

Contact information

Vincenzo Aquaro (aquaro@un.org)

# United Nations Development Programme

## 1. Description of Activities on AI

### Project 1: Increasing AI capability

- Project Description: From big data to machine learning, digital technologies are transforming our world. In 2020, UNDP launched a new Digital Strategy to enhance its support governments in adapting to this rapidly-changing environment - including by building digital capacity within the Organization. The strategy seeks to increase understanding of digital technologies and how they can be used to achieve the Sustainable Development Goals, as well as the risks and trade-offs that come with them.

  AI is a key element of the strategy, as a tool for equitable and accessible digital responses and UNDP has been nurturing AI projects as well as investing in the data foundations needed to harness its potential. In parallel, UNDP is working on ways to manage the unique ethical issues that arise from deploying AI in an international development context. This work is coordinated by the Chief Digital Office - working closely with all UNDP bureaux and offices.

  Three projects currently in development are focused on increasing AI ability - internally and externally:

  AI readiness tool for stakeholders: building on UNDP's Digital Readiness Assessment piloted, CDO is developing an assessment focused on AI. The tool will provide insights into AI understanding and capacity, strategy and planning, and implementation and evaluation using indicators such as vision, governance, ethics, innovation, infrastructure, data availability, human capital, inclusivity, transparency and accountability. It will also foster engagement across government and with stakeholders, including the private sector and civil society.

  AI chatbot for guiderails: a key part of UNDP's digital transformation is the governance of data at all levels. The aim is to engage staff in developing norms, standards and policies and empower them to adopt a 'self-service' approach to governance. To this end, CDO is working on guiderails for data lifecycle management. Rather than being confined to documents, CDO is developing a chatbot to encourage, simplify and enhance their use.

  Machine tagging of projects: to support more effective use of data, the Bureau of Programme and Policy Support is using natural language processing tools to read project descriptions and classify projects into categories of thematic topics, based on supervised machine learning algorithms.
- Department/Division: Chief Digital Office
- Project Type/Output: digital assessment tool, software tool and dataset
- Project Status: Development
- Project Start Year: 2021
- Data Source: open and closed government data, survey data, UNDP project data
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 16 – Peace, Justice, and Strong Institutions; SDG 17 – Partnerships for the Goals

- Partnership(s)/Collaborator(s):
  - Government: AI readiness assessment will be made available to all
  - Private Sector: TBC
  - Civil Society: TBC
  - Academia: TBC
- Relevant Links and Multimedia: www.digitalstrategy.undp.org
- Contact information: Gayan Peiris (gayan.peiris@undp.org)

### Project 2 – AI models to enhance targeting of poverty alleviation interventions

- Project Description: To enhance targeting of poverty alleviation interventions, UNDP Philippines partnered with Thinking Machine and Zero Extreme Poverty PH, a coalition of Philippine NGOs with a presence in 400 cities and municipalities nationwide.

  Traditionally, poverty assessments are informed by on-the-ground surveys. These are necessary but also have limitations. They are usually conducted every three to five years and cost millions of dollars with each round. Designed to interview only a representative sample of the population, they often exclude dangerous and inaccessible areas of interest. With the labour, cost, and incompleteness of surveys, it is difficult to get a complete map of poverty in (near) real time.

  Thinking Machine had previously developed a deep learning model that used satellite data of nighttime lights to approximate wealth. However, while cheaper than a survey, it was still expensive - requiring access to satellite images and intensive compute resources for every run. The model also lacked detail, producing a wealth prediction but without showing why an area was classified as wealthy or poor.

  To overcome these challenges for UNDP, they used open geospatial datasets that together provided insights into geographic features, points of interest (e.g. banks, restaurants, shops) and Facebook users (e.g. using 4G, 3G or 2G access, WIFI, Apple, consumer preferences). These datasets were then merged with demographic and health surveys, and machine learning was applied to predict the wealth indices of all locations in the Philippines.

  While the model is dependent on costly and randomly sampled surveys, the data has full nationwide coverage – which can fill in spatial gaps for measuring poverty across the whole country. Rolling out wealth estimates for the whole population at a negligible cost, at a national scale, in a matter of minutes is now possible.

  A granular map was also created, enabling users to zoom into specific areas to see what resources are accessible to them. UNDP overlaid the map with the locations of their NGO partners to determine their proximity to the most vulnerable areas. Other layers such as other vulnerability indicators and COVID cases could also be added.
- Project Type/Output: The product after project completion: datasets and software tool
- Project Status: Completed
- Project Start Year: 2020
- Project End Year: 2020
- Project Domain: Poverty
- Data Source: satellite data, demographic data
- Technology/Platform:
  - Google Earth Engine - a platform for downloading and processing satellite images
  - QGIS - an open-source GIS desktop application
  - GeoPandas - an open-source Python module for wrangling geospatial data
  - OpenStreetMap - a crowd-sourced geospatial data platform

- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 1 – No Poverty; SDG 10 – Reduced Inequalities; SDG 17 – Partnerships for the Goals
- Partnership(s)/Collaborator(s):
    - UN Partners: UNDP Philippines
    - Private Sector: Thinking Machine
    - Civil Society: Zero Extreme Poverty
- Relevant Links and Multimedia: https://stories.thinkingmachin.es/poverty-mapping-artificial-intelligence/
- Contact information: Selva Ramachandran (communications.ph@undp.org)

### Project 3: SURGE Data Hub

- Project Description: The SDH helps UNDP Country Offices provide governments with human-centered data for evidence-based decision-making that ensures no one is left behind in crisis response and recovery. The Hub ensures decision-makers have access to evidence and insights that reveal the true cost and impact that fragility and shocks have on people's lives.

  SDH was created in 2020 building on previous individual UNDP initiatives such as the HBDA and the Digital Socio-Economic Impact Assessment (SEIA) tools, to provide a comprehensive, structured, and institutionalized solution in UNDP (and partners) for end-to-end digital assessments in crisis. The Crisis Bureau developed these tools, making use of available technologies and building on the existing assessment offer in the humanitarian and development sector.

  SDH seeks to facilitate rapid end-to-end digital assessments remotely for Country Offices in crisis all over the globe—in time zones that are convenient and in languages they understand. Since its inception we have supported over 45 countries across five regions in partnership with national counterparts to carry out digital assessments for decisions about recovery programming (e.g., debris and waste management, emergency employment etc.) and advanced data analysis to address underlying causes of vulnerability and fragility.

  SDH is powered through the UNDP Crisis Bureau Country Support Management Team (CSMT). To roll out the tools in a fast-paced and effective fashion, CSMT established a Remote Support Unit (RSU) that provides targeted technical support with local language and context knowledge on planning and implementing digital assessments. It includes experts in Information Management, Economics, Statistics, Data analysis, and Systems.

  In addition, SDH has developed a training programme to strengthen UNDP practitioners' skills in digital assessments to enhance COs analytical capabilities. We seek to invest in people and nurture a community of 800+ practitioners to generate internal transformation and bring about change with national counterparts through a corporate culture of data and evidence-based decision-making.

  To uphold our shared ambition under Agenda 2030, SDH offers a bold new approach to knowing what's going on in the world through data, ensuring vulnerable populations aren't overlooked in policy-making decisions after crisis.
- Department/Division: Crisis Bureau
- Project Type/Output: Report; Data set; Software tool
- Project Status: Ongoing
- Project Start Year: 2020
- (Projected) End Year: Undefined
- Project Domain: Crisis
- Data Source: Primary data collection through digital assessments (and surveys).

  - HBDA collects digital and georeferenced data on damages, for public and private buildings, and captures socio-economic indicators on Health, Food Security, Education, and WASH at the household level. HBDA have also been expanded through additional modules that collect other data, such as Micro/Informal SME, impact in inventories and sales, available coping mechanisms or support received, and other aspects of business needs.
  - Digital SEIA allows impact assessment of the crisis on vulnerable households and micro, small and medium enterprises. In most of the cases, the focus is on the impacts of COVID-19. Households' assessments can target specific population groups within a country (e.g. refugees and IDPs, informal settlements, women and girls). MSMEs assessments allows for analysis of small business, the socio-economic situation of the workers, and can include gender, risk reduction, and other dimensions for a tailored intervention.
  - The tools can be adapted to focus on specific categories, particularly by modifying the Household section and adding, wherever relevant, issues of concern pertaining to vulnerable groups, economic sectors, or geographical areas. Through innovative tools and open-source software, customized assessments can dig deeper into a thematic area or specific indicators for both holistic and segmented views of impact.
  - The tools also lend themselves to the integration of innovative solutions and aggregation of secondary data analysis and resources, including big data (i.e. sentiment analysis) and satellite imagery. For instance, assessments have been carried out with social media trend analysis and sentiment analysis from Twitter posts.

- Reported as part of 2021 Compendium on UN AI Activities? Yes, the project was featured as part of the 2021 Compendium on UN AI Activities under its previous format and name: Integrated Digital Assessments.
- Project Updates:
  - Household Building Damage Assessment (HBDA), piloting in Philippines, working in with the Disaster Risk Reduction & Recovery for Building Resilience at the Asia Pacific Regional Hub, the SDH and the UNDP Philippines CO. The goal is to harmonize the Early Recovery Needs Assessment (ERNA), Rapid Damage Need Assessment (RDNA), the HBDA and iPDNA, on indicators glossary, data exchange and data analyses. The need to integrate different assessments implemented after a crisis is crucial to avoiding overlap and maximizing efficiency to address challenges in the field.
  - Another new initiative is the interagency Global Data Access Initiative (GDAI). This project is coordinated from the UNDP's Chief Digital Office (CDO), with the technical lead of the SDH. The project is in the design phase, and in collaboration with UN Global Pulse, World Food Programme and McKinsey, will add value by leveraging data on risk reduction, risk management, response and recovery. The project is expected to have the first pilots of Minimum Scalable Product (MSP) in 2022.
- Related Sustainable Development Goals (SDGs): SDG 1 – No Poverty; SDG 10 – Reduced Inequalities; SDG 16 – Peace, Justice, and Strong Institutions; SDG 17 – Partnerships for the Goals
- Partnership(s)/Collaborator(s): All assessments can be conducted across the globe – in all UNDP regions – with access to additional data sources at scale. To support the process, SDH engages partners at the local and global levels, including government authorities, NGOs/CSOs, private sector organizations and UN agencies.

- UN Partners: SDH has worked and will continue working to build strong synergies with relevant actors in the UN system for instance with the UN Big Data Working group, WFP, UN Global Pulse, and the OCHA-UNDP Connecting Business Initiative
- Government: By design, SDH works to support national authorities, INSTAT offices, civil protection and emergency units, Ministries, and works in collaboration with partners at country and local level.
- Private Sector: REACH-IMPACT Initiatives
- Civil Society: Engineers Without Borders
- Academia: Qatar Computing Research Institute

- Links and Multimedia
  - Twitter
  - Medium
  - Website
  - Blogs:
    - Suriname's Indigenous community "continue to hope and believe" despite devastation from COVID-19
    - #Data4Development
    - How human-centred data is helping make evidence-based decisions post-Easter Floods
    - From disaster to recovery: this is the 360 reconstructions of the archipelago of San Andrés, Providencia and Santa Catalina
  - Videos:
    - Household and Building Damage Assessment in Equatorial Guinea
    - Paris Peace Forum - Digital SEIAs
  - Images:
    - SURGE Data Hub Images

- Lesson Learned
  - The project has underscored the importance of building internal and external capacity for digital end-to-end digital assessment and data literacy across organizations. SDH has designed a Household and Building Damage Assessment (HBDA) training programme and has already certified more than 300 UNDP staff and partners.
  - Partnerships for development and implementation are also important. This includes the need for digital infrastructure, digital frameworks as well as data-sharing protocols with external partners, and further building on synergies with other initiatives in the UN system.
  - Further action is needed to create an enabling environment for digital innovation, in terms of appropriate resources, operating frameworks, and partnerships development. Additional support is needed for developing innovative partnerships with the private sector on data, digital, and infrastructure development. This could be achieved by fostering engagement with external partners, supporting collaboration models with appropriate resources, attracting investment, and actively supporting risk mitigation.

  - UNDP COs should be further empowered, through mechanisms and support that builds their capacity to inform governments about UNDP's digital offer, to use existing data and analyses, and to offer their owned datasets and analyses. This could include a common regulated framework, clear protocols of data exchange and the necessary digital infrastructure.
  - UNDP could also be better positioned - playing an active role in clusters, and among other agencies, to make sure data can be one of drivers toward HDP Nexus.
- Contact information: Fabjan Lashi, Project Manager (Fabjan.lashi@undp.org)

### Project 4 – Mexico - New approaches to accountability and governance

- Project Description: Evaluating what works is a vital part of governance and at the centre of SDG 16. Yet monitoring implementation and impact is often neglected by innovators preoccupied with designing new solutions.

  In Mexico, the Accelerator Lab is trailblazing new approaches to address this gap, using novel collective intelligence methods (such as text mining of new data sources) to help the Government better evaluate what's working. Two early-stage initiatives provide a glimpse of a potential niche for the UNDP to work in partnership with national governments:

  Combining datasets to understand gender-based violence in public spaces. Facing public pressure to address high rates of femicide, Mexico City introduced safer public pathways and panic buttons to encourage reporting in 2019. Their impact is still unclear and policymakers are keen to understand where they have proved successful. Working with GIZ Data Lab and GIZ Mexico, UNDP is combining open data about urban infrastructure (e.g. public transport) with closed government data about the use of the panic buttons. Sentiment analysis and crowdmapping is also planned to tap into residents' perceptions of safety, and provide a clearer picture to guide future interventions.

  Text mining to identify barriers to policy implementation. In 2010 the Mexican government introduced a performance evaluation system to track the impact of programming and spending. It includes the option for civil servants to submit open text entries explaining why a target was not met. To date, there has been no analysis of this rich text dataset spanning a decade. UNDP is mining the text entries using NLP 40 to cluster and rank themes. By training an AI model to compare submissions with a set of predefined common causes, and to identify novel themes, the project hopes to make this data analysable. The long-term aim is to build a hybrid collective intelligence model that improves evaluation by combining NLP classification and inputs in real time.
- Department/Division: Accelerator Laba
- Project Type/Output: Datasets (current), software tool (planned)
- Project Status: Ongoing
- Project Start Year: 2021
- Project Domain: Gender; Justice Both tools have the potential to improve evaluation of programmes and policies in all areas.
- Technology/Platform: NLP 40
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 5 – Gender Equality; SDG 16 – Peace, Justice, and Strong Institutions; SDG 17 – Partnerships for the Goals
- Partnership(s)/Collaborator(s):
  - UN Partners: UNDP Accelerator Lab, UNDP Mexico
  - Government: Government of Mexico; Ministry of Women; Digital Agency for Public Innovation (Mexico City); Center for Command, Control, Computing, Communications and Citizen Contact of Mexico City; Germany (GIZ Data Lab, GIZ Mexico)

  - Civil Society: women's groups and women, volunteers
  - Academia: data scientists
- Links and Multimedia: https://www.nesta.org.uk/report/collective-intelligence-sustainable-development-13-stories-undp-accelerator-labs/
- Lesson Learned:
  - In relation to the first project, the Lab has benefited from the government's longstanding support of open data practices and existing data infrastructure within the public sector. However, negotiating a Memorandum of Understanding for the use of non-public government datasets can still take many months. To overcome this, the Lab has started by working with open datasets to develop a proof of concept. Thinking creatively about how they can already work with existing available data, as they wait to finalize data sharing agreements, has given the team flexibility and time to experiment with new methods.
  - In relation to the second project, a key lesson learned is that while the text-mining process will help the government to extract lessons at a speed and scale that was not previously possible, other efforts (such as changes to the user interface of reporting software) to make the existing program evaluation system more effective. This will help to ensure that the insights from the model are integrated into the machinery of government and affect future program design. The Lab is already considering how to achieve this. Ideas include involving civil servants in verifying the model and developing skills across government teams to enable them to work with the new system in the long term.
- Contact information: Gina Lucarelli, (gina.lucarelli@undp.org)

### Project 5: AIDA: Artificial Intelligence for Data Analytics

- Project Description: The Independent Evaluation Office is exploring the use of AI and machine learning to extract findings, conclusions, and recommendations from UNDP evaluation reports, and label them using tags. The objective is to leverage this rich unstructured data to generate insights, trends and relationships that might not otherwise be readily apparent, and to be able to access and visualize this information more quickly and easily.
- Department/Division: Independent Evaluation Office
- Project Type/Output: Software tool
- Project Status: Ongoing
- Project Start Year: 2021
- Data Source: UNDP Evaluation Reports
- Link to Data: http://erc.undp.org
- Publicly available data: Yes
- Technology/Platform: AWS SAGE Maker
- Related Sustainable Development Goals (SDGs): Project covers work related to all SDGs.
- Partnership(s)/Collaborator(s):
  - UN Partners: UN Development Programme - country teams
- Contact information: Anish Pradhan (anish.pradhan@undp.org)

## Project 6: iVerify

- Project Description: Building on UNDP's longstanding support for democratic governance, iVerify is part of the next generation of tools to assist states in carrying out free and fair elections in this era of misinformation.

  The tool uses open-source machine learning to track misinformation and AI to detect hate speech. It leverages Crowdtangle to conduct daily monitoring of significant conversations happening on Facebook and runs posts through an open algorithm, Detoxify, to determine whether there might be toxic content. When such content is flagged, it gets sent to Meedan Check, an open collaborative media annotation platform that uses a 'humans in the loop' approach to combine machine learning with human oversight. Trained experts from a number of organizations can use the platform to send potentially toxic content and/or misinformation - using email, an online form, Facebook Messenger, WhatsApp and Telegram - to local partner organizations who can verify the content as true, false or somewhere in between.

  AI increases efficiency by matching flagged content to similar posts, and reports are published automatically to a Wordpress website for access and amplification - with a simple traffic light system that enables users to see at a glance whether a claim is true, half true, unproven, misleading, false, toxic or later retracted. An analytics dashboard further supports quick analysis, agile monitoring and evaluation.

  iVerify is built like a comprehensive support package around the provision of digital tools as well as the expert technical support to activate the digital innovations. The project has been deployed in Zambia at the occasion of the August 2021 general elections. The team is actively working at evaluating the impacts of that pilot phase while planning for the continuation of the activities in a sustainable manner. In addition, the initiative is currently in a roll-out phase in Honduras ahead of the November presidential elections. Other countries for future planning include: Zimbabwe, Liberia, Mali and Kenya.
- Department/Division: EC-UNDP Joint Task Force on Electoral Assistance, Bureau for Policy & Programming and Chief Digital Office
- Project Type/Output: Software tool and dataset
- Project Status: Ongoing
- Project Start Year: 2021
- Project Domain: Governance and democratic process. While it is currently applied with a focus on elections, the tool has many potential applications – from preventing human rights abuses by flagging hate speech to encouraging vaccine take-up by combating misinformation.
- Data Source: Social Media Data
- Link to Data: https://iverify.org.zm
- Data Publicly available: Yes in anonymised form
- Technology/Platform: Crowdtangle, Detoxify
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 4 Quality Education; SDG 5 – Gender Equality; SDG 16 – Peace, Justice, and Strong Institutions; SDG 17 – Partnerships for the Goals
- Partnership(s)/Collaborator(s):
  - UN Partners: UN Development Programme, UN International Computing Centre
  - Government: European Union, USAID, UK aid, Irish aid, Germany, Sweden
  - Private Sector: Crowdtangle, Meedan, Unitary
  - Civil Society: Panos Institute Southern Africa and various local organisations via Meedan Check (Zambia application)
  - Academia: UNITEC Honduras (Honduras application)

- Relevant Links and Multimedia:
  - https://iverify.org.zm
  - https://ec.europa.eu/international-partnerships/stories/fighting-disinformation-support-elections-zambia_en
- Lessons Learned:
  - The organization of a validation workshop following the assessment mission is key for buy in of all relevant stakeholders
  - Collaborations with alternative/offline sources of information such as radio stations is crucial given the low/uneven internet penetration rates in most of the contexts where we work. In Zambia, this was taken into account when choosing the local partner.
  - Capacity building needs to take place well in advance and an assessment of training needs has to feed into the training development. In Zambia, refresher trainings were needed and organized around fact-checking, while day-to-day coaching took place to strengthen capacity of the fact-checkers.
  - Given the multitude of actors involved in the response and its multi-faceted nature, the response requires clear procedures and a focal point at the implementing institution for coordination and follow-up.
- Contact information: Mathilde Vougny (mathilde.vougny@undp.org)

### Project 7: Sensemaking

- Project Description: In partnership with data science company Dataverz, UNDP's Bangkok Regional Hub is exploring the use of AI to improve its sensemaking process. This is part of the ongoing drive to evolve sensemaking to meet the needs of Country Offices (COs) and strengthen their digital and foresight capacities.

  Over the past two years, sensemaking exercises have been conducted in COs across the region of Asia and Pacific, as a series of conversations and mapping to provide a comprehensive view on the scale, diversity, impact, connectivity and coherence across the selected portfolio of the CO , with the aim of generating actionable intelligence for supporting CO strategy development and accelerating the impact of CO portfolio These discussions allowed teams to abstract from the nitty gritty of projects to identify patterns, including latent capabilities that could be used more deliberately; synergies across activities that could be strengthened; and levers of change that could be used much more strategically.

  Making sense of this rich, unstructured data is time-consuming so the Regional Innovation Center began to explore the use of Natural Language Processing, Machine Learning, and Network Analysis. The Philippines Country Office was the first pilot country. The project looks into the structured and semi-structured data from https://open.undp.org/ and unstructured data from project documents and annual progress reports of selected projects in the UNDP Philippines, to explore the patterns and connections between projects based on the areas of interest. The data analysis will be converted into useful insights to complement the sensemaking exercises for the CO to find new opportunities within its current assets for team and project configuration, for fundraising, and for delivering impact in a systematic way by developing new and better programmes.

  The Country Office has since been experimenting with ways to embed portfolio analysis in the sensemaking process to yield actionable intelligence for decision-making.
- Department/Division: Regional Innovation Centre of UNDP's Bangkok Regional Hub
- Project Type/Output: software tool and dataset
- Project Status: Development

- Project Start Year: 2021
- Project Domain: AI capability that strengthens institutional innovation in development strategies
- Data Source: UNDP project data
- Link to Data: open.undp.org
- Data Publicly available: Yes
- Technology/Platform: Doker, MongoDB, Python, Neo4j
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 17 – Partnerships for the Goals
- Partnership(s)/Collaborator(s):
    - UN Partners: UNDP Bangkok Regional Hub and Regional Innovation Center, UNDP Philippines Country Office
    - Private Sector: Dataverz
- Relevant Links and Multimedia:
    - https://undp-ric.medium.com/working-on-the-engine-using-portfolio-sensemaking-to-accelerate-learning-b7275accf419
    - https://undp-ric.medium.com/time-for-sensemaking-3-0-the-potential-of-ai-powered-portfolio-analytics-to-drive-impact-b60727435a6
- Lessons Learned:
    - During the process, the team was aware of the bias that might be introduced by this data. So rather than present the data as "truth" based on evidence, it used it as an engagement tool to spur interaction and encourage reflection. In addition to the technical elements of the process, the team was keen to keep bigger-picture question in focus, including:
    - Will the insights from data-driven portfolio analytics be able to complement the human sensemaking process with new ways to observe new types of dynamics in the portfolio?
    - Will different modes of analysis (qualitative and quantitative) reveal similar or different patterns? Can this approach bring new intelligence about the country programme?
    - Will the data-driven insights be able to support the generation of actionable intelligence and facilitate the decision-making by the office?
    - Will this added intelligence lead to better strategy and more impact for UNDP and for the people we seek to serve?
    - A second prototype is now underway, using data extracted from the documents of ongoing projects from 2019 to 2021 and expanding the dimensions to include development challenges, interventions, approaches, partnerships, outcome measurement, learning, and gender lens.
- Contact information: Kate Sutton (kate.sutton@undp.org)

### Project 8: AI and the Digital Divide: analysing the impact of digital connectivity on human development

- Project Description: UNDP partnered with Omdena on this initiative, which saw 50 technology change-makers build AI-based solutions for identifying the relationship

between connectivity and human development indicators to assist governments in addressing the digital divide. The main goal was to analyse digital connectivity trends, the factors that impede connectivity and the impacts of exclusion, particularly in the wake of COVID-19.

First, contributing factors were analysed (e.g. distribution of age, people with disabilities, e-government policies, education, gender differences, and infrastructure). Correlation analysis, clustering of countries, and regression modelling were used to identify the impact of these factors on the Human Development Index and Gross Domestic Product. Data was acquired through web scraping, extracting columns from datasets and combining datasets. SVR, Decision Tree, Random Forest Regressor, and various regressions algorithms then generated insights that were used to train Machine Learning models, such as correlations between factors related to internet censorship and to technological limitations.

Investigating the relationship between disability and connectivity was one of the most complex tasks. After spending significant time in the literature review, the team eventually found a dataset that could be used for further processing. The data accumulation was from the G3ict: The Global Initiative for Inclusive ICTs. The Digital Accessibility Rights Evaluation (DARE) Index 2020 score includes points corresponding to the three categories of variables measured: country commitments, capacity to implement, and actual outcomes in digital accessibility for persons with disabilities. It indicates the overall progress and momentum of a country in implementing digital accessibility as per the ICT accessibility dispositions of the Convention on the Rights of Persons with Disabilities. These measures were used to predict the target variables of HDI and GDP. Data visualization was done using Power BI and Tableau.

The results of all task groups were combined into a web-based dashboard using Streamlit, an open-source python library with the ability to render dynamic dashboards that can be updated in real time.

- Project Type/Output: dashboard; tool; datasets
- Project Status: Completed
- Project Start Year: 2021
- Project End Year: 2021
- Project Domain: Telecommunications
- Data Source: UN and open government data
- Technology/Platform: Microsoft Power BI, Tableau, Streamlit
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 10 – Reduced Inequalities; SDG 17 – Partnerships for the Goals
- Partnership(s)/Collaborator(s):
    - UN Partners: UNDP
    - Private Sector: Omdena
- Links and Multimedia: https://medium.com/omdena/ai-the-digital-divide-analyzing-the-impact-of-digital-connectivity-on-human-development-6bb2bb814bc7
- Contact information: James Green (james.green@undp.org)

### Project 9: Analysing COVID-19 misinformation

- Project Description: UNDP is partnering with UNESCO and Citibeats, an ethical AI Platform that focuses on analysing social data, to curb misinformation about COVID-19 in the Dominican Republic.

  More than 10,000 anonymous opinions related to the pandemic were extracted from Twitter and digital media between March and August 2020. Analysis showed that

concerns were diverse, with tourism, security measures and social protections generating the most conversation. In addition, misinformation was identified in relation to security and health measures, spiking in relation to different topics.

Having created an evidence-based perspective on the landscape of disinformation, actions were developed to disseminate clear and verified information, as well as plans to monitor and address concerns in real time.

- Department/Division: Accelerator Labs
- Project Type/Output: datasets
- Project Status: Completed
- Project Start Year: 2020
- Project End Year: 2020
- Project Domain: Health; Telecommunications
- Data Source: Social Data
- Technology/Platform: Natural Language Processing (NLP) and proprietary Machine Learning algorithms
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 3 – Good Health and Well-Being; SDG 17 – Partnerships for the Goals
- Partnership(s)/Collaborator(s):
  - UN Partners: UNDP
  - Private Sector: Citibeats
- Links and Multimedia: https://www.do.undp.org/content/dominican_republic/es/home/library/percepciones-ciudadanas-en-republica-dominicana.html
- Contact information: Gina Lucarelli (gina.lucarelli@undp.org)

### Project 10: Using AI to identify trends in hate speech

- Project Description: Working with local organisations, UNDP's Sudan country office will localise Meekin, an award-winning platform developed by the social enterprise Koe Koe Tech. The platform helps identify trends in social media around hate speech, and/or risk factors and early warning signs for extremism using an algorithm based on AI and natural language processing. The project will build on the platform's success in Myanmar, where the pilot project flagged 80,000 Facebook posts and comments
- Project Type/Output: platform/tool
- Project Status: Development
- Project Start Year: 2021
- Project Domain: Human Rights; Telecommunications
- Data Source: Social Data
- Technology/Platform: Meekin
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 16 – Peace, Justice, and Strong Institutions; SDG 17 – Partnerships for the Goals
- Partnership(s)/Collaborator(s):
  - UN Partners: UNDP, Accelerator Lab
  - Private Sector: Koe Koe Tech
- Relevant Links and Multimedia: https://digital.undp.org/content/digital/en/home/stories/meet-digital-x-s-10-ambitious-new-teams.html

- Contact information: Sudan Accelerator Lab (sudanacclab@undp.org)

### Project 11: Using satellite imagery to help communities tackle stubble burning and to advocate for organic waste composting

- Project Description: Last year, UNDP's Ukraine Accelerator Lab partnered with the Center for Innovations Development to launch the 'Don't Burn - compost' challenge for communities across the country.

  Every year, Ukraine sees over 56,000 fires in natural ecosystems and open territories, according to the State Emergency Service of Ukraine. This leads to billions in economic damage, ecosystem loss, pollution and deaths.

  This pilot project enabled communities to track fires in near real-time, and enter data collected by local community activists into an online map. Using a GIS solution, participants were also able to get information about fires in their communities from the past three years based on satellite data. Analysis showed that about 80 percent of fires in some communities occur in the same locations.

  The project was part of the Collective Intelligence Design Studio facilitated by NESTA, an innovation foundation in the UK, which is based on the premise that intelligence is distributed and different communities hold different pieces of information about what works in their contexts and different perspectives that, when combined, create a more complete picture of the problem and how to solve it. One of the insights generated was that organic waste composting is one of the most effective and eco-friendly ways to reduce burning practices.
- Department/Division: Ukraine Accelerator Lab
- Project Type/Output: dataset and tool
- Project Status: Completed
- Project Start Year: 2021
- Project Domain: Health; Poverty
- Data Source: Social Data
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 1 – No Poverty; SDG 3 – Good Health and Well-Being; SDG 11 – Sustainable Cities and Communities; SDG 13 – Climate Action; SDG 15 – Life on Land; SDG 17 – Partnerships for the Goals
- Partnership(s)/Collaborator(s):
  - UN Partners: UNDP Ukraine Accelerator Lab
  - Government: Centre for Innovations Development
  - Civil Society: NESTA foundation
- Relevant Links and Multimedia: www.ua.undp.org/content/ukraine/uk/home/accelerator-labs/don-t-burn---compost-launch-of-project-for-eco-responsible-commu.html
- Contact information: Yuliia Samus (communications.ukraine@undp.org)

### Project 12: AI chatbot for COVID-19 information campaign

- Project Description: Last year, UNDP China mounted a social media information campaign to encourage people to adhere to World Health Organization viral protection practices. The campaign was urgent and challenging, given the number of languages and dialects spoken in the country. UNDP China partnered with Yunnan Nationalities University and engaged students in generating videos of WHO messaging in different languages. Other students became involved and UNDP put together a milestone video that went viral on Weibo.

The videos developed into an online community and social movement. One touching example was a video by a young man in Shanghai teaching his grandmother how to put on a mask in Shanghainese. The campaign spread to other countries and UNDP began to leverage other platforms, such as TikTok and LinkedIn. UN Goodwill Ambassadors including Lang Lang and Michelle Yeoh participated, increasing the campaign's reach to 10 million.

However, the Country Office saw that there were still gaps in local dialects, so it used an AI generated news anchor named Xiao Qing who could 'speak' 25 languages. This gave the campaign an innovative appeal and resonance with the younger generation.

Overall, the campaign reached 36 million people using 50 languages and dialects.

- Department/Division: UNDP China
- Project Type/Output: Information videos in 25 languages and dialects
- Project Status: Completed
- Project Start Year: 2020
- Project End Year: 2020
- Project Domain: Health
- Data Source: User generated data
- Technology/Platform: social platforms including Weibo, LinkedIn and TikTok
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 3 – Good Health and Well-Being; SDG 10 – Reduced Inequalities; SDG 17 – Partnerships for the Goals
- Partnership(s)/Collaborator(s):
  - UN Partners: UNDP China, UN Goodwill Ambassadors, World Health Organization
  - Private Sector: Weibo, TikTok, LinkedIn and others
  - Academia: Yunnan Nationalities University and others
- Links and Multimedia: https://www.cn.undp.org/content/china/en/home/ourperspective/ourperspectivearticles/2020/spread-the-word--not-the-virus--engaging-36-million-people-in-th.html
- Lessons Learned: Working with multiple partners can sometimes entail multiple layers of approval procedures and efficiency loss; however, it does help us innovate and reach a wider audience. It is key to find a balance between leveraging partner resources without compromising agility and efficiency.
- Contact information: Zhang Wei (registry.cn@undp.org)

### Project 13: AI for aid - GiveDirectly

- Project Description: In Bangladesh, UNDP and a2i have partnered with the non-profit GiveDirectly to direct aid to those most in need. The project uses AI tools to extract mobile phone and satellite metadata to identify vulnerable populations who may be eligible for cash transfers in a way that is faster, cheaper and more accurate than door-to-door evaluations.

  After the AI model is set up, GiveDirectly is able to identify, sign up and distribute cash to tens of thousands of people in days, instead of weeks or months. For example, in Togo, beneficiaries were notified within minutes of applying and paid within an hour via integration with mobile money.

  It is now being scaled in Bangladesh, as part of UNDP's Digital X Scale Accelerator. Supported by the Government of Japan, the Chief Digital Office's Digital X initiative provides funding, five months of organisational support and technical expertise to unblock traditional challenges to scaling up in terms of impact and geographic reach.

Previously, Bangladesh did not have tech-based beneficiary-targeting solutions. When the Government introduced a USD 5 million stimulus package in response to COVID-19, disbursement proved extremely time-consuming and labour-intensive as there was no integrated database that could be used to identify target populations. Instead, they relied on door-to-door visits.

The GiveDirectly project is now piloting the mobile phone-based targeting approach, which aims to reach 10,000 people in this initial phase. The project is an example of partnerships for good, with GiveDirectly bringing the technology expertise and UNDP serving as the link to the Government-UNDP programme a2i, which plans to integrate the approach into its social cash transfer programme.

- Department/Division: UNDP Bangladesh, Chief Digital Office
- Project Type/Output: Tool
- Project Status: Ongoing
- Project Start Year: 2020
- Project Domain: Poverty
- Data Source: mobile phone and satellite data
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs):SDG 1 – No Poverty; SDG 10 – Reduced Inequalities; SDG 17 – Partnerships for the Goals
- Partnership(s)/Collaborator(s):
    - UN Partners: UNDP Bangladesh, Chief Digital Office
    - Government: Bangladesh, a2i
    - Civil Society: GiveDirectly
- Related Links and Multimedia: https://digital.undp.org/content/digital/en/home/stories/meet-digital-x-s-10-ambitious-new-teams.html
- Contact information: Michael Rios (michael.rios@undp.org)

### Project 14: U&AI AI for SDGs Youth Bootcamp

- Project Description: The COVID-19 pandemic has accelerated the proliferation of Artificial Intelligence technologies in public health, such as contact tracing, facial recognition, virus detection and vaccine development. As we start to reap the benefits of AI technologies to combat the pandemic, we need to also recognize the potential risks posed by these technologies such as a widening digital divide, data privacy concerns, and the development of autonomous weapons.

  Youth today will be at the forefront of shaping the future of AI technology, therefore, together with the Institute for AI International Governance (I-AIIG) of Tsinghua University, UNDP China launched the inaugural U&AI AI for SDGs Youth Bootcamp. The Bootcamp has brought together teams of passionate young people from across the world eager to harness AI technologies to tackle real-world problems and embark on a learning journey together.

  The Bootcamp has recruited over 1000 participants from over 50 countries. After two months of Master Classes delivered by the world's leading AI experts, we have thus far received 34 project proposals on AI-powered solutions to address pressing development challenges. Selected proposals are listed below:

  A social media monitoring platform that provides a rapid response to tackle wildfires in the Greater Seattle area

    - AI-powered dynamic pricing model for small to medium food stores to maximize their profit and reduce food waste
    - A robo-advisor for Chinese low-income groups to foster better financial inclusion

  - A platform and a network of dispensers that provide low-cost sanitary products and sex education to women in Kenya
  - An accessible, smart and creative video production platform for visually impaired people to have their voice heard
  - AI-powered Automatic Speech Recognition (ASR) technology to ensure timely assistance and prevent violence
  - A real-time monitoring system of water leakages in distribution networks with a combination of AI, augmented reality and sensors
  - The semi-finalists will go through intensive training sessions with mentors from UN systems, academic partners, and the private sector. The winning teams will then showcase their projects at the International AI Cooperation and Governance Forum in December 2021.

- UN Entity Name: UNDP China
- Department/Division: Communication, Innovation and Partnership Team
- Project Type/Output: Youth Bootcamp
- Project Status: Completed
- Project Start Year: 2021
- Project End Year: 2021
- Project Domain: Environment; Education; Energy; Gender; Health; Climate Change. Circular Economy, Biodiversity & Nature-based Solutions, Education, Healthcare, Misinformation, Financial Inclusion and Digital Inclusion.
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs) SDG 1 – No Poverty; SDG 3 – Good Health and Well-Being; SDG 4 – Quality Education; SDG 5 – Gender Equality; SDG 6 – Clean Water and Sanitation; SDG 7 – Affordable and Clean Energy; SDG 8 – Decent Work and Economic Growth; SDG 9 – Industry, Innovation, and Infrastructure; SDG 10 – Reduced Inequalities; SDG 11 – Sustainable Cities and Communities; SDG 12 – Responsible Consumption and Production; SDG 13 – Climate Action; SDG 14 – Life Below Water; SDG 15 – Life on Land
- Partnership(s)/Collaborator(s)
- UN Partners: UN Women (partner)
- Private Sector: IBM, Intel, Kuaishou, UBTech, etc.
- Civil Society: Youth participants
- Academia: Tsinghua University
- Relevant Links and Multimedia: https://ai4sdgbootcamp.gotin.online/
- Lessons Learned:

  - The greatest challenge with an entirely digital project is ensuring coordination and communication with all stakeholders is smooth and effective. With this in mind, the team has worked extremely hard to regularly connect and communicate with panel judges, lecturers, UN agencies, corporate partners, youth leaders, and participants throughout the project. Since the project operates entirely online, the team has had to stay responsive and alert at all times t in order to respond to any unexpected emergencies, as well as to provide a positive experience for all participants, across all parts of the world. Moreover, all online events inevitably face various degrees of enthusiasm fatigue, given that face-to-face interactions are not possible; this is especially so with an event that spans several months. The team has therefore worked

hard to continuously motivate participants to take part in the bootcamp's Master Classes and to make sure they submit their proposals.

- Going forward, we could leverage offline communities as seed participants and extend to online communities to ensure better engagement. In addition, our invited lecturers are overly focused on AI ethics and governance, which unfortunately cannot provide students with enough practical insights on how to utilize AI technologies to help achieve SDGs. For future youth bootcamps, we need to offer a better balance of SDG knowledge-sharing and technical know-how.

- Contact information: Wei Zhang, (wei.zhang@undp.org)

### Project 15: Sudan Horizon Scanner (SHS)

Sudan Horizon Scanner is an artificial intelligence (AI) software that maps out development and humanitarian interventions in Sudan, does programmatic simulation, identify, and communicates early warnings, and collected and analysis strategic conversation of public interest. The general aim of this software is to generate a continues stream of baseline data, identify, and make sense of emerging issues, assess the impact of interventions concerning development programming, identify new sources of evidence and insights and provide data for modeling and simulation for better decision making and resource mobilization.

FEATURES AND GOALS

The software is made up of four core features:

- The first feature is called interference. The presentation talks about the five portfolio objectives targeted by UNDP: rules of law and constitution building, democratization and economic recovery, environment and energy, health and development, and peace and stability. The objective of this feature is to inform the public about the project currently taking place in Sudan in relation to each of the five portfolio objectives as well as to show a map based on which portfolio objectives most or least of the projects taking place in a state or region. Target and if there is no target portfolio target in a particular region or country. The objective of this feature is to assess the gaps that occur in Sudan and how to penetrate them, the opportunities that can be exploited to improve the welfare of Sudan and its citizens, and the risks that may arise while developing those opportunities.
- The second key feature is the bullish number for the month. Here various sources such as media news, social media trends, religious discourse, polls, and songs will be used to identify the most talked about problems that are currently being tested in Sudan. Just like the intervention feature, the aim of this feature is also to assess gaps by identifying the issues that most, if not all, Sudanese are currently talking about and experiencing, to determine the best course of action to address these issues and what risks may arise while trying to solve the problem.
- The third essential feature is automated simulation. In this feature, the target users are the people who can donate to the project. These donors will be able to see a real-time simulation of the impact of a particular project in relation to the target issue and the problem area, and how their donations can make a difference to that project. The objective of this feature is to assist the donor in making a decision regarding where and how the donor wishes to invest their money by providing the intervention project information for all available projects including the risks of each project and any SDG The project contributes to providing maps of weaknesses and recommendations regarding With the issues that are considered more important and that need immediate intervention, calculate the total budget of the projects including overheads, resource cost and actual cost of the project, and the time value of the project. Money.

- The final key feature is political mapping. With the aim of mapping the ecosystem and finding the most scenarios with the highest probability of occurrence using psychophysical concepts and opinion dynamics, this feature consists of two parts. The first is a dynamic political map in which the history of each actor is presented in detail using the timeline of when they first joined the political sphere, as well as the alliances signed and the events that have taken place or are currently taking place. For coalitions and events, a dynamic map is presented that explains how actors have been affected in relation to certain aspects, such as popularity and power, whether there is a positive or negative impact on both the actors themselves and the event. As well as analyzing their means of influence and their orientations regarding the issues that the electorate cares about. The map will be built to be able to dynamically deal with emerging and common issues in the opinion of Sudanese voters. As for the second part, it is predictive scenarios, and Political Dynamics Map talks about the past and the present about the political system in Sudan, but the predictive scenarios talk about the future of the political system. Predictive scenarios are used to identify and display the chances and odds of winning for each of the major players in the field of Sudanese politics, finding the scenarios with the highest probability of their occurrence, as well as the changes in these opportunities and probabilities dynamically according to their difference. Scenarios that could occur during the next political era.
- Presentation: SHS Algorithm AI Presentation1
- Recording for workshop done for 1. Software tour and explanation, 2. localization of the software with UNDP Egypt. https://undp.zoom.us/rec/play/bS8ALR7uXsLN4_4eCHM2UMS8bgxfapOOoegTdG35gcULT21L2Ctle_-90AO57UzfwXashLCI_Ek517i4.6Deg_MXHrW6CqT70?continueMode=true&_x_zm_rtaid=SzdQM1bXQ4O8O0RJeHiN4A.1660869143856.122c43f4e1c69bdcbe00a11b17affe52&_x_zm_rhtaid=168
- Contact information: Wigdan Seed Ahmed wigdan.seedahmed@undp.org

## 2. Related Sustainable Development Goals

All 17 SDGs

## 3. Relevant links

https://www.undp.org/

Contact Information

General: Natalie Samarasinghe (natalie.samarasinghe@undp.org)

China: Yuwei Dai (yuwei.dai@undp.org)

# United Nations Department of Political and Peacebuilding Affairs and Department of Peace Operations

## 1. Description of Activities on AI

### Project: AI -powered large-scale synchronist dialogues

- Project Description: Complementing other efforts to address the challenges of systematically involving public voices in the specifics of peace negotiations, the Innovation Cell has been exploring the use of Artificial Intelligence (AI) for mediators and actors to hold real-time consultations with a large group of individuals in local dialects and languages, allowing for analyses and segmentation based on demographic interests.
- Department/Division: DPPA – Policy and Mediation Division – Innovation Cell
- Project Type/Output: Software tool, Design Methodology
- Project Status: Ongoing
- Project Start Year: 2020
- Project Domain: Human Rights, Gender, Justice
- Data Source: Anonymous demographic data and insights from participants to the AI-enabled digital dialogue.
- Publicly available data: No
- Technology/Platform: Interface with external software.
- Reported as part of 2020 Compendium on UN AI Activities? Yes
- Project Updates:
    - Following the successful pilot of the Artificial Intelligence (AI)-assisted large-scale public dialogues in June 2020 with the Office of the Special Envoy of the Secretary-General for Yemen (OSESGY) on challenges and opportunities brought on by COVID-19 pandemic on humanitarian and economic issues, the DPPA Innovation Cell continued its support of large-scale digital dialogues for inclusive peacemaking. For instance, towards the end of 2020, the Innovation Cell supported UN Support Mission in Libya (UNSMIL) in designing and deploying the methodology in Libyan dialect on two separate occasions related to the UN-led Libyan Political Dialogue Forum (LPDF). The first digital dialogue, which took place on 16 October with 1000 Libyan youth, aimed to help set the agenda for a subsequent meeting with youth groups under the LPDF. Based on the experience and results of the October dialogue, UNSMIL chose to apply the methodology for a consultation with the wider Libyan public (1500 individuals) on political, military, and economic issues in early November 2020. In continuing support of UNSMIL, the Innovation Cell developed an online dialogue platform (Alhiwar.ly) and prepared for a nationwide poll using Computer-Assisted Telephone Interviews (CATI).

  - In 2021, the Innovation Cell advanced partnerships with field missions, such as most recently with the United Nations Assistance Mission for Iraq (UNAMI) as part of its larger efforts in providing technical support to the upcoming early elections in October. This ongoing initiative with UNAMI also incorporates behavioral insight to test dialogue engagement nudges.
  - Additionally, the Innovation Cell completed the building of five different dialect dictionaries (or corpora) – Yemeni, Libyan, Iraqi, Palestinian and Sudanese Arabic. This represents a major step forward in training computers to understand what is being said in different dialects. These corpora can now be leveraged to support the relevant UN Special Political Missions (SPMs) and presences conduct more AI-enabled dialogues, in addition to helping them parse and better understand radio, TV, and online content in the aforementioned dialects.

- Related Sustainable Development Goals (SDGs): SDG 9 – Industry, Innovation, and Infrastructure; SDG 16 – Peace, Justice, and Strong Institutions
- Partnership(s)/Collaborator(s):
  - Private Sector: Remesh.AI
- Relevant Links and Multimedia:
  - https://futuringpeace.org/ai-for-peacemaking.html
  - https://osesgy.unmissions.org/cutting-edge-tech-service-inclusive-peace-yemen
  - https://unsmil.unmissions.org/asrsg-williams-conducts-digital-dialogue-1000-libyans
  - https://iraq.un.org/en/144266-srsg-jeanine-hennis-plasschaert-conducts-first-digital-dialogue-iraqi-voters
- Lessons Learned: In addition to substantial lessons learned, such as the development of the discussion guide and importance of baseline study suitable to the context, the issue of trust in AI, security and data gathering continues to be a recurring theme. Although the insights gathered by the tool itself are anonymous, participants in the dialogue have expressed a general sense of declining trust in digital tools, especially when discussing formal political processes. The Innovation Cell continues to consider more confidence-building measures, including by working through partnership with local groups.
- Contact information: Martin Waehlisch (martin.waehlisch@un.org), Daanish Masood (masoodd@un.org)

## 2. Related Sustainable Development Goals (SDGs)

SDG 9 and 16

## 3. Relevant Links

www.dppa.un.org

Contact Information

Martin Waehlisch (martin.waehlisch@un.org) and Daanish Masood (masoodd@un.org)

# United Nations Economic Commission for Europe


## 1. Description of Activities on AI

### Project 1: UK Office of National Statistics (ONS) – UNECE Machine Learning Group 2022

- Project Description: national and international statistical organisations produce official statistics that affects important policies and decisions for the society and economy. ML holds a great potential for statistical organisations to harness new data sources (e.g., big data) and make their business more efficient, allowing them to provide better data services. The ONS-UNECE Machine Learning Group 2022 (ML 2022) is an initiative targeted at the official statistics community, providing a platform for the global statistical community to develop research, build skills and share common challenges and solutions on ML developments and applications. It builds on the momentum of the 2019-2020 UNECE HLG-MOS Machine Learning Project and the ML Group 2021. The initiative was launched in January 2022, is led by the ONS Data Science Campus and the UNECE. ML 2022 consists of theme groups focusing on following topics text classification, modelling, imagery analysis, quality of training data, model re-training, web-scrapping data and IT infrastructure.
- Department/Division: Statistics
- Project Type/Output: Community of expertise, research collaboration
- Project Status: Ongoing
- Project Start Year: 2019
- Project Domain: Statistics
- Data Source: Survey data, register data, automatic identification sysem (AIS) data, web-scraped data, satellite imagery data (LandSat, Sentinel), etc.
- Data Publicly available: No
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Updates: the results from the ML Project 2019-20 and ML Group 2021 have been compiled as an UNECE publication "Machine Learning for Official Statistics": https://unece.org/statistics/publications/machine-learning-official-statistics
- Related Sustainable Development Goals (SDGs): All the SDGs
- Partnership(s)/Collaborator(s):
    - Government: ONS (United Kingdom Office for National Statistics) Data Science Campus is the main coordinating partner of the ML2022 Group, but theme groups are led by different organisations such as Statistics Netherlands, Statistics Flanders, Statistics Sweden, Statistics Ireland and Norwegian School of Economics and Center for Applied Research; the group itself consists of more than 380 members from various national and international statistical organizations

- Relevant Links and Multimedia: https://statswiki.unece.org/display/ML/Machine+Learning+Group+2022
- Contact information: InKyung Choi (choii@un.org)

### Project 2: Functional Requirements for Automated Vehicles

- Project Description: The Group dealing on Functional Requirements for Automated Vehicles is led by China (MIIT), Germany (KBA) and the United States of America (NHTSA). It reports to the Working Party on Automated/Autonomous and Connected vehicles of UNECE. It works on safety requirements covering all Automated Driving Systems (ADS) configurations (SAE Levels 3-5). These activities at intergovernmental level form a novel initiative aimed at harmonizing globally automated vehicles regulations and creating a more productive environment for innovation.

  Work assumptions: to Improve road transport, Performance-based, Technology-neutral, Measurable, Feasible, and Socially acceptable.
- Entity Name: WP.29/GRVA
- Project Type/Output: Seminar/meeting; Policy Framework; Intergovernmental working group dealing with technical regulations for vehicles.
- Project Status: Ongoing, initial deliverables already in force.
- Project Start Year: 2019
- End Year: 2024
- Project Domain: Automotive
- Technology/Platform: performance based, technology neutral
- Related Sustainable Development Goals (SDGs): SDG 3 – Good Health and Wellbeing; SDG 9 – Industry, Innovation and Infrastructure; SDG 11 – Sustainable Cities and Communities
- Partnership(s)/Collaborator(s)
  - UN Partners: All UN Agencies may participate
  - Government: All UN member States
  - Private Sector: Represented through NGO with ECOSOC accreditation
  - Civil Society: Represented through NGO with ECOSOC accreditation
  - Academia: In support of the national delegations or upon invitation
- Relevant Links and Multimedia:
  - Press release on adoption of the Framework Document on Automated vehicles: https://unece.org/media/press/1610
  - Press release on adoption of the Level 3 UN Regulation No. 157: https://unece.org/media/press/348314
  - Press release on extending UN Regulation No. 157 to trucks and coaches: https://unece.org/media/press/362551
  - Press release on adoption of amendment extending automated driving to up to 130 km/h: https://unece.org/media/press/368227
  - Meetings and documents: https://unece.org/transport/vehicle-regulations/working-party-automatedautonomous-and-connected-vehicles-introduction
- Contact information: Francois E. Guichard (francois.guichard@un.org)

### Project 3: Validation Method for Automated Driving

- Project Description: The Group on Validation Method for Automated Driving is led by Canada (Transport Canada), The Netherlands (RDW) and Japan (NTSEL). It reports to the Working Party on Automated/Autonomous and Connected vehicles of UNECE. It includes four subgroups on (a) Scenarios, (b) Simulation, (c) Audit and Monitoring, and (d) Track Test and Real-world Test.

  It deals with the validations methods leading to the demonstration of a robust design and validation process based on a systems-engineering approach with the goal of designing automated driving systems free of unreasonable safety risks and ensuring compliance with road traffic regulations [..]. Design and validation methods should include a hazard analysis and safety risk assessment for Automated Driving System (ADS), for the Object and Event Detection and Response, but also for the overall vehicle design into which it is being integrated and when applicable, for the broader transportation ecosystem. Design and validation methods should demonstrate the behavioural competencies an Automated/autonomous vehicle would be expected to perform during a normal operation, the performance during crash avoidance situations and the performance of fall-back strategies. Test approaches may include a combination of simulation, test track, and on-road testing.
- Entity Name: WP.29/GRVA
- Project Type/Output: Policy Framework; Seminar/meeting; Intergovernmental working group dealing with technical regulations for vehicles.
- Project Status: Ongoing
- Project Start Year: 2019
- Project End Year: 2024
- Project Domain: Automotive
- Technology/Platform: performance based, technology neutral
- Related Sustainable Development Goals (SDGs): SDG 3 – Good Health and Well-Being; SDG 9 – Industry, Innovation, and Infrastructure; SDG 11 – Sustainable Cities and Communities
- Partnership(s)/Collaborator(s):
  - UN Partners: All UN Agencies may participate.
  - Government: All UN member States
  - Private Sector: Represented through NGO with ECOSOC accreditation
  - Civil Society: Represented through NGO with ECOSOC accreditation
  - Academia: In support of the national delegations or upon invitation
- Relevant Links and Multimedia: https://unece.org/reference-documents-0
- Contact information: Francois E. Guichard (francois.guichard@un.org)

### Project 4: Task Force on Digitalization in Energy

- Project Description: Technologies facilitating new market opportunities: digital innovations – tools, technologies and processes (such as Artificial Intelligence, Blockchain, Machine Learning, Advanced Data Analytics, Internet-of-Things, Big Data, Cloud Computing, Sensors, Automation, 3D Printing, Robotics, etc.), are inspiring energy suppliers, transmission and distribution companies, and demand sectors (buildings, industry, transport) to establish new business models allowing to generate, deliver and consume energy in a more sustainable fashion. These innovative technologies are providing new opportunities to businesses by changing the way how interaction happens, optimizing processes, enhancing flexibilities, and improving efficiencies.

The Task Force on Digitalization in Energy was established by the Committee on Sustainable Energy in 2020, with the mandate for the period of 2021-2022 with a possibility of extension. The Task Force on Digitalization in Energy reports to the Group of Experts on Energy Efficiency. The Task Force provides a platform for cross-industry experts from the energy sector (including from the other subsidiary bodies of the Committee on Sustainable Energy) and digital innovations to develop a unified voice on digitalization in energy. It critically explores the landscape of new stakeholders through a constructive dialogue (including assessment of opportunities, challenges, risks, and trade-offs) to understand the interaction in the digitalized energy system and bringing consensus about the approach that should be considered for shaping the future of energy system. Activities of the Task Force also include aggregating and reviewing the existing national policy initiatives as well as harmonizing the information produced by other key national and international bodies, in order to better assist policymakers and other stakeholders in UNECE region to provide evidence-based direction to achieve the higher levels of efficiency in the energy system.

- Department/Division: Sustainable Energy Division
- Project Type/Output: Conference(multiple meetings on a theme), papers
- Project Status: Ongoing
- Project Start Year: 2021
- Project End Year: 2022
- Project Domain: Energy
- Data Source: Publicly available data sources.
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 7 – Affordable and Clean Energy; SDG 9 – Industry, Innovation and Infrastructure; SDG 11 – Sustainable Cities and Communities; SDG 12 – Responsible Consumption and Production; SDG 17 – Partnership for the Goals
- Partnership(s)/Collaborator(s):
    - UN Partners: UNEP-DTU Partnership, Copenhagen Centre on Energy Efficiency
    - Government: Swiss Federal Office of Energy, Government of the United Kingdom
    - Private Sector: The Energy Authority, Energy Policy Group, PAN DATA GmbH, Sustainable Decisions, North American Electric Reliability Corporation, Microsoft, Hydro-Quebec
    - Academia: International Energy Research Centre, Vector Institute, Harvard Kennedy School of Government, University of Bayreuth, Institute for Energy Efficiency in Production (EEP)
- Relevant Links and Multimedia: https://unece.org/sustainable-energy/energy-efficiency/digitalization-energy
  https://unece.org/sites/default/files/2020-12/GEEE-7.2020.INF_.3.pdf
  https://unece.org/sed/documents/2021/06/working-documents/improving-efficiency-buildings-through-digitalization
  https://unece.org/sed/documents/2022/07/session-documents/digitalization-accelerating-electricity-system
- Contact information: Igor LITVINYUK (litvinyuk@un.org)

### Project 5: Policy discussion – Challenges of big data and analytics-driven demand-side management

- Project Description: In recent years, the energy sector has experienced a shift towards disruptive trends such as decarbonization, decentralization and digitalization, creating an energy transition that generates a major impact on the utility industry worldwide.

Technologies that are driving digitalization of the utility sector include distributed energy generation, utility-scale storage, electric vehicles and charging infrastructure, and the proliferation of advanced metering infrastructure and smart meters. Big data, however, is still a nascent research area in the electric utility industry due to a lack of resources and expertise, whilst in other industries, such as online commerce and telecommunications, big data research is developing as fast as the technology that supports it.

As a result, new business models, utility capabilities and consumer commitments, especially on the demand side, will be enabled by these emerging technologies. With proper research funding support, the utility industry can realize international collaboration and fair competition in this technology space.

The objectives of this study are: (a) to review the current challenges of big data analytics within the context of distribution grid / demand-side management; (b) describe policy gaps to the progress of advanced analytics in the utility sector; and (c) identify key questions that deserve further analysis to address the challenges, gaps, and barriers to progressing state-of-the-practice for utility demand-side advanced analytics and advanced demand-side management. The paper identifies key areas for further consideration and analysis and suggests focused research on some specific aspects that are deemed to be in greatest need of attention.

- Department/Division: Sustainable Energy Division
- Project Type/Output: Room (unofficial) document
- Project Status: Complete (to be presented at the ninth session of the Group of Experts on Energy Efficiency)
- Project Start Year: 2022
- Project End Year: 2022
- Project Domain: Energy; Telecommunications
- Data Source: Publicly available data sources.
- Reported as part of 2021 Compendium on UN AI Activities? No
- Related Sustainable Development Goals (SDGs) SDG 7 – Affordable and Clean Energy; SDG 9 – Industry, Innovation and Infrastructure; SDG 10 – Reduced Inequalities; SDG 11 – Sustainable Cities and Communities; SDG 12 – Responsible Consumption and Production; SDG 17 –Partnerships for the Goals_
- Partnership(s)/Collaborator(s):
    - UN Partners: UNEP-CCC
    - Government: N/A
    - Private Sector: The Energy Authority, Energy Policy Group
    - Academia: Harvard Kennedy School of Government
- Relevant Links and Multimedia: https://unece.org/sed/documents/2022/07/informal-documents/policy-discussion-challenges-big-data-and-analytics-driven
- Contact information: Igor LITVINYUK (litvinyuk@un.org)

### Project 6: Use of artificial intelligence in trade facilitation

- Project Description: Artificial intelligence (AI) is shifting global value chains and international trade pattern. Artificial intelligence (AI) has a transformative effect on international trade. Specific applications in multiple areas such as analytics and cognitive services are diminishing trade barriers.

  AI undoubtedly will underpin productivity growth, economic growth and create new opportunities in facilitating trade

  The purpose of this project is to look at AI's role in trade facilitation in the context of UN/CEFACT's mandates and create whitepapers that focus on how AI can be used to

facilitate trade processes and key issues that need to be looked into while leveraging AI capabilities in collecting, processing, analyzing data and extracting inferences from the data

Potentially, this work could also provide guidance to data providers, application developers and technology adopters

- Project scope

  The project scope is to define and create white papers on the best practices in implementing secure data flow during cross border trade with a view to examining:

  - How AI technology could be used to facilitate trade and related processes in international supply chain including study of areas such as data privacy, AI based trade policies, use of AI in e-Commerce and payments
  - How existing UN/CEFACT deliverables could be used in AI applications
  - Possible changes to existing UN/CEFACT deliverables, or new deliverables, that could be considered in order to support AI trade facilitation applications

  All of the above will be examined from the perspective of UN/CEFACT's mandates in order to provide input to the Bureau, Programme Development Areas and Domains on

  Possible future work and a possible common approach

  Application developers as a potential new user group for UN/CEFACT standards

- Project deliverables

  - Deliverable 1: A white paper on technical aspects of AI and its relation to UN/CEFACT deliverables
  - Deliverable 2: A business case/process oriented whitepaper on how AI technology could be used to facilitate cross border paperless trade

- Department/Division: The United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT)
- Project Type/Output: White Paper
- Project Status: Ongoing
- Project Start Year:2021
- End Year: 2022
- Project Domain: Trade
- Data Source: Initial contributions include existing descriptions and technical specifications for the UN/CEFACT:

  - AGAT document "Artificial Intelligence Demystified"
  - Core Components Library (CCL);
  - Business Requirement Specifications (BRSs),
  - Requirement Specification Mappings (RSMs) and
  - Reference Data Models (RDMs) as well as
  - already published material on AI technology and implementations,
  - Blockchain work undertaken by UN/CEFACT

- Publicly available data: Yes
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 17 – Partnerships for the Goals
- Partnership(s)/Collaborator(s):

  - Private Sector: UN/CEFACT Experts
- Relevant Links and Multimedia: https://uncefact.unece.org/display/uncefactpublic/Use+of+Artificial+Intelligence+in+Trade+Facilitation
- Contact information: (UNECE Secretariat uncefact@un.org)

### Project 7: United for Smart Sustainable Cities (U4SSC)

- Project Description: In 2016, UNECE and the International Telecommunication Union (ITU) established the UN global initiative United for Smart Sustainable Cities (U4SSC), which currently involves 16 UN bodies. U4SSC is a global platform for smart cities stakeholders, which advocates for public policies to encourage the use of ICT to facilitate the transition to smart sustainable cities. The initiative aims to: Generate guidelines, policies and frameworks for the integration of ICTs into urban operations, based on the SDGs, international standards and urban key performance indicators (KPIs); and help streamline smart sustainable cities action plans and establish best practices with feasible targets that urban development stakeholders are encouraged to meet. The topics of this phase of U4SSC are: circular cities, financing smart sustainable cities projects, blockchain in cities, artificial intelligence in cities, sensing technologies and Internet of Things in cities.

  The initiative delivers policy guidelines and training materials through the work on specific outputs elaborated via regular e-meetings and physically gathers once per year. In 2017, the U4SSC stakeholders also elaborated a set of Key Performance Indicators (KPIs) for smart sustainable cities which includes 92 indicators (core and advanced) divided in the 3 dimensions of sustainable development: economy, environment, and society and culture. The indicators are fully aligned with the Sustainable Development Goals (SDGs) and serve as a tool for evidence-based decision making, progress monitoring and achieving the SDGs at the local level. They are being implemented by 50 cities of different sizes and development worldwide
- Department/Division: Housing and Land Management, Forests, Land and Housing Division
- Project Type/Output: Multi-agency partnership
- Project Status: Ongoing
- Project Start Year: 2016
- Project Domain: Sustainable urban development
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 11 – Sustainable Cities and Communities; SDG 17 – Partnership for the Goals
- Partnership(s)/Collaborator(s):

  - UN Partners: UNECE, ITU, UN Habitat, CBD, ECLAC, FAO, UNDP, UNECA, UNESCO, UNEP, UNEP-FI, UNFCCC, UNIDO, UNOP, UNU-EGOV, UN-Women and WMO
- Relevant Links and Multimedia: https://unece.org/housing/sustainable-smart-cities; https://twitter.com/UNECEHLM; https://www.facebook.com/UNECE.Housing/
- Contact information: Gulnara Roll (gulnara.roll@un.org)

## 2. Related Sustainable Development Goals

All the SDGs

## 3. Relevant links

https://www.unece.org/info/ece-homepage.html

Contact Information

Thomas Croll-Knight, Information Unit, United Nations Economic Commission for Europe (thomas.croll-knight@un.org)

# United Nations Environment Programme

## 1. Description of Activities on AI

### Project 1: Artificial Intelligence tool for valuing the contributions of nature (ARIES for SEEA)

- Project Description: The project aims to accelerate implementation of the new ground-breaking standard for valuing the contributions of nature that was adopted by the UN Statistical Commission in March 2021, the System of Environmental-Economic Accounting (SEEA) Ecosystem Accounting.

  Artificial Intelligence for Environment & Sustainability (ARIES), developed by researchers at the Basque Centre for Climate Change (BC3), is an integrated, open-source modelling platform for environmental sustainability, where researchers from across the globe can add their own data and models to web-based repositories.

  Using ARIES technology, the ARIES for SEEA Explorer application allows users anywhere in the world to produce rapid, standardized, scalable and customizable ecosystem accounts for their area of interest that are consistent with the SEEA Ecosystem Accounting framework. ARIES for SEEA is available on the UN Global Platform, a cloud-service platform supporting international collaboration in the development of official statistics using new data sources and innovative methods.

  The ARIES for SEEA platform is currently being piloted in Botswana, Ghana, Uganda, Rwanda, Senegal and South Africa, following a workshop in Kigali in July 2022.
- Project Type/Output: Software tool
- Project Status: Ongoing
- Project Start Year:2019
- Project End Year: Ongoing
- Project Domain: Environment
- Data Source: freely available global remote-sensing derived data
- Data Publicly available: Yes
- Technology/Platform: ARIES technology; semantics and machine reasoning to automate data and model integration
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 6 – Clean Water and Sanitation; SDG 13 – Climate Action; SDG 14 – Life Below Water; SDG 15 – Life on Land
- Partnership(s)/Collaborator(s):
  - The ARIES for SEEA Explorer was developed by the Basque Center for Climate Change (BC3) under the EU-funded Natural Capital Accounting and Valuation of Ecosystem Services (NCAVES) project, which is jointly implemented by the Statistics Division of the UN Department of Economic and Social Affairs and UNEP.
- Relevant Links and Multimedia: https://seea.un.org/content/aries-for-seea

- Lessons Learned: Functionalities for the ARIES for SEEA explorer will be continuously improved and expanded
- Contact information: William Speller (william.speller@un.org)

### Project 2: Adaptation to climate change in sub-Saharan African humanitarian situations

- Project Description: The project harnesses artificial intelligence to investigate past environmental change around selected humanitarian hotspots of displacement in Burundi, Chad and Sudan and future projections in the face of the climate crisis to inform climate change adaptation measures and anticipatory action for integration in humanitarian programming.
- Entity Name: UNEP/OCHA Joint Environment Unit
- Project Type/Output: Report; Academic paper; Seminar/meeting
- Project Status: Completed
- Project Start Year: Sept 2018
- Project End Year: April 2021
- Domain: Environment; Humanitarian
- Data Source: Population data, satellite imagery and IPCC climate projections
- Publicly Available Data : No
- Technology/Platform: GIS, MapX
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 13 – Climate Action; SDG 17 – Partnerships for the Goals
- Partnership(s)/Collaborator(s):
    - UN Partners: WFP, UNHCR, UNICEF, OCHA
    - Government: Governments of Burundi, Chad and Sudan
    - Academia: University of Ghadarif, Sudan
- Relevant Links and Multimedia: https://eecentre.org/2019/05/01/iki-project/
- Lessons Learned: The project was implemented during the COVID-19 pandemic, with artificial intelligence proving an effective solution to continue delivering despite movement restrictions that hampered fieldwork and other project activities requiring presence
- Contact information: Margherita Fanchiotti (fanchiotti@un.org)

### Project 3: Identifying the potential applications of Artificial Intelligence for Disaster Management.

- Project Description:

  Background

  Rapid advances in science and practices of Artificial Intelligence (AI), Robotics, Drones and Internet of Things (IoT) is expected to change all aspects of human society in the coming decades. Social scientists call this collective change the "Fourth Industrial Revolution" (4IR). There are many possibilities for introducing these technologies into the domain of disaster response, especially for environmental disaster response. In addition to helping mitigate the consequences of disasters, the technologies of the fourth industrial revolution also help prepare for them.

  The proposed project is aimed at the current state of play on the applications of 4IR technologies for disaster management and identifies opportunities and partners to promote these technologies for environmental emergency response in the future.

For instance, in October 2020, during the AI for Good Summit organized by ITU, UNEP led a session on Artificial Intelligence for Natural Disaster Management. In addition to UNEP and ITU, the session had speakers form Google, Government of India and Monash University. With over 2000 registrations, it was the most well attended session at the AI for Good summit. This led ITU, UNEP and WMO to form a partnership to take this work forward.

- Scope of Work
    - Conduct a comprehensive literature review of the developments in the field of AI, Robotics and IoT to identify those with potential applications in Environmental Disaster Response
    - Identify technologies which has been developed and employed, even at pilot phase, for emergency response and prepare a technology forecast for its potential applications in environmental emergency response
    - Identify research and technology partners in academia, research laboratories and industries who are currently working on the area of applications of 4IR technologies and form a network for information exchange and potential collaborations
    - Prepare training programme on the potential applications of 4IR technologies in environmental emergency response
- Department/Division: Ecosystems Division, Resilience to Disasters and Conflicts Global Support Branch.
- Project Type/Output: Report, Seminar/meeting, Conference
- Project Status: Ongoing
- Project Start Year: 2021
- Project End Year: 2022
- Domain: Environment; Health; Telecommunications; Weather; Technology
- Data Source: We are currently using open source information and qualitative data.
- Data Publicly Available: Yes
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 9 – Industry, Innovation and Infrastructure; SDG 13 – Climate Action; SDG 17 – Partnerships for the Goals
- Partnership(s)/Collaborator(s):
    - UN Partners: International Telecommunications Union (ITU), World Meteorological Organisation (WMO)
- Relevant Links and Multimedia:
    - Webinar series promotion
        - UNEP Website
        - Other materials
    - Video recordings of Modern Technologies for Disaster Management Webinar Series
        - Robotics for Disaster management – video
        - Artificial Intelligence for Disaster Management – video
- Lesson Learned:
    - Future work:

- Continue to identify research and technology partners in academia, research laboratories and industries who are currently working on the area of applications of 4IR technologies and form a network for information exchange and potential collaborations
- Prepare training programme on the potential applications of 4IR technologies in environmental emergency response and deliver such trainings.

- Contact information: Muralee Thummarukudy (muralee.thummarukudy@un.org) and Paula Padrino Vilela (paula.padrinovilela1@un.org)

### Project 4: Global Partnership on Marine Litter (GPML) Recommender

- Project Description: The Global Partnership on Marine Litter (GPML) Digital Platform is a multi-stakeholder platform that compiles different resources, connects stakeholders, and integrates data to guide action. Its vision is to be the go-to open source multistakeholder Platform that successfully connects and informs all actors working towards addressing the global problem of marine litter and plastic pollution.

  The Platform allows stakeholders to get an overview of the different initiatives, find relevant resources and connect with other stakeholders in the field. To encourage and make it easier for stakeholders to connect, UNEP would like to implement a matchmaking system that automatically matches stakeholders based on their interests, skills, and other relevant information.

  Three levels of recommender systems are under consideration.

  - Level 1 is a Content-based Recommender Engine. This will match an individual to an individual and an entity to an entity. For individuals, user profile data is used. For entities, the data on representative sector, country, geo-coverage type, entity, seeking, offerings, and bookmarks fields are used. For both, the Geo-coverage is used to further rank/order recommendations.
  - Level 2 is a Content-based Recommender Engine Using Natural Language Processing. Apart from the predefined fields used in the Level 1 Recommender, this model uses the "About Yourself" and document uploads i.e., "Curriculum Vitae" features for matching stakeholders. These fields are natural language data; hence NLP techniques are beneficial for the design of the recommender engine. Matches are prioritized by geo-coverage and offerings of the stakeholders.
  - Level 3 is a Content-Based Recommender Boosted by Collaborative Filtering (Interaction Data). This is a hybrid recommender model that treats collaborative information (interaction data) as additional feature data of the Level 1 or Level 2 recommenders. At this level, the K-means clustering algorithm is used to combine content-based and collaborative filters. In addition to profile data used by the Level 1/Level 2 recommenders, the system will take in interaction data prioritized as follows; Time spent on resources. Clicks on a link or resource, and Stakeholder browsing history.

  With more users signing up to the platform, there will be more interaction data being recorded and stored. The Recommender will not only perform Individual-Individual matching, but also incorporate Entity-Entity and Entity-Individual matching.
- Department/Division: Ecosystems Division
- Project Type/Output: Software tool
- Project Status: Development
- Project Start Year:2021
- Project End Year: 2022

- Project Domain: Environment
- Data Source: User Profile Data + innovative data sources for the data hub
- User profile data is collected when individuals or entities sign up to the GPML Digital Platform.
- This data includes information such as what resources a user is offering and what they are seeking from other users on the GPML digital platform as well as their geo-coverage type if a user signs up as an entity.
- Publicly available data: No
- Technology/Platform:
    - Jupyter Notebook: The Jupyter Notebook App is a server-client application that allows editing and running notebook documents (documents produced by the Jupyter Notebook App, which contain both computer code (e.g., python) and rich text elements (paragraph, equations, figures, links, etc.…)) via a web browser. The Jupyter Notebook App can be executed on a local desktop requiring no internet access (as described in this document) or can be installed on a remote server and accessed through the internet.
    - Python: Python is an interpreted high-level general-purpose programming language.
    - Natural Language Toolkit (NLTK): a suite of libraries and programs for symbolic and statistical natural language processing for English written in the Python programming language.
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 6 – Clean Water and Sanitation; SDG 11 – Sustainable Cities and Communities; SDG 12 – Responsible Consumption and Production; SDG 14 – Life Below Water; SDG 15 – Life on Land; SDG 17 – Partnership for the Goals
- Partnership(s)/Collaborator(s):
    - UN Partners: United Nations Office of ICT
    - Civil Society: AKVO Foundation
- Relevant Links and Multimedia:
    - Digital Platform: https://digital.gpmarinelitter.org/about-us
    - GPML: https://www.gpmarinelitter.org/
    - LinkedIn: https://www.linkedin.com/company/global-partnership-on-marine-litter/
    - Youtube: https://www.youtube.com/channel/UCoWXFwDeoD4c9GoXzFdm9Bg
    - https://digital.gpmarinelitter.org/GPML-One-pager-19.08i.pdf
- Lesson Learned: The GPML Recommender project has just started, lessons learned yet to be obtained.
- Contact Information: Heidi Savelli-Soderberg (heidi.savelli@un.org)

### Project 5: Using Machine Learning to Make Government Spending Greener

- Project Description: The project seeks to show how machine learning (ML) models can help policy makers and researchers design data-driven policies that most efficiently and effectively allocate scarce government resources at home and abroad to maximize inclusive and sustainable prosperity and development.

For policy- and decision-makers in many countries, one of the key impediments to designing well-targeted green transition policies is a lack of data and intelligence on the causal chains from a policy to its impact on society, the economy, and the environment. It is difficult to manage and prioritize green spending if you can't measure its e effects.

Properly trained machine learning (ML) models can enable rapid, quantitative predictions of policy impacts.

This exploratory research venture between the UN Environment Program (UNEP) and UNCTAD showcases how machine learning has the potential to transform the measurement of policy impacts on Sustainable Development Goals (SDGs), Nationally Determined Contributions (NDCs) and National Biodiversity Strategies and Action Plans (NBSAPs) and enable targeted and efficient decision making for underpinning green and inclusive transitions.

Illustrative models and analyses were created for 6 different countries: Zambia, Haiti, DRC, Solomon Islands, Liberia, Madagaskar

- Project Type/Output: Report; Software tool
- Project Status: Ongoing
- Project Domain: Environment
- Data Source: Data features are collected from: The ODA by sector, Aid activities targeting Global Environmental Objectives, and The Global Forest Watch
- Publicly available data: Yes
- Technology/Platform: Trained and evaluated five different types of ML models: Artificial Neural Networks (ANNs), Long Short-Term Memory Networks (LSTMs), Gradient Boost Models (GBMs), Ordinary Least Squares Regression (OLS) models, and Random Forest (RF) models.
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 8 – Decent Work and Economic Growth; SDG 9 – Industry, Innovation and Infrastructure; SDG 12 – Responsible Consumption and Production; SDG 13 – Climate Action; SDG 15 – Life on Land; SDG 17 – Partnership for the Goals
- Partnership(s)/Collaborator(s) :
    - UN Partners: UN Environment Program (UNEP) and UNCTAD
- Relevant Links and Multimedia: https://greenfiscalpolicy.org/blog/using-machine-learning-to-make-government-spending-greener/
- Lesson Learned: A more comprehensive pilot study in collaboration with a national government using historical budget data would serve as a valuable next step in exploring this innovative method of transforming public finance decision-making.
- Contact Information: Himanshu Sharma (himanshu.sharma@un.org)

**Project 6: SDG-meter**

- Project Description: Textual documents produced and consumed by UN frequently require identifying its linkages to SDGs (project proposals, reports, briefings, etc). This mapping demands extensive expert time and rely on personal knowledge of interlinkages among topics and SDGs. While UNEP counts with experts in several topics, identification of SDGs outside their expertise can be missed out.

The SDG-Meter, a web platform based on one of the most sophisticated deep learning - natural language processing algorithms (BERT), permits to analyze text document via and rate relation to each of the 17 SDGs in percent.

- Department/Division Economy Division, ICT Unit
- Project Type/Output: Web application
- Project Status: Complete
- Project Start Year:2020
- Project End Year: 2022
- Data Source: Textual data, in English, with two entries: texts from IISD website (limited to a maximum of 512 words) + associated labels (SDGs) as chosen by experts.
- In total, the database contains 2242 labeled texts (1247 from "News", 677 from "Guest Article" and 318 from "Policy Brief)
- Publicly available data: Yes
- Technology/Platform: BERT (Bidirectional Encoder Representations from Transformers), PyTorch, Python, jupyter Notebook.
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Updates:
    - Current work focuses on the search for an algorithm that is just as powerful as BERT but has the ability to analyze texts without word limitations. To do so, we are in the process of forming a consortium of experts around the problem of automatic classification of SDGs in order to acquire more information on the latest advances in the field. Moreover, via the chair established with the engineering school ISEP, we had the opportunity to realize a hackathon allowing to gather engineering students around our problem of word limitations. The study and the continuation of the various proposed solutions are in progress.
- Related Sustainable Development Goals (SDGs): All the SDGs
- Partnership(s)/Collaborator(s):
    - Academia: ISEP (Institut supérieur d'électronique de Paris)
- Relevant Links and Multimedia: Pilot - http://62.160.8.100
- Lesson Learned:
    - Challenges:
        - Limitation of the size of the text to process with the Google BERT algorithm (512 words or 2 pages)
    - Future work:
        - Experiment new deep learning algorithm in order to avoid input text length limitation
        - The tool can be further developed to analyze texts in bulk, from web databases, and provide insights from collections of texts. Ideally this can be included in different CMS as a plugin/module, streamlining the process.
- Contact Information: Robert Rodriguez (robert.rodriguez@un.org), Jade Guisiano (jade.guisiano@etu.sorbonne-universite.fr) and Jonathas De Mello (Jonathas.demello@un.org)

### Project 7: Predictive analytics to support governments in transforming food systems (TEEBAgriFood)

- Project Description: This project catalyzes the use of predictive analytical tools to support governments in transforming food systems faster, better and at a greater scale than before.

  Predictive analytics and scenario modeling allow decision makers to compare future policy intervention options in the food system, illuminating the full impacts of a policy decision on natural, social, human and produced capital. This enables strategic foresight and anticipatory decision-making that values instead of discounts the future.

  Modeling techniques and tools are increasingly becoming more efficient through machine learning and the use of Earth Observations. Models applied for such exercise can range from 'snapshot' biophysical ecosystem service models (such as InVEST) up to the modeling of dynamic biophysical and socio-economic systems including dynamic relationships between conflicting or compounding government policies (for example agriculture subsidies and environmental regulations).

  Applications are initiated in Brazil, China, India, Indonesia, Mexico, Thailand, Malaysia, Colombia, Kenya, Tanzania, Thailand and Mexico.
- Project Type/Output: Report; Policy Framework
- Project Status: Ongoing
- Project Start Year:2020
- Project End Year: 2023
- Project Domain: Agriculture
- Data Source: freely available global remote-sensing derived data; national and subnational government data; biophysical data at the watershed level
- Publicly available data: Yes
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Contact Information: Salman Hussain (salman.hussain@un.org), Tomas Declercq (declercq2@un.org)

## 2. Related Sustainable Development Goals

All the SDGs

## 3. Relevant links

https://www.unep.org/

**Contact Information**

Saiful Ridwan, Chief, Enterprise Solutions, Corporate Services Division, UN Environment Programme (saiful.ridwan@un.org)

# United Nations Educational, Scientific and Cultural Organization

United Nations
Educational, Scientific and
Cultural Organization

## 1. Description of Activities on AI

### Project 1: Defending Human Rights in an Age of Artificial Intelligence

- Project Description: UNESCO and UNITAR jointly launched a new microlearning course on AI and Human Rights for youths aged 16 to 24. The course breaks down complex concepts about AI through activities built around our daily technology interactions. Through interactive exercises, users will identify and engage with practical examples of uses of AI, which are problematic from a human rights perspective. In turn, they learn about the implications of AI for freedom of expression, the right to privacy and the right to equality.

  The course is available in English, French, Spanish, Russian and Chinese.
- Department/Division: Sector for Communication and Information
- Project Type/Output: Other: Online course
- Project Status: Ongoing
- Project Start Year: 2020
- Project End Year: 2023
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Update:
  - Call for translations will be launched jointly with UNESCO, UNITAR and SALTO (early 2023) to invite open-source translations of languages spoken in Europe, such as German, Italian and so on.
- Project Domain: Education; Human Rights (Freedom of Expression, Right to Privacy, Right to Equality); Artificial Intelligence
- Related Sustainable Development Goals SDGs: SDG 4 – Quality Education, SDG 17 – Partnerships for the Goals
- Partnership(s)/Collaborator(s):
  - UNITAR (Co-partner)
  - SALTO (co-partner)
- Links and Multimedia:
  - https://en.unesco.org/news/join-unesco-and-unitars-ai-and-human-rights-course
  - https://www.edapp.com/course/defending-human-rights-in-the-age-of-artificial-intelligence-2
- Contact information: Prateek Sibal (p.sibal@unesco.org)

## Project 2: AI and the Rule of Law

- Project Description: Based on the findings of the AI Needs Assessment Survey in Africa and another survey of over 1200 judicial operators in 100 countries, UNESCO has launched a global MOOC on AI and the Rule of Law to strengthen capacities of judicial operators in the use of AI in the administration of justice, while addressing the human rights and legal implications of the use of AI with respect to bias, discrimination, privacy, freedom of expression among others. The course is structured around six introductory modules that unpack AI's application and impact in the judiciary.

  The course is available in 7 languages and taught by 20 speakers - including sitting judges from Supreme Courts, Human Rights Courts, Legal Experts and Technology experts. The experts teaching the course come from India, Senegal, Kenya, Netherlands, United States, Chile, Brazil to China.

  Over 4500 judicial operators from 138 countries have enrolled in the course in 2022.

  The project continues to support capacity building for judicial operators through online and in person trainings on AI and the Rule of Law.
- Department/Division: Sector for Communication and Information
- Project Type/Output: Capacity Building through - Massive Open Online Course (MOOC), online and in person trainings
- Project Status: Ongoing
- Project Start Year: 2021
- Project End Year: 2025
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project updates:
  - Follow up trainings are being held online to further build capacities on AI and the Rule of Law.
  - The Eastern Africa Sub-regional Forum on Artificial Intelligence (2-4 Mar 2022)
  - Open for Good Webinar on AI and Justice data (8 Jun 2022)
  - Specialization Training Seminar on Artificial Intelligence, Criminal Justice and Human Rights for Judicial Operators in Siracusa (Italy) (Siracusa Int. Institute) (3-7 Jul 2022)
  - Inter-regional training for judicial operators (10-12 Aug 2022), conducted jointly with SADA, registered over 60 judicial operators from 18 African countries.
- Project Domain: Artificial Intelligence
- Related Sustainable Development Goals (SDGs): SDG 4 – Quality Education, SDG 16 – Peace, Justice, and Strong Institutions; SDG 17 – Partnership for the Goals
- Partnership(s)/Collaborator(s):
  - CETIC.br
  - IEEE
  - The Future Society
  - National Judicial College
- Links and Multimedia: AI and the Rule of Law: Capacity Building for Judicial Systems (unesco.org)
- Contact information: Cédric Wachholz (c.wachholz@unesco.org), Prateek Sibal (p.sibal@unesco.org), Guilherme Canela De Souza Godoi (g.godoi@unesco.org), Vanessa Dreier (v.dreier@unesco.org)

### Project 3: AI for the Planet

- Project Description: UNESCO, UNEP and Startup Inside organized a global virtual conference and series of monthly dialogues that bring together the world's best experts and AI pioneers to share concrete use cases, identify best practices, celebrate successes and inspire further actions in this dynamic field. It highlights AI innovations related to sustainable development and the preservation of the planet. Over 2,000 people worldwide from over 100 countries have joined the digital events. They highlight several developments, such as the impact of AI and machine learning to guide cities towards sustainable mobility, the impact of "green" investments and the use of AI to conserve biodiversity. Following the conference, two marquee reports will be published, in partnership with Startup Inside, UNDP, UN OICT, AI for Good Foundation, BCG and BCG GAMMA

  In its second marquee report, AI for the Planet aims to highlight the top solutions and present action items for global stakeholders in its second marquee report.
- Department/Division: Sector for Communication and Information
- Project Type/Output: Conference (multiple meetings on a theme), Report
- Project Status: Ongoing
- Project Start Year: 2021
- Project End Year: 2023
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Updates:
  - First marquee report, titled "How AI Can Be a Powerful Tool in the Fight Against Climate Change", published (7 Jul 2022)
- Project Domain: Environment; Artificial Intelligence
- Related Sustainable Development Goals (SDGs): SDG 13 – Climate Action; SDG 17 – Partnerships for the Goals
- Partnership(s)/Collaborator(s)
  - UN Partners: UNEP, UNDP, UN OICT
  - Private Sector: Startup Inside, BCG, BCG GAMMA, AI for Good Foundation, Microsoft
- Links and Multimedia:
  - www.aifortheplanet.org/en/
  - https://aifortheplanet.org/en/registration/call-for-solutions
  - https://en.unesco.org/news/ai-planet-highlighting-ai-innovations-accelerate-impact
- Contact information: Cédric Wachholz (c.wachholz@unesco.org), Vanessa Dreier (v.dreier@unesco.org), Prateek Sibal (p.sibal@unesco.org)

### Project 4: Multistakeholder AI Development – 10 building blocks for inclusive policy design

- Project Description: With the Innovation for Policy Foundation (i4Policy), UNESCO facilitated community consultations and developed a report to advise governments on inclusive and multi-stakeholder-driven processes for developing AI policies. Through an iterative series of multi-stakeholder learning and co-creation workshops, i4Policy and UNESCO developed a report on Multistakeholder AI Development, including existing examples of inclusive national approaches to AI and Digital Policy Development.

In the report, UNESCO and i4Policy distill 10 essential lessons for policymakers to harness the collective intelligence of communities and ensure that the process of creating and implementing public policy is inclusive and multi-stakeholder driven.

It leverages AI and innovation community networks in developing countries to inform the development of global protocols on AI policy development process.

- Department/Division: Sector for Communication and Information
- Project Type/Output: Policy Framework/Seminar/meeting
- Project Status: Ongoing
- Project Start Year: 2021
- Project End Year: 2022
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Updates: Mozfest 2022 (held in Mar 2022): Workshop on building a research agenda and community to foster Global South engagement in global AI and data governance
- Project Domain: Human Rights; Artificial Intelligence
- Related Sustainable Development Goals (SDGs): SDG 4 – Quality Education; SDG 5 – Gender Equality; SDG 8 – Decent Work and Economic Growth; SDG 9 – Industry, Innovation and Infrastructure; SDG 10 – Reduced Inequality; SDG 13 – Climate Action; SDG 16 – Peace, Justice, And Strong Institutions; and SDG – 17 Partnership for the Goals
- Partnership(s)/Collaborator(s): Innovation for Policy Foundation (Co-partner)
- Links and Multimedia: https://events.unesco.org/event/?id=4180394255&lang=1033
- Contact information: Cédric Wachholz (c.wachholz@unesco.org), Vanessa Dreier (v.dreier@unesco.org), Prateek Sibal (p.sibal@unesco.org)

### Project 5: UNESCO's first graphic novel on Artificial Intelligence

- Project Description:

  In the framework of UNESCO's work to harness emerging technology for sustainable development, this graphic novel for young adults explores the impact of Artificial Intelligence on humankind. The comic strip is designed to provide basic AI education to all, showcasing the opportunities and challenges of technology in regard to freedom of expression and human rights and ethics, along with other issues related to AI, including AI and Sustainable Development and AI Professions.

  The publication goes beyond theoretical understanding of the topic and shows the everyday applications of AI, their origins, challenges and how these challenges can be addressed. Additionally, the publication will further elaborate AI in relation to the SDGs and UNESCO's ROAM principles.

  In this original work, examples will respect geographical diversity and gender distribution by showing one story based in Asia, Africa, Oceania and South America. Half of these stories feature women as the main character. The screenwriters and graphic designers are from different world regions, ensuring inclusion.

  The comic strip will be published in September 2022.
- Project Type/Output: Graphic Novel
- Project Status: Completed
- Project Start Year: 2021
- Project End Year: 2022
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Domain: Environment; Gender; Human Rights; Justice; Artificial Intelligence
- Related Sustainable Development Goals (SDGs): SDG 4 – Quality Education, SDG 5 – Gender Equality, SDG 17 – Partnership for the Goals
- Partnership(s)/Collaborator(s):

  - Katherine Evans (Writer and AI Expert)
  - Bimot Media (Illustration and Publication)
- Links and Multimedia:
  - https://www.unesco.org/en/articles/inside-ai-algorithmic-adventure
  - https://unesdoc.unesco.org/ark:/48223/pf0000382456
  - Contact information: Cédric Wachholz (c.wachholz@unesco.org), Vanessa Dreier (v.dreier@unesco.org), Prateek Sibal (p.sibal@unesco.org)

### Project 6: Globalpolicy.ai Portal

- Project Description: The platform provides policy and decision makers with data, research, use cases, and best practices in the field of AI policy and facilitates access to relevant AI-related resources from International Organizations. It serves as a platform that highlights cooperation between International Organizations and makes information readily available on one centralized portal related to AI Governance. Key partners include the Council of Europe, the European Commission, the European Union Agency for Fundamental Rights, the Inter-American Development Bank, the Organisation for Economic Co-operation and Development (OECD), the United Nations (UN), and the World Bank Group.
- Department/Division: Sector for Communication and Information
- Project Type/Output: A neutral, authoritative portal where citizens and stakeholders can access up-to-date, accurate information on global AI policy initiatives.
- Project Status: Ongoing
- Project Start Year: 2021
- Project End Year: Continuous
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Domain: Artificial Intelligence - Artificial Intelligence will disrupt/impact almost all industries and society.
- Technology/Platform: Wordpress
- Related Sustainable Development Goals (SDGs): SDG 9 – Industry, Innovation and Infrastructure; SDG 17 – Partnership for the Goals
- Partnership(s)/Collaborator(s):
  - UNESCO
  - Council of Europe
  - The European Commission
  - The European Union Agency for Fundamental Rights
  - Inter-American Development Bank
  - Organisation for Economic Co-operation and Development (OECD)
  - United Nations (UN)
  - World Bank Group
- Links and Multimedia:
  - https://globalpolicy.ai/en/
  - https://www.facebook.com/unesco/videos/3005127219743840/
- Contact Information: Cédric Wachholz (c.wachholz@unesco.org), Prateek Sibal (p.sibal@unesco.org); Vanessa Dreier (v.dreier@unesco.org)

### Project 7: Missing Links in AI Governance

- Project Description: The publication will provide world leaders, policy-makers, and civil society members with perspectives that will be critical to face the immense task they're presented with: to ensure the development of AI reaches its full potential in accordance with democratic values and fundamental rights and freedoms. The magnitude of this challenge requires a collaborative effort that transcends disciplinary barriers and geographical borders. This publication brings together academics, civil society representatives, artists and innovators to help us shift the conversation from what we already know to what we have yet to render visible to ensure AI technologies leave no one behind.
- Department/Division : Sector for Communication and Information
- Project Type/Output: Academic journal
- Project Status: Ongoing
- Project Start Year: 2021
- Project End Year: 2022
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project updates:
    - All contributions received, currently in editing and publication process.
- Project Domain: Artificial Intelligence – Artificial Intelligence will disrupt/impact almost all industries and society.
- Related Sustainable Development Goals (SDGs): SDG 4 – Quality Education; SDG 5 – Gender Equality; SDG 8 –Decent Work and Economic Growth; SDG 10 – Reduced Inequality; SDG 13 – Climate Action; SDG 16 – Peace, Justice, And Strong Institutions; SDG 17 Partnership for the Goals
- Partnership(s)/Collaborator(s):
    - Academia: MILA – Quebec Artificial Intelligence Institute
- Contact information: Cédric Wachholz (c.wachholz@unesco.org), Vanessa Dreier (v.dreier@unesco.org), Prateek Sibal (p.sibal@unesco.org)

### Project 8: The Effects of AI on the Working Lives of Women

- Project Description: UNESCO, the Organisation for Economic Co-operation and Development (OECD), the Inter-American Development Bank (IADB) and Cambridge University have developed a joint report concerning AI's effects on women's working lives.

  The report is intended to raise general awareness of the disruptions of AI during the workforce lifecycle from a gender perspective.

  This descriptive publication is targeted broadly at the general public and decision-makers across sectors including public sectors, private sectors and academia, and provides policymakers with an introduction to issues regarding gender and AI, including applied use cases to consider in AI Programmes and Policy Development

  It has been published in March 2022, in English, Spanish and French.
- Department/Division: Sector for Communication and Information
- Project Type/Output: Report
- Project Status: Completed
- Project Start Year: 2021
- Project End Year: 2022
- Reported as part of 2021 Compendium on UN AI Activities? Yes

- Project update:
  - International Women's Day (8 Mar 2022): Launch of OECD-IDB Joint Publication on "The Effects of AI on the Working Lives of Women"
- Project Domain: Artificial Intelligence
- Technology/Platform: Report, on UNESCO web page
- Related Sustainable Development Goals (SDGs): SDG 4 – Quality Education; SDG 5 – Gender Equality; SDG 8 –Decent Work and Economic Growth; SDG 10 – Reduced Inequality; SDG 17 – Partnership for the Goals
- Partnership(s)/Collaborator(s):
  - UNESCO (Data Collection and Project Management)
  - Organisation for Economic Co-operation and Development (Data Collection and Project Management)
  - Inter-American Development Bank (Data Collection and Project Management)
  - The Minderoo Centre for Technology and Democracy, University of Cambridge
- Links and Multimedia:
  - https://www.unesco.org/en/articles/what-are-effects-ai-working-lives-women-global-experts-weigh
  - https://unesdoc.unesco.org/ark:/48223/pf0000380861
- Contact information: Cédric Wachholz (c.wachholz@unesco.org), Vanessa Dreier (v.dreier@unesco.org); Prateek Sibal (p.sibal@unesco.org)

### Project 9: AI and Digital Transformation Competency Framework for Civil Servants

- Project Description: The challenges of digital era governance require a new set of skills and competencies from civil servants, ICT ministries and digital units in government.

  The UN Broadband Commission's Working Group on AI Capacity Building, which UNESCO co-chairs with Nokia, is developing a Digital Transformation and Artificial Intelligence Competency Framework for Civil Servants. Through a series of interviews with regional policymakers, collection and assessment of good practices globally, and global consultations, the Working Group has developed evidence-based competency domains, complementary attitudes and recommendations, in a Digital Transformation and AI competency framework, for public sector duty bearers.

  As an open resource, the Competency Framework is context-sensitive and adaptable for use to support capacity building for civil services across ICT Ministries and Digital Units in governments.
- Department/Division: Sector for Communication and Information
- Project Type/Output: Broadband Commission Report
- Project Status: Completed?
- Project Start Year: 2021
- Project End Year: 2022
- Reported as part of 2021 Compendium on UN AI Activities? No
- Project Updates:
  - WSIS Consultation: Digital Competency Framework (25 Apr 2022)
  - UNCTAD eCommerce Week: "From Data To AI: Digital Transformation Competency Framework For The Public Sector" (27 Apr 2022)

  - African, Asian and Latin American consultations (May-Jun 2022)
- Project Domain: Artificial Intelligence
- Technology/Platform: Publication
- Related Sustainable Development Goals (SDGs): SDG 9 – Industry, Innovation and Infrastructure; SDG10 – Reduced inequalities, SDG 16 – Peace, Justice, And Strong Institutions; SDG 17 – Partnership for the Goals
- Partnership(s)/Collaborator(s):
  - UN Broadband Commission
  - UNESCO
  - Nokia
  - Open Knowledge Foundation
- Links and Multimedia:
  - https://www.broadbandcommission.org/working-groups/ai-capacity-building/
- Contact Information: Cédric Wachholz (c.wachholz@unesco.org), Prateek Sibal (p.sibal@unesco.org)

### Project 10: The Athens Roundtable

- Project Description: On 1-2 Dec 2022, the fourth edition of The Athens Roundtable will be co-hosted by UNESCO to advance and widen the global dialogue on the enforcement of AI policies and regulations, coordinated efforts toward AI standards and benchmarks, and the adoption of AI in alignment with human rights and democratic values.

  The Athens Roundtable is an annual multi-stakeholder conference seeking to advance the sound development of policies, educational initiatives and evidence-based instruments, to enable the trustworthy adoption of AI in legal systems, the practice of law, and related regulatory compliance.
- Department/Division: Sector for Communication and Information
- Project Type/Output: Conference
- Project Status: Ongoing
- Project Start Year: 2020
- Project End Year: 2022
- Reported as part of 2021 Compendium on UN AI Activities? No (not for new edition of 2022)
- Project Domain: Artificial Intelligence – Artificial Intelligence will disrupt/impact almost all industries and society.
- Technology/Platform: Hybrid format
- Related Sustainable Development Goals (SDGs): SDG10 – Reduced inequalities, SDG 16 – Peace, Justice, And Strong Institutions; SDG 17 – Partnership for the Goals
- Partnership(s)/Collaborator(s):
  - The Future Society
  - European Parliament
  - IEEE
  - Council of Europe
- Links and Multimedia:
  - https://www.aiathens.org/dialogue/fourth-edition

- Contact Information: Cédric Wachholz (c.wachholz@unesco.org), Prateek Sibal (p.sibal@unesco.org), Vanessa Dreier (v.dreier@unesco.org)

### Project 11: Second Launch for TOP 100 Solutions by IRCAI

- Project Description: The launch of UNESCO and International Research Centre in Artificial Intelligence (IRCAI)'s second call for Top 100 innovative solutions that leverage AI to address SDGs. Through this work, UNESCO and IRCAI aim to showcase the promising AI initiatives, that align themselves with human rights and SDGs.
- Department/Division: Sector for Communication and Information
- Project Type/Output: Call for Solutions, Report
- Project Status: Ongoing
- Project Start Year: 2021
- Project End Year: 2022
- Reported as part of 2021 Compendium on UN AI Activities? No
- Project Domain: Artificial Intelligence
- Technology/Platform: Report
- Related Sustainable Development Goals (SDGs): SDG4 - Quality Education; SDG9 – Industry, Innovation and Infrastructure; SDG 10 – Reduced Inequalities; SDG11 – Sustainable Cities and Communities; SDG 16 – Peace, Justice, And Strong Institutions; SDG 17 – Partnership for the Goals
- Partnership(s)/Collaborator(s): International Research Centre in Artificial Intelligence under the auspices of UNESCO
- Links and Multimedia:
    - https://ircai.org/global-top-100/
- Contact Information: Cédric Wachholz (c.wachholz@unesco.org), Prateek Sibal (p.sibal@unesco.org)

### Project 12: Destination A.I.

- Project Description: This course is made available for the public to learn about the applications of AI, issues related to confidentiality and data bias and identify the opportunities brought out by AI. This aims to strengthen the public's basic understanding of AI and its related societal challenges.
- Department/Division: Sector for Communication and Information
- Project Type/Output: Report
- Project Status: Completed
- Project Start Year: 2021
- Project End Year: 2022
- Reported as part of 2021 Compendium on UN AI Activities? No
- Project Domain: Artificial Intelligence
- Technology/Platform: Online Course
- Related Sustainable Development Goals (SDGs): SDG 4 – Quality Education; SDG 10 – Reduced Inequalities; SDG 17 – Partnership for the Goals
- Partnership(s)/Collaborator(s):
    - Institut Montaigne
    - OpenClassrooms
    - Fondation Abeona

- Links and Multimedia:
  - https://openclassrooms.com/en/courses/7078811-destination-ai-introduction-to-artificial-intelligence
- Contact Information: Cédric Wachholz (c.wachholz@unesco.org), Prateek Sibal (p.sibal@unesco.org), Vanessa Dreier (v.dreier@unesco.org)

### Project 13: AI and the Futures of Learning project (based on the Teaching Artificial Intelligence at School project)

- Project Description: To support Member States to harness AI for education, with equity and inclusion as guiding principles, UNESCO initiated this project on effective use of AI in the future of learning underpinned by three enablers: (1) needs-driven AI-enabled futures of learning: the project will reveal emerging use cases for leveraging AI to address fundamental needs of learning and provide recommendation on planning; (2) a guidance on ethical principles: the project will develop ethical principles for the design, deployment, and applications of AI in learning and education; and (3) AI competencies: the project will develop a guiding framework on AI competencies needed by all learners to live and learn with AI.

  The Project will address both the technological and the human-oriented dimensions of AI and the futures of learning across three sub-domains as identified in UNESCO's AI and Education: Guidance for policy-makers: learning with AI, learning about AI, and learning to work and live with AI.
- Department/Division: Sector for Education
- Project Type/Output: Report/seminar/meeting:
  - report proposing recommendations on AI-enabled futures of learning
  - guidance on ethical principles on the use of AI in education
  - guiding framework on AI competencies for school students
- Project Status: Ongoing
- Project Start Year: 2021
- Project End Year: 2023
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project updates:

  The launch event of the AI and the Futures of Learning project was organized in September 2021 to present the main activities and elicit comments, map out ongoing initiatives, and build partnerships around the project. During the event, senior staff members from other UNESCO Sectors as well as from ITU, UNICEF and European Commission Joint Research Centre, Ministers and high-level governmental officials, Directors of relevant UNESCO Institutes (including International Institute for Technology in Education, International Bureau of Education, International Research Center on AI, and Regional Center for Educational Planning), and representatives of the private sector (including IBM and Intel) shared information on their current programmes in the field of AI in education.

  In 2021, UNESCO carried out a survey on the use of AI to support education during the COVID-19 pandemic by non-governmental agencies and a UNESCO Member States. In 2022, UNESCO will undertake a survey on the governmental use of AI as a public good. The results of this exercise will inform a UNESCO report on evidence-based effective use of AI in education, including in response to the COVID-19 pandemic.

  Consultations and brainstorming meetings with AI and education experts are underway to inform the publication on AI-enabled futures of learning and a guidance on ethical principles on the use of AI in education. The synthesis report of the 2021 International

Forum on AI and education (December 2021) organized by UNESCO and the analysis of the discussions have informed the publication on AI-enabled futures of learning.

- Project Domain: Education
- Related Sustainable Development Goals (SDGs): SDG 4 – Quality Education
- Partnership(s)/Collaborator(s): Private Sector- This project is financially supported by TAL Education Group and is open to a multi-stakeholder approach
- Links and Multimedia:
  - https://en.unesco.org/themes/ict-education/ai-futures-education; https://en.unesco.org/artificial-intelligence/education
  - https://en.unesco.org/artificial-intelligence/education
- Contact information: Dr. Fengchun Miao (f.miao@unesco.org)

### Project 14 Guiding the development of policies on AI and education

- Project Description: Based on UNESCO's publication *AI and education: guidance for policy-makers*, the project provides guidance and support with the development of national policies on AI and education. The publication is made available in 7 languages and offers guidance for policy-makers on how best to leverage the opportunities and address the risks, presented by the growing connection between AI and education. It starts with the essentials of AI, provides a detailed analysis of the emerging trends and implications of AI for teaching and learning and introduces the challenges of harnessing AI to achieve SDG 4 and offers concrete actionable recommendations for policy-makers to plan policies and programmes for local contexts. The project also includes country support and the organization of the awareness raising and knowledge sharing events, such as launch events of the policy guidance or international forums on AI and education. Moreover, policy examples, promising initiatives and best practices stemming from the forum discussions are documented in the form of synthesis reports.
- Project Type/Output: Report/Policy Framework/Capacity building activities based on the Guidance are under development.
- Project Status: Ongoing
- Project Start Year: 2019
- Project End Year: TBD
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project updates: The Guidance for policy makers has been published in March 2021, it is in 6 UN languages and Korean
- Online launch events, which included high-level ministry officials, were organized in the LAC region and the Gulf States with the support of relevant Field Offices and UNESCO Category 2 centres in the first of half of 2022. These events serve as the first step in a series of activities to support the development of national policies on A and education in concerned regions and beyond. The launch of the French version is being planned for September 2022.
- Over the past three years, the following events were organized:
  - International Conference on Artificial Intelligence and Education ( May 2019) resulting in the adoption of the Beijing Consensus
  - International Forum on AI and the Futures of Education (December 2020)
  - International Forum on AI and Education: Ensuring AI as a Common Good to Transform Education (December 2021)
- Project Domain: Education
- Related Sustainable Development Goals (SDGs): SDG 4 – Quality Education

- Partnership(s)/Collaborator(s):
  - Private Sector- Weidong Group (financial support)
- Links and Multimedia:
  - https://unesdoc.unesco.org/ark:/48223/pf0000376709
  - https://unesdoc.unesco.org/ark:/48223/pf0000376709
  - https://en.unesco.org/artificial-intelligence/education
- Contact information: Dr. Fengchun Miao (f.miao@unesco.org)

### Project 15 Developing AI competencies for school students

- Project Description: Based on Teaching Artificial Intelligence at School project, the main objectives are to develop a reference framework on AI competencies to raise awareness and build capacities related to developing knowledge, skills and values needed to live and work in the AI era. The project will further facilitate the planning of national or institutional AI curricula for school education of fostering the competencies of both girls and boys. A Report on Mapping of K-12 AI curricula based on the two surveys carried out by UNESCO will inform the development of a guiding framework. Also, the project involves capacity building activities and organization of workshops with countries based on the tools and guidance developed by UNESCO. The project has been aligned with the activities of the AI and the futures of learning project.
- Department/Division: Sector for Education
- Project Type/Output: Seminar/meeting
- Development of an AI skills framework for schools; Workshops to support the integration of AI training into national or institutional school curriculum in a selected number of countries.
- Project Status: Ongoing
- Project Start Year: 2019
- Project End Year: TBD
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project updates:

  In February 2022, UNESCO published a Report on Mapping of K-12 AI curricula based on two surveys on government-approved AI curricula targeting UNESCO Member States and non-governmental organizations that provide AI curricula. The findings indicate that despite the wide demand for AI-related competencies, only 11 countries have endorsed AI curricula to date in their K-12 education systems, with a further 4 countries currently developing AI curricula.

  In May 2022, based on the above mentioned report, UNESCO with the Ministry of Education of Oman, RCEP, UNESCO Doha office and Ericsson organized an online workshop to develop the capacities of more than 25 national curriculum developers in integrating appropriate AI competencies (including knowledge, skills and values relating to AI) into the national K-12 curriculum and/or institutional programmes.
- Project Domain: Education
- Data Source: What the data contains, such as demographic data, satellite data
- Related Sustainable Development Goals (SDGs): SDG 4 Quality Education
- Partnership(s)/Collaborator(s): Private Sector: This project is being developed in partnership with Ericsson and is open to a multi-stakeholder approach.
- Links and Multimedia:
  - https://en.unesco.org/artificial-intelligence/education

- https://en.unesco.org/artificial-intelligence/education

- Contact information : Dr. Fengchun Miao (f.miao@unesco.org)

**Project 16: Flood forecasting for next 24 hours using AI**

- Project description: Through the project "Enhancing Climate Services for Improved Water Resources Management in Vulnerable Regions to Climate Change: Case Studies from Africa and Latin America and the Caribbean" (CliMWaR) activities have been developed on regional and national flood and drought monitoring platforms for the improvement of relevant information on climate and water for decision-making, while making the information actionable, locally relevant and timely.

  The implementation of the platforms has been delivered by Princeton Climate Institute and covers the continental area of Africa, and the national-level of Cameroon, Mozambique, Zimbabwe, South Africa, Africa (at regional level) Namibia, Malawi. The platform is based on a set of ground, satellite and modelled datasets, which are combined to provide a consistent picture of hydrological conditions close to real-time, as well as forecasts out to 7-days for floods and out to 6 months for drought. The system is updated every day, about 1-2 days behind real-time and it runs a hydrological model with a 5 km resolution. The system integrates an AI-driven flood forecast at 30m resolution, indicating the expected area to be flooded in the next 24-36 hours.
- Department/Division: Natural Sciences Sector
- Project Type/Output: Other: Software tool/Application
- Project Status: Ongoing
- Project Start Year: 2020
- Project End Year: 2023
- Reported as part of 2021 Compendium on UN AI Activities? No
- Project Domain: Disaster risk reduction; Artificial Intelligence
- Related Sustainable Development Goals SDGs: SDG 11 – sustainable cities and communities (disaster risk reduction) SDG 13 – climate action
- Partnership(s)/Collaborator(s): Princeton Climate Institute, University of Montana
- Links and Multimedia: https://en.unesco.org/disaster-risk-reduction/ews-water
- Contact information: Koen Verbist (k.verbist@unesco.org)

**Project 17: STEM education**

- Project description: Development of the Robotics and Artificial intelligence program to focus on designing codes, algorithms, linkage between hardware and software and 3D printing to allow teachers, trainers, and students to create machines and AI applications in MS especially in SIDS and Africa.

  In Rwanda, about 120 students, teachers and UNESCO Trainers have convened in FAWE Girls School/Gisozi for STEM Mentoring Boot Camp on Robotics, Artificial Intelligence, 3D Printing and Microscience. UNESCO in partnership with Rwanda National Commission for UNESCO (CNRU), Ministry of Education, Ministry of ICT & Innovation, Rwanda Basic Education Board, Rwanda TVET Board, FAWE Rwanda and the Creativity Lab have organized the event.

  Training on Artificial Intelligence Technology for University Teachers In collaboration with Huawei Kenya, a series of training activities will be organized from 11-29th July on AI for teachers in Eastern Africa. The objective of this course is to provide the most fundamental knowledge to the University / College teachers so that they can understand what the A.I is. So, the teachers can introduce AI to their students during their course of teaching.

  Dominican Republic, The 4 days workshop took place from 15 to 18 March, 2022. 57 teachers from around the country participated in the training workshop. 15 of them have

participated in phase 1 workshop, dedicated to Artificial intelligence and robotics that was held Virtually in July 2021. This was the first face-to-face workshops after the pandemic period. The teachers were exposed to a number of open source softwares such as Cura, Teachable machines etc.

- Department/Division: Natural Sciences Sector
- Project Type/Output: Other: training
- Project Status: Completed
- Project Start Year: 2020
- Project End Year: 2022
- Reported as part of 2021 Compendium on UN AI Activities? No
- Project Domain: Disaster risk reduction; Artificial Intelligence
- Related Sustainable Development Goals SDGs: SDG 4.- quality education
- Partnership(s)/Collaborator(s): Rwanda National Commission for UNESCO (CNRU), Ministry of Education, Ministry of ICT & Innovation, Rwanda Basic Education Board, Rwanda TVET Board, FAWE Rwanda and the Creativity Lab,
- Links and Multimedia:
- Contact information: Imteyaz Khodabux (i.khodabux@unesco.org)

### Project 18: Decision Making support tool using AI for school safety

- Project Description: Exposure of school infrastructure to multi-hazards poses significant risk to vulnerable populations of students and their education process. In response to this objective, UNESCO Chair in Disaster Risk Reduction and Resilience Engineering developed a probabilistic resilience framework, combining two methodologies which exploit Machine Learning technology, Agent-based (AB) and Bayesian Network (BN) approaches, for system performance analysis. The framework aims to estimate the disruption to education due to multiple hazards to quantify its resilience, considering physical, functional, and social vulnerability aspects of the infrastructure. The resilience of the system depends on the interdependencies of system variables from these qualitative and quantitative aspects.
- Department/Division: Natural Sciences Sector
- Project Type/Output: Other: Software tool/Application
- Project Status: Ongoing
- Project Start Year: 2022
- Project End Year: 2023
- Reported as part of 2021 Compendium on UN AI Activities? No
- Project Domain: Disaster risk reduction; Artificial Intelligence
- Related Sustainable Development Goals SDGs: SDG 11 SDG 11 – sustainable cities and communities (disaster risk reduction)
- Partnership(s)/Collaborator(s): University College London
- Links and Multimedia:
- Contact information: Soichiro Yasukawa (s.yasukawa@unesco.org)

### Project 19: UNESO-Southern Africa sub-Regional Forum on Artificial Intelligence (AI)

- Project Description: The Forum aims to provide a platform for Member States, international organizations, civil society, academia, the AI industry, and other stakeholders to discuss issues and challenges related to AI development in Africa, including equity and ethics and encourage intra-African cooperation in AI.
- Department/Division:
- Project Type/Output: Conference, synthesis report

- Project Status: ongoing
- Project Start Year: 2018
- Project End Year: 2022
- Reported as part of 2021 Compendium on UN AI Activities? No
- Project Domain: Artificial Intelligence; human rights; STEM education; data protection; gender equality
- Related Sustainable Development Goals SDGs: SDG 17-Partnership for the Goals, SDG 5- Gender Equality, SDG 4- Quality education, SDG 10- Reduced Inequality
- Partnership(s)/Collaborator(s): Ministry of Higher Education, Technology and Innovation of Namibia
- Links and Multimedia: www.sarfai2022.org
- Contact information: v.soo@unesco.org

### Project 20: Implementation of the Recommendation on the Ethics of AI- innovative tools for building national capacities

- Project Description:

  To build the capacities of Member States and support them in translating the Recommendation on the Ethics of AI into policies and practices at the national level, UNESCO is working towards the development of the following tools and mechanisms as mandated by the Recommendation:

  Readiness Assessment Methodology (RAM) to help governments determine how prepared the country is for developing, adopting and using AI systems, by analysing different dimensions of readiness, including legal, social, cultural, economic, scientific, educational, technological and infrastructural.

  Ethical Impact Assessment (EIA) to enable countries to evaluate AI technologies based on the standards of UNESCO Recommendation, underscoring the benefits and risks of a specific system to individuals, society and the environment.

  The tools should identify impacts on human rights and fundamental freedoms, in particular but not limited to the rights of vulnerable groups, poverty, digital divide, labour rights, the environment and ecosystems, and ethical and social implications.
- Department/Division: Sector for Social and Human Sciences
- Project Type/Output: development of tools
- Project Status: ongoing
- Project Start Year: January 2022
- Project End Year:
- Reported as part of 2021 Compendium on UN AI Activities? No
- Project updates: EIA and RAM are under development and are expected to be ready by the end of 2022. The tools will be piloted in 18 countries starting with 6 selected countries in Africa and SIDS in 2023 then will be further shaped to be employed in the other parts of the world.
- Project Domain: Environment, Education, Gender, Health, Human Rights, Justice, Telecommunications, Artificial Intelligence will disrupt/impact almost all industries and society. In particular, the Recommendation proposes concrete, impact-oriented policy actions in 11 areas: Ethical Impact Assessment; Ethical governance and stewardship; Data policy; Development and international cooperation; Environment and ecosystems; Gender; Culture; Education and research; Communication and information; Economy and labour; Health and social well-being
- Related Sustainable Development Goals (SDGs): SDG 3 – Good Health and Well-being; SDG 4 – Quality Education; SDG 5 – Gender Equality; SDG 8 – Decent Work and Economic Growth; SDG 9 – Industry, Innovation and Infrastructure; SDG 10 – Reduced Inequality; SDG 13 – Climate Action; SDG 16 – Peace, Justice, and Strong Institutions

- Partnership(s)/Collaborator(s):
  - UN Partners: UN
  - Government: 70+ Member States of the Group of Friends of the Recommendation (an op-ended alliance of countries spearheading the implementation of the Recommendation). Particular governmental partners include Japan, South Africa, Namibia, Mozambique, and Zimbabwe.
  - Private Sector:
- Links and Multimedia:
  - https://en.unesco.org/artificial-intelligence/ethics
- Contact information : Dr. Dafna Feinholz (d.feinholz@unesco.org)/ Irakli Khodeli (i.khodeli@unesco.org)

### Project 21: Ethics of AI- networks

- Project Description: To build the capacities of Member States and support them in translating the Recommendation on the Ethics of AI into policies and practices at the national level, UNESCO is setting up experts networks:

  AI Experts Without Borders: a roster of experts to be managed by UNESCO for deployment in beneficiary countries for targeted capacity-building interventions

  Women for Ethical AI Network (W4ethicalAI) to foster the implementation and deployment of the Recommendation, including the gender policy action area by engaging leading women in industry, government, science and civil society.
- Department/Division: Sector for Social and Human Sciences
- Project Type/Output: networks/event/research
- Project Status: ongoing
- Project Start Year: January 2022
- Project End Year:
- Reported as part of 2021 Compendium on UN AI Activities? No
- Project updates:
- Project Domain: Environment, Education, Gender, Health, Human Rights, Justice, Telecommunications, Artificial Intelligence will disrupt/impact almost all industries and society. In particular, the Recommendation proposes concrete, impact-oriented policy actions in 11 areas: Ethical Impact Assessment; Ethical governance and stewardship; Data policy; Development and international cooperation; Environment and ecosystems; Gender; Culture; Education and research; Communication and information; Economy and labour; Health and social well-being
- Related Sustainable Development Goals (SDGs): SDG 3 – Good Health and Well-being; SDG 4 – Quality Education; SDG 5 – Gender Equality; SDG 8 – Decent Work and Economic Growth; SDG 9 – Industry, Innovation and Infrastructure; SDG 10 – Reduced Inequality; SDG 13 – Climate Action; SDG 16 – Peace, Justice, and Strong Institutions
- Partnership(s)/Collaborator(s):
  - UN Partners: ITU, WHO, HLCP
  - Government: 70+ Member States of the Group of Friends of the Recommendation (an op-ended alliance of countries spearheading the implementation of the Recommendation).
  - Private Sector:

- Academia: Alan Turing Institute, IE University, London School of Economics, MIT, Technical University of Munich, Harvard University, Singapore Management University, University of Ghana, Universidad del Rossario, United Nations University, Chinese Academy of Science.

- Links and Multimedia:
- Contact information : Dr. Dafna Feinholz (d.feinholz@unesco.org)/ Irakli Khodeli (i.khodeli@unesco.org)

### Project 22: Global Forum on Ethics of AI

- Project Description:

  The Global Forum on the Ethics of AI will mark an important milestone in the building of a robust international coalition towards ensuring the ethical development and use of AI worldwide. The Forum will comprise three major components:

  1. Ethical Development and Use of AI across the world reinforcing national regulatory frameworks and institutions.
  2. Global Collaboration on the Implementation of the Recommendation on the Ethics of AI: This session will feature digital ministers from across the world, including Africa, Latin America and the Caribbean, and Asia and the Pacific.
  3. Special Topics: parallel sessions will be dedicated to the exploration of the state of AI from different angles – Gender Equality, Environmental Protection, Readiness and Ethical Impact Assessments, Transparency and Non-discrimination.

- The Forum will take stock of the national efforts to promote the ethical development and use of AI and identify the best regulatory practices and institutional settings to ensure the ethical development of these technologies.
- Department/Division: Sector for Social and Human Sciences
- Project Type/Output: event
- Project Status: preparation ongoing
- Project Start Year: December 2022
- Project End Year: recurrent
- Department/Division: Sector for Social and Human Sciences
- Project Type/Output: research/database
- Project Status: ongoing
- Project Start Year:
- Project End Year:
- Reported as part of 2021 Compendium on UN AI Activities? No
- Project updates:
- Project Domain: Environment, Education, Gender, Health, Human Rights, Justice, Telecommunications, Artificial Intelligence will disrupt/impact almost all industries and society. In particular, the Recommendation proposes concrete, impact-oriented policy actions in 11 areas: Ethical Impact Assessment; Ethical governance and stewardship; Data policy; Development and international cooperation; Environment and ecosystems; Gender; Culture; Education and research; Communication and information; Economy and labour; Health and social well-being
- Related Sustainable Development Goals (SDGs): SDG 3 – Good Health and Well-being; SDG 4 – Quality Education; SDG 5 – Gender Equality; SDG 8 – Decent Work and Economic Growth; SDG 9 – Industry, Innovation and Infrastructure; SDG 10 – Reduced Inequality; SDG 13 – Climate Action; SDG 16 – Peace, Justice, and Strong Institutions

- Partnership(s)/Collaborator(s):
  - UN Partners: UN
  - Government: 70+ Member States of the Group of Friends of the Recommendation (an op-ended alliance of countries spearheading the implementation of the Recommendation).
  - Private Sector:
  - Academia:
- Links and Multimedia:
- Contact information : Dr. Dafna Feinholz (d.feinholz@unesco.org)/ Irakli Khodeli (i.khodeli@unesco.org)

### Project 23: AI Ethics Observatory

- Project Description: The Observatory is an online platform that will be used to showcase UNESCO's work on AI ethics, cutting edge research on AI ethics, identifying trends, and serving as a platform for countries to share experiences and best practices for adhering with the policy recommendations.
- Department/Division: Sector for Social and Human Sciences
- Project Type/Output: research/database
- Project Status: ongoing
- Project Start Year:
- Project End Year:
- Reported as part of 2021 Compendium on UN AI Activities? No
- Project updates: preparatory work ongoing
- Project Domain: Environment, Education, Gender, Health, Human Rights, Justice, Telecommunications, Artificial Intelligence will disrupt/impact almost all industries and society. In particular, the Recommendation proposes concrete, impact-oriented policy actions in 11 areas: Ethical Impact Assessment; Ethical governance and stewardship; Data policy; Development and international cooperation; Environment and ecosystems; Gender; Culture; Education and research; Communication and information; Economy and labour; Health and social well-being
- Related Sustainable Development Goals (SDGs): SDG 3 – Good Health and Well-being; SDG 4 – Quality Education; SDG 5 – Gender Equality; SDG 8 – Decent Work and Economic Growth; SDG 9 – Industry, Innovation and Infrastructure; SDG 10 – Reduced Inequality; SDG 13 – Climate Action; SDG 16 – Peace, Justice, and Strong Institutions
- Partnership(s)/Collaborator(s):
  - UN Partners: UN
  - Government: 70+ Member States of the Group of Friends of the Recommendation (an op-ended alliance of countries spearheading the implementation of the Recommendation).
  - Private Sector:
  - Academia: Alan Turing Institute, IE University, London School of Economics, MIT, Technical University of Munich, Harvard University, Singapore Management University, University of Ghana, Universidad del Rossario, United Nations University, Chinese Academy of Science.
- Links and Multimedia:

- Contact information : Dr. Dafna Feinholz (d.feinholz@unesco.org)/ Irakli Khodeli (i.khodeli@unesco.org)

### Project 24: Sensitizing and building capacity of the stakeholders to address ethical issues of AI

- Project Description: To build the capacities of stakeholders of AI technologies (developers and beneficiaries), UNESCO has organized a series of roundtables on the selected topics of ethics of AI inviting eminent experts around the world. A series of short educative and informative video of each topic of the roundtable are produced and made available through UNESCO's youtube channel for educational purposes. This project was financially supported by the Japanese Ministry of Education, Culture, Sports, Science and Technology.
- Department/Division: Sector for Social and Human Sciences
- Project Type/Output: Roundtables, short videos
- Project Status: completed
- Project Start Year: July 2019
- Project End Year: July 2022
- Reported as part of 2021 Compendium on UN AI Activities? No
- Project updates: Three roundtables on selected topics of Ethics of AI had been organized at UNESCO HQ inviting eminent experts from different regions as follows:
    - The 1st roundtable on Ethics of AI "Changing Relationship between Artificial Intelligence and Humans", December 2019.
    - The 2nd roundtable on Ethics of AI "Shaping the Future of AI through Cultural Diversity", March 2021.
    - The 3rd Roundtable on the ethics of AI "Challenges of AI Ethics and Governance", February 2022.
- The video recording of the roundtables are freely accessible through UNESCO website. 5 short educational videos on the topics addressed during the roundtables are freely accessible through UNESCO's youtube channel with several language subtitles.
- Project Domain: Gender, Health, Human Rights, Justice, Telecommunications, Artificial Intelligence will disrupt/impact almost all industries and society.
- Related Sustainable Development Goals (SDGs): SDG 3 – Good Health and Well-being; SDG 4 – Quality Education; SDG 5 – Gender Equality; SDG 9 – Industry, Innovation and Infrastructure; SDG 10 – Reduced Inequality; SDG 16 – Peace, Justice, and Strong Institutions
- Partnership(s)/Collaborator(s): Japanese Ministry of Education, Culture, Sports, Science and Technology
    - Academia: Twente University (Netherlands), Harvard University (USA), Tokyo University (JPN), Kyoto University (JPN), Cardiff University (UK), Glasgow University (UK), Robotics Institute (Spain), Article 19, Concordia University (Canada), Rio de Janeiro State University (Brazil), Australian National University (Australia), Stanford Digital Civil Society Lab (USA), Pollicy organization (Uganda), Pretoria University (South Africa)
- Links and Multimedia:
    - Roundtable video recordings:

      1st roundtable

      "Changing Relationship between Artificial Intelligence and Humans"

http://webcast.unesco.org/live/vod/2019/shs/20190312_shs_room-02/en/

2nd roundtable

"Shaping the future of AI through Cultural diversity"

https://www.youtube.com/watch?v=Rdp6hQXVpqM

3rd roundtable

"AI Ethics and Governance: From Principles to Practices"

https://www.youtube.com/watch?v=Innb8D9NLp8

- Educational short video links:

  Do you know AI or AI knows you better?

  https://youtu.be/im0XTC91qMI

  Does AI make better decisions than humans?

  https://youtu.be/2E7l1hdjHsg

  Shaping AI through Cultural diversity

  https://www.youtube.com/watch?v=AiK0iYZuNS0

- Evolving interactions between Humans and AI

  https://youtu.be/xDmQMpwiHdA

- Contact information: Orio Ikebe (o.ikebe@unesco.org)

### Project 25: Landscape Study of AI Policies and Use in Southern Africa

- Project Description: Guided by the UNESCO Recommendation, this project includes a policy mapping of AI and relevant digital policies in 9 countries in Southern Africa (Angola, Botswana, Lesotho, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe), as well as a light-weight review of the extent of AI use across four key sectors in the 9 countries. These analyses will adopt strong human rights and ethical standpoints, And will Highlight the areas of potential ethical risks and threats on the long-term fulfillment of fundamental rights, protection of social cohesion, and promotion of justice and equality will be essential for the future of technological development.

  UNESCO will use the study findings to inform the expert and policy discussions ensuring that dialogues are evidence-based. In this framework, the specific objectives of this study are to:

  1. Understand and raise public awareness on the actual utilization of the AI technologies in the Southern Africa region, taking some sectors as examples and case studies.
  2. Alert policy makers and technicians on the potential risks and threats of AI utilization on human rights and fundamental freedom of individuals, on social justice and equality, on governance of public affairs, and on the environment.
  3. helps to guide the process of ethical governance by investigating existing stewardship principles from industries and government agencies.
  4. It also seeks to promote human rights respecting governance frameworks by assessing ratification to international, continental and regional policies/frameworks/strategies.

  The study will include two segments: (i) a mapping review of policies that will focus on providing critical analysis of the policy and normative environment from a human rights and ethical standpoint, which can frame the AI utilization;[1] and (ii) a sectoral landscape review of how the AI technologies have been used concretely, without necessarily the public and the policy makers being aware of all the human rights and ethical implications.
- Department/Division: UNESCO Harare office

- Project Type/Output: Research
- Project Status: ongoing
- Project Start Year: May 2022
- Project End Year: August 2022
- Reported as part of 2021 Compendium on UN AI Activities? No
- Project updates: The research has been conducted in August and results will be made available shortly
- Project Domain:
- Related Sustainable Development Goals (SDGs): SDG 3 – Good Health and Well-being; SDG 4 – Quality Education; SDG 5 – Gender Equality; SDG 9 – Industry, Innovation and Infrastructure; SDG 10 – Reduced Inequality; SDG 16 – Peace, Justice, and Strong Institutions
- Partnership(s)/Collaborator(s):
    - UN Partners:
    - Government: Angola, Botswana, Lesotho, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe
    - Private Sector:
    - Academia: Research ICT Africa
- Links and Multimedia:
- Contact information: Chanthalangsy, Phinith <p.chanthalangsy@unesco.org>

## 2. Related Sustainable Development Goals

SDGs 3, 4, 5, 8, 9, 10, 11, 13, 16, and 17

## 3. Relevant links

https://www.unesco.org/en

Contact information

Clare Stark (c.stark@unesco.org), and Misako Ito (m.ito@unesco.org)

# United Nations Population Fund

## 1. Description of Activities on AI

### Project 1: TABOO

- Project Description: Taboo is a service that offers users relevant information and to easily obtain and visualize disaggregated and significant data about myths and misconceptions of sexual and reproductive health contained in the genuine opinions of the Spanish-speaking population on Twitter.

  Through scraping techniques this data is meant to be a complement to the official information gathered by the entities in charge of guaranteeing sexual and reproductive rights in Colombia and other Spanish-speaking countries. In this way, it is possible to obtain a more robust picture of what is happening around this issue, based on this compilation of information to make better decisions when we approach the citizens with new actions and strategies that seek behavioral changes.

  Implementing trusted and tailored messages, in the right channels will bust myths and unveil misinformation and help women, young women and adolescents, to exercise their sexual and reproductive health and rights and prevent unwanted pregnancies.

  The project is centered in eliminating barriers encountered in the demand of family planning related to taboos, lack of understanding of RH and limited decision making. Since we intend to unveil the myths and misconceptions in family planning, our innovation will contribute to preventing unplanned/unwanted pregnancies.
- Department/Division: Innovation Lab UNFPA Colombia
- Project Type/Output: Dataset; Software tool
- Project Status: Completed
- Project Start Year: 2019
- Project End Year: 2021
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project updates: Main results: Through Taboo, it was possible to carry out a classification of myths regarding sexual and reproductive health and to collect 212.257 Tweets.

  After this first exercise we obtained three categories of myths: 1. Sexually transmitted diseases, 2. Modern contraceptive methods and 3. Unscientific methods of contraception.

  From the first category, five major misconceptions were obtained: 1. You cannot get an STI by practicing oral sex, 2. Condoms do not protect people from STIs, 3. Gay people are more likely to get STI's, 4. There is a cure for HIV/AIDS, and 5. Only promiscuous people get STI's, of which 177.522 related tweets were found.

  From the second category, 11 great myths were obtained: 1. More babies die from abortion in two days than all deaths from COVID- 19, 2. Abortion is never medically necessary, 3. The use of the pill can cause varicose veins, 8. You should only use the IUD if you have children, 9. Occasionally you should stop taking contraceptives to "clear" or "take a break" from hormones, 10. The morning-after pill causes abortions, and 11. The morning-after pill can be used as a regular contraceptive, of which 20345 related tweets were found.

Finally, from the third category, 6 myths were obtained: 1. The first relationship does not make you pregnant, 2. There are safe days for a woman not to become pregnant, 3. During menstruation a woman cannot become pregnant, 4. Parsley serves as an abortion, of which 14.390 related tweets were found.

Additionally we have arranged the complete database in a dashboard so that it can be explored by users.

This information will allow the UNFPA Colombia office, other spanish-speaking COs and LACRO to better understand the beliefs of the population with respect to sexual and reproductive health, so that from the lack of clear knowledge these beliefs can be broken by means of more accurate messages.

Activities achieved:

- A clear methodology for the collection of information by looking out some fake news.
- An improvement was made to the scraping algorithm to obtain the expansion information on each myth (Retweets, likes, followers).
- The brand identity of the project (brandbook) was designed: identity guidelines, logo, logo marks and color palette.
- A functional microsite was designed and developed, which contains: 1. Technical information that counters the myths in the form of storytelling, 2. Myths Explorer Dashboard and 3. Tweets Explorer Dashboard.
- By updating the scraping algorithm improvements, 3 categories containing a total of 21 myths were obtained.

  Three main assumptions tested and proven:

  1. People talk and share their beliefs and myths about family planning and contraception on Twitter and Google search:

     Our first scrapping process allowed us to get more than 800.000 tweets. It was possible to carry out a classification of myths regarding sexual and reproductive health and to collect 212.257 Tweets.

     After this first exercise we obtained three categories of myths: 1. Sexually transmitted diseases, 2. Modern contraceptive methods and 3. Unscientific methods of contraception.
  2. There are areas of the country that have different discussions about contraception and sexuality.

     Our main finding here is that not just in the same country we can find different myths, also throughout Latin America we discovered diverse myths and discussion about contraception and sexuality. The gathered information enables UNFPA Colombia office, other Spanish-speaking COs and LACRO to better understand the beliefs of the population with respect to sexual and reproductive health. We identified that the borders on the internet are the languages and not the country borders, so we found posts from all the Spanish speaking countries.
  3. We can gather the information, including new insights, needed (by user) to build an effective campaign for myth busting through scraping.

     The main source of information explored was the Twitter posts (near to 300.000) from July 5, 2007 to December 3, 2020, which contain words that we have identified as relevant and recurrent in conversations about contraceptive myths (our own taxonomy). However, some publications with these same terms try to disprove these misconceptions, not to spread them. The nature of social networks means that we cannot ensure that all trills refer to these myths or want to spread them, which is why in the data exploration tools we have referred to the issues associated with contraceptive myths and not the myths themselves.

We found the next insights related to myths and misconceptions around contraception:

1. You cannot get an STI by practicing oral sex
2. Condoms do not protect people from STIs
3. Gay people are more likely to get STI's
4. There is a cure for HIV/AIDS
5. Only promiscuous people get STI's
6. More babies die from abortion in two days than all deaths from COVID-19
7. Abortion is never medically necessary
8. The use of the pill can cause varicose veins
9. You should only use the IUD if you have children
10. Occasionally you should stop taking contraceptives to "clear" or "take a break" from hormones
11. The morning-after pill causes abortions, and 11. The morning-after pill can be used as a regular contraceptive
12. The first relationship does not make you pregnant
13. There are safe days for a woman not to become pregnant
14. During menstruation a woman cannot become pregnant
15. Parsley serves as an abortion

- Project Domain: Education; Health; Human Rights
- Data Source: Taboo was aimed at searching for information on social networks, specifically on Twitter. More than 330 thousand tweets were collected between July 5, 2007 and December 3, 2020 that were related to sexual and reproductive health and were classified into 3 major areas (Sexually transmitted infections, Non-scientific methods of contraception and Modern methods of contraception).
- Link to data: https://datasketch.github.io/unfpa/
- Publicly Available Data: Yes
- Technology/Platform: NLP (Word vectorization), Web Scraping - Python, D3.js, Google Cloud
- Related Sustainable Development Goals (SDGs): SDG 3 – Good Health and Well-being; SDG 4 – Quality Education; SDG 17 – Partnerships for the Goals
- Partnership(s)/Collaborator(s)
    - UN Partners: UNFPA Innovation Secretariat
    - Government:
    - Ministry of Health
    - Major´s office of Bogotá
    - National Planning Department
    - ICT Ministry
    - Secretariat for Youth in Medellín
    - Private Sector: DataSketch
    - Academia: Universidad del Norte (Barranquilla, Colombia)
- Lessons Learned: *Make sure you have the staff and tools you need*: One of the great lessons we learned during the project was related to human capabilities and technological tools required at the right time. Knowing the resources needed for the project from the beginning allows us to investigate the processes required to obtain them or discover the elements that the Fund already has that can be used. Taboo as a new project in

the organization, had administrative processes unknown to the team, which generated reprocessing and delays in service delivery.

*Build on what is built*: As a great learning process we understood that innovation does not work when it is done individually, in the environment there are multiple actors who have worked on scraping social networks and discovering myths around sexual and reproductive health, actors who can help others not to make the same mistakes and move forward in an optimal way in the development of the project. Before you invent something "new" look around, explore and be inspired by others.

*Involve the users in the whole process*: Including the users in the process of creating the project is an essential step that cannot become a barrier to the continuity of the process, it is important to establish the different objectives that you want to achieve with the users in each session to make the most of them and to collect all the valuable information, it is also important to adjust the expectations of the users' participation in each stage of the process, this will guarantee a better appropriation of the service.

- Links and Multimedia:
  - https://datasketch.github.io/unfpa/
  - https://drive.google.com/drive/folders/1qiRe4NkXgEHYb43QCcQB2shMRoLqaWy6?usp=sharing
- Contact information: Jaime Aguirre (jaaguirre@unfpa.org)

### Project 2: ECHO: Amplifying citizen's voices for the SDGs"

- Project Description: ECHO is a unique tool that uses Automatic Speech Recognition, Cognitive Computing, and Data Analytics to improve the efficiency in processing large amounts of information in real-time. ECHO collects information from individuals of all backgrounds, including minorities and vulnerable populations

  ECHO is a tool powered by artificial intelligence that promotes citizens' participatory planning and awareness about the SDGs through real-time guided public discussion. ECHO is seeking to link conversational and informal citizen's language to SDGs language using a classification model, developed by UNFPA Colombia. After the first phase of the implementation of the interviews in Medellin through ECHO, we obtained, among other things:

  - More than 4,800 guided discussions were carried out, whose results in 56.22% were performed in women and 43.8% in men. Of the total number of respondents, 44.8% were young and 18.3% were older adults.
  - A pact for the SDGs was signed by more than 10 public institutions in Antioquia. These entities include Antioquia Governorate, National Police, EPM, Medellin Metro, Metropolitan Area of the Aburrá Valley, Inder, Medellín City Council, Teleantioquia and TeleMedellín, which makes Medellín the first city in Colombia to use AI to make better public policies and make deep commitments around the 2030 Agenda.
  - A draft of a Dashboard of the SDGs related to the main concerns of the people in these areas. It also contains a call to action and "What to do" related to the SDGs that resulted from the analysis.
  - Data collection campaigns have been conducted in many new cities such as Cartagena, Villavicencio, and the Venezuelan immigrant population in Medellin. Thus obtaining more than 3,000, 15,000 and 1,200 new testimonies in each city respectively.

  The process will cover groups of populations of Medellin, Bogotá and Cartagena, three different zones and two of the largest cities of Colombia.
- Project Type (Status): Software project (Deployment)

- Project Domain: Participatory planning, Freedom of Speech
- AI approach: Automatic Speech Recognition, Cognitive Computing, Natural Language Processing (NLP)
- Technology: GraphQL, Deep Learning IA, live speech to text
- Datasets: ECHO stores all recorded and processed voice information (with NLP technology) in a structured manner. This then involves a large amount of information from recorded voice testimonials converted to text, stored as documents in noSQL databases.
- Related Sustainable Development Goals (SDGs): All SDGs, especially SDG 17 – Partnerships for the Goals
- Partnership(s)/Collaborator(s): UNFPA Innovation Secretariat, Antioquia Governorate, National Police, EPM, Medellin Metro, Metropolitan Area of the Aburrá Valley, Inder, Medellín City Council, Teleantioquia, TeleMedellín
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Links and Multimedia: www.echo -vis -2020.herokuapp.com, Echo Interviewer System: www.echo.carinalab.co. If you are interested and want to get access please write an email to nieto@unfpa.org, https://echo.carinalab.co/#/mMedellin1, Social Media Data Scraper (Beta): http://165.227.124.98/tweetsunfpa/
- Challenges: a) The urgency to achieve our organizational priority areas and leverage the power of AI toward that end. b) The prevalence of myths and misconceptions about contraceptives. c) The prevalence data and visualization. d) Humanitarian crisis: internal and external migration
- Opportunities: a) To accelerate our mandate through AI and cutting-edge technologies. b) The improve our impact including BC and C4D campaigns through among others the internet and social network messages, radio, public tv channels, public spaces, etc.

### Project 3: Big Data for Family Planning Inequalities Analysis (BiDaFPInAs)

- Project Description: The Big Data for Family Planning Inequalities Analysis (BiDaFPInAs) project aims to capture social media conversations of Filipinos about family planning and develop a machine learning (ML) algorithm that converts those conversations to insights. These insights will help provide real-time data on awareness and perception of Filipinos about family planning to government planners. Using appropriate keywords and filters, the system is programmed through a series of iterations to identify levels of awareness and perception of Filipinos on family planning.
- Department/Division: UNFPA Philippines
- Project Type/Output: Dataset and Analysis, Data Visualisation and Dashboard
- Project Status: Ongoing
- Project Start Year: 2019
- Project End Year: 2022
- Project Updates:

  Through BiDaFPInAs, a social media dashboard was developed to capture and broaden the scope of data on Family Planning among key population groups. Social media data was harnessed to provide insights that improve the planning, targeting and execution of Family Planning programs in the Philippines.

  The initial phase of analysis explored the wider dataset that included publicly available tweets, posts, and comments; however, this approach led to poor data quality that made the management of data and the generation of useful insights very challenging. By working with an implementing partner and an academic expert, and with a focus on the data from Reproductive Health Care Info, a Facebook community dedicated to family planning (FP), the analysis of FP-related social media posts was completed at the end of 2021. Another challenge was the difficulty in accessing and using social media data due to data privacy concerns.

The evidence generated from the analysis validated social media as a means to connect Filipinos into several networks, which then facilitated knowledge generation and sharing as to the benefits and disadvantages of FP. More importantly, it suggests the usability of the Big Data Sentiment Analysis platform and lifewise recommends a more targeted approach of pre- identifying family planning related social media accounts in order to more effectively capture and analyse the needed data.

- Reported as part of 2021 Compendium on AI Activities? No
- Project Domain: Health
- Datasets: Social Media (Twitter and Facebook)
- Publicly Available Data: No
- Partnerships and Collaborators: Philippine Legislators Council for Population and Development (PLCPD)
- Related Sustainable Development Goals: SDG 3 (Good Health and Well Being), SDG 5 (Achieve Gender Equality and Empower All Women and Girls)

### Project 4: AI based Early Warning System (EWS) on Youth and SRHR

- Project Description: The early warning system is aimed to provide UNFPA access to real time information on dialogues, social media behaviour, reported and/documented programme interventions by development partners with regards to adolescents and young people. This data is expected to be analysed by an AI algorithm to predict rapid and critical response to address the root causes and/or prevent further escalation of the early signs of opposition/backlash against ASRH deduced from the data analysis. Additionally, we seek to bridge the gap between knowledge and (social media) behaviours by shifting attitudes among the target population group and subsequently adopting positive behaviour choices.

  Young people, who are connected to the internet, use social media to share their thoughts, feelings and impressions about various SRHR issues. Some of the conversations include sexual behaviour, contraceptive use, intergenerational relationships, peer violence. Moreover, social media is often used by opposition groups against SRHR and CSE, this tool will facilitate timely action in response to growing opposition before it escalates and allow relevant UNFPA's offices to counteract misconceptions and opposition to SRHR.

  UNFPA have identified three middle income countries (current suggestions include: Zambia, to largely track opposition opinions to SRHR; Namibia and Rwanda, due to their access to technology and smaller population) implementing the Safeguard Young People Programme with high internet usage especially among young people under 30 years to form a part of the pilot implementation of the early warning system.

  The developed AI based system will be applied to Twitter and/or Facebook during the pilot phase to generate data to train the AI algorithm to familiarise with the conversations. Initially, UNFPA will facilitate conversations through targeted questions to the young people in the target group to test the response of the developed algorithm. In addition to this, we will feed the AI system UNFPA program documents, reports, intervention plans etc. to align the discussions to program response. It is expected that the system will generate reports with recommendations of urgent action in the form of graphs, infographics, word clouds etc. for each use of the information.

  A front facing visualisation platform will be developed to aggregate and present the reports in a user friendly manner. This visualisation platform will be connected to existing UNFPA tools including social media platforms to make the generated report available to all stakeholders.
- Department/Division: Youth and Innovation Units UNFPA ESARO
- Project Type/Output: Data visualisation, AI Algorithm
- Datasets: Social Media (twitter and facebook), publicly available data
- Project Status: Ongoing

- Project Start Year: 2022
- Project End Year: 2023
- Reported as part of 2021 Compendium on UN AI Activities? No
- Project updates: AI Platform currently being developed.
- Project Domain: Currently being developed
- Related Sustainable Development Goals (SDGs): SDG 3, 4, 5, 9
- Partnership(s)/Collaborator(s):
    - Safeguard Young People Project - Funding the project
    - Private Sector AI developer
- Links and Multimedia: NA
- Contact information: Sydney Hushie- hushie@unfpa.org , Renata Tallarico- tallarico@unfpa.org, Isabelle Jost - jost@unfpa.org

### Project 5: Hayati Chatbot

- Project Description: 'Hayati', meaning 'my life' is a mobile application being developed by Men4Women in collaboration with UNFPA South Sudan. The chatbot is a way forward for South Sudan given the increase in technology and phone user uptake across the country. The chatbot is critical for the need to provide young people with a platform where they can access SRH and GBV information confidentially from wherever they are.

  In future, the chatbot also plans to incorporate live information such as reporting of sexual harassment in public spaces etcetera. But currently it will only look at providing free, timely and confidential information on SRH and GBV to the people.

  Key features of the App:

  The chatbot is in a form of an Android based Mobile Application with integrated services/features which includes:

  1. Pinning location from the app with corresponding reason(s)/ information the person seeks to receive.
  2. Integrated Interactive Voice Response (IVR) through the National Helplines 623, 662 and 885.
  3. Canned/ automatic responses linked to the FAQs. Saves time when answering common questions.
  4. Knowledge base or frequently-ask-questions integration. This allows you to incorporate topics of discussion into a support section that can be used for instant answers and to troubleshoot problem areas of the website/app.
  5. Ticket creation and management. This allows visitors to submit a request after business hours. Ideally, it includes auto follow-ups to remind visitors you are waiting for their reply.
  6. Support and agent ratings to identify areas needing improvement.
  7. Visitor tracking. By seeing the pages, the visitor is on or has visited, requests can better be understood.
  8. Analytics integration so you can see which services were assisted by chat. It should also provide periodic reports
  9. Chat tags and keywords to help you find common issues and questions.
  10. Mobile dashboard or app, to monitor chats while on-the-go.
  11. Visitor banning, to minimize "trolls" from taking up your time.
  12. Translation features- It is linked to Google Translate, which is free and can be helpful for the Arabic speakers.

13. Transcript of emails can be done
14. Long-term logging to extend visitors' visiting journey.
15. Chat log and data exporting feature.
16. Chat transfers among agents. This eliminates the need for the visitor to repeat her or himself.
17. Emoji support.
18. File upload support to help visitors describe what they need.

- Department/Division: UNFPA South Sudan and Innovation Unit UNFPA ESARO
- Project Type/Output: Data visualisation, AI Chatbot
- Project Status: Ongoing
- Project Start Year: 2022
- Project End Year: 2023
- Reported as part of 2021 Compendium on UN AI Activities? No
- Project updates: AI Chatbot currently being developed.
- Project Domain: Currently being developed
- Related Sustainable Development Goals (SDGs): SDG 3, 4, 5, 9
- Partnership(s)/Collaborator(s):
    - Men4Women - Youth tech startup supported by UNFPA South Sudan
- Links and Multimedia: NA
- Contact information: Shruti upadhyay - shupadhyay@unfpa.org, Sydney Hushie- hushie@unfpa.org

### Project 6: SophiBot

- Project Description: Sophie Bot is an AI application that directly answers SRHR questions in a private and confidential way. The information is pre-fed in the platform and in instances where no response is provided, the user is linked to a direct chat where they are able to communicate with someone to receive the correct responses and also join the discussion forum. Sophie Bot can also be accessed through Messenger, Telegram or Twitter. The solution seeks to address poor SRH outcomes among young people attributed to inadequate access to comprehensive and correct information on SRH. In Kenya, it is estimated that one in every five teenage girls between the ages of 15-19 years is either pregnant or has had their first child while 51% of new HIV infections occur among young people between the ages of 15-24.
- Department/Division: UNFPA Kenya
- Project Type/Output: AI Chatbot
- Project Status: Ongoing
- Project Start Year: 2016
- Project End Year: NA
- Reported as part of 2021 Compendium on UN AI Activities? No
- Project updates: Major results since the launch of SophieBot in December 2016:
    1. SophieBot has been downloaded 1700 times;
    2. 38,549 questions have been asked across all platforms (most of them through the app and Facebook);
    3. $40,000 raised through the KCB Lions Den Show;
    4. Enrolled in the Merck Accelerator Program (3 months acceleration cycle);

5. Awarded the Microsoft Insiders4Good East Africa Fellowship, which grants support from Microsoft and the broader Windows Insider community including hardware, software, tailored mentorship and access to Microsoft's global network;
6. Enrolled in the SRHR Africa Trust leadership programme for building capacity for advocacy in sexual and reproductive health rights.

- Project Domain: Youth, Reproductive Health
- Related Sustainable Development Goals (SDGs): SDG 3, 4, 5, 9
- Partnership(s)/Collaborator(s):

1. Nailab
2. National AIDS Council - Kenya,
3. Discover JKUAT

- Links and Multimedia:

  - http://misssophiebot.com/
  - https://www.theguardian.com/careers/2018/feb/21/sex-education-at-the-push-of-a-button-the-apps-changing-lives-worldwide

- Contact information: Shruti upadhyay - shupadhyay@unfpa.org, Sydney Hushie- hushie@unfpa.org

### Project 7: #TECH4YOUTH AND #NLP SOLUTIONS TO AMPLIFY SRHR ACCESS AND ACCELERATE THE ACHIEVEMENT OF #SDG3

- Project Description: The number of languages spoken in Africa varies between 1,000 to 2,500, depending on different estimates and definitions. Almost half (48 per cent) of Sub-Saharan African countries have an African language that is spoken by over 50 per cent of the population as a mother tongue. With the additional secondary speakers sometimes at mother-tongue proficiency level, the proportion increases to more than two-thirds (67 per cent). Sixteen of Africa's shared cross-border languages have more than 150 million speakers. Outside the education sector, at least 56 African languages are used in administration and at least 63 African languages are used in the judicial system (26 sub-Saharan nations allow African languages in legislation). In written business communication, at least 66 African languages are used, and at least 242 African languages are used in the mass media. In short, the existence of so many languages within a single country and their right not only to survival but also to development represent a matter of importance that has to be considered over and above the categories into which they fall. This diversity is in itself perceived as an inherent challenge in matters of communication, governance and education. Such a multiplicity is perceived as a communication barrier and viewed as synonymous with conflicts and tension but also a great opportunity to spread messages and information till the last mile.
- Five UNFPA country offices, BENIN, TOGO, GHANA, BURKINA FASO, and NIGERIA, have decided to work collaboratively to use technology-based solutions in Adolescent and Youth Sexual
- and Reproductive Health (AYSRH) to improve knowledge and access to information. In order to reach all youth, especially those left behind, the innovation and technology team set out to
- integrate natural language processing (NLP) in four local languages (Fon-Gbe, Haussa, Fulfulde, and Yoruba) into their existing digital solutions.
- Department/Division: UNFPA Benin, Burkina Faso, Ghana, Nigeria and Togo
- Project Type/Output: Natural language processing, AI Algorithm

- Datasets: 25 hours of professional Hausa audio for text to speech, french and english with African accent licences
- Project Status: Ongoing
- Project Start Year: 2019
- Project End Year: N/A
- Reported as part of 2021 Compendium on UN AI Activities? No
- Project Domain: SRHR education
- UN partner: ITU
- Partnership(s)/Collaborator(s)/: Tsinghua University, Dorabot, W.B, European Institute of technology, Voxygen, Etrilabs, Africa Design School
- Project updates : Due to the lack of datas on african languages and to accelerate the development of this NLP solution, we are establishing a research & development partnership with European Institute of technology on BIG Data and AI issues so that, through its specialized Data/AI Masters, students can undertake research specifically on automatic translations into natural language support from UNFPA Benin.
- Links and Multimedia: Tech4Youth
- Contact information: Wilfried ROUAMBA- rouamba@unfpa.org , Djawad RAMANOU -djawad@unfpa.org, Wilfried GOSSAN- gossan@unfpa.org

### Project 8: SAS & UNFPA Partnership

- Project Description:

  The overall goal of this partnership is to: (1) increase awareness of GBV, in particular targeting the business community in the region; and (2) develop solutions to analyze GBV using data and artificial intelligence to tailor policies on GBV prevention.

  As part of the second goal, SAS and UNFPA will jointly explore how to leverage and analyse large administrative data sets to understand the risk and protective factors using AI, and explore a model that can be used by the public sector and civil society to prevent the incidence of violence against women, and improve GBV response programmes.

  A proof of concept will be developed and showcased for local authorities and public opinion using available data sources such as for example survivors' interviews and police records, and the analytical model (AI) will be applied to identify risk factors that will inform prevention plans at local and national level.

  SAS will convene its internal data scientists, as well as data scientists from SAS customer companies, to explore data sets and analytical techniques to assess what can be learned from data to prevent GBV, improve services for survivors and optimise GBV programs. SAS will also bring its business client base to the advocacy component of the partnership.

  UNFPA will liaise with its country office staff and partners throughout the region to identify countries and public sector bodies who would partner in this project and share data from its own GBV programs. UNFPA will also provide technical expertise and support accurate and robust messaging around the topic of GBV.

  Both organizations will also collaborate on and support each other messaging or communications campaigns to elevate public awareness of GBV.

  Background of AI technology and SAS projects:

  - The first phase of SAS technology was based on improving the existing system to ensure that every woman is given the correct risk factor and receives the correct support and protection. The data included information from the victims, complaints made and the different risk assessments, both at the time of registration of the case and during its evolution.
  - The studies compiled a range of indicators regarding the psychological profile of the perpetrators and the vulnerability of the victims. This includes information such

as suicide attempts, addictions, and the perpetrator's family history, giving a total of more than 50 indicators. This provided a very large data pool to be used for modeling purposes.

- After initial data processing, a two-stage modeling strategy was chosen to manage the different levels of information received.
- This includes drawing on the experience and professionalism of police officers in their reports. Using only these reports, a predictive model was created that assigns the probability of recidivism. In the second stage, an analytical model was developed using the probability generated in the first stage and offender-related indicators were added to assign the eventual recidivism probability.
- Overall, a machine learning model was found to help reduce the risk of recidivism, and AI technology was found to be actionable by authorities. It is believed that the effective use of predictive analytics and machine learning can help prevent a large number of cases of gender-based violence.

- Department/Division: UNFPA Eastern Europe & Central Asia Regional Office (EECARO)
- Project Type/Output: Partnership on Development of Data Analysis Methods and AI Technology to Adapt Policies for GBV Prevention
- Project Status: Ongoing
- Project Start Year: 2021
- Project End Year: N/A
- Reported as part of 2021 Compendium on UN AI Activities? No
- Project updates:
  - Three webinars were organized to introduce the project to its potential stakeholders;
  - The project is in its initial stage of development and SAS is developing a white paper to agree on specific outputs
- Project Domain: Implementing AI Technology and Advanced Data Analysis Methods to Prevent Gender-Based Violence
- Related Sustainable Development Goals (SDGs): SDG 5 – Gender Equality
- Partnership(s)/Collaborator(s):

1. Private Sector – SAS

   SAS is a private US-based global company, operating for more than 40 years, offering the most advanced analytics and AI solutions to its clients.

- Links and Multimedia:
  - https://eeca.unfpa.org/en/news/unfpa-and-sas-partner-work-preventing-gender-based-violence-power-ai
- Contact information: Gabriela Alvarez-Minte, UNFPA EECARO, alvarezminte@unfpa.org

### Project 9: AMMA App - Period & Pregnancy Tracker

- Project Description: ''Amma'' is an international mobile application that allows women and their families to have an informed, safe, and healthy pregnancy. The application, which continues to work in cooperation with UNFPA Eastern Europe and Central Asia Regional Office (EECARO), provides information sharing in a wide scope. Within the application, detailed information can be obtained about the development of the baby, the changes that the mother may experience during pregnancy, and nutrition & moods.

In addition, with the AI technology created, the weight gain and abdominal growth of the expectant mother are controlled, and pregnant women can count the contractions they experience and send their data to their doctors. The application also contains high-quality ultrasound images and explanations. In addition, there is a personal calendar for each day of pregnancy with reminders for medications and mood changes.

With the support of UNFPA EECARO, additional content in mobile applications is created to convey more accurate information on safe pregnancy, prenatal care, and sexual and reproductive health. With the AI technology to be developed, it is aimed to conduct joint research to understand user information, behavior, and information needs on maternal health, sexual reproductive health, and gender issues.

- Department/Division: UNFPA Eastern Europe & Central Asia Regional Office (EECARO)
- Project Type/Output: Mobile Application
- Project Status: Ongoing
- Project Start Year: 2022
- Project End Year: N/A
- Reported as part of 2021 Compendium on UN AI Activities? No
- Project updates:
  - Amma currently has 1.5 million active users. The partnership with UNFPA is quite new (officially launched in 2022), however UNFPA has been able to feed quality SRHR-related content to the application, which has potentially reached the users of the app. UNFPA plans to expand the partnership and tap into the potential the app provides to reach users with accurate SRHR information and data.
  - The Amma app is downloaded by 10 mln pregnant women every year (or 7% of all pregnant women in the world). As content is provided in 13 languages, there are users in almost all countries of the world.
  - With UNFPA support, 3 articles have been published and 12 more topics will be covered before the end of the year. So far, the published articles have had close to 5,000 active engagement with Amma users.
- Project Domain: Education; Sexual and Reproductive Health
- Related Sustainable Development Goals (SDGs): SDG 3, 4, 5
- Partnership(s)/Collaborator(s):
  - Private Sector (Financial Support) - PERIOD TRACKER & PREGNANCY AND BABY CALENDAR LIMITED
- Links and Multimedia:
  - https://pregnancytracker.app/
  - https://amma.family/#landing
- Contact information:
  - Tamar Khomasuridze - khomasuridze@unfpa.org, UNFPA EECARO

## 2. Related Sustainable Development Goals

All SDGs: SDG 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, and 17

## 3. Relevant Links

https://www.unfpa.org/

Contact information

Jaime Aguirre (jaaguirre@unfpa.org)

# United Nations Global Pulse

## 1. Description of Activities on AI

### Project 1: Operational response simulation tool for epidemics in refugee and IDP settlements

- Project Description: The spread of infectious diseases presents many challenges to healthcare systems across the world. Given their density and available infrastructure, refugee and internally displaced person (IDP) settlements can be particularly susceptible to the dangers of disease spread.

  Since the beginning of 2020, we have been working with public health decision-makers to seek to understand how COVID-19 spreads in these settlements. We initially focussed our efforts on the Cox's Bazar settlement in Bangladesh, working with teams from UNHCR and WHO, and have since performed modeling of other settlements around the world. Our model simulates the movements and interactions of each individual in the settlement, incorporating information about family structures and demographic attributes, to understand how COVID-19 might spread under various intervention strategies and scenarios.

  During the height of the pandemic we worked on simulating the effects on public health interventions in settlements under different scenarios and assumptions. We are now focussing on robustly understanding plausible excess mortality rates in the Cox's Bazar settlement given newly available data collected by Community Health Workers. In addition, we are developing new methods for the collection of data on contact patterns between individuals in settlements – a crucial input to many epidemiological models, and an important data point for understanding disease transmission routes. We are currently working towards publishing, to the best of our knowledge, the first set of contact matrices for a refugee settlement.

  With almost 80 million forcibly displaced people in the world, we hope that this work will inspire more modeling groups to focus on these vulnerable populations, which have been traditionally under-served by such efforts, to ensure no one is left behind. To this end, we have also been working with 18 different institutions, both from inside and outside the UN system, to form a community of practice around disease modeling in refugee and IDP settlements. This collaboration has led to a report documenting shared challenges as well as a global call to action.
- Department/Division: Executive Office of the Secretary General
- Project Type/Output: Academic paper/Software tool/Report
- Project Status: Ongoing
- Project Start Year: 2020
- Project End Year: Ongoing
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Domain: Health, crisis response and humanitarian assistance
- Data Source: Census, epidemiological and survey data

- Publicly Available Data: Partially
- Technology/Platform: Python, Javascript, AWS
- Related SDGs: SDG 3 – Good Health and Well-being; SDG 10 – Reduced Inequality; SDG 17 – Partnership for the Goals
- Partnership(s)/Collaborator(s):
    - UN Partners: UNHCR Innovation, WHO, UNHCR, OCHA
    - Private Sector: IBM
    - Academia: Durham University, University College London, London School of Hygiene and Tropical Medicine, Massachusetts Institute of Technology, Delft University of Technology, University of Manchester
- Lessons Learned: People living in refugee and IDP settlements are highly vulnerable to disease spread, however, few modelling works exist which address these groups specifically. As part of forming a community of practice around this challenge, we have systematically documented our lessons learned as a collective in our group report. The link to this can be found below.
- Links:
    - https://www.unglobalpulse.org/microsite/epidemic-modelling-in-settlements/
    - https://journals.plos.org/ploscompbiol/article?id=10.1371/journal.pcbi.1009360
    - https://gh.bmj.com/content/7/3/e007822
    - https://epimodel.unglobalpulse.net
- Contact information: Joseph Aylett-Bullock (joseph@unglobalpulse.org)

**Project 2: Using Social Media Tools to Monitor and Fight the COVID-19 Infodemic**

- Project Description: This project consists of two core components. First, in partnership with the WHO we have been conducting ongoing social media listening exercises in the Africa region. The data is explored and analyzed with the help of a third-party platform but we have developed a custom classifier to categorize mentions as positive or negative from the perspective of the WHO. UN Global Pulse has produced over 40 reports to assist WHO AFRO in monitoring its brand and understanding the conversations associated with COVID-19 and poliovirus.

  Second, in collaboration with WHO we are supporting a team from Stanford University which aims to test interventions to reduce vaccine hesitancy among social media users. Machine learning will be used to segment users into different vaccine hesitancy types based on their responses to an online chatbot survey, and a contextual bandits experiment will be used to dynamically assign personalized treatments to reduce vaccine hesitancy according to the user type.
- Department/Division: Executive Office of the Secretary General
- Project Type/Output: Report
- Project Status: Ongoing
- Project Start Year: 2020
- Project End Year: Ongoing
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Domain: Health, misinformation
- Data Source: Our social media listening relies on data collected from platforms such as Twitter, blogs, and news media. The research on reducing vaccine hesitancy uses survey/chatbot log data collected through engagement with participants on Facebook.
- Publicly Available Data: No

- Technology/Platform: Our social media listening exercise adopts an AI-driven approach supported by a commercially available consumer research tool with a human in the loop to manually validate the performance of the tool and provide contextual insights.

  The vaccine hesitancy interventions will be deployed using the Facebook platform (Facebook ads will be used to recruit respondents, and Facebook messenger will be used to implement the surveys and treatments).
- Related Sustainable Development Goals (SDGs): SDG 3 – Good Health and Well-Being
- Partnership(s)/Collaborator(s):
  - UN Partners: UN Global Pulse, World Health Organization
  - Academia: Stanford University Golub Capital Social Impact Lab (research collaborator)
- Lessons Learned: Lessons learned from the social media listening exercise include the importance of clearly defining project objectives, the intended use of the data, timeframe, and a taxonomy at the start of the project in order to effectively filter the vast quantity of social media data into a useful product. At the same time, adopting an iterative approach was important for improving the sensitivity and specificity of the taxonomy as well as the ability of the analysis to address the questions most important to the WHO.

  While the social media analysis process has been simplified by the use of a third-party tool, the setup, monitoring and analysis steps are still very labor intensive. Automatic tools are not without flaws, which reinforces the importance of having a human in the loop to validate the findings. Challenges included the "black-box" nature of the third party tool's algorithms and the need to define a custom classifier because the tool's built-in sentiment analysis failed to capture some of the nuances of interest.
- Contact information: Katherine Hoffmann Pham (katherine@unglobalpulse.org)

**Project 3: A computational framework for predictive modeling of refugee and IDP movements**

- Project Description: Predicting forced displacement is an important undertaking of many humanitarian aid agencies, which must anticipate flows in advance in order to provide vulnerable refugees and Internally Displaced Persons (IDPs) with shelter, food, and medical care. While there is a growing interest in using machine learning to better anticipate future arrivals, there is little standardized knowledge on how to predict refugee and IDP flows in practice. Researchers and humanitarian officers are confronted with the need to make decisions about how to structure their datasets and how to fit their problem to predictive analytics approaches, and they must choose from a variety of modeling options. In an academic paper and an accompanying set of practitioner-focused "modeling cards", we attempt to facilitate a more comprehensive understanding of this emerging field of research by providing a systematic model-agnostic framework, adapted to the use of big data sources, for structuring the prediction problem.
- Department/Division: Executive Office of the Secretary General
- Project Type/Output: Policy Framework/Academic paper
- Project Status: Completed
- Project Start Year: 2020
- Project End Year: 2022
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Domain: Human Rights, Forced displacement
- Related Sustainable Development Goals (SDGs): SDG 10 – Reduced Inequality; SDG 16 – Peace, Justice, and Strong Institutions
- Partnership(s)/Collaborator(s)
  - UN Partners: UNHCR
- Links:

  - http://unglobalpulse.net/predictingdisplacement/
  - https://www.tandfonline.com/doi/abs/10.1080/1369183X.2022.2100546
- Lessons Learned: The field of predictive analytics for humanitarian response is still at a nascent stage, but due to growing operational and policy interest we expect that it will expand substantially in the coming years. In the course of preparing this framework, we have found that relatively little is known about the structure of this prediction problem at the high level, and that there are a number of big-picture questions for which we lack empirical evidence, such as: how far in advance displacement can be predicted; how much data is needed to train effective models; and whether models transfer across borders and humanitarian settings. We hope that this framework will help to encourage future research on these questions; facilitate comparisons between existing models; and spark a broader discussion on best practices for predicting forced displacement.
- Contact information: Katherine Hoffmann Pham (katherine@unglobalpulse.org)

### Project 4: PulseSatellite: A collaboration tool using human-AI interaction to analyse satellite imagery

- Project Description: Humanitarian response to natural disasters and conflicts can be assisted by satellite image analysis. In a humanitarian context, very specific satellite image analysis tasks must be done accurately and in a timely manner to provide operational support. PulseSatellite is a collaborative satellite image analysis tool which leverages neural network models that can be retrained on-the-fly and adapted to specific humanitarian contexts and geographies. The tool grew out of a long standing collaboration with UNOSAT which began by building an AI model for counting structures in refugee and IDP settlements. This was then expanded to a web-based toolkit - PulseSatellite - that can be easily adapted to other remote sensing applications and which allows for the incorporation of models created by other users. Currently, we have three models loaded into the system - one that allows users to map structures in refugee settlements, a roof density detection model (e.g. for slum mapping), and a flood mapping application. PulseSatellite is now open for use by other UN agencies.
- Department/Division : Executive Office of the Secretary General
- Project Type/Output: Academic paper/Software tool
- Project Status: Ongoing
- Project Start Year: 2017
- Project End Year: Ongoing with various UN partners on a needs-based system
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project updates: Over the past year we have continued to work with UNOSAT to develop and improve on the machine learning models included in the PulseSatellite tool. A particular focus has been on rigorous testing of the flood mapping capabilities of the tool by testing the model in a variety of settings. The model has been used to produce the UN's first AI generated flood maps which have been used in operational contexts, and has now been deployed in many countries across the world.

  We are also working closely with UNOSAT to develop benchmark datasets for shelter (refugee camp) mapping, building footprint detection and damage assessment. We plan to use these to test many of the available well trained and top-performing models, but in the context of UN-focused datasets (e.g. with more of a Global South and development context than many of the standard machine learning benchmarks) and make this available as a service to the UN system.

  In addition, we are working with WHO and UNOSAT, alongside the US CDC, to develop methods for rapid estimations of population counts in refugee camps for use in public health programming, such as inputs to computational disease models as well as for resource planning.
- Project Domain: Crisis response and humanitarian assistance

- Data Source: Satellite data
- Publicly Available Data: No
- Technology/Platform: Python, Javascript, TensorFlow, PyTorch, Keras, AWS
- Related Sustainable Development Goals (SDGs): SDG 10 Reduced Inequality; SDG 13 Climate Action; SDG 17 Partnership for the Goals
- Partnership(s)/Collaborator(s)
    - UN Partners: UNOSAT, WHO
    - Public sector: US CDC
    - Academia: Durham University
- Links:
    - https://www.unglobalpulse.org/microsite/pulsesatellite/
    - https://ojs.aaai.org/index.php/AAAI/article/view/7101
- Lessons Learned: Operational contexts are rapidly changing, meaning that AI models may not always perform well. Through using a human-in-the-loop approach we have found that models can be adapted to such changing settings, however, this still requires (sometimes significant) manual intervention from analysts. In addition, there are various workflows which have been more tailed to AI models but which do not always follow the workflow of satellite image analysis using our tool. In future work we will continue to work with end users to test and help refine PulseSatellite. We will also expand into more applications, and continue to open PulseSatellite as a tool to agencies across the UN system.
- Contact information: Tomaz Logar (tomaz@unglobalpulse.org)

### Project 5: Online radio monitoring for public health social listening and beyond

- Project Description: Radio remains the most reliable and affordable medium of accessing and sharing information in most of the developing world. Indeed, studies have shown that radio remains more prevalent as a means of communication in many parts of the world than social media. Since 2019, UN Global Pulse has worked with the WHO to explore the use of data from radio talk shows to signal early warnings of health risks and health-related matters. We have developed a radio monitoring pipeline which can 'listen' to online radio stations, transcribe the audio using machine learning speech-to-text models, and analyse the content using a series of NLP methods for display in a frontend dashboard. The dashboard was designed to be used by infodemic managers and decision makers to inform public health interventions and communication strategies. However, we aim to convert it into a generally applicable radio mining tool that can be used in a variety of settings.
- Department/Division : Executive Office of the Secretary General
- Project Type/Output: Academic paper/Dataset/Software tool
- Project Status: Ongoing
- Project Start Year: 2019
- Project End Year: 2024
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project updates: This year, we have continued to provide insights from radio data to the WHO as part of the Africa Infodemic Response Alliance. Through partnerships, we are currently working to adapt the dashboard to conduct radio monitoring in a wide range of additional application contexts, ranging from gender stereotypes and xenophobia to preparedness for environmental disasters. We are also independently conducting research on mentions of hate speech in a global sample of radio data.

- Project Domain: Telecommunications
- Data Source: Radio data from online stations
- Publicly Available Data: Yes
- Technology/Platform: Python, Spacy, Gensim, Plotly Dash, AWS
- Related Sustainable Development Goals (SDGs): SDG 3 – Good Health and Well-being; SDG 10 – Reduced Inequality; SDG 17 – Partnership for the Goals
- Partnership(s)/Collaborator(s)
    - UN Partners: WHO, UNDP Accelerator Labs, UN Women
- Links: https://www.unglobalpulse.org/2021/05/who-and-un-global-pulse-are-building-a-social-listening-radio-tool-to-aid-the-covid-19-infodemic-response/
- Lessons Learned: One of the technical challenges encountered has been the wide variability in the quality of speech-to-text machine learning models when applied to speakers of the same language but with different accents. We have worked to find diverse training datasets to fine tune existing language models and performed benchmarking tests to find the most generalisable approach. We have also conducted user testing of the dashboard with WHO infodemic managers, which helped shape the development of the tool. In the future we also hope to be able to plug in our radio data to existing WHO analysis tools such as EARS and EIOS, as well as to transfer the technology for radio analysis to other partners for use in different contexts.
- Contact information: Katherine Hoffmann Pham (katherine@unglobalpulse.org)

### Project 6: Imagining post-Covid-19 UN: foresight for organizational realignment and adaptation

- Project Description: Through its SG Lab Futures Initiative, UN Global Pulse fostered a strategic foresight exercise and dialogue to frame the role of the UN post-COVID-19 through scenarios and future visioning. The activity leveraged partnerships with two private sector entities to access AI tools as a backbone for foresight research, including scenario building to support the UN leadership in accessing the futures and foresight capacity.

  The purpose of the exercise is to systematically analyze the driving forces and future trends underpinned by the COVID-19 pandemic, synthesizing them into alternative futures scenarios. The scenarios provided a framework for discussing implications for the UN long-term, including country-level operations.
- Project Type/Output: Seminar/meeting/Strategic dialogue
- Project Status: Completed
- Project Start Year: 2021
- Project End Year: 2021
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Domain: Strategic transformation and planning
- Data Source: 1. Horizon scanning included a combination of structured and unstructured qualitative data collected from web scraping and uploaded documentation to customize an internal search engine functionality. 2. Social media analysis
- Publicly Available Data: No
- Technology/Platform: IBM Watson
- Related Sustainable Development Goals (SDGs): SDG 3 – Good Health and Well-being; SDG 8 – Decent Work and Economic Growth; SDG 10 – Reduced Inequality; SDG 13 – Climate Action; SDG 16 – Peace, Justice, and Strong Institutions;SDG 17 Partnership for the Goals
- Partnership(s)/Collaborator(s):

  - UN Partners: HLCP foresight network, UNESCO, WHO
- Lessons Learned:
  1. Introducing the benefits of new methodologies and mixed methods approaches to foresight takes time and engagement with the stakeholders.
  2. Blending qualitative and quantitative data in foresight analysis can help contextualize and provide a broader understanding of long-term challenges within a system.
  3. Applying AI tools developed for commercial purposes in the UN context requires collaboration from a multi-disciplinary team from both sides.
- Contact information: Tiina Neuvonen (tiina.neuvonen@un.org)

### Project 7: Understanding population movement related to COVID-19 border closures

- Project Description: UN Global Pulse and UNHCR are working to calculate and anticipate the number of displaced persons a) that have already crossed the Brazil-Venezuela border and b) that can potentially cross in order to understand their need for humanitarian support and overall strengthen protection efforts. This project consists of: (i) a queue modeling tool for simulating border crossings under different conditions, (ii) a nowcasting effort to calculate the amount of urban population and potentially identify interest in population movements to Brazil using big data sources, and (iii) predictive models for forecasting future arrivals/population movements.
- Project Type/Output: Report/Interactive dashboard tool
- Project Status: Ongoing
- Project Start Year: 2020
- Project End Year: 2022
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Domain: Migration
- Data Source: We draw on a range of traditional and nontraditional data sources, including: Twitter and Facebook data; Google trends and Google mobility data; radio data; conflict data from ACLED; data on COVID cases, deaths, and symptoms; economic indicators; and data on arrivals from UNHCR.
- Publicly Available Data: No
- Technology/Platform: The data cleaning and modeling pipeline is primarily coded in Python and stored in Jupyter notebooks. Some scripts have been written in R. The code is stored on Github. The front-end dashboard has been coded with Plotly Dash.
- Related Sustainable Development Goals (SDGs): SDG 3 Good Health and Well-being and SDG 10 Reduced Inequality
- Partnership(s)/Collaborator(s):
  - UN Partners: UN Global Pulse, UNHCR
- Links:
  - https://www.unglobalpulse.org/project/understanding-population-movement-from-venezuela-to-brazil-related-to-covid-19-border-closures/
  - https://brazil-venezuela-flows.unglobalpulse.net/
  - https://medium.com/unhcr-innovation-service/predicting-the-unpredictable-preparing-for-potential-future-scenarios-1b22cd7f8da2
- Lessons Learned: One of the core challenges to prediction/forecasting/nowcasting is that there is a large period of unusual data from the COVID pandemic. At the time of this

project, we could only make assumptions about how COVID-19 might have changed population movement intentions, since we did not have reliable information on the extent of suppressed demand and the true number of people crossing illegally. We attempted to address these limitations by adapting our modeling approach. First, we developed a simulation tool for arrivals which does not rely on precise information about border crossings, but rather allows decision-makers to experiment with a variety of assumptions about crossing volumes, the demand for shelters, and relocation capacity. Second, we are conducting ongoing data collection to "nowcast" potential border flows in real time. Finally, we tested a range of different arrivals forecasting models, comparing predictions across methods and developing uncertainty estimates for each model.

- Contact information: Katherine Hoffmann Pham (katherine@unglobalpulse.org)

### Project 8: Ukraine response - Data Science Cell

- Project Description: In response to the Ukraine crisis there were many actors in the data science space who were providing support and performing analysis to inform the response efforts of the UN. Early in the crisis, we initiated a Data Science Cell to bring together entities from across the UN system to coordinate and collaborate on these topics. The cell has grown to over 60 members from over 15 institutions. The cell also has three subgroups: population estimation (facilitated by UNHCR and IOM); socioeconomic impacts (facilitated by the World Bank-UNHCR Joint Data Center on Forced Displacement); and situational awareness (facilitated by UNDP). These subgroups are currently being used as spaces for focused interagency collaboration on these topics.
- Project Type/Output: working group
- Project Status: Ongoing
- Project Start Year: 2022
- Project End Year: Ongoing based on need
- Reported as part of 2021 Compendium on UN AI Activities? No
- Project Domain: Crisis response and humanitarian assistance
- Data Source: Varied
- Publicly Available Data: Mixed
- Technology/Platform: Varied depending on use case
- Related Sustainable Development Goals (SDGs): 10 (Reduced Inequality), 16 (Peace, Justice and Strong Institutions), 17 (Partnerships for the Goals)
- Partnership(s)/Collaborator(s):
    - UN Partners: UNHCR, OCHA, World Bank, UNHCR-World Bank JDC, UNICEF, IOM, WFP, UNDP, WHO, UNOCC, UNOSAT, WTO, UNFPA, IFAD
    - Non-UN Partners: NRC/DFS, Oxford University, QCRI, ACAPS
- Lessons Learned: Data science is being used in a vast number of ways across the UN system to respond to crises and humanitarian emergencies. There was and is a strong desire to collaborate among institutions to build better systems and overcome challenges. As a community we hope to release a report outlining our shared challenges and lessons learned throughout our response to the Ukraine crisis, which we aim to use as a foundation for continuing to improve the data science community's crisis responses in the future.
- Contact information: Joseph Aylett-Bullock, Katherine Hoffmann Pham (joseph@unglobalpulse.org , katherine@unglobalpulse.org)

### Project 9: Data Science Cell subgroup - situational awareness

- Project Description: Situational awareness can be broadly defined as the "knowledge, understanding and anticipation of a situation through monitoring and reporting of current

events, analysis and predictive assessments" (2019 DPO JOCs). As part of the data science cell, one of the three subgroups is looking at understanding and developing data science methods for improved situational awareness during a crisis, based on our experience in responding to the Ukraine crisis. We are currently focussed on damage assessment, conflict monitoring and understanding the affected geography in the first month and then the first six months of a crisis. We hope to produce a literature review of current methods, conduct an analysis of where gaps in this literature exist, and work towards developing methods to address these gaps. This subgroup is facilitated by UNDP, and UN Global Pulse is a member of the group.

- Project Type/Output: working group
- Project Status: Ongoing
- Project Start Year: 2022
- Project End Year: 2022
- Reported as part of 2021 Compendium on UN AI Activities? No
- Project Domain: Crisis response and humanitarian assistance
- Data Source: Varied
- Publicly Available Data: Mixed
- Technology/Platform: Varied depending on use case
- Related Sustainable Development Goals (SDGs): 10 (Reduced Inequality), 16 (Peace, Justice and Strong Institutions), 17 (Partnerships for the Goals)
- Partnership(s)/Collaborator(s):
    - UN Partners: UNDP, UNOSAT, UNICEF, UNOCC
- Contact information: UN Global Pulse focal point - Joseph Aylett-Bullock (joseph@unglobalpulse.org); subgroup facilitator - Gaia Rigodanza (gaia.rigodanza@undp.org)

### Project 10: Spotlight Initiative – Mining Gender Perceptions from Public Radio Discussions

- Project Description: UNGP in Kampala is using its AI-powered public radio social listening tool to mine data on perceptions around Gender Based Violence (GBV), Violence Against Women and Girls (VAWG), Harmful Practices (HP), Sexual Reproductive Health Rights (SRHR), and Violence Against Children (VAC) in Uganda. This data source complements perception surveys but provides the present state of affairs and the evolving context of violence against women and girls in the community to allow for timely and targeted interventions. Following engagements with the Recipient UN Organizations (RUNOs), the team of data analysts at UNGP in Kampala registered the following achievements:
    - Maintained the radio flow from 22 radio stations broadcast in Luganda covering Kampala and its surrounding districts.
    - Defined a detailed taxonomy of keywords to mine relevant data and defined a tagging taxonomy (capturing perpetrators, victims, and violence types).
- Department/Division: Executive Office of the Secretary General
- Project Type/Output: Dashboard/Report
- Project Status: Ongoing
- Project Start Year: 2019
- Project End Year: Ongoing
- Reported as part of 2021 Compendium on UN AI Activities? No
- Project updates: Biweekly dashboard updates are produced by UNGP and shared with stakeholders to inform their programming.

- Project Domain: Telecommunications
- Data Source: Radio data from FM stations
- Publicly Available Data: No
- Technology/Platform: Python, Bash, AWS, My SQL, PHP, HTML, Ruby, C++
- Related Sustainable Development Goals (SDGs): SDG 5 – Gender Equality and SDG 10 – Reduced Inequality
- Partnership(s)/Collaborator(s)
    - WHO, MGLSD, UNICEF, UN RCO, UN WOMEN, UNFPA and Ministry of Gender Labour and Social Development in Uganda
- Links: https://www.unglobalpulse.org/project/ending-violence-against-women-and-girls-in-uganda/
- Lessons Learned: Radio remains the most popular source of information in Uganda, used by different people irrespective of their demographics. For example, according to the Spotlight Initiative's baseline report in 2020 the majority of respondents (70.8% of women and 73.3% of men) received information on VAWG/HPs and SRHR through radio. Radio shows allow two-way communication between radio studios and people in the community through call-ins, making them a rich representation of the people that are digitally marginalized.

### Project 11: Developing Ethical AI Frameworks and Data Exchanges for Uganda and Ghana

- Project Description: AI and other emerging technologies present opportunities for the achievement of national priorities and to increase national and regional welfare. To realize these opportunities, and to safeguard against risks and potential harms, key foundations need to be put in place, such as access to data (a.o., to train AI), and the development and use of emerging technologies need to be guided by ethical rules and principles. UNGP has been supporting the Government of Ghana and the Government of Uganda on developing solutions to address these two issues. This support has led to the development, in each country, of a Roadmap for an Ethical AI Framework informed by the local social and societal context, and a Roadmap for the development of Community-Centric Data Exchanges at the national level.
- Department/Division: Executive Office of the Secretary General
- Project Type/Output: Ethical AI Framework, and community-centric Data Exchange Roadmap to unlock data as a resource for the attainment of national and regional priorities (each for both Uganda and Ghana).
- Project Status: Completed
- Project Start Year: 2021
- Project End Year: 2022
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project updates: The recommendations made in the Ethical AI Framework and the data exchange roadmap are being used to inform the follow-up work in developing a data strategy for Uganda and implementing a use case of the data exchanges focusing on the tourism sector. Both projects are underway.
- Domain: Digital technologies
- Related Sustainable Development Goals (SDGs): SDG 8 – Decent Work and Economic Growth; SDG 12 – Responsible consumption and Production; SDG9 – Industry, Innovation and Infrastructure(each for both Uganda and Ghana), SDG11 – Sustainable Cities and Communities
- Partnership

- Government: Government of Uganda (Ministry of ICT and National Governance)

## 2. Related Sustainable Development Goals

SDG 3, 8, 10, 13, 16, and 17

## 3. Relevant links

https://www.unglobalpulse.org/

Contact information

Rene Clausen Nielsen (rene.nielsen@un.org) and Miguel Luengo Oroz (miguel@unglobalpulse.org)

# United Nations Habitat

## 1. Description of Activities on AI

### Project 1: Artificial Intelligence (AI) for Sustainable Urban Development in Cities

- Project Description: UN-Habitat is collaborating with Mila to produce a policy paper on the application of artificial intelligence in urban contexts. The paper takes a risk-based approach highlighting the risks of AI throughout its lifecycle and application in cities. The report first describes AI, its different types, the opportunities it offers for cities, and its current limitations. It identifies key sectors for intervention for cities, along with examples of AI applications within each of those sectors. The report then presents a detailed risk assessment framework with reflective guiding questions. Finally, the report offers a set of recommendations and areas of action to consider when developing an AI strategy.
- Department/Division: Knowledge & Innovation Branch
- Project Type/Output: White paper
- Project Status: Development
- Project Start Year: 2021
- Project End Year: 2022
- Project Domain: Human Rights, Environment
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 11 – Sustainable Cities and Communities
- Partnership(s)/Collaborator(s)
    - Civil Society: MILA
- Related Sustainable Development Goals: SDG 11
- Contact Information
    - Abdinassir Sagar (abdinassir.sagar@un.org)

### Project 2: AI for people-centered smart cities workstream in the UN inter-agency working group on AI

- Project Description: In early 2022, a new workstream on AI for people-centered smart cities, co-chaired by UN-Habitat ITU, UNESCO, and UNDP, was established in the UN's Inter-agency working group on AI. The objectives of the workstream are to understand the needs of cities and the capabilities of UN System organizations in relation to AI, and how to leverage AI for people-centered smart cities while promoting ethical guidelines for AI that are human-rights based, strengthening inter-agency cooperation, and implementing key performance indicators and other metrics to ensure that these values are respected. Currently, the project is kicking off a global assessment of responsible AI use in cities to map out the opportunities and constraints for local governments to responsibly use, implement and govern AI technologies in cities.

- Department/Division: Knowledge & Innovation Branch
- Project Type/Output: Reports
- Project Status: Development
- Project Start Year: 2022
- Project End Year: 2023
- Project Domain: Human Rights, Environment
- Reported as part of 2021 Compendium on UN AI Activities? No
- Related Sustainable Development Goals (SDGs): SDG 11 – Sustainable Cities and Communities
- Partnership(s)/Collaborator(s)
    - UN Agencies: UNDP, ITU, UNESCO
    - Civil Society: IDRC, UNU-E-GOV, U4SSC, CC4DR
- Related Sustainable Development Goals: SDG 11
- Contact Information

  Abdinassir Sagar (abdinassir.sagar@un.org)

### Project 3: BEAM: Building & Establishment Automated Mapper: Mapping informal settlement in eThekwini, South Africa

- Project Description: The city of eThekwini has the largest number of informal settlements of any municipality in South Africa. To keep track of the fast changes in the built environment and develop a pipeline of public service delivery and upgrading projects, it is essential that the city has access to evidence-based information. That requires up-to-date records, particularly on the scale, location, and number of informal areas.

  To assist the eThekwini's Human Settlement Unit (HSU) in automating their building mapping process, United Nations Technology Accelerator for Cities (UNITAC) developed BEAM, a model that uses machine learning to radically accelerate the spatial recognition of settlements and building structures on aerial imagery. BEAM can mark pixels specific to a building's spectral profile with an accuracy of 94%. It looks to provide HSU with up-to-date geo-referenced base maps.

  In addition to the tool development, there will be a technology and knowledge transfer component. This capacity-building process aims to enable the eThekwini Municipal Government to leverage BEAM to more effectively target their upgrading and basic urban service delivery interventions. A project advisory group has been established to address the BEAM's potential risks, challenges, and opportunities.
- Department/Division: UNITAC Hamburg (linked to UN-Habitat's Flagship II Program: People Cantered Smart City)
- Project Type/Output: Application Tool & Manual; Academic Paper; Project Advisory Group; External Communications, including blog posts and video content
- Project Status: Ongoing
- Project Start Year: 2021
- Project Domain: https://unitac.un.org
- Data Source:
    - Population demographics: 580 urban informal settlements encompassing 314,000 household
    - Geography: South Africa
    - Locations: eThekwini
- Link to data: Aerial photography is provided by the city

- Data publicly available: Not yet
- Reported as part of 2021 Compendium on UN AI Activities? No
- Related Sustainable Development Goals (SDGs): SDG 11 – Sustainable Cities and Communities, SDG 9 – Industry Innovation and Infrastructure, SDG 10 Reduce Inequalities, and SDG 17 – Partnership for the Goals
- Partnership(s)/Collaborator(s)
    - UNITAC partnership between the United Nations Human Settlements Programme (**UN-Habitat**), the United Nations Office for Information and Communication Technology (**OICT**), and **HafenCity University**
    - Human Settlement Department, City of eThekwini, South Africa
- Relevant Links and Multimedia:
    - https://express.adobe.com/page/kyYWPHoATpii6/
- Lesson Learned:

  **Perception of AI in the Field of Informality**

  Mapping a community inherently makes it "legible" to public authorities. Doing so can have tremendous advantages for the planning and allocation of critical public health and infrastructure services, especially in slum settlements. However, such data collection must respect both the privacy of residents and their unique cultural dynamics. Similar initiatives need to ensure that all developed tools adhere to United Nations Human Rights guidelines. The legal agreements with project partners, including MoUs and NDAs, need to have clauses on human rights and social safeguards that denote language, such as that the data and results produced by the tool will not negatively impact people on the ground. It is vital to integrate within the project objective, the understanding that such tools are only to be used towards the upholding of rights and freedoms of all.

  Without a doubt, such initiatives should be communicated openly and transparently to the public. A Community of Practice or Project Advisory Committee should be established to bring diverse perspectives on project development and implementation. At the same time, communication for #tech4good initiatives needs to be considerate of public perception and biases toward AI solutions, so that there are no misinterpretations of project objectives

  **Knowledge Transfer and Training Sessions can be Difficult**

  The tool was co-designed with project partners. However, knowledge transfer and training sessions can become difficult in the long run. Long-term hosting and maintenance of the tool require ongoing resources for cloud computing and HR. The cost may exceed the project's lifetime. There is a risk that this tool cannot be ensured in the long run.

  **The Model needs to be Re-trained for New Cities**

  A key limitation for project upscaling is that the tool needs to be re-trained for each city. In addition to limited personnel, another challenge is access to geospatial images. BEAM currently relies on aerial photography. However, not every city has access to or can afford frequent aerial images. An alternative will be the use of satellite imagery. Not only are satellite images available on numerous platforms, but using them will also be advantageous during the project upscaling phase, where some cities may not have the capacity to produce aerial imagery.

  Unfortunately, high-resolution (ideally 1m Ground Sampling Distance or below), freely-accessible satellite images are not always easily attainable. As such, it is worthwhile to consider the possibility of merging multiple sources and types of geospatial images.
- Contact Information

  Pontus Westerberg (pontus.westerberg@un.org)

### Project 4: Hola ISUD plan (Integrated Strategic Urban Development Plan for Hola Town, Tana River County, Kenya).

- Project description: UN-Habitat in collaboration with UNEP (UN Environment Programme) is committed to supporting the preparation and elaboration of the Hola ISUD, with a strong link between urbanization, biodiversity, and ecosystem services. The preparation of Hola ISUDP will form part of a larger territorial strategy: The Go Blue project, an Innovative Land-Sea Planning and Management for Sustainable and Resilient Kenyan Coast, which is a partnership between the EU (European Union) and the Government of Kenya to advance the blue economy agenda through coastal development. For the Hola ISUDP, AI was primarily used in the remote sensing process of extraction of land cover information from satellite imagery. Land cover is a key layer necessary to perform most of the GIS-based multicriteria analyses, helping to analyze a territory to detect historical changes and trends, particularly in a poor data environment, in which we mostly rely on information extraction from satellite imagery. The land cover layer was obtained through a supervised process of machine learning (considered as a subcategory of AI) applied to Copernicus Sentinel-2 imagery with 10 m resolution, by which the software is trained to recognize the different land cover classes (built up, tree cover, shrubland, agriculture, water, etc.). The creation of a high-quality land cover layer was critical to producing different analyses related to natural hazards like flooding vulnerability, drought potential, or land degradation, to take into consideration, among different other factors, the impact or influence of each type of cover on the specific hazard. Moreover, it was important for environmental assessments as biodiversity condition land cover change and ecosystem service value, as well as for multicriteria analyses aimed to assess the agriculture or urban development suitability. Therefore, we used two key open-source datasets originated through AI processes, to fill the data gap and to support different analyses and maps. The first one is the high-resolution density map provided by Facebook data for good in collaboration with CIESIN (Center for International Earth Science Information Network) of Columbia University. The map estimates the population at 30 x 30 m resolution for different categories (youth, elder, women, men). The data are generated by distributing the aggregate population data from the available census on building footprint and density extracted using advanced AI methodology. The data were used in the project to produce a population density map, to estimate the population affected by natural hazards, the amount of population served or unserved by public facilities, and to support strategic scenarios of growth and development. The second one is the open buildings dataset provided by Google, which produced a large dataset of 516 M buildings covering 64% of Africa extracted from high-resolution imagery in 2021, by applying AI. We used the buildings layer for different applications from the production of topographic maps to city scale and neighborhood strategic plans.
- Department/Division: UN-Habitat, Global Solution Division, Planning Finance and Economic Section (PFES)
- Project type/output: *The main objective is to prepare the Integrated Strategic Urban Development Plan For Hola Town. The ISUDP is a document that will define a comprehensive long-term vision of the Municipality and guide sustainable urban development for the upcoming ten years.*
- Project status: Ongoing
- Project start year: 2022
- Project domain: Urban planning and design, spatial analysis
- Data source: Google earth engine https://developers.google.com/earth-engine/datasets/

  Open buildings https://developers.google.com/earth-engine/datasets/catalog/GOOGLE_Research_open-buildings_v1_polygons

  High-resolution density map: https://dataforgood.facebook.com/dfg/docs/methodology-high-resolution-population-density-maps
- Publicly available data: Yes
- Technology/Platform: ArcGis, Google Earth Engine

- Related SDGs: SDG 3 – Good Health and Well-Being; SDG 11 – Sustainable Cities and Communities; SDG 13 – Climate Action
- Contact information:
  Eduardo Forzano
  edoardo.forzano@un.org

## 2. Related Sustainable Development Goals

SDG 3, 9, 10, 11, 13, 17

## 3. Relevant Links

https://unhabitat.org/

Contact Information

Abdinassir Sagar (abdinassir.sagar@un.org )

# United Nations High Commissioner for Refugees

## 1. Description of Activities on AI

### Project 1: Predictive Analytics for UNHCR Improved Contingency Planning

- Project Description: This project seeks to forecast the number of people who cross the border into Brazil and the shelter capacity in Boa Vista and Pacaraima, the Brazil border with Venezuela. This project utilises interlinked tools that consists of three computer-based solutions using different techniques: a queueing modelling tool for simulating future border crossing scenarios under different conditions, nowcasting model efforts for estimating the current urban population and potentially identifying interest in population movements to Brazil using big data sources, and the development of predictive models for forecasting future arrivals and population movements. This is done using different tools (e.g., web engines search, surveys, and social media analysis) as well as different computer and data science techniques (e.g., artificial intelligence, specifically supervised machine learning for time series analysis).

  These tools have been developed in collaboration with operational teams over the past year and a half, and currently are deployed in the Brazil operation. The desired effect of the project is increased evidence-informed decision-making in contingency planning, using scenarios triggered by estimated nowcasting and forecasting figures related to population movements. These tools have been developed in collaboration with UNHCR Brazil operational teams over the past year and a half, and currently are deployed in the Brazil operation. UNHCR Brazil has already used the preliminary findings to advocate and prepare for arrivals and to have medical services and shelter available according to their needs. In the pastFor example, UNHCR utilised these tools to expanding isolation areas to treat COVID-19 cases, and UNHCR and its partners have advocated for the delivery of vaccines according to the level of demand from new arrivals.
- Department/Division: Innovation Service
- Project Type/Output: Report, Software tool, Medium Blog Post
- Project Status: Ongoing
- Project Start Year: 2020
- Project Domain: Forced Displacement
- Data Source: Population data: population historical data , Other variables: COVID-19, market prices, transportation, exchange rates, https://data.humdata.org/group/ven
- Data publicly available: No, partial datasets only
- Technology/Platform: Open Source - Jupyter notebook, Python
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 10 – Reduced Inequality; SDG 16 – Peace, Justice, and Strong Institutions; SDG 17 – Partnership for the Goals
- Partnership(s)/Collaborator(s)
  - UN Partners: UN Global Pulse, UNHCR Brazil
- Relevant Links and Multimedia:

  - Project site: (link)
  - Academic papers: KDD Workshop on Data-driven Humanitarian Mapping Workshop 2022 Conference Paper [pending publication]
  - Blog post: (blog post 1)

- Lesson Learned: For predictive analytics of mixed-migration and forcibly displaced populations, it is important to take into consideration existing policies - such as the UNHCR contingency planning and emergency-related policies- to strengthen ongoing work and avoid duplication. It is also important to keep in mind that the sporadic nature of population movements across a number of informal crossings undermines many field operations' ability to collect data crucial to their work, which makes the application of predictive analytics a useful tool that can be one of datasets used to inform decision making. Additionally, a key lesson learned is the need to assess the risks related to data management – particularly data protection-related . There are risks associated with predictive/forecasting analytics data/information/variables (inputs), as well as the results/predictions (forecast outputs). These may be direct or unintended consequences (e.g., lack of access to territory/asylum) derived from analytics results. It is important to consider and adequately mitigate these risks through the implementation of safeguards when embarking on any predictive analytics project.
- Contact Information: Hovig Etyemezian (etyemezi@unhcr.org)

**Project 2: Epidemic Simulation Modelling of COVID-19 in Refugee Settlements**

- Project Description: A computer simulation initiative that can estimate how COVID-19 could spread within the Cox's Bazar refugee settlement - which is the largest refugee settlement in the world with a population of more than 725,000 people and a high population density - and can assist humanitarian actors with better coordination and decision-making tools. This project - which is based on an agent-based model originally deployed in the UK - uses available georeferenced data to construct a "digital twin" of Kutupalong settlement. The digital twin includes information on geo-locations of key population movement mixing points such as: households, food distribution centers, water pumps, handwashing stations and schools, and the demographic data of over 700,000 inhabitants. The simulation probabilistically determines what agents (refugees) do during the day. Therefore, disease spread and symptom progression are based on demographic characteristics and other conditions and diseases when calculating the likelihood of severe disease progression.

  The results of the simulation will be used to advocate with relevant stakeholders for avoiding certain restrictive measures (e.g. freedom of movement) in favour of other less restrictive measures (e.g. obligatory use of masks) by simulating their effects on the spread of COVID-19. The initiative may also be scaled to other settlements in the future.
- Department/Division: Innovation Service, United Nations High Commissioner for Refugees (UNHCR)
- Project Type/Output: Academic paper, White Paper, Software tool
- Project Start Year:2020

  Project End Year: 2021
- Project Domain: Forced Displacement
- Data Source:
  - Population demographics: UNHCR Microdata library
  - Geography: Bangladesh, Cox's Bazar
  - Locations: Kutupalong settlement
- Link to data: https://microdata.unhcr.org/
- Data publicly available: No, need registration/credentials

- Technology/Platform: Open Source, Python application with the following Python libraries: Matplotlib, Numpy, Pandas, Scipy, SciencePlots and GNU parallel 2018.UNGP repo GitHub for the project available here: https://github.com/UNGlobalPulse/UNGP-settlement-modelling
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 3 – Good Health and Well-being, SDG 16 – Peace, Justice, and Strong Institutions, and SDG 17 – Partnership for the Goals
- Partnership(s)/Collaborator(s)
    - UN Partners: UN Global Pulse, WHO, UNHCR, OCHA
    - Private Sector: IBM
    - Academia: Durham University, University College London, London School of Hygiene and Tropical Medicine, Massachusetts Institute of Technology
- Relevant Links and Multimedia:
    - Epidemic Modelling of COVID-19
    - Operational response simulation tool for epidemics within refugee and IDP settlements
    - Using computer simulations in refugee settlements
- Lesson Learned: One of the main limitations of this work so far has been the possible validation of model predictions with real world data - since case and testing data availability has also been limited. This approach aims to understand the potential impact of interventions by simulating the effects of interventions as if they were in place from the beginning of the simulated period. If required, however, in the event that more precise data becomes available, we expect to be able to perform further retrospective validations of the results by leveraging the flexibility of the model which can be fitted to historical trends, enabling the provision of future forecasts, as well as the simulation of different sequences of measures being implemented at different points in time.
- Contact Information: Joseph Bullock (joseph@unglobalpulse.org)

### Project 3: Project Jetson

- Project Description: Project Jetson is UNHCR's first AI-based predictive analytics experiment to predict the movement of internally displaced persons within Somalia, as well as to discover and understand the factors that cause or exacerbated that forced displacement. This project focused on the development of predictive models for forecasting future arrivals and population movements in each region. This is done using a variety of datasets (e.g., conflict, weather/climate anomalies, market commodity prices, and historical population movement) and utilizes different computer science and data science techniques (e.g., artificial intelligence, specifically supervised machine learning for time series analysis). The project follows UNHCR guidance for data responsibility, data protection, ethics and human rights due diligence, as well as OCHA peer-review framework for predictive analytics projects. The Innovation Service intends for Project Jetson to lead to evidence-informed decision-making in contingency planning, improved humanitarian action through preparedness and risk reduction, and strengthened protection for those who are forcibly displaced.
- Department/Division: Innovation Service
- Project Type/Output: Academic paper, Software tool (application)
- Project Status: Project Jetson ran from 2017-2019, but the UNHCR Innovation Service and Somalia Operation are currently exploring potentially restarting the project.
- Project Start Year: 2017
- Project End Year: 2019

- Project Domain: Human Rights, Weather, Conflict, and Forced displacement
- Data Source: PRMN-UNHCR Somalia, ACLED, FAO SWALIM, FAO FSNAU
- Link to data:
  - https://unhcr.github.io/dataviz-somalia-prmn/index.html
  - https://acleddata.com/#/dashboard
  - https://dashboard.fsnau.org/
  - https://www.faoswalim.org/article/swalim-online-systems-virtual-launch
- Data Publicly Available: Yes
- Technology/Platform: Open Source, Python Jupyter Notebooks and R Markdown notebook, R several packages, including R-shiny https://unhcrinnovation.shinyapps.io/Somalia/
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Update: While Project Jetson has not had any specific technical updates, the teams are currently exploring the potential relaunch of the project in order to support UNHCR Somalia Operation. Conversations are ongoing both with different members of the UNHCR in Somalia to identify new trends and assess current needs and capacity, as well as with researchers at Essex University exploring the link between conflict and climate in Somalia. Additionally, there is a pending publication from UNHCR about Project Jetson and relevant lessons for decision makers in the migration space in the IOM Big Data for Migration Handbook (BD4M).
- Related Sustainable Development Goals (SDGs): SDG 13 – Climate Action; SDG 16 – Peace, Justice, and Strong Institutions, and SDG 17 – Partnership for the Goals
- Partnership(s)/Collaborator(s)
  - UN Partners: UN Global Pulse
  - Civil Society: Uptake Foundation (Data Fellows Program) (Capacity Building), Omdena Foundation (Challenge Team)
  - Academia: University of Essex (Human Rights, Big Data & Technology Project HRBDT) (Research)
- Relevant Links and Multimedia:
  - The project page for Project Jetson on UNHCR's website
  - The book chapter that explains the journey on Predictive Analytics for UNHCR
  - Some academic papers highlighting Jetson (paper 1, paper 2, paper 3 on ethics)
  - Some blogs about project jetson (blog 1, blog 2, blog 3, essay)
  - The code repositories (repo 1)
  - Some media articles highlighting Jetson (here, here, here, here and here in German)
- Lesson Learned: Because this was UNHCR's first application of predictive analytics experiment to try to predict movement and understand some of the unique drivers and indicators of displacement within Somalia and along the Somali-Ethiopian border, it prompted significant learnings. The most crucial lessons learned highlighted the importance of engaging the populations you serve; Project Jetson received crucial inputs from refugees and IDPs in Somalia who described the act of selling their goats before fleeing. This information allowed the Innovation Service to identify the market prices for goats as a predictor for potential displacement behavior. Additionally, although Project Jetson represented the first time predictive analytics had been leveraged by UNHCR to understand displacement, it was never operationalized and used by field or country operations to inform their decision making prior to arrivals. It just served as proof of

concept that an AI-based system could be used to anticipate displacement. Linkages with emergency-related policies, ethics, human rights-based approach to AI and other issues such as closure of borders due to predictions, need to be taken into account prior triggering decision-making based on AI products.

- Contact Information: Hovig Etyemezian (etyemezi@unhcr.org)

### Project 4: Detecting drought with computer vision (AI) and satellite imagery

- Project Description: This project came out of engagement with Human Rights, Big Data and Technology Initiative, University of Essex during a previous innovation project, Project Jetson. This project saw the utilisation of computer vision (AI sub-domain) and satellite imagery of Somalia to detect drought in the different regions and correlate with conflict and displacement patterns. This project represents a nascent exploration for UNHCR to incorporate the detection of extreme weather events due to climate change as part of regular monitoring to perhaps one day better anticipate the flow of internally displaced people due to drought. This project utilised Landsat 8 satellite imagery to detect indicators of drought on the terrain, which was cross-validated with weather datasets from the same regions.
- Department/Division: Innovation Service, United Nations High Commissioner for Refugees (UNHCR)
- Project Type/Output: Code repository, Software tool (application), Blog article
- Project Status: Ongoing
- Project Start Year:2020
- Project Domain: Forced Displacement
- Data Source:
    - Conflict Data (ACLED.org), Satellite imagery: Landsat8
    - Geography: Somalia
    - Locations: admin level 2 (subnational, per region)
- Link to data:
- Data publicly available: Yes
- Technology/Platform: Open Source, Python with the following libraries: espa-bulk-downloader, rasterio, scikit-image matplotlib, earthpy and geopandas. GitHub for the project available here: https://github.com/unhcr/Jetson/wiki/3c.-Experiment-3
- Reported as part of 2021 Compendium on UN AI Activities? No
- Related Sustainable Development Goals (SDGs): SDG 13 – Climate Action; SDG 16 – Peace, Justice, and Strong Institutions, and SDG 17 – Partnership for the Goals
- Partnership(s)/Collaborator(s)
    - Academia: University of Essex - Human Rights, Big Data and Technology (HRBDT) Initiative
- Relevant Links and Multimedia:
    - Github repository: (link)
    - Software tool: (application link)
- Lesson Learned: For a successful project implementation, there was a requirement for extensive computer vision (AI) and geographical information systems (GIS) knowledge, a need that was satisfied through the ongoing partnership with the HRBDT team from University of Essex. The project also needs significant server storage space for the satellite imagery tasking and processing. Additional data protection considerations need to be

taken in case the imagery is high definition (HD) and therefore capturing settlements or other areas of concern.

- Contact Information: Hovgi Etyemezian (etyemezi@unhcr.org)

### Project 5: Text Analytics for Improved Protection

- Project Description: In 2016, the Innovation Service teamed up with UN Global Pulse to use public data from Twitter to understand protection issues, and used artificial intelligence to categorize and quantify interactions between host communities, general public and refugees in different countries.

  The Innovation Service explored with several teams different open-source and commercial tools and computer science techniques (e.g. topics modelling, natural language processing) to quantify, analyse and help the organization understand issues related to UNHCR's protection mandate. For example, protection-related incidents such as hate speech, discrimination, xenophobia against refugees and asylum seekers, as well as other persons of concern to UNHCR are commonly expressed online. The ability to quickly identify issues arising from text-based data (e.g. search engines, documents and reports, social media, and other text-based information), helps UNHCR colleagues to become more agile in advocacy and response.

  The aim of this initiative is to leverage information technologies to increase capacity for text analysis and provide actionable insights and evidence-informed decision-making for UNHCR and its partners, particularly in preparedness and response. The Innovation Service seeks to use new computer science techniques (natural language processing, supervised learning) to create an efficient process that will save time by avoiding the manual analysis and classification of data, and contribute to the UNHCR Action Plan against hate speech and xenophobia, as well as with the UN Secretary General Action plan on the use of new technologies to counter hate speech, discrimination and xenophobia online.
- Department/Division: Innovation Service
- Project Type/Output: Software tool
- Project Status: Ongoing
- Project Start Year: 2016
- Project Domain: Gender, Human Rights, Justice, and Forced Displacement
- Data Source: social media (public APIs), media outlets, text-based reports, websites, surveys
- Data publicly available: Yes
- Technology/Platform: Wide range: We have utilised different tools, both commercial (e.g. Crimson Hexagon-Brandwatch, Quid.com, the DEEP.io) to non-commercial (open source, Python/R-based) scripts, such as UN Global Pulse-Qatalog, voyant tools, infranodus/noduslabs. As well as explore/demo other commercial platforms such as Citibeats, AWS comprehend, Oracle Text, Microsoft LUIS.
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 10 – Reduced Inequality; SDG 16 – Peace, Justice, and Strong Institutions
- Partnership(s)/Collaborator(s):
  - UN Partners: UN Global Pulse, multiple UNHCR teams and operations: UNHCR Germany, UNHCR Americas and Europe Bureau, UNHCR Syria, Inspector General Officer, and others.
- Relevant Links and Multimedia:

  - White Paper: Social Media & Forced Displacement - Big Data Analytics and Machine learning
  - Understanding Perceptions of Migrants and Refugees with Social Media
  - Teaching a robot how to detect xenophobia online
  - Qatalog: Query, Assign, Tag and Analyse
  - Twitter and UN Global Pulse announce data partnership
  - The DEEP.io: the humanitarian secondary data review & analysis platform
- Lesson Learned: Given the sensitive nature of some datasets, it would be a good idea to develop an internal tool for text analytics that combines the best features of many of the tools commercially or externally available. Some of the humanitarian tools (e.g. The DEEP.io) have promising potential development, as they have done validation and manual tagging of the many datasets to automate or use other techniques (such as AI-based classification). This is an ever-increasing area of work, particularly now with behavioral analytics and futures and foresight signals analysis, therefore more investment should be made in this area.
- Contact Information: Hovig Etyemezian (etyemezi@unhcr.org)

### Project 6: Text Analytics for Call Centre Data logs in Uganda

- Project Description: In Uganda, UNHCR uses the Feedback Referral and Resolution Mechanism (FRRM). This software tool is used by 68 different UNHCR partners that provide services to displaced communities and host communities across Uganda. Information gathered from call centres is logged and the relevant focal points are notified of any issues that need rectification. FRRM requires both the sending of data to responsible parties and reporting of their subsequent actions in order to ensure accountability to the people that UNHCR serves. The logged information is then displayed in a dashboard that can highlight trends visually, including how they impact different demographics and/or sectors. Since 2021, UNHCR Innovation Service has been working closely with the UNHCR Uganda team to improve the automation for calls classification, into different "action-based" categories that reflect programmatic work (sectors) and protection issues (incident type) for UNHCR to aggregate or create and alert of certain type of incidents per sector using AI.
- Department/Division: Innovation Service, United Nations High Commissioner for Refugees (UNHCR)
- Project Type/Output: Code repository , Blog article
- Project Status: Ongoing
- Project Start Year:2021
- Project Domain: Forced Displacement
- Data Source:
- Data publicly available: No
- Technology/Platform: Open Source, Python Libraries (proof of concept) and commercial off-the-shelves platforms (Microsoft/Amazon AWS) for testing environment/production.
- Reported as part of 2021 Compendium on UN AI Activities? No
- Related Sustainable Development Goals (SDGs): SDG 10- Reduced Inequality, SDG 16 – Peace, Justice, and Strong Institutions, and SDG 17 – Partnership for the Goals
- Partnership(s)/Collaborator(s)
  - UNHCR Uganda team
- Relevant Links and Multimedia:

  - FRRM dashboard (current categorization, link)
  - Github repository for new classification: (by Amazon team)
  - Blog Posts: Blog Post 1, Blog Post 2, Blog Post 3
- Related Sustainable Development Goals (SDGs): SDG 8 – Decent Work and Economic Growth, SDG 9 –Industry; Innovation and Infrastructure; SDG 16 – Peace, Justice, and Strong Institutions; SDG – 17 Partnership for the Goals
- Contact Information: Hovig Etyemezian (etyemezi@unhcr.org)

### Project 7: ARiN

- Project Description: ARiN is a software solution that uses machine learning techniques for the screening of applications submitted to UNHCR's human resources talent pools, according to a set criteria. It assists the pre-screening phase, where the recruiters make the first parsing of the thousands of talent pool applications. It is a web application developed by UNHCR's Innovation Service for the Affiliate Partnerships and Recruitment Section (APRS) within DHR. The application is machine-learning based and supports them with the screening process for external candidates coming from the UNHCR external talent pool applications. The talent pools are the most sought-after functional profiles within UNHCR, and they are dedicated to help respond urgently to forced displacement crises. There are approximately 29 talent pools that receive on average 8000, mostly text-based, applications per month. Contrary to other off the shelf tools, ARiN was customized in order to comply with the internal policies and rules for talent acquisition within UNHCR, which includes transparency of process, gender and diversity considerations.
- Department/Division: Innovation Service
- Project Type/Output: Software tool
- Project Status: Completed
- Project Start Year: 2016
- Project End Year: 2022, officially hand over to UNICC
- Project Domain: Forced Displacement
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Updates: ARiN was developed as a proof of concept by UNHCR Innovation. The software has been officially handed over to UNICC for maintenance with user requirements coming from the human resources team. ARiN is currently being analysed for potential interoperability/integration to Workday (new human resources system).
- Related Sustainable Development Goals (SDGs): SDG 8 – Decent Work and Economic Growth, SDG 9 –Industry; Innovation and Infrastructure; SDG 16 – Peace, Justice, and Strong Institutions; SDG – 17 Partnership for the Goals
- Contact Information: Hovig Etyemezian (etyemezi@unhcr.org)

## 2. Related Sustainable Development Goals

SDG 3, 8, 9, 10, 13, 16, and 17

## 3. Relevant Links

https://www.unhcr.org/uk/

Contact information

Catherine Schneider (schneide@unhcr.org), Hovig Etyemezian (etyemezi@unhcr.org), Rebeca Moreno Jimenez (morenoji@unhcr.org), and Sofia Kyriazi (qiriazi@unhcr.org)

# United Nations Children's Fund

## 1. Description of Activities on AI

### Project 1: End-Year Summary Narrative Quality Assurance Tool

- Project Description: End-year reports are important instruments for accountability and monitoring of UNICEF's ongoing performance for all offices. The End-year Summary Narrative (EYSN) component is posted on UNICEF's external website, making it accessible to the general public – including through UNICEF's Transparency Portal (https://open.unicef.org/). It needs to be written in a style and tone that is appropriate, credible, relevant, and understandable for external audiences. It is important to ensure the quality of the report, as well as guarding against the inclusion of statements that may give rise to reputational risk to UNICEF and partners in the public domain.
- Collaborating with UNESCWA, UNICEF DAPM developed an AI-driven quality assurance tool that can quickly scan the draft EYSN reports and assess the degree of adherence to reporting guidelines, flag any potential reputation risk language, and perform certain editorial check functions. This tool was offered to CO's during 2021 end year reporting period and helped achieve efficiency gains and improve the overall quality of final reports.
- Department/Division: Division of Data, Analytics, Planning and Monitoring (DAPM)
- Project Type/Software tool
- Project Status: Completed
- Project Start Year: 2021
- Project End Year: 2022
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Domain: Improved quality of end-year summary narrative reporting that's made available to the public, as well as guarding against the inclusion of statements that may give rise to reputational risk to UNICEF and partners in the public domain.
- Data Source: Executive analyses of key aspects of annual results and management performance for both external and internal audiences.
- Link to data: Past reports - Country, Regional and Divisional Annual Reports 2020 | UNICEF
- Data is publicly available: Yes
- Technology/Platform: *Net core with ML running on Python. Frontend build with Angular*
- Related Sustainable Development Goals (SDGs): SDG 9 – Industry, Innovation, and Infrastructure; SDG 17 – Partnerships for the Goals
- Partners: UN Partners: UN ESCWA
- Contact information: Sanjana Gaddam, Timothy Takona (sgaddam@unicef.org, ttakona@unicef.org)

### Project 2: AI4D Research Bank

- Project Description: Data gaps hinder the development sector from implementing evidence-based programs for children and other vulnerable populations. Access to updated and high-resolution data would help unlock timely insights for decision

making such as vulnerability, economic activity, and environmental conditions. The AI4D Research Bank will leverage various geospatial analytic solutions to help fill in and augment data gaps, scaling poverty estimation efforts and air quality exploratory research, while promoting open science by giving other data scientists access to datasets and machine learning model training references. Access to updated and high-resolution data would help unlock timely insights for decision making such as vulnerability, economic activity, and environmental conditions. The resulting web app is designed for both data scientists and program staff, and will offer a Data Catalogue, a Model Catalogue, and API Functionality to ensure replicability. Funding for this initiative is made possible through the UNICEF Venture Fund, Office of Innovation.

- Department/Division (if applicable): Frontier Data Hub, Regional Office for East Asia, and the Pacific islands (EAPRO)
- Project Type/Output: Software tool
- Project Status: Development
- Project Start Year: 2021
- Project End Year: 2022
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Domain: Environment and Poverty
- Data Source: Our poverty estimation model features a low-cost and efficient implementation that will use publicly available data sources:
    - Google Earth Engine satellite images
    - Facebook High Resolution Settlement Layer
    - OpenStreetMap
    - Ookla Internet Dataset
- The exploratory air quality research side of the platform, will use data from:
    - Satellite Imagery MODIS, VIIRS (NASA Earth Data)
    - Mapillary Street-level Sequences Dataset image dataset for Bangkok
    - Meteorological data from the World Air Quality Index
- Data is publicly available: Yes
- Technology/Platform: The web app itself will be open sourced and data analysis made available via an API. The repository will be maintained on GitHub.
- Related Sustainable Development Goals (SDGs): SDG 1 – No Poverty; SDG 3 – Good Health and Well-Being; SDG 13 – Climate Action; SDG 16 – Peace, Justice, and Strong Institutions
- Partnerships:
    - UN Partners: UNICEF
    - Private Sector: Thinking Machines
- Links: Partner's website: https://thinkingmachin.es/
- Lessons Learned: The bulk of the development work for the AI4D Research Bank will happen in 2022. During 2021, UNICEF and the technology partner co-designed the project through a constant communication of respective priorities and interests. This alignment is paramount on such projects, where the capacity and expertise of partners is crucial to guarantee the rigor and speed of execution. We will create an impact assessment report to evaluate the use of the AI4D Research Bank, poverty estimation models, and air quality estimation research. We will gather information on how these models and tools have helped other users' work and inputs to future iterations.
- Contact information: Benjamin Grubb (bgrubb@unicef.org)

### Project 3: Safer Chatbots

- Project Description: Chatbots, including those run by Unicef, often do not detect, or respond to users attempts to seek urgent help with potentially life threatening experiences. The Safer Chatbots project aims to standardise safeguarding mechanisms within any chatbot reaching vulnerable communities, especially those engaging girls and women. Safer Chatbots includes 3 options for chatbot implementers who wish to improve the ability of their chatbot to detect and respond automatically to safeguarding disclosures, for example, messages from users indicating they have experienced or are at risk of serious harm including Gender Based Violence or suicidal ideation. Implementers can take inspiration from tried and tested mechanisms which have been accessibly documented via Implementation Guidelines and piloted by 3 Unicef country offices. Chatbot developers do not have to be running an AI powered chatbot, but one of the options is powered by an NLP model developed and tested by external partners with our support. Mechanisms and guidelines can be implemented on any chatbot-building software but the guidelines have been tailored for those using platforms such as RapidPro, Turn.io and Bothub. By implementing a Safer Chatbot mechanism, chatbot developers can improve the safety of their chatbots users and ensure they get the support they need from appropriate referral services.
- Department/Division: Gender (EAPRO)
- Project Type/Output: The main output of this project is implementation guidelines including RapidPro flows. Through a partnership with external organisations this project we have also produced a first draft of a safeguarding NLP model.
- Project Status: Completed
- Project Start Year: 2020
- Project End Year: 2021
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Domain: Gender, Health
- Data Source: Data used for the development of the NLP model option was collated anonymously based on training data from external partners. No other data is involved in this project until the point of implementation, at which point the data collected depends on that collected by the implementer, but may include anonymised safeguarding disclosures, and demographic data included age and gender.
- Data is publicly available: Yes
- Technology/Platform: Templates have been created and made available using RapidPro (.json files available as part of project documentation). One of the options is available via the Turn.io platform as a template, and the other via Weni/Bothub as well as via Github.
- Related Sustainable Development Goals (SDGs): SDG 3 – Good Health and Well-Being; SDG 5 – Gender Equality; SDG 16 – Peace, Justice, and Strong Institutions
- Partnership
- Private Sector: Weni, technical partner
- NGO: Girl Effect, technical partner
- Lessons Learned: One of the biggest challenges was understanding what other initiatives may already be in motion to address this important problem within Unicef, and ensuring we were not doubling up our efforts. Secondly, although local teams running or planning chatbots recognised the importance of this issue, it was hard for them to prioritise addressing it amongst the many other pressing issues involved in running/developing a chatbot. For us this emphasised the importance of making this mechanism available as part of the 'standard' templates for teams wishing to roll out a new chatbot, and a pre-condition for its release to vulnerable users.
- Contact information: Gerda Binder (Gbinder@unicef.org)

## Project 4: Spotlight

- Project Description: Spotlight is a project to predict country-level changes in the ACLED data set (events and fatalities) using the news-report event data set GDELT. It will be used to inform the UNICEF Horizon Scan, a monthly process that seeks to identify a short list of countries facing imminent increases in humanitarian need, to support enhanced country office preparedness. It aims to solve the problem of an absence of statistically proven quantitative forecasting inputs related to changes in conflict intensity.
- Department/Division (if applicable): EMOPS
- Project Type/Output: Software tool
- Project Status: Ongoing
- Project Start Year: 2021
- Project End Year: 2022
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Domain: Risk analysis and emergency preparedness, Risk mitigation
- Data Source: News and media events (GDELT), conflict events (ACLED)
- Link to data:
    - https://www.gdeltproject.org/
    - https://acleddata.com/data-export-tool/
- Data is publicly available: Yes
- Technology/Platform: Microsoft Azure Databricks (Pyspark) Notebooks, Microsoft Azure ML (Pyspark/TensorFlow) Jupyter Notebooks, Microsoft Azure Data Factory, Microsoft SQL Server, Power BI
- Related Sustainable Development Goals (SDGs): SDG 16 – Peace, Justice, and Strong Institutions
- Links: Tool is only available on UNICEF internal network
- Lessons Learned: Please elaborate here: The computing costs associated with calculations on a large dataset are a constraint on exploration. Internal bureaucracy is an impediment to experimentation. A lack of internal expertise is a limit on development.
- Kevin Wyjad (kwyjad@unicef.org)

## Project 5: UNICEF Venture Fund

- Project Description: Launched in 2016, the UNICEF Venture Fund makes $50k - $100k early-stage investments in technologies for children developed by UNICEF country offices or companies in UNICEF program countries. By providing flexible funding, UNICEF has the ability to quickly assess, fund and grow open-source technology solutions that show potential to positively impact the lies of vulnerable children.

  The Venture Fund has made specific calls for solutions that are in the data science and AI space. Specific focus is placed on using satellite imagery or social media to map infrastructure, using natural language processing, generating insights from big data, and curating data from various sources.

  In 2021, the fund launched a call for AI & ML solutions to improve access to and delivery of digital services and systems. The RFP proposals for this call are currently being reviewed. In addition, in the coming weeks, the fund will be announcing 2 new investments into Child Online Safety solutions, both utilizing AI to strengthen children's skills to stay safe in the digital world.

  The Fund has made investments of over $1.4MM to date in data science and AI in Argentina, Brazil, Chile, Guatemala, India, Kenya, Mexico, Philippines, South Africa, and Tanzania. For example, UNICEF invested in Afinidata, which offers a personalized, virtual assistant that guides parents with early childhood development tools for children under

the age of six. The company has delivered over 2 million educational sessions. Using machine learning, Afinidata has built a content personalization algorithm which increases the use of suggested content, benefiting over 80k families in Latin America.

## Startup Investments

| Portfolio Company Name | Country | Programmatic/ Operational Area | SDGs | One-Line Summary |
|---|---|---|---|---|
| Dymaxion Labs | Argentina | emergencies, social and economic policy | 11 | Using satellite imagery and machine learning to deliver geospatial analytics insights |
| Ilhasoft | Brazil | emergencies | 3 | Open platform for training and sharing Natural Language Processing datasets in multiple languages |
| Datawheel Chile | Chile | social and economic policy | 1, 9, 10, 11 | Data visualization engine for integrating data from multiple sources |
| Comunicacion Aumentativa | Chile | education, disabilities, social inclusion | 4 | AI enabled communication assistant for children with speech impairments using AI and pictograms |
| Afinidata | Guatemala | ECD, education | 4 | Artificial intelligence powered personalized educational development centered (ECD) advice for parents |
| Geospoc GeoSpatial | India | connectivity | 9, 11, 8 | Platform using artificial intelligence and machine learning with satellite data to map schools and hospital in India |
| ISTEM | India | education, disabilities, social inclusion | 4 | Dashboard for students with disabilities providing automated workflows, accessible content conversion, and mentorship matching services |
| Avyantra | India | newborn health, child survival | 3 | Using machine learning for early diagnosis of neonatal sepsis |
| Angaza Elimu | Kenya | education | 4 | AI powered eLearning platform that delivers personalized and mastery based learning experiences to students and amplifies teacher student engagement |

## Startup Investments (continued)

| Portfolio Company Name | Country | Programmatic/ Operational Area | SDGs | One-Line Summary |
|---|---|---|---|---|
| Kimetrica | Kenya | nutrition, health, child survival | 2, 3 | Facial recognition tech to detect severe malnutrition from a single photo |
| Pixframe Studios | Mexico | education | 4 | Game-based learning tools customized using data science analysis |
| Thinking Machines | Philippines | emergencies, social and economic policy | 11, 10 | Mapping hard-to-reach areas and connecting communities to resources using artificial geospatial analysis |
| Giraffe | South Africa | youth, education | 8 | Job matching portal connecting employers and jobseekers, while also generating insights around critical skills in demand. |
| Inspired Ideas | Tanzania | health | 3 | Health Assistant tool, powered by data and artificial intelligence |

## Country Office Investments

| Country | Project | Description |
|---|---|---|
| Eastern Caribbean States | School Mapping | Mapping every school and their access to facilities and connectivity |
| Serbia | School Mapping | Mapping all schools and measuring connectivity for improved service delivery |
| Colombia | Big Data for Emergencies and Resilience | AI for emergency preparedness in Colombia |
| Iraq | Monitoring child poverty through new methods and data | Poverty estimating using big data |
| Kygyzstan | Mapping schools and connectivity | Mapping every school, and monitoring its connectivity real-time |
| Brazil | Big Data for Epidemics | Big data to predict and prevent tropical disease transmission in Brazil |
| India | Safetipin | Using Machine Learning to analyze night-time images taken by taxi cabs to provide insights on safety of public spaces to women and girls. |

## Country Office Investments (continued)

| Country | Project | Description |
|---|---|---|
| Mexico | Matemat IA | AI-powered game based learning tool to enhance mathematics skills in upper secondary school children. Developed by Innovation Fund alumni Pixframe. |
| ECAR | Bebbo | A parenting app that will integrate an AI chatbot at a subsequent stage. |
| India | UniLearn | Learning management system that will use AI / ML to provide personalized learning for children. |
| EAPRO, Indonesia | Thinking Machines | Data Science & ML to use new and different data sources for better poverty estimations and insights on pollution. Implemented jointly with fund alumni Thinking Machines. |

- Department/Division: Office of Innovation
- Project Type/Output: Software tool, Investments into early stage open source frontier technologies, (including AI, ML, data science) developed by startups in UNICEF's programme countries or UNICEF's Country Offices.
- Project Status: Ongoing
- Project Start Year: 2016
- Project End Year: ongoing
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Domain: Environment, Education, Gender, Health, Poverty, and Risk mitigation
- Related Sustainable Development Goals (SDGs) SDG 1 – No Poverty; SDG 3 – Good Health and Well-Being; SDG 4 – Quality Education; SDG 5 – Gender Equality; SDG 8 – Decent Work and Economic Growth, SDG 9 – Industry, Innovation, and Infrastructure, SDG 10 – Reduced Inequalities, SDG 13 – Climate Action; SDG 16 – Peace, Justice, and Strong Institutions
- Partnership:
    - Government: Country governments that are implementing partners to the Country Office solutions
    - Private Sector: Startup companies
- Links:
    - https://www.unicefinnovationfund.org
    - https://www.unicef.org/innovation/venturefund
    - https://www.facebook.com/unicef.innovation
    - https://twitter.com/UNICEFinnovate
    - https://www.instagram.com/unicefinnovate/
    - https://www.linkedin.com/showcase/unicef-innovation/
- Lessons Learned: In the learning space, we have identified the need for easier adoption of personalized AI learning tools. This is why we are currently building an AI personalization toolkit that collates from the Innovation Fund portfolio Open Source algorithms, training datasets, and a 'how to guide' to help plug and play personalized learning functionalities - into existing Learning Management Systems.
- Contact information: Sunita Grote (sgrote@unicef.org)

### Project 6: UNICEF Policy Guidance on AI for Children

- Project Description: The Office of Global Insight and Policy led a two-year project to better understand how Artificial Intelligence (AI) systems can protect, provide for, and empower children. Key to this project was the development of a guide for creating and implementing AI policies and systems that protect children's rights and brings the attention of the public and private sectors to how AI systems impact on children. To develop the guidance over 200 experts were consulted in 5 regions, and almost 250 children were consulted on AI issues.
- Department/Division: Office of Global Insight and Policy
- Project Type/Output: Report, Policy Framework, and Conference (multiple meetings on a theme)
- Project Status: Completed
- Project Start Year: 2019
- Project End Year: 2021
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project updates: UNICEF released a report of the consultation with 245 children as well as the consultation workshop methodology. The draft policy guidance was put out for public consultation to solicit feedback. UNICEF also worked with eight governments, companies, and non-profit organizations to "pilot" the guidance. The results were released as case studies and a version 2 of the Policy Guidance on AI for Children was published during the first-ever Global Forum on AI for Children. The guidance has been translated into French, Spanish and Arabic.
- Domain: Education, Human Rights, Child rights, and Digital technologies
- Related Sustainable Development Goals (SDGs): SDG 3 – Good Health and Well-Being; SDG 4 – Quality Education; SDG 5 – Gender Equality; SDG 8 – Decent Work and Economic Growth
- Partnership
    - Government: Government of Finland
    - Civil Society: IEEE Standards Association, World Economic Forum, the 5Rights Foundation
    - Academia: Berkman Klein Centre for Internet & Society, Harvard University
- Links: https://www.unicef.org/globalinsight/featured-projects/ai-children #ai4children
- Lessons Learned: There is a real need for greater guidance on how to develop AI policies and systems that uphold child rights, that include children in the design process. Many of the valuable lessons learned by the organizations piloting the guidance are captured in the case studies. The Government of Scotland formally adopted the policy guidance in its National AI Strategy in 2021, a key success for the project.
- Contact information: Steven Vosloo (svosloo@unicef.org)

### Project 7: UNICEF's Good Governance of Children's Data

- Project Description: Since data is a key input into AI systems, the governance of children's data to ensure child-centred AI is critical. UNICEF developed a Manifesto that sets aspirational benchmarks to guide governments, the private sector and international organizations in developing data governance that take full account of children's issues and rights. The Manifesto proposes the world we want and aims to address ambiguous or sensitive areas where there are no straightforward answers. To develop this Manifesto, a working group of 17 global experts from the private sector, academia, think tanks and others provided analysis, insights, guidance and comments. They wrote short commentaries examining data governance approaches, evidence, gaps and grey or

conflicting areas. A wider group of experts was engaged through convenings, webinars and consultations throughout the year.

- Department/Division: Office of Global Insight and Policy
- Project Type/Output: Report
- Project Status: Completed
- Project Start Year: 2020
- Project End Year: 2021
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project updates: A Manifesto that articulates a vision for a better approach to children's data has been published.
- Domain: Human Rights, Child rights, Digital technologies, Data
- Links: https://www.unicef.org/globalinsight/good-governance-childrens-data
- Contact information: Jasmina Byrne (jbyrne@unicef.org)

## 2. Related Sustainable Development Goals (SDGs)

SDGs 1, 3, 4, 5, 8, 9, 10, 13, 16, 17

## 3. Relevant links

https://www.unicef.org/

Contact information

Mr Ronen Rapoport (rrapoport@unicef.org)

# United Nations Interregional Crime and Justice Research Institute

## 1. Description of Activities on AI

### Project 1: Responsible Artificial Intelligence Innovation in Law Enforcement

- Project Description: Through its specialized Centre for Artificial Intelligence and Robotics in The Hague, UNICRI advances understanding on the risks and benefits of AI, robotics and related technologies vis-à-vis crime, terrorism and other threats to security and seeks to support Member States to leverage the potential of these technologies in a responsible manner.

  Fostering responsible AI innovation within the law enforcement community is one of the priority areas of the UNICRI's Centre for Artificial Intelligence and Robotics. In this context, UNICRI has established a partnership with INTERPOL to create a unique global forum to discuss the advancements and impact of using AI for law enforcement. The purpose of this project is to demystify the world of AI, not only for law enforcement officers but also for policymakers, practitioners, industry partners, academic researchers, civil society and the general public.

  Within this project, UNICRI and INTERPOL organize annual global meetings on AI for law enforcement, conducting in-depth interviews with several law enforcement experts and other partners and hosting virtual meetings with a multi-disciplinary group of experts to identify AI use cases for law enforcement and discuss issues related to the dichotomy between the potential opportunities and challenges presented by AI, coupled with the lack of guidance tailored to the relative novel use of AI in law enforcement.

  During this process, UNICRI and INTERPOL have identified the need for developing operationally oriented support and guidance for law enforcement in the design, development and deployment of AI in a trustworthy, lawful and responsible manner and, in this regard, have undertaken the development of a "Toolkit for Responsible Artificial Intelligence Innovation in Law Enforcement". The Toolkit, the development of which is funded by the European Commission DG HOME, is intended to provide guidance and support for law enforcement agencies on the development, procurement and deployment of AI in their work in a human rights compliant and ethical manner.

  Through the Toolkit, law enforcement agencies globally will have access to the knowledge and resources needed to enable them to tap into the positive potential of AI. At the same time, many different stakeholders play an important role in promoting responsible AI in law enforcement. As a result, the resources developed as part of the Toolkit will also cater for and be approachable by other stakeholders, including industry, academia, civil society and the general public.
- Department/Division: Centre for Artificial Intelligence and Robotics
- Project Type/Output: Multi-stakeholder platform bringing together law enforcement, industry and academia from all over the world to explore the positive potential of AI in law enforcement in a trustworthy, lawful and responsible manner, as well as an actionable Toolkit consisting of resources that include principles, guidance

documents and actionable recommendations to support law enforcement to make more informed decisions and prevent possible risks related to the implementation of AI in their work.

- Project Status: Ongoing
- Project Start Year: 2018
- Project End Year: 2023
- Project Domain: Justice
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Updates:
  - The process of conceptualizing and drafting the Toolkit underway, with the Toolkit anticipated to be presented for peer review and community validation in late 2022.
  - The Core Group of Experts, which was established in November 2020, got together for three additional Virtual Discussion Rooms organized. The first focused on the principles of policing and examining the intersection of these principles with the emerging sets of principles governing the use of AI. The second focused on presenting the latest conceptualization of the Toolkit to collect feedback and expert insights on the utility and completeness of the various resources that envisioned to be part of the Toolkit and their desirable format. The third focused on presenting and collecting feedback on the initial drafts of the first set of resources developed for the Toolkit: the guidance documents.
  - Two stakeholder consultations also took place engaging human rights experts and representatives from law enforcement agencies. These are part of a series of consultations that aim to gather and address the views of the projects' most relevant stakeholders.
  - Complementing these actions, a parallel stream of work focused on public perceptions of the use of AI by law enforcement was established, inviting the general public to contribute to this process. This process has so far involved the organization of two consultations with representatives from disadvantaged and vulnerable communities as well as experts on the engagement between law enforcement and the public. A survey on public opinions on the use of AI by law enforcement is also being prepared and will be launched in September 2022.
- Related Sustainable Development Goals (SDGs): SDG 16 –Peace, Justice, and Strong Institutions
- Relevant Links and Multimedia: https://unicri.it/topics/Toolkit-Responsible-AI-for-Law-Enforcement-INTERPOL-UNICRI
- Partnership(s)/Collaborator(s):
  - UN Partners: UNPOL, OICT
  - Other International Organizations: INTERPOL, European Commission (European Union)
- Lesson Learned:

  Challenges:

  1. Ensuring human rights compliant AI and building public trust in AI for law enforcement.
  2. Lack of a global governance framework and the prevalence of policies and regulatory frameworks centred in the global north.

3. Differences in rules and regulations on AI and the law enforcement use of AI.
4. Evolving development of AI and digital transformation in law enforcement.
5. Heterogenous level of technical capabilities and the level of engagement with AI by law enforcement agencies around the world.

   Lessons learned:

   - It is essential to work with law enforcement directly to identify their needs and help them fill their gaps in a practical and operationally oriented manner.
   - The Toolkit should be a living document rather than a complete and definitive statement on the topic, to keep pace with ongoing developments in the area.
   - The Toolkit should build upon the already established legal and ethical discussions and guidelines surrounding the use of AI, rather than redefining them.
   - The Toolkit must promote trust in the law enforcement use of AI, by fostering a sense of openness and transparency and engaging all relevant stakeholders from the outset.

   Future work:

   - Further Virtual Discussion Rooms with the Core Group of Experts, stakeholder consultations with human rights experts and representatives of industry and judiciary and prosecutors will take place.
   - A survey on public opinions on the law enforcement use of AI will be launched publicly and its results analysed and taken into account in the Toolkit development process.
   - The first version of the Toolkit will be subject to a validation process in late 2022, including experts and law enforcement stakeholders.
   - An interactive version of the Toolkit will be developed in early 2023.
   - Law enforcement agencies from different countries will pilot the Toolkit in the first half of 2023. The results of the pilot will be incorporated into the second version of the Toolkit.
   - 4th Global Meeting on AI for Law Enforcement will take place in June 2023, disseminating the Toolkit for to the law enforcement community.
   - A training curriculum focused on responsible AI in law enforcement will be developed on the basis of the Toolkit. Pilot national training workshops for law enforcement will be also organized to support operationalizing the Toolkit.

- Contact Information: Irakli Beridze (irakli.beridze@un.org); Odhran McCarthy (odhran.mccarthy@un.org)

### Project 2: Working with Law Enforcement to Build Capacities for the use of Artificial Intelligence to Combat Child Sexual Abuse and Exploitation Online

- Project Description: In 2019, UNICRI, through its Centre for AI and Robotics, together with the Ministry of Interior of the United Arab Emirates launched the *AI for Safer Children* initiative. This project aims to explore the positive potential of AI to support law enforcement agencies to prevent, detect and prosecute online child sexual abuse and exploitation.

  Online child sexual exploitation and abuse has been growing exponentially over the last decades and has experienced a further increase throughout the COVID-19 pandemic. Law enforcement agencies face significant challenges in combating this crime, including a high turnover of investigators, largely due to the psychological burden of reviewing the abuse material, as well as the difficulties in identifying both perpetrators and victims and the challenges posed by the global nature of the Internet and new technologies such as encryption.

While AI tools already existing can contribute to solving these challenges, law enforcement agencies are not yet widely using them. Many are not aware of the potential of the AI tools or are sceptical towards the technology. Additionally, selecting and implementing AI tools is a complex process for which law enforcement agencies may lack the necessary knowledge and resources.

The project aims to tackle this issue through the development of a Global Hub consisting of a platform built to assist law enforcement in leveraging AI to combat online child sexual exploitation and abuse, combined with network-building, awareness-raising and advocacy on the issue.

- Department/Division: Centre for Artificial Intelligence and Robotics
- Project Type/Output: Online platform
- Project Status: Ongoing
- Project Start Year:2020
- Project End Year: 2024
- Project Domain: Justice
- Data Source: AI tools that can be leveraged by law enforcement agencies in preventing, detecting, and prosecuting online child sexual exploitation.
- Data publicly available: No
- Technology/Platform: Microsoft SharePoint
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Updates:

  Since the launch of the AI for Safer Children Initiative in late 2019, UNICRI has:

  - Conceptualized the pilot of the platform dedicated to support law enforcement in leveraging AI to combat online child sexual exploitation and abuse, including by building a database of existing AI-based approaches.
  - Established an Advisory Board composed of representatives of law enforcement agencies, technology providers, academia, international organizations and civil society organizations, to support the initiative and ensure its relevance to the needs of and requirements of combating online child sexual exploitation and abuse.
  - Held several meetings, including two semi-annual Advisory Board meetings, an Ethics Expert Meeting on December 2021, two Stakeholder Meetings for law enforcement agencies in June 2021 and June 2022 and a meeting for the Technology Providers on February 2022.
  - Carried out extensive research and analysis on the ethical considerations associated with the AI for Safer Children initiative, including those associated with the ethical development and deployment of AI in law enforcement efforts to combat online child sexual exploitation. This resulted in the development of the core principles of the initiative, the Terms of Engagement for Law Enforcement Users, the Terms of Engagement for Technology Providers, and the Data Protection Policy. A Responsible AI Questionnaire is also being developed to collect information from the technology providers on ethical and legal aspects related to the development of their tools.

- Developed and managed the AI for Safer Children Global Hub on SharePoint by collecting information to display on the Global Hub (including creating two learning videos for the law enforcement audience and collecting information about AI tools from technology providers), translating the Global Hub into the official UN languages and onboarding law enforcement agents worldwide to the Global Hub.
- Presented and attended at a variety of events and conferences including but not limited to the United Nations General Assembly, UNPOL Conference, the Investigator Conference

and the United Nations Chiefs of Police Summit to promote the initiative and further build the AI for Safer Children community.

- Related Sustainable Development Goals (SDGs): SDG 16 – Peace, Justice, And Strong Institutions
- Partnership(s)/Collaborator(s):
  - UN Partners: UNICEF, OICT, UNPOL
  - Government: Ministry of Interior of the UAE
  - Private Sector: Griffeye, SafeToNet, Kaseware, Semantics21, WebIQ, Cyacomb Examinor, Qumodo, ZiuZ Visual Intelligence, Paliscope, CameraForensics Ltd, FriendMTS, Trilateral Research, SUMURI, 1st1 Technologies, Netspark, GetData Forensics, Nuix, Dark River Systems, Magnetic Forensics, Breakpoint Forensics, Wiretap, Securium
  - Civil Society: Red Papaz, ECPAT, International Justice Mission, National Center for Missing & Exploited Children, Thorn, Childhood Foundation, Bracket Foundation, Aarambh India, Canadian Center for Child Protection, wePROTECT Alliance, Gucci Foundation, Project Vic, Child Rescue Coalition.
  - Academia: University of Massachusetts Amherst
  - Other International Organizations: INTERPOL, European Commission (European Union), Europol, Virtual Global Taskforce, Fund to End Violence Against Children
- Relevant Links and Multimedia:
  - https://unicri.it/topics/AI-for-Safer-Children
  - https://unicri.it/index.php/topic/AI-for-Safer-Children-Global-Hub
  - Twitter: @AISaferChildren
  - https://youtu.be/aYJJ2m2Y29g
  - https://www.youtube.com/watch?v=sJShhYiTjoM&t=20s
- Lessons Learned:
  - Challenges:
    - Ensuring ethical and human rights compliant AI and building public trust in the use of AI by law enforcement.
    - Lack of a global governance framework and the prevalence of policies and regulatory frameworks centred in the global north.
    - Differences in rules and regulations in different countries and regions not only on AI and the law enforcement use of AI, but also on online child sexual exploitation and abuse.
    - Heterogenous level of technical capabilities, accessibility, and engagement with AI by law enforcement agencies around the world.
  - Lessons learned:
    - The project should target law enforcement agencies in all Member States, especially low- and middle-income countries and law enforcement agencies in the global south.
    - The project should seek to build a community around the responsible use of AI by law enforcement, with a strong emphasis on a human rights-centred approach.
    - The project should take a bottom-up approach, working with law enforcement agencies directly to identify their needs and help them fill their gaps.

- The project should include appropriate measures and processes to ensure that it is developed and implemented in accordance with ethical principles to warrant that any possible issues are addressed early on.
- The project should seek to pursue specialized training for law enforcement to increase capacity building and engagement of AI to combat online child sexual abuse and exploitation around the world.
- The project should seek to increase accessibility of AI tools around the world.

o Future work:

- Maintain, optimize, and grow the Global Hub including desk-based research and analysis on AI tools and techniques for the purposes of inclusion in the Global Hub and coordination with technology developers; creation and curation of content for the Learning Centre; networking with law enforcement agencies for onboarding purposes; promotion and visibility activities of the Global Hub in general
- Provide training and build capacities to implement knowledge imparted through the Global Hub by promoting a training programme and delivering the training courses to law enforcement agencies.
- Leverage the Global Hub to foster further innovation, including organizing hackathons and sharing selected tools with the AI for Safer Children community.
- Development of tailored content for other non-law enforcement stakeholders and conducting research and analysis on the phenomenon of child exploitation and abuse online as well as on responsible AI

- Contact Information: Irakli Beridze (irakli.beridze@un.org), Odhran McCarthy (odhran.mccarthy@un.org)

### Project 3: Building Knowledge on Counter-Terrorism in the Age of Artificial Intelligence / Human Rights Aspects Of The Use Of Artificial Intelligence In Counter-Terrorism

- Project Description: In 2020, UNICRI, through its Centre for Artificial Intelligence and Robotics commenced a research initiative aimed at exploring the dual nature potential of artificial intelligence (AI) from the perspective of counter-terrorism.

  Together with the United Nations Counter-Terrorism Centre (UNCCT) of the United Nations Office of Counter-Terrorism (UNOCT), UNICRI explored the dual nature potential of AI, analyzing the concerning aspects of the advent of AI, such as the possibility of its use with malicious intent by terrorist groups and individuals, as well as how AI might be leveraged to support counter-terrorism efforts, in particular in terms of combatting terrorist use of the Internet and social media. This resulted in the release of two reports "Algorithms and Terrorism: The Malicious Use of Artificial Intelligence for Terrorist Purposes" and "Countering terrorism online with artificial intelligence – An Overview for Law Enforcement and Counter-Terrorism Agencies in South and South-East Asia".

  In partnership with UNOCT/UNCCT and the Office of the High Commissioner for Human Rights (OHCHR), UNICRI further examined how artificial intelligence technology can be used to counter terrorism in a manner that complies with human rights. The ongoing research will result in the release of report on the human rights aspects of the use of AI in counter-terrorism .

  UNICRI, UNOCT/UNCCT and OHCHR organized a high-level briefing entitled "Counter-Terrorism in the Age of Artificial Intelligence: Risks, Opportunities and Safeguarding Human Rights" on 29 June 2021 as part of the Second Counter-Terrorism Week at the United Nations. During this briefing the findings of their collective research were presented.

**Project updates:**

- UNICRI and UNOCT organized an expert group meeting to explore the specific application of AI-enabled social network analysis in counter-terrorism in March 2022 to develop knowledge and understanding of this application and develop a concept for further activities in this domain.
- Department/Division: Centre for Artificial Intelligence and Robotics
- Project Type/Output: Report
- Project Status: Ongoing
- Project Start Year: 2020
- Project End Year: 2023
- Project Domain: Justice
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 16 –Peace, Justice, and Strong Institutions
- Partnership(s)/Collaborator(s) :
    - UN Partners: UNOCT/UNCCT and OHCHR
    - Government: Kingdom of Saudi Arabia, Government of Japan
- Relevant Links and Multimedia:
    - https://www.un.org/counterterrorism/sites/www.un.org.counterterrorism/files/malicious-use-of-ai-uncct-unicri-report-hd.pdf
    - https://www.un.org/counterterrorism/sites/www.un.org.counterterrorism/files/countering-terrorism-online-with-ai-uncct-unicri-report-web.pdf
- Lesson Learned:
    - Challenges:
        - Ensuring human rights compliant AI and building public trust in the use of AI by law enforcement and counter-terrorism agencies, especially given the complex interaction between human rights and counter-terrorism.
        - Absence of consensus on the definitions of both terrorism and AI.
        - Lack of a global governance framework and the prevalence of policies and regulatory frameworks centred in the global north.
        - Insufficient public information related to the level of technological readiness and the current use of AI tools in the regions of South Asia and South-East Asia.
        - Lack of understanding of how malicious actors could use AI.
    - Lessons learned:
        1. While the use of AI for terrorist purposes is currently not a developed threat, it is important to not underestimate it.
        2. The capacity of all stakeholders to identify and respond to the threat of the malicious use and abuse of AI for terrorist purposes should be improved.
        3. Efforts need to be made to raise awareness of governments and industry partners about the role of AI in counter-terrorism.
        4. It is essential to ensure that law enforcement and counter-terrorism agencies appreciate the potential human rights impacts of AI, as well as the limitations and fallibility of AI.
    - Future work:

  - Supporting the design of human rights compliant models for the use of AI for counter-terrorism together with UNOCT/UNCCT and OHCHR.
  - Building good practices for the use of AI for social network analysis for counter-terrorism together with UNOCT/UNCCT.
  - Further research and monitoring of the willingness and future ability of terrorists to use or abuse AI.

- Contact Information: Irakli Beridze (irakli.beridze@un.org), Odhran McCarthy (odhran.mccarthy@un.org)

### Project 4: Responsible Limits on Facial Recognition Technology

- **Project Description:** The development of facial recognition technology (FRT) presents considerable opportunities for socially beneficial uses, mostly through enhanced authentication and identification processes, but it also creates unique challenges. To fully grasp these challenges and the trade-offs they may entail and to build appropriate governance processes, it is necessary to approach FRT deployment through specific use cases.

  To this end, the World Economic Forum, in partnership with UNICRI, INTERPOL and the Netherlands Police, has spearheaded a global and multistakeholder policy initiative to design a robust governance framework for the responsible use of FRT for law enforcement investigations

  This workstream was started in November 2020 focused on the law enforcement use case – identifying a person by comparing a probe image to one or multiple reference databases to advance a police investigation. While law enforcement has been using biometric data, such as fingerprints or DNA, to conduct investigations, facial recognition technology represents a new opportunity for law enforcement but also a new challenge.

  The ambition of this work is to support law- and policy-makers across the globe to design an actionable governance framework that addresses key policy considerations in terms of the prevention of untargeted surveillance, the necessity of a specific purpose, the performance assessment of authorized solutions, the procurement processes for law enforcement agencies, the training of professional forensic examiners, and the maintenance of the chain of command for emergency situations. To achieve this goal, this multistakeholder community has co-designed a set of principles for action that defines what constitutes the responsible use of facial recognition for law enforcement investigations and a self-assessment questionnaire that details the requirements that law enforcement agencies must respect to ensure compliance with the principles for action.

**Project updates:**

- Established core project community consisting of UNICRI, World Economic Forum, INTERPOL and the Netherlands Police to lead the initiative jointly.
- Co-developed in consultation with external stakeholders from law enforcement, industry, academia and civil society, 8 principles for action and a self-assessment questionnaire.
- Released the principles and questionnaire as a White Paper at a public webinar held in November 2021.
- Launched pilot process to test the principles, onboarding law enforcement agencies in France, Brazil, New Zealand, Sweden and the Netherlands to participate and organized three pilot workshops.
- Department/Division: Centre for Artificial Intelligence and Robotics
- Project Type/Output: Report
- Project Status: Ongoing
- Project Start Year: 2020
- Project End Year: 2023

- Project Domain: Justice
- Reported as part of 2021 Compendium on UN AI Activities? No
- Related Sustainable Development Goals (SDGs): SDG 16 –Peace, Justice, and Strong Institutions
- Partnership(s)/Collaborator(s): World Economic Forum; INTERPOL; the Netherlands police; Brazilian Federal Police; New Zealand Police Agency; Swedish Police Authority; Gendermerie Nationale, France; the Central Directorate of Judicial Police, France.
- Relevant Links and Multimedia:
  - https://www.weforum.org/whitepapers/a-policy-framework-for-responsible-limits-on-facial-recognition-use-case-law-enforcement-investigations/
- Lesson Learned:

  Challenges:

  1. The use of FRT by law enforcement is one of the most controversial uses of AI with negative records of abusive practices, discriminatory decisions, wrongful arrests, moratoriums and bans by several public and private entities.
  2. There are several initiatives to regulate AI worldwide but most of them are general frameworks that do not give technical and procedural specific recommendations on how to implement FRT in a responsible way.
  3. Because of the misuse of the technology, there is a lack of public trust on the use of FRT by law enforcement.
  4. Law enforcement agencies are not used to publicly share their use of technology which further contributes to general distrust.

  Lessons learned:

  - It is essential to work with law enforcement directly to identify their needs and help them fill their gaps in a practical and operationally oriented manner.
  - Among the pilot members, there were very different procedures on the use of FRT which shows a lack of guidance and standardization on the use of FRT by law enforcement.
  - None of the pilot agencies implements real-time FRT which is the most controversial use of FRT that has been banned by several countries.
  - Pilot members were cognizant that transparency is the field where they could develop the most to increase their trust by the public and improve their relation with the communities.

  Future work:

  - Release of revised version of the policy framework in late 2022 (TBC)
  - Development of a training program to implement the policy framework at a larger scale.

## 2. Related Sustainable Development Goals

SDG 16

## 3. Relevant Links

http://www.unicri.it/

Contact Information

Irakli Beridze (irakli.beridze@un.org), Odhran Mc Carthy (odhran.mccarthy@un.org)

# United Nations Institute for Disarmament Research

## 1. Description of Activities on AI

### Project 1: Security and Technology – AI and Autonomy Workstream

- Project Description: The UNIDIR Security and Technology Programme's (SecTec) AI and Autonomy workstream conducts original research and convenes international events to promote a fact-based, technologically sound dialogue between policymakers, the tech community, the private sector and other stakeholders working on AI technology and its implications for peace and security. This project directly supports the Convention on Certain Conventional Weapons Group of Government Experts on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems (GGE on LAWS) in its efforts to advance multilateral debate on concepts such as human control and responsibility, the human-machine interface, and the predictability and reliability of AI-enabled conventional weapon systems (among other considerations). This project also seeks to address considerations related to broader applications of AI in military systems– particularly in decision-making support tools, cyber operations, and command and control– which themselves raise novel concerns about understandability, reliability and predictability; the potential for unintended interactions or outcomes; and susceptibility of these systems to manipulation. The rate of technological progress in this space requires, as the Secretary-General has described it, a "broader consideration of the impacts of introducing autonomy and artificial intelligence into other military systems, and how effective governance and risk mitigation can be achieved". The implications of AI for digital, physical and even political security require a fundamental reassessment and, in some instances, re-equipping of the multilateral arms control toolbox.

  UNIDIR's AI and autonomy workstream seeks to a) support understanding of the implications of military uses of AI in and beyond weapon systems and b) explore the options available for AI governance and arms control. In addition to continuing its work on autonomy in weapon and military systems, in 2022, UNIDIR adopted a new research agenda on AI and Autonomy that focuses on building an understanding of different types of AI, their different purposes and military uses, the broader international security implications of advancements in AI, convergence between AI and other new and emerging technologies and issues of AI governance.
- Project Type/Output: Framework/Strategy/Policy, Research (Fully fledged Development)
- Project Status: Ongoing
- Project Domain: Peace and Security, Lethal Autonomous Weapons Systems, Military applications of AI
- Data Source: Research, Events
- Reported as part of 2020 Compendium on UN AI Activities? Yes
- Project Updates: In the 2020 and 2021 submissions, UNIDIR outlined that its future work will encompass research studies and events at the regional and international level on the science, significance, and solutions related to artificial intelligence and the weaponization of increasingly autonomous technologies. This research agenda and program of convenings form a fundamental part of UNIDIR's efforts in support of the Group of

Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapon Systems, as well as other stakeholder communities. As part of this research agenda, UNIDIR completed the following activity in 2022: As part of this project, between March and May 2022, SecTec supported the ongoing work of the GGE on LAWS. The Programme conducted a comprehensive and comparative analysis of the Proposals submitted to the GGE on LAWS and prepared a resource paper for delegations. In May 2022, the Programme organized a workshop to support further substantive deliberations, to assess areas of common ground and to address open-ended questions. Furthermore, SecTec conducted a research study on human-machine interfaces in lethal autonomous weapons. The Programme's ongoing research projects focus on (a) confidence-building measures for military AI, (b) Responsible AI including the mapping and analysis of AI Principles, and (c) uses of AI beyond weapon systems. As part of the latter, SecTec held a workshop in the fall aimed at identifying and mapping relevant AI applications in military tasks, and discussing the impact of such applications of AI. In addition, the Programme is also developing an AI Policy Portal (AIPP) which aims at gathering available information at the national, regional and international level on policies, processes and structures that are relevant to development and use of AI for military or security purposes.

- Related Sustainable Development Goals (SDGs): SDG 16 – Peace, Justice, and Strong Institutions
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Partnership(s)/Collaborator(s): Technology and academic research community, arms control practitioners and other experts in the area of technology governance and regulation.
- Links and Multimedia
    - https://unidir.org/programmes/security-and-technology
- Lesson Learned:
    - Challenges: Complexity and constant evolution of the research Project Domain, uncertainties regarding possible future applications of military AI, low technological literacy of many policy makers and a reluctance to adopt multistakeholder approaches (particularly in cooperation with the private sector and technical community) to international security challenges, exploring the governance of applications of AI that do not fit within the mandate of existing multilateral arms control processes.
    - Opportunities: demand is high for UNIDIR primers, briefings and multistakeholder convenings such as the Innovations Dialogue ( The theme of the 2022 Innovations Dialogue is AI Disruption, Peace and Security)Through these outputs we seek to create spaces to build knowledge, raise awareness among policy makers and convene multi-stakeholder discussions on new technology issues, as mandated by the Secretary-General in his Agenda for Disarmament.
    - Lessons learned: – Need and demand for focused research on specific topics, clarification of the scope and exact meaning of broadly used terms or concepts, as well as description of process pertaining to the use of AI in the framework of military operations or the weaponization of AI. – The multi-stakeholder approach continues to be valuable for finding common ground and building constructive approaches among stakeholders holding divergent or competing points of view. – Neutral expert analysis is very much welcomed by stakeholders and policy makers.
- Contact Information: Dr Giacomo Persi Paoli (giacomo.persipaoli@un.org)"

## 2. Related Sustainable Development Goals

SDG 16

## 3. Relevant Links

https://unidir.org/

Contact Information

Ioana Puscas (ioana.puscas@un.org), Alisha Anand (alisha.anand@un.org) and Giacomo Persi Paoli (giacomo.persipaoli@un.org)

# United Nations Industrial Development Organization

## 1. Description of Activities on AI

### Project 1: Empowering SMEs in Developing Countries through Artificial Intelligence

- Project Description: The initiative originates in the framework of the Inter-Agency Working Ground on Artificial Intelligence (hereinafter referred to as "IAWG-AI"), established during the 40th High Level Committee on Programmes (HLCP) session, and co-led by United Nations Educational, Scientific and Cultural Organization (UNESCO) and the International Telecommunications Union (ITU). The IAWG-AI has the mission to deliver concrete outcomes on Artificial Intelligence (AI) aimed at enhancing UN system-wide policy coherence and programmatic coordination.

  During the inception stage of this project, a gap analysis carried out by the HLCP found a lack of collaborative system-wide efforts on supporting small- and medium-sized enterprises (SMEs) in the field of AI. A further gap analysis found that the availability of knowledge products that support the adoption of AI by SMEs in developing countries is especially lacking. The recommendation was made to further efforts including identifying requirements that would be specific to AI businesses, compiling technical recommendations on conducting legal and policy assessments, and developing clear frameworks and guidance for Member States. This proposed initiative is a significant step in this direction, and it is key for us to note this gap in the market to focus work upon.

  The purpose of this initiative is to improve the competitiveness and sustainability of SMEs located in developing countries by promoting their innovation and digitalization. By developing a set of Artificial Intelligence technical recommendations and a toolkit specifically tailored to SMEs in developing countries, the initiative aims at raising awareness on the potential of AI and fostering its adoption and application among the target group—SMEs in developing countries, with a particular focus on formal businesses as opposed to informal businesses.
- Department/Division: Directorate of Digitalization, Technology and Agri-business/ Division of Digitalization, Technology and Innovation
- Project Type/Output: Report, Technical Guidelines, and Practical Toolkit
- Project Status: Development
- Project Start Year:2021
- End Year: 2022
- Project Domain: Trade, Innovation, Digital Transformation, Industrial Technology, Economic Competitiveness
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 8 –Decent Work and Economic Growth, SDG 9 – Industry; Innovation and Infrastructure;SDG 17 – Partnership for the Goals
- Partnership(s)/Collaborator(s) :

- UN Partners: UNIDO, UNESCO, ITU, ITC, Inter-Agency Working Group-Artificial Intelligence,
- Government: Indonesia, Jordan

- Lesson Learned: Receiving support from another partners has until represented a significant challenge. Additional partners from the public and private sector will be invited to take part on this initiative.
- Media and Links:
  - https://hub.unido.org/sites/default/files/publications/Empowering%20SMEs%20through%204IR%20Technologies_0.pdf
- Contact Information: Alejandro Rivera Rojas (A.RIVERA-ROJAS@unido.org)

### Project 2: Promoting sustainable bush-processing value chains in Namibia

- Project Description: In Namibia, the vast majority of the population is engaged in agricultural production as subsistence farmers, yet due to low productivity levels, only half of the country's food demand can be met through these activities, while the other half is met through imports. Since Namibia is one of the driest countries in sub-Saharan Africa, concerns about issues related to water management and shortages, waste generation and pollution are growing. In addition, the agricultural activities are threatened by bush encroachment, a form of land degradation that can be found worldwide, but much more frequently in arid and semiarid rangelands. While bush encroachment constitutes an immense challenge, it also provides opportunities: by utilizing biomass, agricultural productivity becomes storable, thereby strengthening the drought resilience of farmers.

  The project's aim is to strengthen important sources of food and income through processing and converting invasive bush species into animal feed and charcoal utilizing it in agricultural, livestock and water management practices. Direct outcomes of the project encompass provision of 4IR and digital tools in supporting targeted, responsible and sustainable bush thinning and subsequent processing leading to value addition and job generation. In line with the Strategic Action Plan launched in 2020, a convergence of feasibility and market intelligence study, NGGP, a special purpose production plant, is being operationalized for manufacturing of high-value livestock feed, coal, chips, Arabic gum and other selected products utilizing Acacia species. Through these measures, higher levels of agro-industrial productivity will be achieved, resulting in a better local and regional supply of animal feed, energy, and other bush-based products, that will further facilitate improved competitiveness, import substitution and exports of food, relying, inter alia, on better quality meat and dairy products.

  Thus far the following objectives have been met:

  - Sustainably address the bush encroachment by promoting new state of the art technological and sustainable business solutions for the development and supply of acacia based products;
  - Provide decision makers with timely and effective operational information via easily understandable maps and innovative tools;
  - Enable mapping of data and development of effective information dashboards;
  - Create targeted GIS analyses to estimate number and volume of Acacia bush trees over a large area.
  - The following concrete outputs have been consolidated:
  - Produce well designed maps, dashboards and Web GIS tools;
  - Collect, manage and update geospatial data in the GIS infrastructure;

  - Develop automated procedures for analysis and mapping to strengthen project preparedness and response;
  - Develop a novel approach of automating the detection of Acacia species from very high-resolution satellite imagery.

- Department/Division: Directorate of Digitalization, Technology and Agri-business/ Department of Digitalization, Technology and Innovation, Innovation and Digitalization Division
- Project Type/Output: Report, Dataset, Software tool, Conference
- Project Status: Ongoing
- Project Start Year:2017
- Project End Year: 2021
- Project Domain: Agriculture, Environment, Energy
- Data Source: Geographic Information System (GIS) data–reference maps, satellite imagery, geospatial technology data, visual example data of Acacia bush trees
- Link to storymap: https://storymaps.arcgis.com/stories/d316418096244bb0b00ece24082d7632
- The libraries used are open source, the code developed is proprietary.
- Data publicly available: Yes
- Technology/Platform: The project is developed using the R programming language using RStudio.
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Updates:

  - Outputs in 2021:
  - Provide support to the NGGP for installation and adaption of the procured equipment to the local conditions and requirements following in the national regulatory frameworks;
  - Test technologies and manufactured products in laboratory conditions and in the field to identify parameters required for establishing cost-effective and sustainable business models;
  - Identify, select and train national experts (technicians, manufacturers, farmers, skilled and semi-skilled workers, entrepreneurs and their associations, staff of local agencies and other interested stakeholders) on the collection and manufacturing of bush/ Acacia-based products.
  - Contribute to the development of a national/regional technology database on emerging technologies for production of bush/Acacia-based end products, including required technical know-how, technology providers, researchers and companies, with a pronounced potential of advancing sustainable industrial growth with the support of local agencies and local entrepreneurs.
  - Impact in 2021:
  - Innovative digital technologies and know-how for responsible harvesting have been transferred: specifically, the Machine Learning Model for acacia species mapping that is based on remote sensing texture image analysis, satellite- and drone-supported imagery recognition for enhanced performance of the agricultural sector and related value chains.
  - Machine Learning algorithm was fine-tuned to provide yield predictions, which will enable the NGGP to produce high quality bio charcoal and animal feed. A

special-purpose animal feed recipe developed by the project experts will help farmers optimise livestock feeding. The main expected benefits include the following: 1) sustainable use of land in harmony with natural processes; 2) improved farming practices and productivity: reduced land degradation and diminishing invasive bushes pave the way towards enhanced agricultural activities; 3) issues related to water management and shortages, waste generation and pollution are addressed; 4) technological know-how, hands-on skills and ready-to-use business models facilitated by the project provide better opportunities for sustainable job creation among women and men, especially in rural areas.

- Related Sustainable Development Goals (SDGs): SDG 1 – No Poverty; SDG 7 – Affordable and Clean Energy ; SDG 8 – Decent Work and Economic Growth; SDG 9 – Industry, Innovation, and Infrastructure; SDG 11 – Sustainable Cities and Communities; SDG 12 – Responsible Consumption and Production
- Partnership(s)/Collaborator(s) :
  - UN Partners: UNIDO, EURO Trust Funds
  - Government: Ministry of Foreign Affairs of Finland, Ministry of Industrialization, Trade and SME Development of Namibia, Ministry of Agriculture, Water and Forestry of Namibia,
  - Private Sector Funding
  - Civil Society: Trust Fund for Increased Food Security through Agribusiness, Trust Fund for Trade-related Capacity Building, Walvis Bay Corridor Group, Namibian Meat Board, Agricultural Bank of Namibia
  - Academia: University of Namibia
- Relevant Links and Multimedia:
  - UNIDO Open Data Platform: https://open.unido.org/projects/NA/projects/170017
  - ProDoc: https://open.unido.org/api/documents/7524581/download/ProDoc%20Namibia%20170017%20signed.pdf
  - Brochure: https://www.unido.org/sites/default/files/files/2019-12/NAMIBIA%20BAOBAB%202020%20PDF%20WEB.pdf
  - Strategic Action Plan for sustainable bush value chains: https://www.unido.org/sites/default/files/files/2020-02/Namibia_v_2.20-spreads%20%281%29.pdf
  - Twitter posts:

    https://twitter.com/UNIDOInnovation/status/1260240671551750145

    https://twitter.com/UNIDOInnovation/status/1261323437630459904

    https://twitter.com/UNIDOInnovation/status/1271459140548923395

    https://twitter.com/UNIDOInnovation/status/1272906796135518208

    https://twitter.com/UNIDOInnovation/status/1280513545235546117

    https://twitter.com/UNIDOInnovation/status/1309523426776879107

    https://twitter.com/UNIDOInnovation/status/1326475288805564417

    https://twitter.com/UNIDOInnovation/status/1423669128464932865

    Practical Application: Web, Dashboard, AR-based manual on Mobile Devices https://unido.maps.arcgis.com/apps/webappviewer/index.html?id=7e3265ab3bbc43b1a5b2a6b2c23dfc3a

- UNIDO Success Stories on Promoting Green and Smart Manufacturing, video recording: https://xfiles.unido.org/index.php/s/cwNWW6792Rmo8M7

- Lesson Learned: The project resulted in a novel machine learning algorithm, a resource that could be used in the future by further AI projects in Namibia and in regions facing similar bush encroachment and land degradation issues. The deployment of the technology has proven to be successful and the reliability of the Acacia-detection algorithms is high; the algorithms themselves could be training for other vegetation species and can be applied in other projects addressing issues related to sustainable biomass processing and detection of eligible species, improving agricultural productivity and strengthening drought resilience. This technological solution can produce a multiplier effect in terms of providing a market-oriented sustainable business model to benefit from biomass for production of competitive higher value added products, identification of market niches at local and external markets, thereby facilitating job creation.

  This project was especially valuable as an exploration of the applications of Artificial Intelligence and Machine Learning and the successful collaboration among several international organizations.

  As an added benefit and drawing upon the successful use of GIS in this project, UNIDO has committed to promoting the creation of a Global GIS Community to raise awareness on this technology, and to expanding GIS capacity across the organization.
- Contact Information: Farrukh Alimdjanov (F.ALIMDJANOV@unido.org)

### Project 3: Strengthening Implementation Design of Artificial Intelligence (AI) Eco-System in Jordan

- Project Background: Global experience shows that entrepreneurship stimulates job creation in the economy. The degree of entrepreneur success depends on the maturity of the supporting ecosystem. Traditional pathways for job creation and growth, however, are at risk of not producing enough jobs in the future. The Government of Jordan has been encouraging entrepreneurship to shift these forecasts and accelerate the rates of job creation.

  The entrepreneurship ecosystem in Jordan has been emerging over the last decade, but there are key challenges hindering its growth and connectedness. Jordan's ranking in the Global Entrepreneurship Index, which measures both the quality of entrepreneurship and the extent and depth of the supporting entrepreneurial ecosystem in 137 countries, improved by 23 ranks between 2014 and 2018 (going from 72 to 49). According to the Global Entrepreneurship Index 2018, the score of Jordan is equal to the Arab region's average score of 37%. Jordan outperforms the region in product innovation, technology absorption, competition, startup skills, and cultural support indicators. On the other hand, Jordan lags in high growth, risk capital, risk acceptance, networking, and human capital indicators.

  In 2019, the World Economic Forum (WEF) included 27 Jordanian startups among the top 100 in the Arab World. Jordan's technology entrepreneurs have shaped the region's tech scene in the last decade (Maktoob, Souq.com, Arabia Weather, Mawdoo3, and many others). There are thousands of Jordanian technology professionals, who assume senior positions in key technology companies in the Arabian Gulf region and look for good opportunities to work back in Jordan.

The 2019 World Bank survey of 230 Jordanian entrepreneurs found that Jordanian entrepreneurs are well- educated and have solid experience in business. According to the survey, 94% of the Jordanian startups key founders hold BA degree or above, 62% have 10 years of experience or above, and 20% have 6-9 years of experience. The majority of Jordanian entrepreneurs (71%) have previous experience working at middle- or senior-level jobs, and most of them (91%) worked as employees in a private enterprise, including their own, before establishing a business.

Jordanian entrepreneurs also tend to work in groups where co-founders bring in a mixture of diverse but complementary skills to support business operations. These characteristics show high quality composition that align with the characteristics of WEF's 2017 top 100 startups from the Arab World. The World Bank surveyed the top 100 startups back then, studied entrepreneurship trends and policies, and published a chapter on entrepreneurship at the Arab World Competitiveness Report 2018 to inform government policies in the region.

As a step to support entrepreneurs' aspirations, the Government of Jordan and the World Bank facilitated the participation of 14 leading entrepreneurs from Jordan at the 2019 London Initiative. The entrepreneurs demonstrated the scale of ambition of Jordan's economic transformation, highlighted the growth potential in digital entrepreneurship, and pitched investment opportunities to global funds.

Expansion into the wider regional/ global markets is key for the Jordanian entrepreneurs, considering the relatively small size of the local market.

On challenges, Jordanian entrepreneurs perceive taxes as the key barrier facing their business (73%), followed by laws governing investments in startups (62%), excessive government formalities (58%), obstacles related to customs law and regulations (55%), and social security (52%). Focus group discussions provided insights on these challenges and suggested that tech-enabled entrepreneurs are unclear on the economic classification of activities that are tax exempted, burdened by the relatively high tax levy on imported/ input services (26%), and troubled by the requirement to file tax on a monthly basis. Startups also expressed concerns about the complicated company restructuring process (increasing/decreasing capital, changing shareholders, etc.), difficulty in obtaining work permits for skilled foreign labor, and inconsistent estimation of custom fees on imports. Clearly, there are specific legal and procedural reforms that the Government could implement to support businesses in Jordan. Entrepreneurs expect the Government to enable a friendly business environment, help open local and regional markets, and develop the local entrepreneurial ecosystem, according to World Bank's survey.

In May 2019, the Government of Jordan introduced a new cabinet Ministry for Digital Economy and Entrepreneurship (MoDEE) to expand the mandate of the former Ministry of Information and Communication Technology and support digital entrepreneurship, electronic payments, and digital skills development. This comes as an organic step to support the growing role of the Government in supporting these digital economy pillars.

The Government has taken key steps in supporting the digital economy by endorsing a PPP model for expanding the national broadband network, supporting digital skills development for hundreds of youth, launching an ambitious plan for government e-payments, and supporting access to growth finance and global markets for entrepreneurs. These efforts will contribute to World Bank's Moonshot initiative for MENA, which calls for doubling broadband access by 2021 and expanding access to digital payments.

To enable a business-friendly environment in Jordan, entrepreneurship ecosystem representatives (including Intaj, Oasis 500, Endeavor, JEIA, Startup Council, and others) and MoDEE have started drafting Artificial Intelligence Strategy and an implementation roadmap, as well as the Jordan Policy for Artificial Intelligence 2020, which aims to:

- Promote the use of AI in all key economic sectors.
- Build an enabling environment for AI that encompasses the legislative, regulatory and technological environment.
- Develop a digital infrastructure to keep pace with AI needs and developments.

- Build AI-specialized Jordanian capacities, expertise and skills, and employ knowledge in developing all sectors.
- Strengthen the role of the public sector in the use of AI and its applications and build the necessary partnerships with the private sector with the aim of enhancing productive pathways toward sustainable development.
- Strengthen AI business environment and increase investment and support for AI-related initiatives and Jordanian startups in the IT sector, providing service-based solutions.
- Build a well-established system for scientific research, development, application and experimentation related to AI, and create the right environment for it.
- Raise public awareness and increase confidence in AI in the public sector and all segments of society.
- Project Description: To support building the Artificial Intelligence (AI) Ecosystem in Jordan aiming at creating job opportunities and improving the efficiency and quality of government services as well as enhancing the comprehensive social and economic development of different sectors, accelerating economic development, and creating suitable opportunities for innovation and entrepreneurship thus making Jordan a regional and enabling center for information technology.
- Expected Outcome: Artificial intelligence ecosystem in Jordan established and the 2020 Jordan Artificial Intelligence Policy goals achieved.
- Department/Division: Directorate of Digitalization, Technology and Agri-business/ Department of Digitalization, Technology and Innovation, Innovation and Digitalization Division
- Project Type/Output: AI Strategy, Report, Technical Guidelines, and Practical Toolkit
- Project Status: Development
- Project Start Year: 2021
- End Year: 2024
- Project Domain: Trade, Innovation, Digital Transformation, Industrial Technology, Economic Competitiveness
- Reported as part of 2021 Compendium on UN AI Activities? No
- Related Sustainable Development Goals (SDGs): SDG 8 –Decent Work and Economic Growth, SDG 9 – Industry; Innovation and Infrastructure;SDG 17 – Partnership for the Goals
- Partnership(s)/Collaborator(s):
    - UN Partners: UNIDO, European Union
    - Government: Jordan
- Lesson Learned: Navigating the governmental political landscape takes time and effort and thus has to be calculated in the overall timeframe of the project.
- Media and Links:
    - https://www.dataguidance.com/news/jordan-ministry-announces-draft-ai-strategy -and
- Contact Information: Farrukh Alimdjanov (F.ALIMDJANOV@unido.org)

### Project 4: Industrial modernization and upgrading of carpet-weaving, embroidery and traditional textile sectors in Tajikistan

- Project Background: UNIDO has developed and successfully implemented (2015-2017) a technical cooperation project entitled "Industrial modernization and competitiveness improvement of carpet-weaving and embroidery/textile sectors in Tajikistan". A two-year pilot project (or Phase I) aimed to increase the productivity and competitiveness of

Tajik enterprises in the carpet weaving and embroidering sectors by identifying regional and international export markets, improving the technological cycle and industrial modernization, introducing innovative marketing tools, and strengthening national expertise to provide required technical support and services to local enterprises on a sustainable basis. Within the framework of the pilot project, fully fledged enterprise diagnosis of carpet weaving and embroidery manufacturers was carried out, activities were conducted to train experts throughout the production and market access cycle, including product design, personnel management, financial management of enterprises, marketing of finished products. As a result of the technical support of the project, the products of Tajik enterprises under a joint brand "LA'AL Textiles", including carpet weaving, home textile, and Adras products, were presented at more than 16 national and international exhibitions, while commercial contracts were signed with leading hotels and retail chains in Tajikistan for the supply of Tajik products.

- Phase II of this project (2019-2022) is aimed to contribute to the implementation of the National Development Strategy of the Republic of Tajikistan for the Period to 2030 and "Programme on development of carpet weaving in the Republic of Tajikistan for the period 2014- 2020", and to take advantage of opportunities afforded by prospects of regional integration through strengthening productivity, export and employment generation capacities of the national carpet weaving, embroidery and traditional textile sectors. In particular, the project will facilitate improved productivity and competitiveness of Tajik enterprises operating in the carpet weaving, embroidery and traditional textile sectors through the identification of regional and international market opportunities, enterprise upgrading and technological modernization, introduction of innovative marketing tools, as well as capacity building of national experts and business support institutions for the long term sustainability of the project.
- The Phase II of this project is expected to deliver the following Outputs:
    - Enterprise diagnosis and industrial modernization for the selected pilot carpet weaving and embroidery and traditional textile enterprises in Tajikistan, and strategic market positioning for selected niches in the carpet/embroidery industries/value chains in the context of regional and international export markets.
    - Human and technical capacities of national counterpart institutions and of national expertise (experts, trainers, engineers and technicians) strengthened on applied market positioning, industrial upgrading and export promotion approaches and methodologies, while inter-institutional networking and business partnerships are built for promotion of the national carpet weaving, embroidery and traditional textile products.
    - Artificial Intelligence Component: The machine-learning artificial intelligence module analyses all the sales in a smart way, it learns from them, and then it is able to predict the most relevant products to the customers, thus increasing sales. With each purchase going forward, it keeps learning and gets better and better. The more data it has to learn from, the better it gets at suggesting products. The predictions are saved in a database and are retrained every month in order to keep the suggestions relevant and up to date.
- Department/Division: Directorate of Digitalization, Technology and Agri-business/ Department of Digitalization, Technology and Innovation, Innovation and Digitalization Division
- Project Status: Completed
- Project Start Year: 2021
- Project End Year: 2022
- Project Type/Output: E-commerce Platform including AI analysis

- Project Domain: Trade, Innovation, Digital Transformation, Industrial Technology, Economic Competitiveness
- Reported as part of 2021 Compendium on UN AI Activities? No
- Related Sustainable Development Goals (SDGs): SDG 8 –Decent Work and Economic Growth, SDG 9 – Industry; Innovation and Infrastructure;SDG 17 – Partnership for the Goals
- Partnership(s)/Collaborator(s):
    - UNIDO
    - Government: Tajikistan
- Lesson Learned: using Machine Learning and Artificial Intelligent modules can boost sales up to 40% with very little efforts using intelligent plugins.
- Media and Links:
    - https://laaltextiles.com/
    - https://wordpress.org/plugins/the-intelligent/
- Contact Information: Farrukh Alimdjanov (F.ALIMDJANOV@unido.org)
- Contact Information
    - Rafik FEKI (R.Feki@unido.org)

### Project 5: Industry 4.0 to foster youth employment in Tunisia and Côte d'Ivoire

- Project background: This project document outlines UNIDO's proposed approach to address a major socio-economic problem in Tunisia, as well as in the complementary country Côte d'Ivoire, namely the high unemployment rates among youth and women. In the context of the industrial sector, the focal problem lies in the lack of dedicated policy and mechanisms as well as updated capabilities and infrastructure to benefit from the 4IR in promoting growth and fostering youth employment. BMZ's has a Special Initiative on training and Job Creation with emphasis on technology and innovation development and value chains promotion, under which the current project document is designed to boost integration into 4IR ecosystems combined with increased and enhanced employment opportunities and conditions in selected enterprises in Tunisia and Côte d'Ivoire. The suggested industrial sector for intervention are: Automotive, Aerospace and ICT, Solar energy (Tunisia); ICT and agro-industry (Côte d'Ivoire)._

  The intervention will foster higher demand for skilled workers by addressing constraints on the business side that prevents firm growth and cluster development and will support youth and others to engage in these opportunities by increasing access to technology, skills, and information about jobs and business prospects. Consequently, the project will focus on agents working in the targeted clusters, especially youth and women, support for labour market integration, entrepreneurship, incubators and training structures; and strengthening of financing institutions (banks, micro-credit institutes, etc.). In addition, alignment will be sought with the broader framework of relevant national policies.

  The project is addressing the main challenged identified in Tunisia, as well as in the complementary country Côte d'Ivoire, which is the high unemployment rates especially among youth and women. Regarding the industrial sector, the focal problem to be addressed is the identification and elaboration of missing points or gaps at dedicated policy and strategies, capability and infrastructure to adopt and benefit from the 4IR to promote growth and foster youth employment.
- Specifically, the involved countries share the following challenges on their efforts towards transition to Industry 4.0:
- The lack of demonstrative institutions which showcase the potential of Industry 4.0 technologies.

- The lack of capacity to quantitatively measure the country's progress towards Industry 4.0 adoption.
- The lack of relevant courses in education curricula to promote digital skills development.
- The absence of industrial accelerators to support the industrial development capacities of start-ups.
- High unemployment rate among large youth populations.
- A considerable SMEs and labour base but lack technology, innovation, skills and access to finance thus limiting formal sector growth.
- Inexistent or inadequate regulations, laws, rules and policies in favour of employment (including youth and women) and SME development.
- Project objective: The main goal of UNIDO interventions is to support Tunisia and Côte d'Ivoire in increasing youth employment, salaries and labour conditions through shaping and consolidating a digital economy ecosystem. The envisaged wide impact of this objective will contribute to a structural transformation of the economy in Tunisia and set the ground for this transformation in Côte d'Ivoire in the targeted sectors, leading to sustainable job creation.
- To accomplish this objective the project will carry out a set of activities that contribute to the following conditions:
    - An active governance system, including sound labor regulations.
    - A supportive business environment.
    - Efficient mechanisms to build 4IR capacity among labor and businesses.
    - Enhanced awareness of the opportunities of 4IR.
- The project adopts an integrated approach that seeks to support the four conditions for employment generation and job security by simultaneously strengthening policy and regulations, and public-private partnerships that engage business. The project will also help establish 4IR demonstrations and build institutional capacities for training labour in 4IR and it will develop a support network among institutions in different countries promoting 4IR investments, partnerships, and financing. The project has the following six components, which will be fully implemented in Tunisia as the main and primary beneficiary, whereas some components will be implemented (with a limited scope) for Cote d'Ivoire (as the complementary country):

    1. Enhanced and conducive business environment for employment generation and adoption of 4IR technologies and methods within priorities VC and sectors (CIV will undergo the 4IR reediness assessment; specific strategies will be developed for the targeted sectors).
    2. Establishing a SMART factory within or adjacent to training facilities, development of curricula, facilities, and methodologies for 4IR integration and adoption (CIV will benefit from trainings and capacity building/services offered by the smart factory in Tunisia (i.e. virtual facilities)).
    3. Development of dedicated training capacity on 4IR knowledge in vocational centers, universities and business school (CIV to benefit from the trainings methods and material adapted from Tunisia, as well as ones developed for CIV)
    4. Establishing and strengthening of 4IR institutions and centers in selected country(s) for shared training, knowledge, experience and activities (CIV will benefit from established online platform for training, assistance, knowledge and experience sharing).
    5. Pilot on adopting and operating 4IR technologies in a selected number of enterprises (CIV will have a limited number of enterprises that will benefit from diagnosis, instalment of new technologies, trainings and skills development for staff).

6. Investment promotion network digital transformation facilitation for attracting investors, partners and finances for acquiring 4IR technologies.

- Artificial Intelligence Component: The component on Smart Factory will allow the use, training and deployment of AI for increasing competitiveness of the enterprise sector.
- Department/Division: Directorate of Digitalization, Technology and Agri-business/ Department of Digitalization, Technology and Innovation, Innovation and Digitalization Division
- Project Status: under implementation
- Project Start Year: 2022
- Project End Year: 2024
- Project Domain:I4.0, Youth Employment, Digital Transformation, Industrial Technology, Economic Competitiveness
- Related Sustainable Development Goals (SDGs): SDG 8 – Decent Work and Economic Growth, SDG 9 – Industry; Innovation and Infrastructure;
- Partnership(s)/Collaborator(s):
  - UNIDO
  - Government: Tunisia, Cote D'Ivoire

### Project 6: Digital transformation and 4IR: Regional studies and Development Dialogues

- Project Description: The digital divide and its implications for manufacturing remain an urgent concern for UNIDO Member States. The UNIDO Industrial Development Report 2020 illustrated this gap, stating that just ten economies (mostly in the Global North) account for over 90 per cent of the advanced innovation patents and some 70 per cent of the exports associated with advanced digital production (ADP) technologies. Meanwhile, 88 developing economies located in the Global South play little or no role in the Fourth Industrial Revolution, either as consumers or producers of ADP technologies. This underlying structural issue has been exacerbated by the outbreak of the COVID-19 pandemic, which since early 2020 has significantly disrupted global value chains and cross-border manufacturing and trade. In an effort to maintain continuity of production and business operations during the lockdown period, many businesses turned to digital platforms, which are enabling recovery from the associated industrial downturns. The UNIDO Industrial Development Report 2022 finds that firms, which have digitalized some of their operations, have been recovering significantly quicker than those who have not.

  Manufacturing has been vital to the common multilateral effort against the COVID-19 pandemic internationally, not least through the repurposing of industrial facilities towards essential goods in the healthcare sector, such as personal protective equipment, testing kits and the development of contact tracing and identification of infected individuals. As we are entering the post-pandemic period, some global trends have been identified, with many multinational firms choosing to avoid global risk through prioritizing local production, customization and intra-regional trade over global value chain production. This shift may have implications for developing countries, which are disproportionately dependent on foreign direct investment in labor-intensive sectors and which currently lack the advanced technological capacities to easily transition to the Fourth Industrial Revolution (4IR).

  With the Abu Dhabi Declaration, adopted at the 18th session the General Conference (GC.18) in November 2019, UNIDO's Member States drew attention to the emergence of frontier technologies of the 4IR. UNIDO's most recent Medium-Term Programme Framework (MTPF) 2022-2025 responds to this call and identifies digital transformation and innovation as one of the three focus areas for the Organization to promote Inclusive and sustainable industrial development (ISID).

To respond to the strategic priorities outlined in the Abu Dhabi Declaration, under the guidance of its Member States and the leadership of the Technical Cooperation and Sustainable Industrial Development Directorate, UNIDO is preparing several regional studies to map out the unique 4IR challenges and opportunities in each region where the organization operates. Those studies are built on the UNIDO Middle-Term Programmatic Framework 2022-2025, and the UNIDO activities related to Digital Transformation and Innovation.

The studies will facilitate and promote the dialogue on 4IR among Member States. They will include the discussion of digital transformation and the Fourth Industrial Revolution in a particular region, outlining geographical and economic perspectives, and presenting action oriented sections on skills and capacity building; digital transformation at firm level; innovation ecosystems; partnerships, investment and infrastructure; governance, technologies and innovation policies. The studies will highlight activities and opportunities in the pillars of actions, namely in smart production for economic development, innovation and 4IR for advanced climate action, and 4IR technologies for improved livelihoods, along with an action plan of UNIDO in the region.

- *Department/Division*: Technical Cooperation and Sustainable Industrial Development Directorate / Digital Transformation and AI Strategies Division
- *Project Type/Output:* Working Paper; Report; Data set
- *Project Status:* Ongoing
- *Project Start* Year: 2021
- *End Year:* 2022
- *Project Domain:* Innovation, Digital Transformation, Industrial Technology, Economic Competitiveness
- *Data Source:* Economic data; World Development indicators (WDI) – World Bank Group; E-government Development Index (EGDI) – UN-DESA;
- *Publicly available data:* Yes
- *Reported as part of 2021 Compendium on UN AI Activities?:* No
- *Related* Sustainable *Development Goals (SDGs):* SDG 8 – Decent Work and Economic Growth, SDG 9 Industry, Innovation and Infrastructure
- Relevant Links and Multimedia:
  - https://www.unido.org/news/unido-scales-development-dialogues-4ir-strategic-framework
  - https://www.unido.org/our-focus-building-better-future/digital-transformation-innovation-and-industrial-recovery
- *Contact Information:* Marco Kamiya (M.KAMIYA@unido.org)

## 2. Related Sustainable Development Goals

SDG 1, 7, 8, 9, 11, 12, 17

## 3. Related Links

Contact Information

Alberto Medina Islas (A.MEDINAISLAS@unido.org), Alejandro Rivera Rojas (A.RIVERA-ROJAS@unido.org), and Sibilla Sartori (S.SARTORI@unido.org)

# United Nations Institute for Training and Research


## 1. Description of Activities on AI

### Project 1: NVIDIA

- Project Description: The United Nations Satellite Centre (UNOSAT) announced a collaboration with NVIDIA on training and research activities to promote the use of Artificial Intelligence (AI) for Earth Observation activities in support of the Sustainable Development Goals (SDGs), with an initial emphasis on disaster management. This cooperation framework allows UNOSAT and NVIDIA to benefit from their respective facilities, resources, and domain experience. The collaboration has two initial priorities: 1) integration of NVIDIA's accelerated computing platform within UNOSAT's infrastructure to fast-track research and development of AI for Earth Observation and 2) design and roll-out of an e-learning course on the use of deep learning for flood detection to upskill data scientists within disaster management agencies worldwide.
- Department/Division: United Nations Satellite Centre (UNOSAT)
- Project Type/Output: Research and Training
- Project Status: Development
- Project Start Year: 2022
- Project Domain: Other – Geographic Information System (GIS)
- Data Source: Copernicus Sentinel-1 satellite imagery, flood maps, exposed population impact layer
- Data Publicly Available: Yes
- Technology/Platform: NVIDIA Deep Learning Institute
- Reported as part of 2021 Compendium on UN AI Activities? No
- Related Sustainable Development Goals (SDGs): SDG 1 – No Poverty; SDG 3 – Good Health and Well-Being; SDG 6 – Clean Water and Sanitation; SDG 8 – Decent Work and Economic Growth; SDG 9 – Industry, Innovation, and Infrastructure; SDG 10 – Reduced Inequalities; SDG 11 – Sustainable Cities and Communities; SDG 13 – Climate Action; SDG 15 – Life on Land; SDG 16 – Peace, Justice, and Strong Institutions; SDG 17 – Partnerships for the Goal
- Partnership(s)/Collaborator(s)(s):
  - NVIDIA
- Relevant Links and Multimedia:
  - https://blogs.nvidia.com/blog/2022/06/24/un-satellite-centre-boosts-sustainable-development-goals/
  - https://courses.nvidia.com/courses/course-v1:DLI+S-ES-01+V1
- Contact Information: Einar Bjorgo (einar.bjorgo@unitar.org)

## Project 2: UNOSAT S-1 FloodAI

- Project Description: The UNITAR-UNOSAT designed, developed, and deployed UNOSAT S-1 FloodAI: an end-to-end pipeline where Copernicus Sentinel-1 Synthetic Aperture Radar (SAR) imagery of flood-prone areas are automatically downloaded and processed by a deep learning model to output flood vector data and update operational dashboards. Access to timely and accurate data could not only inform the decision-making process to help optimize the disaster response, but it also has the potential to significantly reduce the loss of life and mitigate structural damage, particularly in the context of humanitarian operations, thus supporting both national authorities and international emergency management organizations for the benefit of affected populations.
- Department/Division: United Nations Satellite Centre (UNOSAT)
- Project Type/Output: Software tool
- Project Status: Ongoing
- Project Start Year: 2019
- Project Domain: Other – Geographic Information System (GIS)
- Data Source: Copernicus Sentinel-1 satellite imagery, flood maps, exposed population impact layer, JRC permanent water layer
- Data Publicly Available: Yes
- Technology/Platform: UNOSAT S-1 FloodAI was deployed on a local GPU at the European Organization for Nuclear Research (CERN) connected to a 64 TB data storage server and a high-speed CERN internet connection. The entire infrastructure is currently in the process of being transferred to a cloud centralized service at CERN built on Kubeflow, a machine learning platform on Kubernetes. The deep learning model was written in Pytorch. The operational dashboard is based on an ESRI dashboard linked to a web map.
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Updates: Previously reported in 2021 as "Project 3: Flood Mapping – UNOSAT FloodAI", is now fully deployed and embedded as one of the UNOSAT Rapid Mapping Service.
- Related Sustainable Development Goals (SDGs): SDG 1 – No Poverty; SDG 3 – Good Health and Well-Being; SDG 6 – Clean Water and Sanitation; SDG 8 – Decent Work and Economic Growth; SDG 9 – Industry, Innovation, and Infrastructure; SDG 10 – Reduced Inequalities; SDG 11 – Sustainable Cities and Communities; SDG 13 – Climate Action; SDG 15 – Life on Land; SDG 16 – Peace, Justice, and Strong Institutions; SDG 17 – Partnerships for the Goal
- Partnership(s)/Collaborator(s)(s):
  - UN Partners: UN Global Pulse
  - Academia: European Organization for Nuclear Research (CERN) , NVIDIA
- Relevant Links and Multimedia:
  - https://www.unitar.org/about/news-stories/news/unosat-flood-ai-dashboards-nepal-creation-one-stop-shop-real-time-evidence-based-decision-making
  - https://www.mdpi.com/2072-4292/12/16/2532
  - https://ahacentre.org/wp-content/uploads/2022/07/ARMOR-3rd-Ed.pdf
- Contact Information: Einar Bjorgo (einar.bjorgo@unitar.org)

### Project 3: Mapping Refugee Settlement and Damage Assessment with Machine Learning and Remote-Sensing Data

- Project Description: The purpose of this project is the creation of an end-to-end pipeline that takes high-resolution satellite imagery as input and returns damage assessment maps in the form of a building footprint together with a damage class label.
- Department/Division: United Nations Satellite Centre (UNOSAT)
- Project Type/Output: Software tool
- Project Status: Ongoing
- Project Start Year: 2018
- Project Domain: Geographic Information System (GIS)
- Data Source: Satellite data, building footprints, damage assessment data
- Data Publicly Available: No
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Updates: Previously reported in 2020 as "Project 3: Mapping refugee settlement with machine learning and remote-sensing data". The focus is now not only on mapping refugee settlement, but on building footprints in general and damage assessment.
- Related Sustainable Development Goals (SDGs): SDG 1 – No Poverty; SDG 3 – Good Health and Well-Being; SDG 9 – Industry, Innovation, and Infrastructure; SDG 10 – Reduced Inequalities; SDG 11 – Sustainable Cities and Communities; SDG 13 – Climate Action; SDG 15 – Life on Land; SDG 16 – Peace, Justice, and Strong Institutions; SDG 17 – Partnerships for the Goals
- Partnership(s)/Collaborator(s):
    - Academia: European Organization for Nuclear Research (CERN), CERN Openlab, Wuhan University
- Relevant Links and Multimedia:
    - https://arxiv.org/abs/2201.10953v2
- Contact Information: Einar Bjorgo (einar.bjorgo@unitar.org)

### Project 4: ML4Floods

- Project Description: UNITAR-UNOSAT partner with Trillium Technologies and FDL Europe to test and use ML4Floods: an ecosystem of data, models and code pipelines to tackle flooding with machine learning ML. After a successful testing phase of the methodology, UNOSAT is implementing ML4Floods into its operations and deploying the tool into the UNOSAT AI pipeline at CERN.
- Department/Division: United Nations Satellite Centre (UNOSAT)
- Project Type/Output: Software tool
- Project Status: Ongoing
- Project Start Year: 2021
- Project Domain: Geographic Information System (GIS)
- Data Source: Copernicus Sentinel-2 images, flood maps from Copernicus EMS, UNOSAT and GloFIMR, JRC Permanent water layer
- Data Publicly Available: Yes
- Technology/Platform: Google Cloud Platform, Pytorch, pytorch lightning, weights and biases, GDAL, jupyter notebook, colab tutorials.
- Reported as part of 2021 Compendium on UN AI Activities? Yes, previously reported in 2021 as "Project 2: ML4Floods Deployment Test"

- Related Sustainable Development Goals (SDGs): SDG 1 – No Poverty; SDG 3 – Good Health and Well-Being; SDG 6 – Clean Water and Sanitation; SDG 8 – Decent Work and Economic Growth; SDG 9 – Industry, Innovation, and Infrastructure; SDG 10 – Reduced Inequalities; SDG 11 – Sustainable Cities and Communities; SDG 13 – Climate Action; SDG 15 – Life on Land; SDG 16 – Peace, Justice, and Strong Institutions; SDG 17 – Partnerships for the Goals
- Partnership(s)/Collaborator(s)(s):
  - Private Sector: Trillium Technologies
  - Academia: Frontier Development Lab Europe
- Relevant Links and Multimedia:
  - http://trillium.tech/ml4floods/content/intro/introduction.html
  - ML4Floods time series segmentation
- Contact Information: Einar Bjorgo (einar.bjorgo@unitar.org)

## 2. Related Sustainable Development Goals

SDG 1, 3, 6, 8, 9, 10, 11, 13, 15, 16, 17

## 3. Related Links

https://unitar.org/

Contact Information

Einar Bjorgo (einar.bjorgo@unitar.org)

# United Nations Office for Disarmament Affairs

## 1. Description of Activities on AI

### Project 1: CCW Group of Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems

- Project Description: The Office for Disarmament Affairs (ODA) supports the work of the Convention on Certain Conventional Weapons (CCW) Group of Governmental Experts on emerging technologies in the area of lethal autonomous weapons systems (LAWS). The Group has affirmed eleven guiding principles covering, inter alia, the applicability of international humanitarian law, the retention of human responsibility and that human-machine interaction should ensure LAWS are used in compliance with international law. In the context of the Sixth Review Conference of the Convention on Certain Conventional Weapons, the group considered recommendations in relation to the clarification, consideration and development of aspects of the normative and operational framework on emerging technologies in the area of lethal autonomous weapons systems.
- Project Type/Output: Intergovernmental Meeting
- Project Status: Ongoing
- Project Domain: Peace and security, legal, humanitarian
- Related Sustainable Development Goals (SDGs): SDG 16 –Peace, Justice, and Strong Institutions
- Relevant Links and Multimedia: https://meetings.unoda.org/meeting/group-of-governmental-experts-gge-on-emerging-technologies-in-the-area-of-lethal-autonomous-weapons-systems-laws/
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Contact Information: Michael Spies (spiesm@un.org), Juliana Helou van der Berg (juliana.helou@un.org)

### Project 2: Report of the Secretary-General on Developments in Science and Technology and their Potential Impact on International Security and Disarmament Efforts

- Project Description: As requested by United Nations General Assembly resolution 76/24, the United Nations Secretary-General will report to the 77th session of the General Assembly on current developments in science and technology and their potential impact on international security and disarmament efforts, including on developments related to AI. This report has been issued as A/77/188.
- Project Type/Output: Report
- Project Status: Ongoing
- Project Domain: Peace and security
- Related Sustainable Development Goals (SDGs): 16 – PEACE, JUSTICE, AND STRONG
- Reported as part of 2021 Compendium on UN AI Activities? Yes

- Relevant Links and Multimedia: https://www.un.org/disarmament/topics/scienceandtechnology/
- Contact Information: Michael Spies (spiesm@un.org), Charles Ovink (charles.ovink@un.org)

### Project 3: Responsible Innovation in AI for Disarmament, Arms Control and Non-Proliferation

- Project Description: ODA, with implementing partner the Stockholm International Peace Research Institute (SIPRI) is carrying out activities to promote responsible innovation in AI as an "upstream" contributor to disarmament, arms control, and non-proliferation efforts related to military use of AI. The project covers three work packages:

  1. An online publication aiming to introduce international security, disarmament, arms control, and non-proliferation issues into civilian discussion and processes related to responsible AI innovation. This was recently published through IEEE Spectrum, and is available here https://spectrum.ieee.org/responsible-ai-threat
  2. Educational material to help the civilian AI community to identify and understand the potential consequences for international security, disarmament, arms control and non-proliferation, including the risk of misuse by malicious actors, of developments and practices in the field of AI. These have been developed and piloted with students, educators and other experts, and will soon be launched publicly.
  3. A capacity building workshop series to support greater engagement of young civilian AI practitioners in the policy debate on the international security, disarmament, arms control and non-proliferation concerns surrounding the military use of AI. Science, Technology, Engineering and Mathematics (STEM) students and experts from Federal University of Rio Grande do Sul, New York University, Sorbonne University and Umeå University and others carried out disarmament, responsible innovation of AI, and risk identification and mitigation exercises in teams through spring 2022

  These workshops introduce participants not-traditionally exposed to disarmament issues to the key concepts in responsible innovation of AI. The project seeks to fill a gap in existing efforts to promote responsible development and use of AI, the majority of which pay little to no attention to the impact of AI research and innovation on the military sphere, or international peace and security. Its interactive and partially student guided format encourages participants to identify themselves the risks generated by the technology they develop. The scenario, role-play and pitch-based exercises have proven to be successful in making students interested in disarmament, arms control and non-proliferation issues but also in generating useful insights on peace and security risks associated with AI. It also allows for students to recognize more granular issues, like bias and inclusion, and consider their implications for peace, security, and disarmament. In addition to SDGs 4, 5 and 16, the project responds to action 28 of the Secretary-General's Disarmament Agenda.
- Project Type/Output: Capacity building and Outreach
- Project Status: Ongoing
- Project Domain: Peace and security
- Related Sustainable Development Goals (SDGs): SDG 4 – Quality Education; SDG 5 – Gender Equality; SDG 16 – Peace, Justice, and Strong Institutions.
- Partnership(s)/Collaborator(s)(s): Stockholm International Peace Research Institute (SIPRI), Federal University of Rio Grande do Sul, New York University, Sorbonne University and Umeå University, Institute of Electrical and Electronics Engineers (IEEE) (made possible thanks to generous support from the Republic of Korea)

- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Relevant Links and Multimedia: https://www.un.org/disarmament/update/young-ai-practitioners-discuss-how-to-innovate-responsibly/
- Contact Information: Charles Ovink (charles.ovink@un.org)

### Project 4: Advocacy on Autonomous Weapons

- Project Description: The Secretary-General, the High Representative and Under-Secretary-General for Disarmament Affairs and other ODA officials have sought to raise awareness of the possible implications of autonomous weapons and the weaponization of artificial intelligence.
- Project Type/Output: Outreach
- Project Status: Ongoing
- Project Domain: Peace and security
- Related Sustainable Development Goals (SDGs): SDG 16 – Peace, Justice, and Strong Institutions.
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Relevant Links and Multimedia: https://www.un.org/disarmament/hrstatement/
- Contact Information: Michael Spies (spiesm@un.org), Juliana Helou van der Berg (juliana.helou@un.org), Charles Ovink (charles.ovink@un.org)

## 2. Related Sustainable Development Goals

SDG 4, 5, 16

## 3. Related Links

https://www.un.org/disarmament/

Contact Information

Juliana Helou van der Berg (juliana.helou@un.org), Charles Ovink (charles.ovink@un.org)

# United Nations Office on Drugs and Crime

UNODC
United Nations Office on Drugs and Crime

## 1. Description of Activities on AI

### Project 1: Improving the monitoring of illicit crop cultivation and production by using artificial intelligence

- Project Description: Jointly with the main drug-growing countries in the world - Colombia, Peru and the Plurinational State of Bolivia for coca, Afghanistan, Mexico and Myanmar for opium and Nigeria for cannabis – the UNODC Illicit Crop Monitoring Programme (ICMP) uses GIS and geospatial analysis, satellite imagery and field surveys to monitor the extent and evolution of illicit crop cultivation and production, as well as the factors driving illicit cultivation. The crop and socio-economic surveys help Governments in their policy development and in planning how to tackle illicit drug production.

  UNODC cooperates with external partners from academia and other research entities to continuously improve and develop the methods used in the surveys.

  The present project seeks to research and eventually apply (semi-) automated methods such as machine learning and big data analysis for improving illicit crop surveys and more specifically the identification, interpretation and delineation of illicit crop fields. Moreover, research is conducted on spectral based yield information, and to enhance obtaining and updating spatial information on potential agricultural land and potential risk areas for illicit crop cultivation.
- Department/Division (if applicable):
- Project Type/Output: Software tool
- Project Status: Ongoing: Pilot activities have been conducted.
- Project Start Year: 2021
- Project End Year: 2023
- Project Domain: Agriculture (Plant based illicit drug production, such as the cultivation of opium poppy and coca bush)
- Data Source: Satellite data
- Publicly Available Data: No
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 16 – Peace, Justice, and Strong Institutions
- Partnership(s)/Collaborator(s):
- Academia: Cranfield University, UK; University of Salzburg, Austria
- Contact information: Irmgard Zeiler (Irmgard.zeiler@un.org)

## Project 2: Drugs Monitoring Platform

- Project Description: The UNODC Drugs Monitoring Platform (DMP) is a multi-source system for collecting, visualizing, and sharing drug data aimed at providing access to near real-time data on drug trafficking trends, delivering data using interactive visualizations adapted to user-specific needs, and improving early warning drug threat identification for law enforcement and analysts. The DMP provides additional geographical insight on current drug trafficking trends, with approximately 500,000 geo-coded drug seizure data points obtained from countries around the world.

  More than ever, there is a critical need to enhance capacities to produce rapid pictures of threats related to drug trafficking and build better analytical pictures to guide operational responses and support the development of evidence-based policy. One component of the DMP project aims to collect and enhance capacities to collect real-time information through targeted text mining/text analytics applied to data harvested from the internet. Automation is critical for analyzing text-based data efficiently to address the vast quantity of unstructured data that is generated on a daily basis. For UNODC to process large quantities of critical information 'harvested' in the form of external content, a combination of Artificial Intelligence (AI) procedures centered around Machine Learning modeling, the streamlining of data ETL (extract, transform, load) processes together with the implementation of MLOps have been deployed to ensure the delivery of over 14,000 real-time quantitative data points annually. A series of newly optimized analytical dashboards are being launched to enhance the DMP user experience and optimize Platform geospatial content.
- Project Type/Output: Report, Dataset, Software tool (There are a combination of products for this project which includes a dataset as well as several analytical briefs and software tool development.)
- Project Status: Ongoing
- Project Start Year: October 2019
- Project End Year: May 2023
- Project Domain: Drug Trafficking trends
- Data Source: webscraped open data on individual drug seizure events from media sites and official government websites. Initiating the use of information from select social media sources.
- Publicly Available Data: Yes (The first ever public environment was launched within the Platform containing a subset of Individual Drug Seizure (IDS) data shared by UN Member States. All other seizure data content is housed within a closed environment requiring login credentials).
- Technology/Platform: R, Python (scrapy library), Microsoft Azure Cognitive Services and other functions, PowerBI, MLOps, CosmosDB.
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 3 – Good Health and Well-Being; SDG 5 – Gender Equality; SDG 16 – Peace, Justice, and Strong Institutions
- Links and Multimedia: dmp.unodc.org
- Lessons Learned:
  - Improved more timely response between seizure events and data dissemination through the DMP.
  - Increased the ability to increase geographic coverage and timeliness of seizure data.
  - Exploring cross-fertilization for additional research endeavors across multiple crime areas specifically related to firearms and wildlife trafficking.
  - Living process of testing and development. (active learning of machine learning models required).

  - Not all open data is scrapable.
  - Integration of multi-sourced datasets (i.e. open data, officially reported by Member States to UNODC and other data sharing partners) requires rigorous deduplication and quality control procedures.
- Contact information: Francesca Massanello (Francesca.massanello@un.org)

## 2. Related Sustainable Development Goals

SDG 3, 5, 16

## 3. Relevant Links

https://www.unodc.org/

Contact Information

Peter Erhart (erhart@un.org), Angela Me (angela.me@un.org)

# United Nations Office for Outer Space Affairs

## 1. Description of Activities on AI

### Project 1: Access to Space for All Initiative and Artificial Intelligence

- Project Description: Access to Space for All is a joint initiative of UNOOSA and space agencies, research institutions and industry to offer access to space research facilities, infrastructure and information with the aim of developing technical know-how, engineering processes and infrastructure in the areas of hypergravity and microgravity, satellite development and space exploration and promote international cooperation in the peaceful uses of outer space.

  Space technologies, data and applications are key enablers for development, in the same way access to internet is an enabler. Access to Space for All provides access to information, educational resources, tools and research infrastructure and facilities thanks to international collaboration.

  The partners of the Initiative are space agencies, research institutions and private companies.

  In the framework of the Initiative, the Office organized a webinar covering the use of artificial intelligence applications for space technology development. It aimed at providing applicants to the Access to Space for All hands-on opportunities an overview of what technologies can be incorporated in their projects. The webinar covered hardware and software elements. The webinar had speakers from NVIDIA, IBM and the European Space Agency as well as UNOOSA staff. The Office plans to have a follow up of the webinar this year.

  We have continued to work with NVIDIA on artificial intelligence matters and, as part of this cooperation, UNOOSA was invited to present Access to Space for All during the Graphics Processing Unit Technology Conference April 2021 (GTC April 2021).

  The objective is to raise awareness about how artificial intelligence can be integrated in space-technology projects.
- Project Type/Output: Seminar/meeting
- Project Status: Ongoing
- Project Start Year: 2020
- Project Domain: Outer Space Technology
- Technology/Platform: Webinar conducted in MS Teams and GTC conducted in a separate platform.
- Reported as part of 2021 Compendium on UN AI Activities?: Yes
- Related Sustainable Development Goals (SDGs): SDG 4 – Quality Education; SDG 9 – Industry, Innovation and Infrastructure; SDG 17 – Partnership for the Goals
- Partnership(s)/Collaborator(s)
  - Private Sector: Nvidia Corporation, International Business Machines (IBM)
  - Other: China Manned Space Agency, European Space Agency, German Aerospace Center, Japan Aerospace Exploration Agency, Center of Applied Space Technology

and Microgravity, Keldysh Institute of Applied Mathematics (Russian Academy of Science), Kyutech Institute of Technology, Airbus Defence and Space, Avio and Sierra Space.

- Relevant Links and Multimedia:
  - https://www.unoosa.org/oosa/en/ourwork/access2space4all/index.html
  - Access to Space for All and Artificial Intelligence
- Lessons Learned: There webinar was well attended and the participants were very much engaged, demonstrating the interest for the combination of these two topics.
- Contact Information: Jorge Del Rio Vera (jorge.delriovera@un.org)

### Project 2: AI and Climate Action Curriculum

- Project Description: The project consists on the development of a curriculum module on the utilization of space-based datasets for the development of AI applications on climate action, targeting girls in developing countries.
- Project Type/Output: Curriculum module and capacity building implementation
- Project Status: Ongoing
- Project Start Year: 2020
- Project End Year: 2022
- Project Domain: Outer Space and Sustainable Development Goals (SDGs)
- Reported as part of 2021 Compendium on UN AI Activities?: Yes
- Project Updates: A partnership with Technovation (https://technovation.org/) was launched in 2021 and several webinars presenting the role of space activities for climate action were organized. Including a Diversity and Inclusion event during the International Joint Conference on Artificial Intelligence (IJCAI 2021).
- Related Sustainable Development Goals (SDGs): SDG 4 – Quality Education; SDG 5 – Gender Equalit;, SDG 6 – Clean Water and Sanitation; SDG 13 – Climate Action; SDG 15 – Life on Land; SDG 17 – Partnerships for the Goals
- Partnership(s)/Collaborator(s):
  - Civil Society: Technovation, implementing through which mentors and girls will use space data and tools to address the SDGs
- Relevant Links and Multimedia:
  - https://technovation.org/
  - https://youtu.be/GbX5QgHQSEQ
  - https://www.technovation.org/news-events/ijcai-2021-tech-for-sustainable-development/
- Lessons Learned: The work is in progress, working to attract women (age 8-18) to STEM careers through the incorporation of space related concepts in the curriculum that is run by Technovation each year. The use of satellite remote sensing data created excitement and engagement in the audiences that participated in the various events organized.
- The use of space data requires dedicated expertise and time is needed to incorporate the expertise and knowledge into and accessible curriculum.
- Contact Information: Jorge Del Rio Vera (jorge.delriovera@un.org)

### Project 3: AI and Climate Action Curriculum

- Project Description: In its resolution 61/110 of 14 December 2006 the United Nations General Assembly agreed to establish the "United Nations Platform for Space-based Information for Disaster Management and Emergency Response - UN-SPIDER" as a new United Nations programme, with the following mission statement: "Ensure that all countries and international and regional organizations have access to and develop the capacity to use all types of space-based information to support the full disaster management cycle".

  A number of initiatives in recent years have contributed in making space technologies available for humanitarian aid and emergency response. Yet, UN-SPIDER is the first to focus on the need to ensure access to and use of such technologies during all phases of the disaster management cycle, including the risk reduction phase which is crucial for reducing the losses of lives and property.

  UN-SPIDER works in delivering resources for Member States to facilitate the acquisition and processing of space remote sensing data.
- Project Type/Output: Software tool
- Project Status: Ongoing
- Project Start Year: 2009
- Project Domain: Agriculture, Environment, Weather, Space, Disaster Management, Emergency Response
- Data Source:
  - Sentinels, Aqua/Terra, Landsat and other satellite data,
  - Composite data from other sources developed by the space community (drought indices like NDVI, etc).
  - Additional data, products and services established by the space and geospatial communities
  - See "Data Sources": https://un-spider.org/links-and-resources/data-sources
- Data Publicly Available: Yes
- Technology/Platform:
  - Python (Jupyter notebooks) and R Studio SNAP, EsriGIS, Quantum GIS, etc
- Reported as part of 2021 Compendium on UN AI Activities?: Yes
- Project Updates: Continuing the compilation of technical content on data sources, services and products developed by the space community to support disaster management efforts. Continuing to present information on activities carried out by the space and the disaster management communities and technical information on how space-based technologies contribute to efforts in all phases of the disaster management cycle. Continuing with the creation of step-by-step workflows in GIS software, Python (Jupyter notebooks) and R scripts to download, process and visualize Earth observation data for monitoring and assessing droughts, floods, mudslides, burn severity after forest fires
- Related Sustainable Development Goals (SDGs): SDG 11 – Sustainable Cities and Communities; SDG 13 – Climate Action
- Partnership(s)/Collaborator(s)(s):
  - Other: UN-SPIDER Regional Support Offices https://www.un-spider.org/network/regional-support-offices
- Relevant Links and Multimedia: https://www.un-spider.org/

- Lessons Learned: The goal of this project is to provide the knowledge, tools, information, and assessments in the hands of those who can action them for the disaster management cycle including emergency response.
- Since its launch at the end of 2009, it has been gaining recognition as a one-stop-shop:
    - to acquire information on what can be done with space technologies to support efforts in all phases of the disaster management cycle, and on the mechanisms, products and services established by the space community to support efforts in all phases of the disaster management cycle,
    - to gain access to data, information and products developed and made available by the space and geospatial communities, information on software packages and tools that can be used to process data and to generate relevant products or information,
    - To gain access to step-by-step procedures developed in open software to process data to generate maps that are relevant in disaster management applications,
    - To find information on upcoming training opportunities (virtual, presential, academic)
    - Nearly a million visits to the tool on an annual basis in the last two years (2020 and 2021)
- Contact Information: Juan Carlos Villagran de Leon (juan-carlos.villagran@un.org)

## 2. Related Sustainable Development Goals

SDG 4, 5, 6, 11, 13, 15, 17

## 3. Relevant Links

https://www.unoosa.org/

Contact Information

Jorge Del Rio Vera, Scientific Affairs Officer (Space Technology) (jorge.delriovera@un.org); Markus Woltran (Markus.woltran@un.org)

# United Nations Research Institute for Social Development

## 1. Description of Activities on AI

UNRISD has launched a think-piece series on new technology and human rights (More details here)

### Project: Think Piece Series

UNRISD has launched a Think Piece Series which invites experts from academia, think tanks and civil society to engage with the topic of linking technology and human rights, and to share their experience at the front lines of policy-driven research and advocacy aimed at leaving no one behind in an increasingly digital, automated world.

This Series aims to provide perspectives on the intersections between new technology and various dimensions of civil and political rights and economic, social and cultural rights, including the right to health, work, social protection, freedom of expression and more. It also presents reflections on how we conceptualize and practice human rights in the face of technology-driven change on a global scale.

The Series was launched to coincide with the 37th Session of the UN Human Rights Council, as part of UNRISD's commitment to promote socially just and sustainable development within and beyond the UN system. It is also part of the UN system's celebration of the 70th anniversary of the Universal Declaration of Human Rights.

- First Edition: From Disruption to Transformation
    - Tech for Transformative Change? Looking beyond Disruption–Kelly Stetter
    - Time for a Fourth Generation of Human Rights?–Changrok Soh, Daniel Connolly and Seunghyun Nam
    - Embracing Human Diversity: Policies and Enabling Factors for Accessible Technologies–Alejandro Moledo
    - Data Frameworks for a Right to Development–Anita Gurumurthy and Nandini Chami
    - Big Data and Monitoring Sustainable Development Goal 3: Not Counting Those Left Behind?–Carmel Williams
    - Accounting for the Most Vulnerable: Ensuring Big Data Works for Sustainable and Inclusive Development–Sabrina Rau and Sheldon Leader
    - How IT Threatens Democracy–Kofi Annan
    - Technology and Freedom of Expression: Opportunities and Threats through the Journalist's Lens–Mariateresa Garrido
    - A Feminist Interrogation of Autonomy on the Internet–Jac sm Kee

- Second Edition: Tools for Transformation

  The second edition of this think piece series on new technologies and human rights focuses more on responses and possible solutions to issues sketched out in the first edition. The authors were speakers at our official side event of the 39th session of the United Nations Human Rights Council on new technologies and human rights held in September 2018.

  - Profiling and Automated Decision Making: Is Artificial Intelligence Violating Your Right to Privacy?–Tomaso Falchetta
  - Legal Literacy: An Essential Complement to Digital and Scientific Literacy–Thérèse Murphy
  - Human Rights and New Technologies: Setting the Agenda for Human Rights-Centred Innovation–Molly K. Land

UNRISD held an event on **new technologies and human rights**, co-sponsored by Austria and Denmark, at the 39th session of the UN Human Rights Council. More detail here.

## 2. Challenges and Opportunities

Great interest in the topic, but difficult to convert into solid funding for holistic and critical research enquiries.

## 3. Relevant Links

Contact Information

Paul Ladd, Director (paul.ladd@un.org)

# Office of the Secretary-General's Envoy on Technology

## 1. Description of Activities on AI

- Project: Secretary-General's Advisory Body on Global AI Cooperation Project Description: As part of the follow-up to the Secretary General's Roadmap for Digital Cooperation, the Office of the Secretary-Generals' Envoy on Technology is coordinating the implementation of the Secretary-General's proposal to establish a multi-stakeholder advisory body on global artificial intelligence cooperation. The body will provide guidance on artificial intelligence that is trustworthy, human-rights based, safe and sustainable, and promotes peace. The advisory body will bring a diverse group of relevant entities in the AI landscape, including experts, scientists and academia, to address issues around inclusion, coordination, and capacity-building by sharing and promoting best practices, as well as exchanging views on artificial intelligence standardization and compliance efforts.
- Project Type/Output: Policy Framework
- Project Status: Development
- Project Start Year: June 2020
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Domain: All Project Domains, as part of overall effort to strengthen
- Data Source: Various.
- Related Sustainable Development Goals (SDGs) : SDG 1 – No Poverty; SDG 2 – Zero Hunger; SDG 3 – Good Health and Well-Being; SDG 4 – Quality Education; SDG 5 – Gender Equality; SDG 6 – Clean Water and Sanitation; SDG 7 – Affordable and Clean Energy; SDG 8 – Decent Work and Economic Growth; SDG 9 – Industry, Innovation, and Infrastructure; SDG 10 – Reduced Inequalities; SDG 11 – Sustainable Cities and Communities; SDG 12 – Responsible Consumption and Production; SDG 13 – Climate Action; SDG 14 – Life Below Water; SDG 15 – Life on Land; SDG 16 – Peace, Justice, and Strong Institutions; SDG 17 – Partnerships for the Goals
- Partnership(s)/Collaborator(s):
    - UN Partners: Various
    - Private Sector: Various
    - Civil Society: Various
    - Academia: Various
- Links: https://www.un.org/techenvoy/content/artificial-intelligence
- Contact Information: Yu Ping Chan (chan7@un.org)

## 2. Related Sustainable Development Goals

SDG 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, and 17

## 3. Relevant Links

https://www.un.org/techenvoy/

Contact Information

Yu Ping Chan (chan7@un.org)

# United Nations University

## 1. Description of Activities on AI

### Project 1: Enhancing Resilience to Flood Disasters through the use of AI, Cloud Computing and Open Datasets

- Project Description: The Project aims to develop Web-based Spatial Decision Support System (WSDSS) to address flood-related information gaps in the currently available flood early warning and risk management systems. The WSDSS comprises a historical flood mapping tool (HFMT) and a flood risk prediction tool (FRPT).

  The HMFT developed and launched in 2021 that generates inundation maps for significant floods from 1984 till the present using open Earth data. The tool applies a water classification algorithm to 'stacks' of historical satellite imagery derived from Landsat to reveal inundation patterns over space and time. HFMT is a hindcast tool that allows impacts of inundation on various socio-economic sectors to be analyzed. The tool is now being enhanced using higher resolution open data from Sentinel 2 and Sentinel 1 to generate flood hazard maps including inundation extent and depth. The FRPT will use AI models to generate current and future flood risk maps at river basin and administrative boundary level. A framework based on historical flood map generated by flood mapping tool and trained AI model will be developed to analyse flood risk of selected region. The AI model will be trained using open data including land use land cover, population, infrastructure, precipitation, temperature, and gender and age disaggregated socioeconomic data. This module will help identify the most flood-risky areas for the future planning and risk mitigation.

  WSDSS improves the spatial and temporal coverage of national and regional flood early warning and risk management systems and enhance the spatial resolution of the outputs WSDSS will build the capacity of flood forecasting centers in Global South to use AI models, big data and, cloud computing to analyze the impacts of climate change.
- Division/Department: United Nations University Institute for Water, Environment and Health (UNU-INWEH)
- Project Type/Output: Software tool
- Project Status: Ongoing
- Project Domain: Environment, Weather
- Data Source: The tool uses open datasets, including land use, land cover, precipitation, temperature, gender, and age-disaggregated socio-economic data. The tool also uses Landsat and Sentinel 1, Sentinel 2 to reveal inundation extent and depth patterns over space and time
- Publicly Available Data: Yes
- Technology/Platform: The tool is deployed on Google Cloud Compute Engine and it uses Google Earth Engine to process the satellite imagery and the open datasets. 3D maps and building data from MapBox is used in the tool.
- Reported as part of 2021 Compendium on UN AI Activities? Yes

- Related Sustainable Development Goals (SDGs): SDG 6 – Clean Water and Sanitation; SDG 9- Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation, SDG 11 – Sustainable Cities and Communities; SDG 13 – Climate Action
- Partnership(s)/Collaborator(s):
- UN Partners: United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP)
- Government: Flood Forecasting and Warning Center (FFWC), Bangladesh
- Private Sector: Google and MapBox
- Civil Society: Asian Disaster Preparedness Center Thailand and International Center for Integrated Mountain Development (ICIMOD)
- Academia: McMaster University Canada
- Relevant Links and Multimedia: http://floodmapping.inweh.unu.edu/
- Lessons Learned: Scaling solutions is challenging because of data gaps and inconsistent data resolution, especially in the Global South.
- Contact Information: Mir Matin (mir.matin@unu.edu)

### Project 2: UNU-Macau Conversations Series Seminar

- Project Description: UNU-Macau Conversation series seminar invited top researchers and thought leaders in Digital Technologies, Artificial Intelligence, Modeling for Sustainability. The following seminar has been more specifically on AI:
    - Dr. Christiine Boshuijzen-van Burken (UNSW) Multi-aspectual Ethics of Autonomous (weapons) Systems
    - Dr. Omar Guerrero (Turing Institute), Modelling Sustainable Development from the Bottom Up: Coupling Open Data and Agent Computing to Inform Policy Prioritization
    - Dr. Nils Ferrand: Codesigning and Politing Inclusive Participatory Procedures for Enacting the SDGs - From
    - Pr. Rostam J. Neuwirth: Artificial Intelligence and Sustainable Development: Two Oxymora, One Challenge?
- Division/Department: United Nations University Institute in Macau
- Project Type/Output: Seminar/meeting
- Project Status: Ongoing
- Project Start Year: 2021
- Project Domain: Agriculture, Environment, Education, Health, Human Rights
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 3 – Good Health and Well-Being; SDG 5 – Gender Equality; SDG 11 – Sustainable Cities and Communities
- Relevant Links and Multimedia: Videos are available UNU-Macau YouTube account: https://www.youtube.com/playlist?list=PL3BvGAbnIT9vik4iQ_XnBENgdBtZzNP0K
- Contact Information: Serge Stinckwich (stinckwich@unu.edu)

### Project 3: UNU-Macau Gender-sensitive AI policy in Southeast Asia

- Project Description: This is a research project conducted in Thailand, Indonesia, Malaysia and the Philippines, which aims to understand gender and societal risks in AI in the focus countries, with a focus on critical technologies. The outputs of this research include a policy report, which makes recommendations to include consideration on gender

discrimination, stereotyping and exclusion in future AI legislation, as well as a training programme for policymakers in the four countries.

- Division/Department: United Nations University Institute in Macau
- Project Type/Output: Policy research project and training programme
- Project Status: Ongoing
- Project Start Year: 2022
- Project Domain: Women's rights
- Reported as part of 2021 Compendium on UN AI Activities? No
- Related Sustainable Development Goals (SDGs): SDG 5: Gender Equality
- Relevant Links and Multimedia: N/A
- Contact Information: Eleonore Fournier-Tombs (fourniertombs@unu.edu)

### Project 4: Gender equality for health and well-being: Evaluative evidence of interlinkages with other SDGs

- Project Description: Understanding synergies and trade-offs between sustainable development goals (SDGs) is an important component of SDG focused evaluations. Progress towards SDGs needs to consider feedback and interaction between society, the economy, and the biosphere and the interventions aimed at achieving these goals. However, the current assessment approach is based on only one or a few indicators that do not evaluate the interdependence between goals and targets. More evidence from multidisciplinary evaluations and academic studies are needed to inform multisectoral approaches that coordinate efforts to promote gender equality and to ensure healthy lives and wellbeing for all. This project explored the link between SDG 3 and SDG 5, as part of a system of interconnected SDGs and indicators within these goals. This study consists of an analysis of evaluation reports of United Nations Evaluation Group (UNEG) members to build conceptual models (Phase 1) whose interlinkages were analysed empirically with secondary data analysis (Phase 2). In Phase 1, we developed a natural Language Processing (NLP) model based on semantic-similarity between SDGs and a list of keywords related to gender issues and gender equality to classify (from the universe of available reports at the UNEG Database of Evaluation Reports) the relevance of each of the 17 SDGs, as well as extracted the countries and any metadata information of the interventions. Equipped with this information, we selected 289 reports across 26 UN agencies and United Nations Development Assistance Framework (UNDAF) evaluations for which gender and health were the most relevant. The selected reports were qualitatively analysed in terms of their content using a framework of realist evaluation and a system thinking approach, to build several thematic conceptual models would illustrate the type of linkages between systems of SDGs and the contexts that were drawn.
- Division/Department: United Nations University International Institute for Global Health
- Project Type/Output: Report, Academic paper, Dataset, Software tool
- Project Status: Closed
- Project Start Year: 2020
- Project End Year: 2022
- Project Domain: Gender Equality, Global Health
- Data Source: UNEG reports and extraction dataset
- Data Publicly Available: Yes
- Technology/Platform: Python
- Reported as part of 2021 Compendium on UN AI Activities? No
- Related Sustainable Development Goals (SDGs): SDG 3 – Good Health and Well-Being; SDG 5 – Gender Equality
- Partnership(s)/Collaborator(s):

UN partners: UN Women's Independent Evaluation Service

- Relevant Links and Multimedia: https://www.unwomen.org/en/digital-library/publications/2022/07/gender-equality-for-health-and-well-being
- Contact Information: Claudia Abreu Lopes (claudia.lopes@unu.edu)

### Project 5: Mapping implementation research trends in the WHO regions: Text mining of letters of intents of TDR Implementation Research MOOC

- Project Description: UNU IIGH developed a text mining method to automatically extract information from Letters of Intent (LoIs) submitted as part of TDR's Massive Online Open Course on Implementation Research. MOOC participants are instructed to develop proposals to tackle a global health implementation challenge that they consider critical for the country they live and work in. The analysis of the proposals highlighted the tropical diseases, countries, world regions, research methods, research strategies and outcomes that the LoIs focused on. The results from the first batch of documents were displayed on a beta version of the website which featured a dashboard and graphs to illustrate the character of implementation research emerging from the LoIs. This beta website was improved with users' feedback so LoIs can be submitted online and the dashboard automatically updated when the submission is approved. The text mining method was developed using the first batch of 581 LoIs as the training set to extract information from the total 2393 LoIs. The final website is in English and translated into Spanish and French: https://irmooc.org.
- Division/Department: United Nations University International Institute for Global Health
- Project Type/Output: Website, Method, Academic paper, Dataset
- Project Status: Closed
- Project Start Year: 2021
- Project End Year: 2022
- Project Domain: Global Health, Implementation Research
- Data Source: Letters of Intent submitted as final assessment of Implementation Research MOOC
- Data Publicly Available: Yes. The resulting dataset with the outputs from the analysis is available on the website to download in an Excel format.
- Technology/Platform: R Studio, Python and WordPress
- Reported as part of 2021 Compendium on UN AI Activities? No
- Related Sustainable Development Goals (SDGs): SDG 3 – Good Health and Well-Being
- Partnership(s)/Collaborator(s): Special Programme in Research and Training in Tropical Diseases (TDR)
- Relevant Links and Multimedia: https://irmooc.org/ (website) and https://rpubs.com/cimdal2/717755 (method)
- Contact Information: Claudia Abreu Lopes (claudia.lopes@unu.edu)

### Project 6: Mapping Implementation Research Trends in the WHO Regions: Text mining of letters of intents of TDR Implementation Research MOOC

- Project Description: Following reports of vaccine hesitancy amongst young people in Malaysia, the UNU-IIGH in collaboration with UNICEF Malaysia, ran a U-Report poll with a chatbot in WhatsApp and Facebook Messenger between 19th May and 23rd June 2021. These platforms were selected due to their high popularity amongst young people in the country. The poll was delivered in several relevant languages (Bahasa Malay, English, Burmese, Arabic and Mandarin Chinese), with questions designed and tested through focus group discussions in May 2021. Responses to the poll were received from 1,181 people from all 13 states of Malaysia. 71% of respondents were aged between 18 and 25 years old, whilst 71% of respondents were female. The team leveraged the above

digital platforms in order to survey an often hard-to-reach (but digitally-savvy) audience. Collaboration with civil society organisations was also crucial in order to engage participants across all Malaysian states and diverse socio-economic groups.

- Division/Department: United Nations University International Institute for Global Health
- Project Type/Output: Academic paper, Policy brief, Online dashboard
- Project Status: Closed
- Project Start Year: 2021
- Project End Year: 2021
- Project Domain: Global Health
- Data Source: structured dataset with the responses to the U-report poll
- Data Publicly Available: No
- Technology/Platform: R Studio and RapidPro (chatbot)
- Reported as part of 2021 Compendium on UN AI Activities? No
- Related Sustainable Development Goals (SDGs): SDG 3 – Good Health and Well-Being
- Partnership(s)/Collaborator(s):
    - UN Partners: UNICEF
    - Civil Society: several civil society organisations in Malaysia to design and disseminate the poll
- Relevant Links and Multimedia: https://go.unu.edu/ogAWD (online dashboard)
- Contact Information: Claudia Abreu Lopes (claudia.lopes@unu.edu)

### Project 7: The Strategies of Governments for Artificial Intelligence: an overview

- Project Description: The primary purpose of the report is to compile information about how various countries have designed their AI strategies
- Division/Department: United Nations University Operating Unit on Policy Driven Electronic Governance (UNU-EGOV)
- Project Type/Output: Report/Seminar
- Project Status: Finished
- Project Start Year: 2020
- Project Domain: Public Administration, Government
- Reported as part of 2021 Compendium on UN AI Activities? No
- Related Sustainable Development Goals (SDGs): SDG 11 – Sustainable Cities and Communities, SDG 16 - Peace, Justice and Strong Institutions.
- Relevant Links and Multimedia:
  https://egov.unu.edu/events/archive/seminar/vaibhav-shah-17-march-2020.html#overview
- Contact Information: https://egov.unu.edu/

### Project 8: Understanding the urban space for better governance: use of non-traditional data for real-time disaggregated decision-making

- Project Description: Local governments around the world need well-curated data on the urban spaces to monitor their inhabitants and to understand the impact of policy interventions. Urbanization plays a critical role in changing the urban environment. Most developed countries have almost completed urbanization. However, with more and more people moving to cities, the urban environment in developing countries is undergoing significant changes. Sustainable development cannot be achieved without significant changes in building, managing, and responding to changes in the urban environment.

The scarcity of well-curated Spatio-temporal data of urban spaces gives the AI engines the fuel to build machine learning and data science tools for the policymakers to make decisions based on evidence of the present. Understanding the issues, visualizing the challenges, and monitoring progress are keys to achieving SDG goals. However, collecting traditional data from urban spaces is expensive and therefore not easily replicable. Hence, by the time the data are prepared, the reality of the decision-making space changes. Moreover, data collected in most cases are not usable for decision-making. With the advent of computational capacity, and advances in knowledge streams such as machine learning, data mining, and statistical inference it is possible to harness data from heterogeneous sources, organize them in conjunction with the traditional data, and visualize them in various ways. One such data comes in abundance from the satellites. These data help monitor the urban spaces' changes in real-time. This project uses satellite data and computational mechanisms to understand the socio-economic condition of urban spaces.

The primary focus of this project is the cities in the developing world. The first part of the project is focused on developing a novel method to classify urban spaces based on the buildings and their surroundings. The novel method is designed to help prepare the datasets for state-of-the-art deep learning mechanisms. The second part of the project focuses on training and designing a novel deep learning mechanism that is suitable for the urban categorization process. The resulting automated method can detect the socio-economic condition of urban spaces of the cities in the developing world by detecting highly formal to highly informal zones with very high accuracy. The ease in data curation and scalability make the model useful for city planners and policymakers in the developing world at almost no cost compared with traditional survey-based methods. The third part of the project is now focusing on including various other data features such as road conditions, green spaces, urban air and temperature, water bodies, etc. to build more robust categories.

- Department/Division: United Nations University Operating Unit on Policy-Driven Electronic Governance (UNU-EGOV)
- Project Type/Output: Academic paper/ Dataset/Policy Framework / Software tool
- Project Status: Ongoing
- Project Start Year: 2020
- Project End Year: Ongoing
- Reported as part of 2021 Compendium on UN AI Activities? No
- Project Domain: Sustainable cities and communities
- Data Source: Satellite, Census, and survey data
- Publicly Available Data: Yes
- Technology/Platform: R, Python, PHP, JavaScript, FCN-8, U-Net, DeepLabv3+
- Related SDGs: SDG 11 – Sustainable cities and communities; SDG 10 – Reduced Inequality; SDG 8 – Decent Work and Economic growth; SDG 1- No Poverty.
- Partnership(s)/Collaborator(s):

  Academia: University of Tokyo, Japan; University of Dhaka, Bangladesh; Independent University of Bangladesh, Bangladesh.
- Lessons Learned: Satellite data with usable socio-economic categorization methods and computational models can help categorize urban spaces in real time. This can complement the traditional survey and census-based data sources that are expensive and time-consuming. The categorization method helps categorize the city spaces into sixteen subcategories based on building conditions and surrounding environments. The sub-categories are then clustered to find four socioeconomic categories ranging from highly formal to highly informal spaces. After training the deep learning module detects these spaces with over 90% accuracy. The final model can segment the test part with an average accuracy of 90.0% for Dhaka, 91.5% for Nairobi, 94.75% for Jakarta, 82.0% for Guangzhou city, 94.25% for Mumbai, 91.75% for Cairo, and 96.75% for Lima. The

methods are novel, rapid, and scalable for the public policy practitioners relying mostly on traditional survey and census data for their decision-making purposes.

- Links:
  - https://www.mdpi.com/1424-8220/21/22/7469
  - https://www.mdpi.com/2071-1050/14/7/4336
- Contact information : Moinul Zaber (zaber@unu.edu)

## 2. Related Sustainable Development Goals

SDG 1, 3, 6, 9, 11, 12, 13, 14, 15

## 3. Relevant Link

https://unu.edu/

Contact Information

Serge Stinckwich (stinckwich@unu.edu)

# United Nations Women

United Nations Entity for Gender Equality and the Empowerment of Women

## 1. Description of Activities on AI

### Project: Action Coalition for Technology and Innovation for Gender Equality

- Project Description: With the rapid digitalization of work, school and social life stimulated by the COVID-19 pandemic, the importance of technology and innovation to achieving gender equality and inclusive development have never been clearer nor more urgent.

  From a gender perspective, specific applications of AI and machine learning have shown the greatest risks of bias and misuse, like facial recognition and deep fakes. The AI world today is almost entirely dominated by men and we find societal biases relating to gender roles and identities embedded in social programs and services via automated decision-making. Data modelling such as predictive policing or social intervention increasingly transcends the individual to focus on groups or communities, making women more at risks of being discriminated.

  UN Women's role and mandate is to reaffirm the need to focus on diversity and inclusiveness when developing AI technologies. Ensuring that societal values are reflected in algorithms and AI technologies will require no less creativity, hard work and innovation than developing the AI technologies themselves.

  In order to drive action and unite efforts from across governments, private sector and civil society, UN Women is convening partners working on gender and technology as part of the Generation Equality Forum. An Action Coalition focusing on innovation and technology will be launched in 2021 to generate innovative ideas for policies and initiatives needed to accelerate progress for more gender-responsive AI.

  The Action Coalition will explore how to harness opportunities arising from the use of AI and overcome the challenges associated with algorithms. By breaking down silos and fostering collaboration through this new multi-stakeholder platform, the Coalition aims to inspire public and private partners to make strong and actionable commitments that will advance gender equality and women's rights.
- Project Update: The Generation Equality Forum, held in Mexico and Paris in 2021, resulted in the launch of the Action Coalition for Technology and Innovation for Gender Equality, to ensure women and girls have equal opportunities to safely and meaningfully access, use, lead, and design technology but also to ensure that building inclusive digital economies is at the core of the COVID-19 recovery efforts.

  This initiative is open to world leaders and grassroots leaders equally, which makes it a unique space for co-creating innovative solutions and for generating bold and transformative commitments in the next five years.

  The Coalition's Global Acceleration Plan recommend stakeholders to join efforts on four priorities:

  - First, to prioritize initiatives that support digital access and the development of digital skills, to ensure equal use, creation and control of digital technology by women and girls.

  - Second, to invest in feminist technology and innovation, to embed gender in tech development and create solutions that leverage technology for social impact.
  - Third, to build inclusive, transformative and accountable innovation ecosystems that ensure women and girls' full participation in digital economy and society.
  - And finally, to prevent and eliminate online and tech-facilitated GBV and discrimination to allow women and girls in all their diversity to use digital spaces safely.
  - More than a thousand commitments and 40 billion dollars were pledged for Generation Equality, many originating from governments, civil society, international organizations, youth networks and companies engaged in building more inclusive and gender-transformative technology and innovation ecosystems. This resulted in commitments to improve regulatory frameworks, to systematize gender impact assessments and AI audits, to improve the availability of disaggregated data and to bridge the massive gender gap that currently exists in tech professions – and Artificial Intelligence in particular.

- Project Type/Output: Multi-stakeholder partnership
- Project Status: Ongoing
- Project Start Year: 2021
- End Year: 2026
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Domain: Gender
- Related SDGs: SDG 4 – Quality Education , SDG 5 – Gender Equality; SDG 9 – Industry, Innovation, and Infrastructure; SDG 17 – Partnerships for the Goals
- Partnership(s)/Collaborator(s):
  - UN Partners: ITU, UNICEF
  - Government: Chile, Rwanda, Armenia, Tunisia, Finland
  - Private Sector: Salesforce, Microsoft, Koc Holding
  - Civil Society: A+ Alliance, Social Builder, Global Fund for Women, Digital Grassroots
- Links and Multimedia:
  - https://techforgenerationequality.org/
  - https://forum.generationequality.org/action-coalitions
  - https://www.unwomen.org/en/get-involved/beijing-plus-25/generation-equality-forum
- Contact information: Helene Molinier (helene.molinier@unwomen.org)

## 2. Related Sustainable Development Goals (SDGs)

SDG 4, 5, 9 and 17

## 3. Relevant Link

https://www.unwomen.org/en

Contact Information:

Helene Molinier (helene.molinier@unwomen.org); Adam Simpson (adam.simpson@unwomen.org)

# United Nations World Tourism Organization

## 1. Description of Activities on AI

### Project 1: UNWTO Awake Tourism Challenge

As part of the Programme: Startup Competitions and Innovation Challenges, UNWTO has launched the Awake Tourism Challenge, a global call with the aim of identifying the most disruptive start-ups working to achieve the Sustainable Development Goals (SDGs) based on tourism.

Startups from all walks of life, from all over the world and all economic sectors are invited to participate in any of the following categories:

- Local community involvement
- Green and blue economies
- Ecological and sustainable capital creation
- Tourism Tech for Good (Artificial Intelligence (AI), NFTs, Metaverse, amongst tohers)
- Tourism education
- Women empowerment

Participating start-ups will be assessed according to their:

- Contribution to the Sustainable Development Goals
- Ease of value capture via collaboration with the start-up
- Potential business impact
- Maturity of the product/technology
- Maturity of the team and the organization
- Partnership readiness

Once the evaluation stage is completed and winners are announced, they will benefit from being part of the UNWTO Innovation Network, a world group of Governments, corporations, investors, accelerators, education centres and entrepreneurs set to find funding and pilot-project opportunities. For instance, since 2018, top startups from the Network have raised over 214 USD million for their growth.

Official website: https://www.unwto.org/unwto-awake-tourism-challenge

Deadline for candidatures: 15 October 2022

### Project 2: UNWTO Tourism Online Academy

While allowing for an inclusive recovery, UNWTO has also placed education as a key priority as the basis for added value jobs. For this reason, the UNWTO Tourism Online Academy has amplified its impact by allowing the global audience to develop vocational and managerial skills for tourism and hospitality with 20 courses from top institutions and over 15,000 students from all regions. Currently, partners are IE University, Sommet Education, Swiss Education Group, Totem Branding, Pontifical Catholic University of Chile, Externado de Colombia University, Palermo University, Bilkent University, Lucerne University of Applied Sciences and Arts.

Recently, the platform launched the course "Artificial Intelligence (AI) in Hospitality: Challenges and Business Opportunities" by Swiss Education Group, which has been designed for students and practitioners to acquire the tools and know-how required to open the potential of AI and change the way businesses operate. They learn the various terminologies, meanings, and applications in diverse business areas such as Front Office, Customer Experience, Food & Beverage, Cost Optimisation, Sales & Marketing, Sustainability. Also, they can analyse how the unstoppable growth of AI can display diverse challenges to the world status quo, and they examine what can be considered ethical or a threat to the privacy laws due to illegal practices.

Official website: https://www.unwto-tourismacademy.ie.edu

### Project 3: UNWTO Jobs Factory

In order to link skills development to added-value jobs, UNWTO launched in 2021 its Jobs Factory in collaboration with Hosco, an AI-powered platform to matchmake job offer and demand, targeting both job seekers and corporations or Governments looking for talent. Currently, it offers over 57,000 job opportunities throughout the tourism and hospitality value chains.

Official website: https://www.unwto.org/jobs-factory

## 2. Related Sustainable Development Goals

SDG 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17

## 3. Relevant Link

https://www.unwto.org/

Contact Information

José Diaz Ardila (jdiaz@unwto.org), Natalia Bayona (nbayona@unwto.org)

# World Food Programme

## 1. Description on Activities On AI

### Project 1: SKAI

- Project Description: A lack of on-the-ground information at the start of a humanitarian crisis is a major obstacle to a quick, effective response. Following disasters, WFP works to assess the magnitude of damage, the needs of local communities, and its humanitarian intervention plans to mobilize resources and coordinate emergency response efficiently. As part of its frontier innovations portfolio, WFP has been exploring new technologies that can automate this process and speed up response times. WFP partnered with Google Research to set up SKAI, a humanitarian response mapping project powered by artificial intelligence – an approach that combines statistical methods, data and modern computing techniques to automate specific tasks. SKAI assesses damage to buildings by applying computer vision – computer algorithms that can interpret information extracted from visual materials such as, in this case, satellite images of areas impacted by conflict, climate events, or other disasters. The key to this process is a machine learning model developed specifically for SKA, which detects damaged buildings by comparing imagery of the same buildings before and after the disaster. SKAI aims to leverage the power of artificial intelligence and remote sensing to assess damage within 24 hours after disasters take place.
- Department/Division: INKA
- Project Type/Output: Software tool
- Project Status: Ongoing
- Project Start Year: 2018
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project updates: WFP in partnership with Google Research will be open-sourcing the machine learning source codes of SKAI . It will be made accessible to the general public by the end of 2021. In addition, a new cloud-based image labeling tool is being developed and tested. It will allow people with local knowledge to label damaged buildings in a collaborative manner.
- Project Domain: Emergency
- Data Source: Satellite data
- Publicly Available Data : No
- Technology/Platform: Deep neural network machine learning model, Google Earth Engine APP, and Google Cloud AI Platform.
- Related Sustainable Development Goals (SDGs): SDG 2 - Zero Hunger
- Partnership(s)/Collaborator(s):
    - Private Sector: Google Research
- Lessons Learned: Main challenges were twofold. First, the model did not generalize well for new types of disasters in new geographical areas. This challenge was addressed by

developing the machine learning model that would be trained for a new disaster using a small number of labelled images. The new SKAI model uses a semi-supervised learning technique that reduces the required number of labeled examples. As such, SKAI typically only needs 200 to 500 labeled examples to achieve high accuracy, significantly improving the speed at which accurate results can be obtained. The ambition for SKAI is to optimize its platform to function across a variety of geographic locations, disasters, and damage types.

Second, we need to research more into the ways how artificial intelligence-powered damage assessment platforms like SKAI can be operationalized at scale in humanitarian response. .

To address this challenge, the SKAI team is developing and testing a cloud-based platform that streamlines the loop of image labelling, model training, model validation and fine-tuning. This can potentially turn SKAI into a self-service damage assessment platform that can be used by humanitarian practitioners who have little knowledge of machine learning, improving the user experience and performance of SKAI.

- Links and Multimedia:
  - Assessing post-disaster damage from satellite imagery using semi-supervised learning techniques: https://arxiv.org/abs/2011.14004
  - WFP innovation accelerator blog post: the skai isn't the limit: how wfp uses satellite imagery and machine learning in emergencies https://wfpinnovation.medium.com/the-skai-isnt-the-limit-how-wfp-uses-satellite-imagery-and-machine-learning-in-emergencies-b5c866ace186
  - Google AI Blog: Machine Learning-based Damage Assessment for Disaster Relief
  - https://ai.googleblog.com/2020/06/machine-learning-based-damage.html
- Contact Information: Fiona Huang (fiona.huang@wfp.org)

### Project 2: HungerMap LIVE

- Project Description: Understanding the food security situation requires a thorough analysis of data that are scattered across different data sources and platforms. HungerMapLIVE brings together different streams of publicly available information on food security, nutrition, conflict, weather and a variety of macro-economic data – including from WFP – all in one place to provide a holistic overview of the food security situation at global, country and sub-national levels. The resulting analysis is displayed on an interactive map using advanced data visualization tools. As WFP's global food security monitoring system, the HungerMap LIVE:

  enhances operational effectiveness by identifying areas that are sliding towards food insecurity, providing information on shocks, hazards and other drivers of hunger in real-time, ensuring more informed and timely response to food crises;

  maximises efficiency by providing continuously updated data at a lower cost and in less time, compared to traditional food security monitoring systems alone;

  ensures continuously updated information in countries of interest, regardless of accessibility issues and the scale of WFP's operational presence.
- Department/Division: Research, Assessment and Monitoring Division
- Project Type/Output: Integrated food security information system
- Project Status: Ongoing
- Project Start Year: 2019
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project updates: Since 2020, the HungerMap LIVE has been upgraded in several aspects. Firstly, near real-time food security monitoring systems were scaled up from 15 to over

30 countries to provide continuous updates on the food security situation in countries in or at risk of food crises.

Secondly, the HungerMap LIVE has been improved by applying a new machine learning-based predictive model, which has been trained using a much broader set of data and a refined methodology. The new model provides more precise estimates of the number of people with insufficient food consumption. A technical paper on the predictive model has been submitted for publication (currently under peer review, please see the link below).

Furthermore, WFP has been working on new predictive models to forecast food security indicators up to 1 month in advance, in addition to nowcasting. A technical paper about the forecastability of food insecurity has been submitted for peer review (please see link below).

Thirdly, an alerting system has been integrated into the HungerMap LIVE, which signals a marked deterioration in food intake, in COVID-19 cases, in conflict-related fatalities, and in vegetation anomaly. These new features aim to capture the impact of key drivers of hunger and signal improving or deteriorating circumstances in near-real time.

Finally, a new risk classification framework has been developed using key food security indicators. All data and country classifications are made available through the HungerMap LIVE platform. In addition, a range of new resources including Global, Regional and Country Insights and Key Trends are available and updated daily on the platform (please see the links below).

- Project Domain: Hunger and food security
- Data Source: The HungerMap LIVE combines key metrics from various data sources – such as food security information, weather, population size, conflict, hazards, nutrition information and macro-economic data – to help assess, monitor and predict the magnitude and severity of hunger in near real-time. The HungerMap LIVE system comprises:

  Remote, near real-time food security monitoring systems, collecting data on key IPC/CH indicators every day in over 30 countries experiencing acute food crises and those where WFP has the largest operations.

  Machine learning-based predictive models, providing estimates of the prevalence of acute food insecurity in countries and areas that are stable and where near real-time data is not active yet.

  The HungerMap LIVE global platform, where users can access the food security information to monitor areas at risk or deteriorating across a range of indicators. Related resources include Global, Regional and Country Insights and Key Trends.
- Link to data: https://hungermap.wfp.org/
- Publicly Available Data : Yes
- Predictive model: Python, Docker.

  HungerMap frontend systems: AlibabaCloud (FunctionCompute (serverless APIs), API Gateway (REST APIs), Elastic Compute Service (computing), OSS (object storage), RDS (relational DB), Elastic Container Instance (managed serverless Docker), cloud CDN, DataWorks (data integration)), Azure DevOps (automation), React (frontend)
- Data backends: RedHat OpenShift (k8s-based running environment), MSSQL (relational DB)
- Related Sustainable Development Goals (SDGs): SDG 2 – Zero Hunger; SDG – 17 Partnerships for the Goals
- Partnership(s)/Collaborator(s):
  - UN Partners: Food Security Information Network
  - Government: USAID, DEVCO, DLR
  - Academia: Institute for Scientific Interchange Foundation
- Lessons Learned: Despite the challenges posed by the COVID-19 pandemic, WFP has successfully leveraged the existing remote, near real-time food security monitoring

systems to collect data from new sectors such as school-feeding and plans to expand data collection to other sectors, which will be integrated into the HungerMap LIVE.

For example, WFP is currently working on the integration of gender-disaggregated data and gender-sensitive data. To this end, questionnaires have been adjusted to collect more gender-sensitive data. This information will be displayed in the HungerMap LIVE, along with gender-disaggregated results to better understand intra-household differences in vulnerability.

In addition, the HungerMap LIVE team is working with relevant WFP units to integrate climate-related metrics such as data on climate shocks as well as nutrition data (e.g., micronutrients, acute malnutrition) to the system.

- Links and Multimedia:
  - HungerMap LIVE: https://hungermap.wfp.org/
  - Global Insights and Key Trends: https://static.hungermapdata.org/insight-reports/latest/global-summary.pdf
  - Middle East and Northern Africa Insights and Key Trends: https://static.hungermapdata.org/insight-reports/latest/rbc-summary.pdf
  - Southern Africa Insights and Key Trends: https://static.hungermapdata.org/insight-reports/latest/rbj-summary.pdf
  - Eastern Africa Insights and Key Trends: https://static.hungermapdata.org/insight-reports/latest/rbn-summary.pdf
  - Western Africa Insights and Key Trends: https://static.hungermapdata.org/insight-reports/latest/rbd-summary.pdf
  - Asia and the Pacific Insights and Key Trends: https://static.hungermapdata.org/insight-reports/latest/rbb-summary.pdf
  - Latin America and the Caribbean Insights and Key Trends: https://static.hungermapdata.org/insight-reports/latest/rbp-summary.pdf
  - Country Insights and Key Trends: accessible through the HungerMap LIVE country pages
  - 'Nowcasting food insecurity on a global scale' paper: https://www.medrxiv.org/content/10.1101/2021.06.23.21259419v1
  - 'On the forecastability of food security' paper: https://www.medrxiv.org/content/10.1101/2021.07.09.21260276v1
  - WFP Hunger Monitoring Unit's blog: https://mvam.org/
  - WFP Hunger Monitoring Unit's twitter account: https://twitter.com/mobileVAM
  - HungerMap Launch WFP Insight: https://www.wfp.org/stories/wfp-launches-hungermap-live
  - HungerMap LIVE mock-up: https://docs.wfp.org/api/documents/WFP-0000131795/download/
  - HungerMap LIVE & products mock-up:https://docs.wfp.org/api/documents/WFP-0000131794/download/
- Contact Information: Jonathan Rivers (jonathan.rivers@wfp.org)

**Project 3: MEZA (an Optical Character Recognition system that uses Artificial Intelligence to digitize handwritten records, speeding up data collection and analysis processes and allowing decision makers make data-based decisions in a timely manner.**

- Project Description: Nutrition records for millions of malnourished children lie in remote health clinics around the world. Many of these clinics record patient data using paper-based booklets, which may be easily lost or destroyed. Different stakeholders involved in the fight against malnutrition in affected countries acknowledge that the digitization of these conventional paper-based systems would increase the efficiency and effectiveness of malnutrition management efforts.

  Meza is a tool powered by artificial intelligence, developed by Charitable Analytics International to help digitize handwritten data from the deep field. MEZA uses an Optical Character Recognition technology to rapidly collect nutrition and related health data from remote, low-resource health clinics, enabling WFP and governments to have the information they need to provide high-quality, context-specific, and timely nutrition support. Following a WFP Innovation Bootcamp in June 2018, WFP's Nutrition Division of WFP and WFP's Country Office in the Republic of Congo identified Meza as a potential solution that could enhance the digitization of beneficiary management systems in the Republic of Congo.

  From November 2018 to April 2020, the tool was tested across 45 clinics supported by WFP in the Republic of Congo through two pilots funded by the WFP Innovation Accelerator.
- Entity Name: Innovation Accelerator
- Department/Division: Innovation and Knowledge Management
- Project Type/Output: Software tool
- Project Status: Ongoing
- Project Start Year: 2018
- Project End Year: The plan is to make the project become a WFP corporate tool in case the pilot is successful
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Domain: Agriculture; Education; Health
- Data Source: MEZA uses nutrition data to refine the services offered to people benefiting from various interventions implemented by WFP. These data include, for example: nutrition status of children under 5; nutrition status of pregnant and lactating women and school feeding programme-related data such as information on student attendance.
- Publicly Available Data : No
- Technology/Platform: The tech used is CAI's own software.
- Related Sustainable Development Goals (SDGs): SDG 2 – Zero Hunger; SDG 3 – Good Health and Well-Being; SDG 4 – Quality Education; SDG 17 – Partnerships for the Goals
- Partnership(s)/ Collaborator(s):
  - UN Partners: Indirect collaboration with UNICEF & UNHCR during the Proof of Concept currently tested
  - Private Sector: Charitable Analytics International
- Lessons Learned: WFP conducted a performance review in the summer of 2020 and below are the main lessons learned from the two pilots that were conducted in the Republic of Congo from June 2018 to April 2020.

  1. Facilitate access to mobile network or internet connectivity:

     Clinic workers cited connectivity as one of the key challenges they faced. For instance, one clinic worker had to travel 10 km to access the network and submit photos of the

logbooks. A potential solution to mitigate connectivity limitations could include ICT assessments carried out before deploying a digital solution to ensure selected sites have adequate network connectivity to sync data. If the deployment sites are found to lack connectivity, one of the below models could be used to ensure regular data synchronization:

Bringing mobile devices with adequate internet or 3G connectivity to a central location (for instance, nearby cities or towns) on a weekly or bi-weekly basis; or

Deploying district health officials or WFP staff from field offices as roving agents to visit sites at regular intervals to take photos and sync data with the Meza server once back to base with connectivity.

2. Invest in digital literacy and capacity building for frontline health workers:

   Health workers at remote locations in the Republic of Congo have rather limited exposure to mobile technologies. For instance, out of the five clinic workers interviewed in the post-pilot review, two reported that they had never used smartphones before participating in Meza. While the training before deployment helped introduce health workers to smartphones, the volume of submissions and the quality of photos suggest that some frontline workers need more training than others. Introductory training needs to be tailored to match health workers' capabilities and experience using mobile devices, and follow-up training should be organized at regular intervals to reinforce learning Health workers' capacity to record information in the Meza logbook will contribute to the overall effectiveness of nutrition programmes by minimizing the risk of human error and enhancing data collection to guide effective decision-making.

3. Build confidence in the data extracted from Meza:

   The OCR performed well during the first implementation phase of the Meza pilot as the logbook template was simpler and offered the space required for health workers to write using a large and clear script. The logbooks had to be redesigned during phase two as the CO project leads noticed that the P1 templates only covered 70 percent of the programmatic data needed to produce a meaningful analysis. The P2 logbooks were designed to meet nutrition reporting requirements. However, the OCR performed poorly because of the P2 templates' compact structure as well as data contents (e.g. words and dates) which were beyond the technology's decoding capabilities.

   Subsequently, the data extracted from the tool was not adequately analyzed or utilized in order to determine if it could provide actionable insights - the core value proposition of the project. During phase one, the Meza project managers from the CO M&E unit fed data from the OCR into a Tableau dashboard in order to test if it was possible to derive useful insights. However, staff turnover in the M&E team and the logbook template re-design during phase two meant that the link with Tableau was broken. Additionally, no one at the CO had access to the Tableau dashboards or the technical skills necessary to extract data from the Meza web platform and ingest it into another analytics platform. As the business had no visibility of the data resting in Meza in order to share feedback with external stakeholders, there was scepticism towards the project.

   Going forward, this project should consider the following factors to build a high level of confidence in the data extracted from the tool:

1. Clear specification of the capabilities and limitations of the OCR technology (including but not limited to the type of characters the OCR can or cannot recognize, types of template that the OCR can read without excessive customizations to the template or the technology, prediction accuracy rate and the conditions required for the tool to perform optimally).
2. Close collaboration between the team designing the data collection template and CAI, including adequate time to test before deploying to the field.
3. Determination of an acceptable data accuracy threshold by the business in line with their analytical requirements. This entails close collaboration with and frequent consultations with the end-users of the data (for example Nutritionists at the CO or HQ-levels), to understand their data needs and minimum acceptable data quality to inform programmatic decision-making.
4. Continuous monitoring of data extracted from the Meza web platform vis-à-vis paper records to identify and rectify any discrepancies. Constant and timely feedback to the Meza developers will be valuable in enabling them to improve the tool's performance and data quality.
5. Identification of a data focal point at the CO-level, alongside training geared towards building data literacy for all relevant decision-makers involved in the programme. Alternatively, if capacity at CO is limited, business stakeholders at the HQ or RB-levels should identify and dedicate the resources required to optimally consume data for informing decisions.
6. Regular communication and dissemination of reports using data received through Meza to relevant external stakeholders, including health clinics, to demonstrate the tool's value in supporting programme efficiency.

   Thanks to these learnings, we have decided to test Meza's proof of concept in a controlled environment in collaboration with WFP's technology division. If the concept is proved, the solution will be re-deployed to WFP Country Offices again.

- Contact Information: Nicolas Umuhizi (nicolas.umuhizi@wfp.org)

### Project 4: Optimus

- Project Description: WFP staff face complex, cross-functional challenges every day, often with many possible solutions. Whether it's funding shortfalls, access restrictions due to rainy seasons, new import regulations, or operational scale-ups, every day it's something new. To properly manage the complexity and to enable an agile comparison of potential alternatives, it is critical to use data and optimization to find the right solutions. Optimus is a web application that looks at WFP operations end-to-end to support better planning, helping users identify the most cost-effective solutions using advanced mathematics. It pulls together a wide variety of data—from beneficiary numbers to sourcing options and from transport routes to nutritional values. Users can create their own scenarios or ask Optimus to find optimal plans, taking into account operational restrictions such as lead times and funding and preferences such as nutritional value targets and local procurement targets. A user-friendly interface allows users from any functional area to quickly explore and compare different scenarios.
- Department/Division: Supply Chain/Planning Service
- Project Type/Output: Software tool
- Project Status: Completed
- Project Start Year: 2015
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project updates: Improved user experience: The tool has been refactored, thus becoming increasingly user-friendly.
- Project Domain: Supply Chain
- Data Source: End-to-end Supply chain data

- Publicly Available Data : No
- Technology/Platform:
  - Back End: Django 2.x + Django REST Framework DRF 3.x + Python 3.x, optimization solver: COIN-OR
  - Front End: react.js + Redux
  - Team development: Microsoft Azure
  - Hosting server: AWS
- Related Sustainable Development Goals (SDGs): SDG 2 – Zero Hunger
- Partnership(s)/ Collaborator(s):
  - Private Sector: UPS
  - Academia: The Georgia Institute of Technology (USA), Tilburg University (Netherlands)
  - Lessons Learned: It is crucial to develop the new tool together with the corporate IT team to ensure smooth adoption, integration, and implementation of the best corporate human-centered design practices.
- Links and Multimedia:
  - https://optimus.wfp.org/login/?next=/%3F_ga%3D2.212128916.1670390044.1631111249-1871728533.1615974575
  - https://innovation.wfp.org/project/optimus
  - https://www.youtube.com/watch?v=wdEcVj5LTGg
- Contact Information: Koen Peters (koen.peters@wfp.org)

### Project 5: Humanitarian Chatbots

- Project Description: In emergency and development contexts, communication with affected communities is crucial. Having access to accurate, tailored information and engaging in a dialogue contributes to the resilience and ability of people to cope with a crisis. Since 2016, WFP has been working on the development and rollout of humanitarian chatbots to help deliver vital information to the people in urgent need. This technology improves WFP's outreach to populations in hard-to-reach areas using a mobile device or a computer and complementing existing communication channels and WFP's food security monitoring systems. This technology has proven to be particularly useful during COVID-19, as communication with affected communities has become even more crucial in times of unprecedented uncertainty.

  Chatbots are highly customizable. For example, chatbots can be deployed as part of an assets creation programme to provide information about the use of assets as well as to collect feedback from the users. As part of Complaint Feedback and Mechanism (CFM) systems, chatbots have been useful in offering access to information 24/7. Moreover, the analytics produced by chatbots can inform further interactions; WFP staffs can monitor errors and improve the technology and user experience over time. As such, chatbots are highly user-friendly and do not require a high level of computer literacy, making them accessible to large segments of the population.
- Department/Division: Research, Assessment and Monitoring Division
- Project Type/Output: Software tool
- Project Status: Ongoing
- Project Start Year: 2016
- Reported as part of 2021 Compendium on UN AI Activities? Yes

- Project Updates: In response to the challenges posed by COVID-19 in the Latin America and Caribbean region, WFP rapidly scaled up humanitarian chatbots to provide critical information to vulnerable populations on COVID-19 measures, WFP assistance, and l health-related tips on breastfeeding, nutrition, anemia, among others. Harnessing the ChitChat technology and building on the best practices from previous pilots, WFP has thus provided easy access to accurate health and safety information for affected communities. Chatbots have been an integral part of WFP's humanitarian response in Peru, Colombia, Nicaragua, and Guatemala during the COVID-19 pandemic outbreak and in the face of increasing migration from Venezuela to Peru and Colombia. Chatbots were integrated into the current Complaint Feedback and Mechanism (CFM) systems. In addition to the helpline which receives the high volume of calls, chatbots powered by artificial intelligence can answer the most frequently asked questions and are available 24/7. Users can navigate the chatbot to find information , for example, about WFP, different social protection programs and selection criteria, and cooperating partners on the ground. This builds trust, enhances transparency and counters misinformation, improving the way WFP serves communities facing hunger.
- Project Domain: Agriculture, Health, Weather, Other: Hunger and food security
- Data Source: The data source for the chatbots are stored in the chitchat main site and all differ in content. No personal information is shared, currently only informational material is included. Configuration based chat system. No additional data source consumed or produced.
- Technology/Platform: Chitchat technology - Java, PostgreSQL
- Related Sustainable Development Goals (SDGs): SDG 2 – Zero Hunger; SDG 17 – Partnerships for the Goals
- Partnership(s)/ Collaborator(s):
    - Government: Government of Peru, Government of Nicaragua, Government of Guatemala
    - Academia: Centre for Innovation of Leiden University
- Lessons Learned: Moving forward, WFP will optimize the chatbot builder interface to allow the development of more sophisticated chatbots, to support WFP's global field operations as well as the wider humanitarian and development community.

  WFP will continue developing ad-hoc chatbot scripts leveraging existing key features such as voice recognition, languages settings, channel integration, adapted to particular country and operational contexts. Building on lessons learned from previous pilots, WFP will continue exploring platforms which are more familiar to and widely used by local communities such as WhatsApp.
- Links and Multimedia:
    - Infochatea (Peru): https://infochatea.per.wfp.org/
    - Nutrechatea (Peru): https://nutrechatea.per.wfp.org/
    - Lineachatea (Colombia): https://lineachatea.col.wfp.org
    - Bonochatea (Nicaragua): https://bonochatea.nic.wfp.org/
    - Misegurochatea.(Guatemala): https://misegurochatea.gtm.wfp.org/
    - INFOchatea_dashboard: INFOchatea dashboard - Tableau Server (wfp.org)
    - Bonochatea_dashboard_final: Bonochatea_Dashboard - Tableau Server (wfp.org)
    - WFP Hunger Monitoring Unit's blog: https://mvam.org/
    - WFP Hunger Monitoring Unit's twitter account: https://twitter.com/mobileVAM
    - Humanitarian Chatbots video: https://docs.wfp.org/api/documents/WFP-0000131792/download/

  - Humanitarian Chatbots photo: https://docs.wfp.org/api/documents/WFP-0000131793/download/
  - Humanitarian Chatbots: Kenya Pilot https://www.youtube.com/watch?v=ASHROjd008s
- Contact information: Rossella Bottone (rossella.bottone@wfp.org)

### Project 6: Voice-to-text AI phone survey tool

- Project Description: WFP's field numerators may not be able to conduct face-to-face household nutrition surveys due to the COVID-19 restrictions. In addition, it is costly to conduct surveys through alternative means like call centres. We wish to use an artificial intelligence-powered IVR solution to automate the beneficiary surveying process. The project is set up to (1) test the commercially viable IVR service embedded with AI-powered speech recognition technology; (2) fine-tune open-sourced speech recognition models using audio training data from populations that best represent the demography of WFP beneficiaries in terms of age, gender, region, accent, dining behaviours, and etc.; and (3) compare the performance of the two technologies. Shall the technologies be proven effective, the project will aim for a corporate-wide adoption before scaling to the wider humanitarian and development sector.
- Department/Division: Ethiopia Country Office, Nutrition Division
- Project Type/Output: Software tool
- Project Status: Development
- Project Start Year: 2020
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Updates: The project team is currently collecting, transcribing and verifying audio data from native Amharic speakers based in the Amhara region.
- Project Domain: Nutrition, but with possibility to expand to other Project Domains
- Data Source: Proprietary audio data that is transcribed into text.
- Link to data: No
- Technology/Platform: Python
- Related Sustainable Development Goals (SDGs): SDG 2 – Zero Hunger
- Lessons Learned: Strong data protection provisions will need to be implemented in the future, as the project may need to use personal identifiable information such as audio data from users to enhance its functionalities based on historical data.
- Contact Information: Filippo Dibari (filippo.dibari@wfp.org)

### Project 7: Child Growth Monitor

- Project Description: Malnutrition is a global health crisis and the leading cause of death among children under five. To be able to efficiently treat malnutrition, it must first be detected. This detection requires anthropometric measurements of weight, height, and middle-upper arm circumference. However, measuring children accurately is a challenge, especially in the Global South, due to limited resources, unreliable, bulky traditional measurement hardware and/or lack of trained enumerators. Child Growth Monitor (CGM), an AI-powered smartphone app launched by the German non-profit organization Welthungerhilfe, was created to overcome these issues. With CGM, we aim at developing a non-profit, open-source, mobile solution that leverages artificial intelligence, especially computer vision machine learning technology, to enable frontline-healthcare workers to quickly and accurately measure children under five years, using a smartphone. Our measurements will be used to support the diagnosis of malnutrition of children according to the WHO growth standards and provide quick and accurate data in the most ethical way to organizations working on the UN SDGs and in public health.
- Project Type/Output: Academic paper, Dataset, Software tool

- Project Status: Ongoing
- Project Start Year: 2018
- Project End Year: Founding of a non-profit open-source software business in 2022 for sustainable providing the software and services.
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Updates:
    - CGM was re-positioned as a COVID-19 pandemic response tool;
    - 04/2020 Data tagging tool;
    - 05/2020 App runs on three additional devices;
    - 08/2020 Results are now delivered in just 6 minutes, down from 30 minutes and the application started measuring reliability of measurements;
    - 01/2021 Minimum-viable product was rolled out;
    - 03/2021 Assessment carried out by the Boston Consulting Group confirmed the feasibility of the solution, business model and the ability of the project team to create the product as planned (BCG Gamma 06/2021);
    - Plans of testing CGM in further counties: Nepal, Bangladesh, Uganda and Zimbabwe with BMZ, field test in Namibia with UNAM and UNICEF;
    - First discussions conducted with partners for validation study;
    - Studies on Racial Bias in artificial intelligence and COVID-19 are being conducted in collaboration with Microsoft;
    - We were able to build up a solid team and restructure the development team into 3 different units.
- Project Domain: Health
- Data Source: All the present data was collected from two states of India, Rajasthan (Baran district) and Madhya Pradesh.

  (Chatarpur and Sheopur districts), during 2017-2019, using the Child Growth Monitor phone app developed by Welthungerhilfe. We focus on data collected for children who can stand (usually two-five years of age) for this work. The data was collected in the regional Anganwadi centers, which are a type of rural child care center in India. The data collectors were mostly young adults (20-30 years old) and received a four-day data collection training.

  After receiving consent from their legal guardians, children were asked to stand in front of a solid-colored wall. If needed, a white banner was placed behind the child to replicate a wall. All the videos were recorded using the Lenovo Phab 2 Pro phone, which has a time-of-flight sensor to capture point cloud data at 1920x1080 resolution with three frames/second. The point cloud videos were converted into depth images in the data processing stage. For each child, the data collector used the phone app to collect three point cloud videos: (a) front video: where the child is facing the camera, (b) back video: where the child's back is facing the camera (Figure 1a), and (c) 360 video: where the child was asked to spin slowly to capture a 360-degree view of the child. The data collector decided the length of these videos; usually, the front and back videos were 2-4 seconds long, while the 360 videos were 5-8 seconds. (Note: For front and back data, a single image would have sufficed, however as children move frequently, we opted for videos.) The data collector ensured that the child's head to toe was fully visible in each video. Next, manual measurements of the ground truth weight, height, and mid-upper arm circumference (MUAC) were taken, using the standardized weight machine, height board, and MUAC tape, respectively. On average, it took 15-20 mins to collect data for a child, involving consent forms, digital videos, and manual measurements. In case the child did not co-operate, they move to the next child. The child and/or guardian did not receive any

incentive for participation. Overall, data was collected for 3887 children, and the age-wise distribution of the point cloud video dataset is shown in Table I.

## TABLE I – AGE-WISE DISTRIBUTION OF TRAINING AND TEST VIDEOS

| Age | Total | Training | Test |
|---|---|---|---|
| 2-3 | 1030 | 712 | 318 |
| 3-4 | 1370 | 895 | 475 |
| 4-5 | 1487 | 974 | 513 |
| Total | 3887 | 2581 | 1306 |

- Publicly Available Data : No
- Technology/Platform:
  - Lenovo Phab 2 Pro / Huawei P30 Pro Android Smartphones
  - Microsoft Azure
  - Python
  - Tensorflow
  - Jupyter Notebooks
  - More details can be found in the cgm-* GitHub repositories https://github.com/orgs/Welthungerhilfe/repositories
- Related Sustainable Development Goals (SDGs): SDG 1 – No Poverty; SDG 2 – Zero Hunger; SDG 3 – Good Health and Well-Being; SDG 17 – Partnerships for the Goals
- Partnership(s)/ Collaborator(s):
  - Partners in Measurement Prediction (AI and ML) (Support with research and development of the approach to measurement prediction): Technische Hochschule Ingolstadt, Leipzig Research Center for Civilization Diseases, Tilburg University, Microsoft, Open Sorce Community
  - Partners in Implementation in the Field (Distribution of mobile application on commodity smartphones to field workers, as well as further IT Integration and support): UNICEF, Government of Madhya Pradesh, Action Contre La Faim, Fight Against Hunger Foundation, Clifford Chance, Msg Advisors, Global Nutrition Cluster, University of Namibia, SMART
  - Partners in Tech (Collaboration with partners to bring the solution from specific IR phones to commodity smartphones): Microsoft, SONY, PHAT Consulting
  - Partners is Endorsement & Funding (Endorsement of mobile application in the field, dissemination of data, demonstration of usage benefits and rewards): WFP, Deutsche Telekom, Microsoft, GSMA ,Boston Consulting Group, Tereska Foundation, Happel Stiftung, Government of Madhya Pradesh, Munich RE, Federal Ministry for Economic Cooperation and Development (BMZ) ,Deutsche Gesellschaft für internationale Zusammenarbeit (GIZ)
- Links and Multimedia:
  - https://arxiv.org/abs/2105.01688

- https://childgrowthmonitor.org/
- http://github.com/Welthungerhilfe/
- https://twitter.com/ChildGrowthMon
- https://www.youtube.com/watch?v=f2doV43jdwg
- https://www.youtube.com/watch?v=PAvGwHqgr8k
- https://www.youtube.com/watch?v=Ni9PlO00cZ0
- https://www.youtube.com/watch?v=FfYxIkp_vw4
- https://www.youtube.com/watch?v=RuluVPJLTEA
- https://www.itu.int/en/ITU-T/AI/2018/Documents/Presentations/Jochen%20Moninger.pdf

- Lessons Learned:

1. Well-aligned partnerships are essential to driving the innovation process.
2. A stage-gate project approach with well-defined milestones can minimize risks and is key to funding a complex and long-term innovation.
3. Ensuring funding for Software and Machine Learning Engineers, Data Scientists and Software Development may be challenging in the current system that tends to prioritize emergency response and short-term impact over driving game-changing innovations involving a higher risk and uncertainty.

   User-centric design and agile organizations and processes are required to achieve long-term sustainable solutions.

- Contact Information: Markus Pohl (Head of Project) / Markus Matiaschek (Head of Tech) (Markus.Pohl@welthungerhilfe.de / mmatiaschek@childgrowthmonitor.org,)

### Project 8: Combination of Drone and Sentinel-2 data for crop type mapping over areas of resilience interventions

- Project Description: Crop land and type mapping is crucial in the assessment of agricultural production of a country. It is also a critical prerequisite for the monitoring and assessment of changes in agricultural livelihood resources, which is particularly important in areas affected by conflict, natural disasters and other disruptions, allowing staff to timely allocate resources and deliver food assistance. However, the collection of ground data tends to take considerable time and may be particularly expensive and hard to carry out in emergency contexts.

  The current project explores innovative methodologies for making the crop type mapping process more efficient and cost-effective. A combination of images from drones and satellites such as Sentinel-2 open up new possibilities for obtaining accurate data from the ground. WFP is testing the use of drones to capture images from much larger areas, compared to conventional data collection methods which use enumerators or smartphone applications which lead to relatively small sample sizes. The drone images are then classified into different crop types with high or sufficient accuracy. The ultimate goal is to use the drone data to train the Sentinel-2's machine learning model to recognise different types of crops over larger unsampled areas. As a result, this new process combining artificial intelligence with drone and satellite imagery data will substantially reduce field work and automate the process of crop type mapping.
- Department/Division Research, Assessment and Monitoring Division
- Project Type/Output: Academic paper, Software tool
- Project Status: Ongoing
- Project Start Year: 2018

- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project updates: A new ground data capture experiment using drones was carried out in Mozambique in 2021, which resulted in a more extensive field data collection.
- Project Domain: Agriculture
- Data Source: Sets of drone images covering about 0.5Km2 each, coupled with smartphone acquired samples of labelled field perimeters. Sentinel-2 data covering the sampled areas.
- Publicly Available Data : No
- Technology/Platform: The main technology used to develop the project is a Jupyter Notebook containing Python code. Keras and TensorFlow libraries power the artificial intelligence behind the project. Finally, the technology includes convolutional neural networks pre-trained on computer vision datasets such as ImageNet, among others, to transfer knowledge applicable to classification of drone data.
- Related Sustainable Development Goals (SDGs): SDG 2 – Zero Hunger; SDG – 17 Partnerships for the Goals
- Partnership(s)/Collaborator(s):
    - UN Partners: World Food Program
    - Government: National Disaster Management Institute, Ministry of Agriculture, Mozambique
- Lessons Learned: It is important to collaborate with the local government when deploying new technologies. Since the early-phase, the project has been implemented in collaboration with the Government of Mozambique and the Mozambique National Disaster Management Institute, which have contributed to a safe and effective deployment of drone technology. Currently, drones are helping local authorities in different activities including crop mapping, flood modelling, and damage assessments).
- Contact Information- Artur Nowakowski, Rogerio Bonifacio (artur.nowakowski@wfp.org, rogerio.bonifacio@wfp.org)

### Project 9: AI4Human – AI for Humanitarian Applications (DLRR and WFP)

### Project 9A: AI for Human

- Project Description: AI for Human is an artificial-intelligence-assisted building damage detection and classification tool used in the aftermath of natural disasters such as floods, cyclones and earthquakes. The project was focused on the development of methods and processing environments to detect changes in infrastructure and buildings by using machine learning techniques. The main focus is on the demand-driven development of existing deep learning methods and the provision of software for humanitarian organisations, to speed up response times in emergencies. WFP is particularly interested in exploring and testing the use of artificial intelligence-enabled procedures, for instance, for detecting infrastructure damages caused by natural disasters. WFP will provide the datasets used for the case study The project will also evaluate and illustrate the opportunities and and limitations pertaining to the machine learning methods in this specific technology.

### Project 9B: Fusion of Remote Sensing and Web-based data sources

- Project Description: This project explores the systematic development and evaluation of national and global data and metadata published on the Internet to assess its usability for the derivation of crisis-related information. National and global databases published on the Internet and blogs, newsfeeds and social media contributions are a complementary source of information on satellite imagery and derived products. Therefore, the acquisition and aggregation of such data and the integrated presentation of these two sources of

information (e.g. in mapping products of the ZKI or web-based services) can greatly contribute to an overall analysis. The fusion techniques will be developed and tested grounded on past or ongoing crisis situations. For example, humanitarian emergencies such as floods in Mozambique in 2019 can be included in the model (from M1). Data on refugee camps and their dynamic developments will also be added systematically (from M13). Finally, analyses of food security issues such as post harvest loss estimation in Africa can also potentially enhance the model.

- Department/Division: Emergency Operations Division
- Project Type/Output: Dataset/Software tool
- Project Status: Completed
- Project Duration: 2019- 2021
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project updates: Currently developing algorithm for building damage detection and classification including road damage assessment.
- Project Domain: Environment, Human Rights, Telecommunications, Weather, Humanitarian Emergencies related to natural disaster and/or conflict
- Data Source: Satellite data, labelled training datasets for damaged (and undamaged) buildings, road, other infrastructure, Twitter data related to crisis information.
- Publicly Available Data : No
- Technology/Platform: Python, Jupyter Notebook, Linux, TensorFlow, NLP
- Related Sustainable Development Goals (SDGs): SDG 1 – No Poverty; SDG 2 – Zero Hunger; SDG 13 – Climate Action
- Partnership(s)/ Collaborator(s):
    - Private Sector: DLR – German Aerospace Center
- Contact Information: Michael Andrew Manalili (michael.manalili@wfp.org)

### Project 10: Fampred

- Project Description: FamPred project is complementary to WFP's HungerMap LIVE humanitarian mapping project (https://hungermap.wfp.org). FamPred expands the HungerMap LIVE's capabilities to forecast food crises by adding projections on insufficient food consumption. Artificial intelligence offers new opportunities for forecasting food insecurity in complex systems, where an approach known as "reservoir computing" is among the most promising. The project aims to develop a reservoir-computing-based prediction model using relevant datasets for the identified geographies in HungerMap LIVE. This model would strengthen WFP's and national governments' capacities to predict crises, deploy resources and prevent food crises outbreaks, ensuring communities at risk of hunger continue to get the support they need, when they need it.
- Department/Division): INKA
- Project Type/Output: Software tool
- Project Status: Completed
- Project Start Year: 2021
- End Year: 2021
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Domain: Agriculture
- Data Source: Satellite data
- Publicly Available Data : No
- Technology/Platform: We plan to develop a reservoir computing-based prediction model using well-suited data sets for the identified geographies

- Related Sustainable Development Goals (SDGs): SDG 1 – No Poverty; SDG 2 – Zero Hunger
- Partnership(s)/Collaborator(s):
  - UN Partners: WFP
  - Government: DLR
- Contact Information: Raghu Nallabotula (raghu.nallabotula@wfp.org)

## 2. Related Sustainable Development Goals

SDG 1, 2, 3, 4, 13, 17

## 3. Relevant Link

https://www.wfp.org/

Contact Information

Fiona Huang (fiona.huang@wfp.org); Kyriacos Koupparis (kyriacos.koupparis@wfp.org); Bernhard Kowatsch (bernhard.kowatsch@wfp.org); Jean-Martin Bauer (jean-martin.bauer@wfp.org); Hila Cohen (hila.cohen@wfp.org)

# World Health Organization

## 1. Description of Activities on AI

In recognition of the growing importance of digital health technologies—including AI—the WHO Member States unanimously adopted the resolution on Digital Health during the 71st World Health Assembly on 26 May 2018 in Geneva, Switzerland (WHO, 2018). Following this MS agreed on the *Global strategy on digital health 2020–2025* (www.who.int/dhstrategy) which highlights the importance of artificial intelligence. It is deeply embedded in the 172 implementation actions endorsed by Member States, with specific focus under digital health governance and human-centred health system. During the opening speech of the 144th session of the WHO Executive Board on 24 January 2020 in Geneva, Switzerland, the importance of digital health (and, particularly, AI for health) was reinforced: "the future of health will be influenced by digital health significantly [and WHO must] embrace it, but at the same time, WHO should be ahead of the curve in digital health, in order to contribute to global health [...] working with the International Telecommunications Union to find new ways of using artificial intelligence to get care to remote communities" (WHO, 2020)

To provide cross-cutting guidance on Ai for health, The ITU-WHO Focus Group on Artificial Intelligence for Health (FG-AI4H) was created by the ITU and WHO to explore the potential for standardization work in the application of AI to health in 2018. In particular, it has looked at and created guidance (including open-source implementations) on the benchmarking of AI for health solutions. With ten cross cutting guidance and 23 topic areas in the process of developing benchmarks, and several already having produced the first experimental audits, the Focus Group has set a strong foundation at this opportune time for the Focus Group to transition to a long-term institutional structure.

AI has enormous potential for strengthening the delivery of health care and medicine and helping all countries achieve universal health coverage. This includes improving diagnosis and clinical care, enhancing health research and drug development and assisting with the deployment of different public health interventions, such as disease surveillance, outbreak response, and health systems management.

At the same time, AI raises some important ethical concerns, such as Equity and the digital divide, data protection, and the regulation of the private sector in this area, which includes several of the world's largest technology companies. Thus, equity and greater participation from LMICs in AI R&D is an important component that need greater collaboration in addressing.

To address these questions, WHO has specific activities and guidance that will help to strengthen the potential role of AI, the approaches that will facilitate the potential for research,

and the appropriate use of data, training, and development of AI. Some of the major activities at WHO includes:

- Guidance on Ethics & governance of AI, : last year WHO published this guidance which contains a set of consensus principles to provide guidance to AI developers, MoH, and clinicians. The interest from our Member States for these areas has been tremendous, and we have been working with them in the implementation and adaptation of the global guidance to local needs. Earlier this year WHO also released a training course on this guidance, https://openwho.org/courses/ethics-ai, the course is designed to provide knowledge to policymakers, AI developers and designers, and health care providers who are involved in designing, developing, using and regulating AI technology for health
- Ai benchmarking framework : together with ITU, WHO is also developing benchmarking framework on AI for health together with several other collaborators . This includes in addition to ethics and governance , regulatory considerations , implementation scaleup and adoption guidance, technological and data specifications as well as evidence collation of specific health topic areas.
- WHO and ITU together with key partners are currently discussing the potential of a way to create a global initiative on AI for health to bring stakeholders together to build solutions that adhere to these principles and best practices.
- In addition the ongoing development of our SMART guidelines approach- making available clear data capture, semantic and syntactic standards for each health domain will help create globally consistent datasets. This allows data pooling and training of algorithms against prioritized health and system outcomes.
- WHO also released Generating Evidence for Artificial Intelligence Based Medical Devices: A Framework for Training Validation and Evaluation (https://www.who.int/publications/i/item/9789240038462) This first-of-its-kind publication from the WHO is a framework targeted at developers and researchers of AI-based software as a medical device, as well as policy-makers and implementers. It is intended to guide those seeking to understand the evidence generation requirements from development to post-market surveillance of these devices. The framework uses cervical cancer screening as a use-case to support the goals of the WHO strategy on cervical cancer elimination and set the foundations for WHO to be able to usher in new and emerging technologies in cancer screening and beyond.
- WHO is also working with several experts to develop the Regulatory considerations on Ai for health, This guidance document aims to deliver considerations to MS on Regulatory Considerations around Artificial Intelligence for Health that covers the following 6 general topic areas: Documentation & Transparency, Total Product Lifecycle Approach & Risk Management, Intended Use and Analytical & Clinical Validation, Privacy and Data Protection, and Engagement & Collaboration. meant as a listing of key regulatory concepts and a resource that can be considered by all relevant stakeholders in medical devices ecosystems, including but not limited to, developers who are exploring and developing AI solutions, regulators who might be in the process of identifying approaches to manage and facilitate AI solutions, manufacturers who design and develop AI-embedded medical devices, health practitioners who deploy and use such medical devices and AI solutions, and those working to remit.

In addition to the above key cross-cutting guidance documents, and with the objective of truly enabling Ai to health build resilient health systems, WHO is also working on several use cases around AI for health policy, research, evidence gathering and review and implementation programs in the technical areas of TB, cervical cancer, traditional and complementary medicine, medical devices, breast cancer, diabetes, food fortification and security, emergencies and pandemic preparedness and response, ageing as some of the examples.

Global Strategy on Digital Health 2020- 2025. Geneva: World Health Organization; (2020) (https://www.who.int/docs/default-source/documents/gs4dhdaa2a9f352b0445bafbc79ca799dce4d.pdf?sfvrsn=f112ede5_58)

Thirteenth General Programme of Work 2019–2023. Geneva: World Health Organization; (2020) (https://www.who.int/about/what-we-do/thirteenth-general-programme-of-work-2019---2023)

The WHO guidance on Ethics & Governance of Artificial Intelligence for Health (https://www.who.int/publications/i/item/9789240029200)

WHO ITU Ai for health focus group https://www.itu.int/en/ITU-T/focusgroups/ai4h/Pages/default.aspx

https://www.itu.int/en/ITU-T/focusgroups/ai4h/Documents/FG-AI4H_Whitepaper.pdf

WHO Publication : Generating Evidence for Artificial Intelligence Based Medical Devices: A Framework for Training Validation and Evaluation (https://www.who.int/publications/i/item/9789240038462)

## 2. Relevant Links

https://www.who.int/

Contact information

Alain Labrique (Labriquea@who.int), Sameer Pujari (pujaris@who.int), Ursula Zhao (Zhaoy@who.int), and Shada Alsalamah (Alsalamahs@who.int)

# World Intellectual Property Organization

## 1. Description of Activities on AI

### Project 1: WIPO Translate

- Project Description: "WIPO Translate is a market-leading translation software for specialized text. Originally created to translate patent documents, WIPO Translate can also be adapted and customized to other technical Project Domains. Once trained in a specific subject area, WIPO Translate has been shown to out-perform other paid and free translation tools."
- Project Type/Output: Software tool
- Project Status: Full fledged development
- Project Domain: Intellectual Property
- Data Source: Translation database
- Technology/Platform: Supervised learning and Natural Language Processing (NLP)
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 9 – Industry, Innovation, and Infrastructure
- Relevant Links and Multimedia: https://www.wipo.int/wipo-translate/en/
- Lessons Learned: Project Domain adaptation (we need different models for different Project Domain). E.g. patent translation is totally different than conference translation.
- Contact Information: Sandrine Ammann (sandrine.ammann@wipo.int)

### Project 2: WIPO Speech-to-Text

- Project Description: WIPO speech-to-text (S2T) is a homemade transcription tool for conferences. It generates an automatic transcript, which becomes available few minutes after the meeting. This transcript can be further cascaded through WIPO Translate in order to generate UN-6 language reports (always synchronized with the original video). It has been successfully used in other organizations.
- Project Type/Output: Software tool
- Project Status: Full fledged development
- Project Domain: Intellectual Property
- Data Source: Conferences
- Technology/Platform: Supervised learning for automatic speech recognition
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 9 – Industry, Innovation, and Infrastructure
- Relevant Links and Multimedia: https://www.wipo.int/s2t/
- Lessons Learned: Adapt to various speakers: in international conferences native and non-native accents is a challenge.

- Contact Information: Sandrine Ammann (sandrine.ammann@wipo.int)

### Project 3: WIPO Brand Image Search

- Project Description: Perform a trademark search by text or image in brand data from multiple national and international sources, including trademarks, appellations of origin and official emblems.
- Project Type/Output: Software tool
- Project Status: Full-fledged development
- Project Domain: Intellectual Property
- Data Source: Global Brand Database
- Technology/Platform: Computer Vision
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 9 – Industry, Innovation, and Infrastructure
- Relevant Links and Multimedia: https://www3.wipo.int/branddb/en/
- Lessons Learned: Adapt to various speakers: in international conferences native and non-native accents is a challenge.
- Contact Information: Sandrine Ammann (sandrine.ammann@wipo.int)

### Project 4: International Patent Classification (IPC)

- Project Description: The International Patent Classification (IPC) provides for a hierarchical system of language independent symbols for the classification of patents and utility models according to the different areas of technology to which they pertain.
- Project Type/Output: Software tool
- Project Status: Full-fledged development
- Project Domain: Intellectual Property
- Data Source: Patents
- Technology/Platform: Classification and machine learning.
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 9 – Industry, Innovation, and Infrastructure
- Relevant Links and Multimedia: https://www.wipo.int/classifications/ipc/en/
- Lessons Learned: Adapt to various speakers: in international conferences native and non-native accents is a challenge.
- Contact Information: Sandrine Ammann (sandrine.ammann@wipo.int)

### Project 5: WIPO Conversation on IP and Frontier Technologies

- Project Description: The objective of the WIPO Conversation is to provide Member States with an opportunity to exchange views on various topics regarding frontier technologies, including AI, and to formulate questions with respect to the possible impact of frontier technologies on the IP system.
- Project Type/Output: Conference
- Project Status: Ongoing
- Project Start Year: 2019
- Project Domain: Intellectual Property
- Reported as part of 20210 Compendium on UN AI Activities? Yes

- Project Updates: WIPO has expanded the scope of the Conversation to cover frontier technologies as a whole. While AI remains an important component of our work, it will not be its sole focus either. WIPO will also ensure that these sessions have a practical, as well as conceptual emphasis – reflecting the fact that frontier technologies are piecing together a new kind of global economy.
- Related Sustainable Development Goals (SDGs): SDG 9 – Industry, Innovation, and Infrastructure
- Relevant Links and Multimedia: https://www.wipo.int/about-ip/en/frontier_technologies/frontier_conversation.html
- Contact Information: Alica Daly (alica.daly@wipo.int)

### Project 6: AI and IP Strategy Clearing House

- Project Type/Output: Clearing House
- Project Status: Ongoing
- Project Start Year: 2020
- Project Domain: Intellectual Property
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 9 – Industry, Innovation, and Infrastructure; SDG 17 – Partnerships for the Goals
- Relevant Links and Multimedia: https://www.wipo.int/about-ip/en/artificial_intelligence/policy.html#clearing_house
- Contact Information: Alica Daly (alica.daly@wipo.int)

### Project 7: WIPO Technology Trends

- Project Description: WIPO Technology Trends (WITT) on AI - the analysis of more than 340,000 AI-related patent applications and 1.6 million scientific papers published since the 1950s, and comments and suggestions made by 27 world leaders in the field
- Project Type/Output: Report
- Project Status: Completed
- Project Duration: 2018-2019
- Project Domain: Intellectual Property
- Data Source: Patents, scientific publications
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Related Sustainable Development Goals (SDGs): SDG 9 – Industry, Innovation, and Infrastructure; SDG 17 – Partnerships for the Goals
- Relevant Links and Multimedia: http://www.wipo.int/tech_trends/en/artificial_intelligence/
- Contact Information: Alica Daly (alica.daly@wipo.int)

### Project 8: WIPO Virtual AI Exhibition

- Project Description: In order to assist stakeholders in better understanding the issues arising for IP due to AI, WIPO will launch a virtual IP and AI exhibition.
- Project Type/Output: Virtual Exhibition
- Project Status: Completed
- Project Start Year: 2020
- Project End Year: 2020
- Project Domain: Intellectual Property
- Reported as part of 2021 Compendium on UN AI Activities? Yes

- Related Sustainable Development Goals (SDGs): SDG 9 – Industry, Innovation, and Infrastructure; SDG 17 – Partnerships for the Goals
- Relevant Links and Multimedia: https://www.wipo.int/about-ip/en/frontier_technologies/ai_and_ip.html#virtual
- Contact Information: Alica Daly (alica.daly@wipo.int)

## 2. Related Sustainable Development Goals

SDG 9, 17

## 3. Relevant Links

https://www.wipo.int/portal/en/index.html

Contact Information

Alica Daly (alica.daly@wipo.int) and Victor Owade (victor.owade@wipo.int)

# World Meteorological Organization

## 1. Description of Activities on AI

### Project1: Research Board Concept Notes on Exascale Computing, Data Handling, and AI

- Project Description: The two Concept Notes identify challenges and opportunities on Exascale computing, data handling and AI for weather, climate, water and the environment and make recommendations to the WMO Research Board. It will serve as a guideline for the Research Board to plan its follow up activities and facilitate collaboration and interactions within WMO and with partners.
- Department/Division: WMO Research Board on Weather, Climate, Water and the Environment
- Project Type/Output: White Paper
- Project Status: Finished
- Project Start Year: 2020
- Project End Year: 2022
- Project Domain: Environment
- Reported as part of 2021 Compendium on UN AI Activities? Yes
- Project Updates: The initial Concept Note has been evolved into two interconnected concept notes – one is focusing on Exascale computing and data and the other on use of AI and data exploitation in environmental modelling. The two Concept Notes had been reviewed by WMO entities and wide community and are going to be published.

  In addition, WMO, ITU and UNEP has jointly established the Focus Group on AI for Natural Disaster Management (FG-AI4NDM) with the aim to exploring best practices in the use of AI for assisting with data collection and handling, improving modelling across spatiotemporal scales, and providing effective communication.

  WMO has attended 6 FG-AI4NDM meetings and hosted a Sixth meeting of FG-AI4NDM in Geneva on 7-9 June 2022, finalized the roadmap and glossary, and reviewed new use case proposals, and advanced the deliverables of the working groups.

  Working group papers (and distilled 'policy brief' versions) from the FG on modelling, data and communications were presented and shared with delegates by the WMO at the Multi-Hazard Early Warning Conference (MHEWC-III) in Bali in May 2022.

  Finally, at the 6th (in person) meeting of the FG-AI4NDM in Geneva in June 2022, a new working group on Educational Materials was created. Its aim is to drive the development and dissemination of policy briefs, educational materials, and training tools related to the work of the overall FG. The new WG is being chaired by the WMO's Science and Innovation department.
- Related Sustainable Development Goals (SDGs): SDG 9 – Industry, Innovation, and Infrastructure; SDG 11 – Sustainable Cities and Communities; SDG 13 – Climate Action; SDG 17 – Partnerships for the Goals
- Partnership(s)/Collaborator(s):

  - UN Partners: ITU/WMO/UNEP Focus Group on AI for Natural Disaster Management
  - Government: National Meteorological and Hydrological Services
  - Private Sector: Private companies on AI and technologies
  - Academia: Modeling centers and research institutes
- Relevant Links and Multimedia:
  - https://community.wmo.int/governance/commission-membership/research-board
  - https://community.wmo.int/activity-areas/wwrp
  - https://www.wcrp-climate.org/
  - https://community.wmo.int/activity-areas/gaw
  - https://www.itu.int/en/ITU-T/focusgroups/ai4ndm/Pages/default.aspx
- Lessons Learned: Recognizing the complexity of the topics and their different stages, the initial document had evolved into two interconnected concept notes to better reflect challenges and opportunities and make recommendations.
- Contact Information: Wenchao Cao (wcao@wmo.int), Jürg Luterbacher(jluterbacher@wmo.int)

### Project2: Prize Challenge to improve Sub-seasonal to Seasonal Predictions using Artificial Intelligence

- Project Description:

  WMO launched the Challenge in June 2021 with the aim to improve, through AI/Machine Learning techniques, the current precipitation and temperature forecasts for 3 to 6 weeks into the future from the best computational fluid dynamic models available today.

  This Challenge was organized by the Subseasonal-to-Seasonal Prediction Project (S2S Project), coordinated by the World Weather Research Programme (WWRP)/World Climate Research Programme (WCRP), in collaboration with the Swiss Data Science Center and the European Centre for Medium-Range Weather Forecasts (ECMWF).

  After the submission phase closed until 31 October 2021, the Organizing Committee received 9 submissions from a wide range of countries, among which 5 submissions beat the calibrated ECMWF benchmark and climatology. Based on the ranked probability skill scores (RPSS) and the verification by an experts review for the top ranked submissions, the Organizing Committee selected the top 3 submissions.
- Department/Division: WMO WCRP/WWRP
- Project Type/Output: AI Prize challenge
- Project Status: finished
- Project Start Year: 2021
- Project End Year: 2022
- Project Domain: Environment
- Reported as part of 2021 Compendium on UN AI Activities? No
- Project Updates:. The s2s-ai-competition is officially over. The expert peer review gave a pass on all five submissions. Based on the leaderboard, the prizes were announced on February 2022. The organizers encourage everyone to post new contributions on renku in the future and to take advantage of the software framework developed for the competition. This website and the renku projects will be kept available until December 2023.
- Related Sustainable Development Goals (SDGs): SDG 9 – Industry, Innovation, and Infrastructure; SDG 11 – Sustainable Cities and Communities; SDG 13 – Climate Action; SDG 17 – Partnerships for the Goals

- Partnership(s)/Collaborator(s):
  - UN Partners: WMO WCRP/WWRP
  - Government: Swiss Data Science Center
  - Academia: European Centre for Medium-Range Weather Forecasts (ECMWF)
- Relevant Links and Multimedia:
  - https://s2s-ai-challenge.github.io/
  - https://community.wmo.int/activity-areas/wwrp
  - https://www.wcrp-climate.org/
- Lessons Learned: This AI challenge Improved sub-seasonal-to-seasonal precipitation and temperature forecasts with Machine Learning/Artificial Intelligence. AI competition is a good tool and way to promote AI's application and development and provide viable solutions in weather and climate domains.
- Contact Information: Wenchao Cao (wcao@wmo.int), Jürg Luterbacher(jluterbacher@wmo.int)

## 2. Related Sustainable Development Goals

SDG 9, SDG 11, SDG 13, SDG 17

## 3. Related Links

https://public.wmo.int/en

Contact Information

Kanghui Zhou(kzhou@wmo.int)

# World Bank Group

## 1. Description of Activities on AI

### Project 1: Natural Language Processing (NLP) to evaluate the presence of gender biases in the written decisions of judges

- Project/initiative description: Natural Language Processing (NLP) to evaluate the presence of gender biases in the written decisions of judges
    - Do Judges Favor their Own Ethnicity and Gender? Evidence from Kenya: Leveraging publicly available information on hundredths of thousands of judicial decisions in Kenya, the team uses NLP to measure gender attitudes in the language of decisions and evaluate the presence of gender biases. The paper finds that the written judgments are on average shorter and less likely to be cited when defendants who are of the same gender or ethnicity as the judge win their case. This is consistent with in-group biased decisions being of lower quality. In addition, the findings show that female defendants are less likely to win the case if the judge exhibits stereotypical or negative attitudes towards women in their writings.
    - Gender Attitudes in the Judiciary: Evidence from U.S. Circuit Courts: this is earlier work by some of the team members using the same method for the US. The paper proposes a novel judge-specific measure of gender attitudes based on use of gender-stereotyped language in the judge's authored opinions. The authors find that slanted judges vote more conservatively in gender-related cases. Slant influences interactions with female colleagues: slanted judges are more likely to reverse lower-court decisions if the lower-court judge is a woman than a man, are less likely to assign opinions to female judges, and cite fewer female-authored opinions.
- Department/Division: Development Impact Evaluation (DIME)
- Project type: Research Report
- Project status: completed
- Project start year: 2019
- Project end year: 2022
- Related SDGs: SDG 16 on Peace, justice, and strong institutions
- Partners: none
- Any publicly available URL links/multimedia: https://openknowledge.worldbank.org/handle/10986/37108; https://ideas.repec.org/p/cge/wacage/462.html
- Project lead contact: Daniel Chen (dchen9@worldbank.org ); Manuel Ramos-Maqueda (mramosmaqueda@worldbank.org )

### Project 2: Transmitting AI Training: Evidence from Policymakers in Pakistan

- Project/initiative description: Transmitting AI Training: Evidence from Policymakers in Pakistan
    - How does AI training impact policymaking? We randomly assign a rigorous "AI for policy" workshop to deputy ministers in Pakistan and find that deputy ministers shift their attitudes towards AI and increase funding for digitization, a precursor to AI. During this randomized evaluation of the training program, we then cross-randomized ministers to receive AI fairness activism that emphasizes the inescapability of algorithmic bias. AI fairness activism causes policymakers to report greater costs associated with AI in policymaking and decrease funding for digitization. Both interventions transmit from the deputy ministers to their subordinate staff and impact the population. Amid land record digitization efforts, treated ministers' jurisdictions reduced delays in handling land disputes by 33%. AI training increases downstream support for AI in policy making while AI fairness activism reduces the effect of the training.
- Department/Division: Department/Division: Development Impact Evaluation (DIME)
- Project type: Development Research Report
- Project status: Working paper draft
- Project start year: 2020
- Project end year: 2022 (Expected)
- Related SDGs: SDG 16: Peace, Justice and Strong Institutions
- Partners: Pakistan National Institute for Public Policy
- Any publicly available URL links/multimedia: http://users.nber.org/~dlchen/papers/Transmitting_AI_Training.pdf
- Project lead contact: Daniel Chen (dchen9@worldbank.org ); Sultan Mehmood (smehmood@nes.ru )

### Project 3: Transport Systems Improvement Project (TRANSIP) in Ethiopia using AI

- Project/initiative description: As a subcomponent of the Transport Systems Improvement Project (TRANSIP) in Ethiopia impact evaluation component, we have developed a video analysis tool using open-source AI and computer vision algorithms to produce data on incidents, such as near collisions, that are not normally captured by traditional road safety data, which tends to focus on accidents and fatalities. Using CCTV footage of over 200,000 minutes from surveillance cameras located around Addis Ababa, we employ AI to detect different types of objects, such as cars, buses and pedestrians. Furthermore, we assemble the objects' trajectories, assign them to location specific movements (such as jaywalking, east-left-turn, etc.), compute their speed and develop a granular measure of near collisions between objects. This data will be used to evaluate the road safety related impact of different road improvements across the city and improve the targeting of interventions.
- Department/Division: Department/Division: Development Impact Evaluation (DIME) and the Transport Global Practice Unit
- Project type: Development Research Report
- Project status: ongoing
- Project start year: 2018
- Project end year: 2024 (expected)
- Related SDGs: 3.6
- Partners:
- Any publicly available URL links/multimedia:

- Project lead contact: Nino Pkhikidze (npkhikidze@worldbank.org ), Girija Borker (gborker@worldbank.org )

### Project 4: Using AI to Analyze Road Traffic Crash Data in Kenya

- Project/initiative description: Data on road traffic crashes is lacking in low-income countries with official data estimated to capture only 17% of road traffic deaths. Missing data largely results from poorly developed administrative data systems that often rely on paper records where data is not up to date. This project investigates whether data generated from smartphones and social media usage can help fill gaps in administrative records. Specifically, the project creates road traffic crash location data from crowdsourced crash reports posted on Twitter in Nairobi, Kenya. The project scraped 874,588 traffic related tweets from Nairobi and applied a machine learning model to capture the occurrence of a crash and developed an improved geoparsing algorithm to identify its location. We geolocate 32,991 crash reports from Twitter for 2012-2020, clustering them into 22,872 unique crashes. For a subset of crashes reported on Twitter, a motorcycle delivery service was dispatched in real-time to verify the crash and its location; the results show 92% accuracy.
- Department/Division: Department/Division: Development Impact Evaluation (DIME)
- Project type: Development Research Report
- Project status: completed
- Project start year: 2018
- Project end year: 2021
- Related SDGs: 3.6
- Partners: MIT Civic Data Design Lab
- Any publicly available URL links/multimedia:
    - [Academic Paper] https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0244317
    - [Brief] https://documents1.worldbank.org/curated/en/609971608546546068/pdf/Urban-Planning-I-Spy-Crashes.pdf
    - [Blog] https://blogs.worldbank.org/opendata/finding-missing-data-creating-actionable-information-solving-development-problems
- Project lead contact: Sveta Milusheva (smilusheva@worldbank.org ); Guadalupe Bedoya (gbedoya@worldbank.org ) ; Arianna Legovini (alegovini@worldbank.org )

### Project 5 : Predictive Performance of household poverty models using Machine Learning

- Project/initiative description: Household surveys give a precise estimate of poverty; however, surveys are costly and can only be fielded infrequently. This project aims at comparing the predictive performance of models based on globally available, spatially referenced public and private sector data sources that have been used to estimate poverty. We include daytime and nighttime satellite imagery, Facebook marketing data, OpenStreetMap data, among other sources. The project trains a machine learning model to predict levels and changes in poverty relying on ground truth poverty data across 82,000 villages and 59 countries, spanning Africa, Asia, the Americas, and Europe. Globally, the model explains over 60% of the variation of an asset-based poverty index at the village level and over 70% of the variation at the district level; in some countries, the model explains over 90% of the variation in poverty at the district level. Features from OpenStreetMaps, nighttime lights, and daytime imagery are most important in explaining poverty, where some features from Facebook Marketing data—such as the proportion of active Facebook users with interests in restaurants and luxury goods—are

highly (negatively) correlated with poverty across most countries. Accuracy for predicting changes in poverty is lower, but the model explains above 25% of the variation in poverty in some countries. The model performs best in lower income countries and in countries with more variation in levels/changes in poverty.

- Department/Division: Department/Division: Development Impact Evaluation (DIME)
- Project typeDevelopment Research Reports
- Project status: ongoing
- Project start year: 2019
- Project end year: 2022 (expected)
- Related SDGs: 1.1
- Partners (internal and external to WBG)
- Any publicly available URL links/multimedia
- Project lead contact: Rob Marty (rmarty@worldbank.org); Alice Duhaut (aduhaut@worldbank.org)

### Project 6: Fostering Long-term Savings linked to the Zambia Financial Inclusion Country Support Program

- **Project/initiative description:** The project used a novel AI-based text-messaging-based intervention to: i) identify the behavioral barriers that lead to low engagement with formal financial services amongst those using the services; and ii) test strategies to help people overcome those barriers to increase engagement and financial security. Additionally, it provides the first evidence (that the team is aware of) on the impact of conversational machine-learning based, two-way text messaging designed to encourage savings and improve loan repayment behaviors through Q&A capabilities and efforts to enhance trust in formal financial products.
- **Department/Division**: Finance, Competitiveness, and Innovation Practice Unit and Development Economics Research Unit
- **Project type:** Impact Evaluation Report
- **Project status:** Completed. The academic paper is in the process of being finalized.
- **Project start year:** 2015
- **Project end year:** 2020
- **Related SDGs:** The project had a strong focus on financial inclusion which is positioned prominently as an enabler of other developmental goals in the 2030 Sustainable Development Goals, where it is featured as a target in eight of the seventeen goals. These include:
    - SDG1, on eradicating poverty;
    - SDG 2 on ending hunger, achieving food security and promoting sustainable agriculture; SDG 3 on profiting health and well-being;
    - SDG 5 on achieving gender equality and economic empowerment of women; SDG 8 on promoting economic growth and jobs;
    - SDG 9 on supporting industry, innovation, and infrastructure; and SDG 10 on reducing inequality.
    - Additionally, in SDG 17 on strengthening the means of implementation there is an implicit role for greater financial inclusion through greater savings mobilization for investment and consumption that can spur growth.
- **Partners (internal and external to WBG):** Natsave, Junto Finanzas (acquired by Nubank), Trinity College Dublin, Swarthmore
- Any publicly available URL links/multimedia

- **Project lead contact:** Siegfried Zottel (szottel@worldbank.org )

### Project 7: Croatia Business Environment Reform with applied AI

- **Project/initiative description:** The World Bank has been supporting the Ministry of Economy and Sustainable Development (MoESD) of Croatia in digitalizing Government to Business (G2B) service delivery for business registration and business licensing. This advisory work is carried out by the Bank at the request of the Government, with funding by the European Union, and in cooperation with the European Commission's DG REFORM. The work involved piloting an innovative approach for mapping business administrative procedures that involved the application of AI/Machine Learning (ML) and Natural Language Processing (NLP). The developed digital algorithm processed 110 laws and 1,204 bylaws from the registry of regulations to identify more than 9,000 potential regulatory requirements in 33 administrative areas, including business authorizations (permits, licenses, etc.), and minimum conditions. Further, the data cleansing resulted in a mapping database of ~1,500 business-related administrative procedures. The Bank also produced a report on recommendations for publishing the mapping online and on a mechanism to keep the mapping data updated following regulatory changes, and a roadmap for modernization and digitalization of Government to Business (G2B) service delivery.
- **Department/Division**: Finance, Competitiveness, and Innovation Practice Unit
- **Project type:** Advisory Services
- **Project status:** Active
- **Project start year:** 2019
- **Project end year:** 2023
- **Related SDGs:**
    - SDG8 (Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all) and
    - SDG 16 (Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels)
- **Partners (internal and external to WBG):** European Union and Ministry of Economy and Sustainable Development (MoESD) of Croatia
- **Any publicly available URL links/multimedia:** Assessment of Digital Government to Business Services Business Environment Reform II Croatia
- **Project lead contact:** Goran Vranic (gvranic@worldbank.org)

### Project 8: Croatia Innovation and Digital Economy

- **Project/initiative description:** The World Bank is supporting the government of Croatia by informing strategies for the improvement of the innovation performance of firms, and supporting the promotion of firm digitalization, as is set out in the sub-component C1.1.2. Resilient, Green and Digital Economy of the Croatian EU National Recovery and Resilience Plan ("NRRP"). The relevant sub-objective is the third sub -objective which is to provide technical input for the design and implementation of a national plan for digitalization and artificial intelligence.
- **Department/Division**: Finance, Competitiveness, and Innovation Practice Unit
- **Project type (operation, ASA, guidance note, something else):** Advisory Services
- **Project status:** Pipeline
- **Project start year:** 2022
- **Project end year:** 2026

- **Related SDGs:** SDG 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.
- **Partners (internal and external to WBG):** TBD
- Any publicly available URL links/multimedia: NA
- Project lead contact: Anita Okemini (aokemini@worldbank.org)

### Project 9: Disruptive Technologies for Agile Business Regulation

**Project/initiative description:** The Disruptive Technologies for Agile Business Regulation (Agile & RegTech KPD) was implemented from April 2019 through May 2021 to develop and pilot agile regulation approaches to unlock investments and enable regulatory service delivery while safeguarding public policy concerns and mitigating risks. The main result is introducing a new solution area/workstream within the World Bank Group – Regulatory Technology (RegTech). The project supported organizing one of the first workshops on Agile Regulation in cooperation with OECD, European Commission, UK Government Better Regulation Executive (BRE), and Massachusetts Institute of Technology Internet Policy Research Initiative (MIT-IPRI). For the agile regulation component, on the onset of the COVID-19 pandemic in March and April 2020, the project produced an internal white paper co-authored with OECD on AI and other emerging technologies to inform regulatory and non-regulatory measures to fight COVID-19. For the integrated regulatory delivery, the project developed research and publication on the New Technologies for Regulatory Delivery under the Donor Committee for Enterprise Development (DCED)

- **Department/Division**: Finance, Competitiveness, and Innovation Practice Unit
- **Project type:** Report
- **Project status:** Closed
- **Project start year:** 2019
- **Project end year:** 2021
- **Related SDGs:**
    - SDG8 (Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all) and
    - SDG 16 (Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels)
- **Partners:**
    - **Internal WBG partners:** IFC
    - **External partners:** OECD, European Commission, UK Government Better Regulation Executive (BRE), and Massachusetts Institute of Technology (MIT)
- **Any publicly available URL links/multimedia:**
    - **Use of New Technologies for Regulatory Delivery**, available at**:** https://www.enterprise-development.org/wp-content/uploads/DCED-BEWG-Use-of-New-Technologies-in-Regulatory-Delivery.pdf
    - **Blog and database: Technology helps strengthen countries' regulatory capacity to respond to COVID-19**, available at: https://blogs.worldbank.org/psd/technology-helps-strengthen-countries-regulatory-capacity-respond-covid-19

- **Project lead contact:** Goran Vranic (gvranic@worldbank.org)

### Project 10: Business environment guide and diagnostics

- **Project/initiative description:** This project developed a business environment operational guide for project teams and a framework for a business regulation diagnostic framework to inform WBG analytics and facilitate the design of business environment reform programs. The business environment operational guide provides the overall framework and chapters for various business environment topics (entry and exit, operations, regulatory technology, informality, gender). The other deliverables (diagnostic framework, policy note on data-driven business registries, deliver framework for licensing and inspections, and the determinants of informality note) complement the operational guide by developing further the topic presented in the guide and providing more detailed toolkits. The guidance note on Data Driven Company Registry takes a deep dive into the frontier developments in the use of data, AI and other emerging technologies for company and business registration. The note summarizes key regulatory policies, presents an initial maturity model, and an implementation approach with a high-level roadmap. The note benefits from lessons learned from successful pilot projects (Denmark and Greece). It explores AI-augmented real-time company registration and the use of AI for the prevention of fraudulent behavior. It complements the chapter on Regulatory Technology Data and G2B in the Business Environment Operational Guide.
- **Department/Division**: Finance, Competitiveness, and Innovation Practice Unit
- **Project type:** Report
- **Project status:** Closed
- **Project start year:** 2020
- **Project end year:** 2022
- **Related SDGs:**
    - SDG8 (Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all) and
    - SDG 16 (Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels)
- **Partners**
- **Any publicly available URL links/multimedia**
- **Project lead contact:** Sylvia Solf (ssolf@worldbank.org)

### Project 11: Logistics performance index

- **Project/initiative description:** Logistics Performance Index 2022: The objective of this activity is to produce a new version of the Logistics Performance Index (LPI; a biennial index established by the World Bank in 2007) and its component indicators, using Machine Learning and Big Data techniques, to make sense of large supply chain tracking data. This dataset will help policymakers to benchmark a country's logistics performance and to develop informed policies and interventions in trade- and transport-related infrastructure, border management, and logistics services delivery.

  The project relies on Machine Learning for two components:

    - Deriving country indicators mimicking the scale of the survey bases LPI, using the information from a large number of supply chain tracking variables.

  - In the future, derive logistics related indicators from GIS information (E.g. density of logistics) or social network data (Twitter, LinkedIn). Research in this area is postponed until delivery of the main indicator in late 2022.

- **Department/Division**: Finance, Competitiveness, and Innovation Practice Unit
- **Project type (operation, ASA, guidance note, something else):** ASA, data
- **Project status:** Ongoing
- **Project start year:** 2019
- **Project end year:** 2022
- **Related SDGs:**
  - SDG 8 – Decent work and economic growth;
  - SDG 9 – Industry, Innovation, and Infrastructure
- **Partners (internal and external to WBG**):
  - WBG-internal (all in advisory role): Transport Global Practice Unit, Development Economics Unit (DEC)
  - WBG-external (data partners): Universal Postal Union (UPU); TradeLens; IATA CargoiQ; MDS Transmodal
  - WBG-external (advisory role): UNCTAD
- **Any publicly available URL links/multimedia**: Publication planned for December 2022)
- **Project lead contacts:** Christina Wiederer (cwiederer@worldbank.org); Jean-Francois Arvis(jarvis1@worldbank.org)

### Project 12: Economic networks

- **Project/initiative description:** This project takes stock of existing leads and POC before proposing a concept note to propose applying ML-inspired methodology to improved trade costs and trade composition/complexity databases. The concept is to exploit the low effective dimensionality of actual trade networks and identify with ML the latent features. This applies to trade composition and trade costs. ML algorithms identify latent geometry consistently with known elementary economic mechanisms (productivity, gravity).
- Unit/GP leading: Finance, Competitiveness, and Innovation Practice Unit (Trade and Competitiveness)
- Project type: ASA, data
- Project status: Ongoing
- Project start year: 2022
- Project end year: 2023
- Related SDGs
- Partners (internal and external to WBG): TBD , potentially WTO
- Any publicly available: internal presentation available, earlier research working papers
- Project lead contacts: Jean-François Arvis (jarvis1@worldbank.org)

### Project 13: Fraud analytics in Algeria

- **Project/initiative description**: This multidimensional project provides technical support to Algeria's Customs Services as part of a broader project regarding barriers to exports in Algeria. One of the activities consist in developing a machine learning model to predict the probability that a new-submission is fraudulent. Algerian Customs has shared its historical database with the Bank to facilitate this activity.

- Department/Division: Finance, Competitiveness, and Innovation Practice Unit and Middle East / North Africa Regional Unit
- Project type (operation, ASA, guidance note, something else): Technical Assistance
- Project status: Ongoing
- Project start year: 2019
- Project end year: 2023
- Related SDGs
- Partners (internal and external to WBG):
    - WBG-internal: Development Economics Unit
- Any publicly available: internal presentation available, working papers summarizing experimentation in preparation
- Project lead contacts: Jean-François Arvis(jarvis1@worldbank.org)

### Project 14: Fraud analytics Kenya

- Project/initiative description: This project aims at helping the Kenyan Revenue authority implement tools to better target fraud of corruption, including AI application similar.
- Unit/GP leading it: Macroeconomics, Trade, and Investment Practice Unit
- Project type: Technical Assistance
- Project status: Proof of concept stage; data acquisition pending.
- Project start year: 2020
- Project end year: 2023
- Related SDGs
- Partners (internal and external to WBG):
    - WBG-internal, Development Economics Unit
- Any publicly available: internal presentation available
- Project lead contacts: Jean-François Arvis (jarvis1@worldbank.org)

### Project 15: Fraud analytics Armenia aka smart risk management

- Project/initiative description: This project helps the Armenian revenue authority implement a fraud targeting tool based on AI.
- Unit/GP leading: Finance, Competitiveness, and Innovation Unit
- Project type: Technical assistance as part of a large EU-funded program on tax reform.
- Project status: Not yet started
- Project start year: 2022-23
- Project end year: 2023
- Related SDGs
- Partners (internal and external to WBG):
    - WBG-internal: Macroeconomics, Trade, and Investment Practice Unit; Development Economics Unit
- Any publicly available: None yet
- Project lead contacts: Jean-François Arvis(jarvis1@worldbank.org)

### Project 16: Using remote sensing and artificial intelligence to measure trade node activity

- Project/initiative description: The objective of this project is to demonstrate the use of alternative tools based on artificial intelligence and remote sensing of domestic and international trade nodes and corridors, based on quantitative, objective metrics, to inform policy and country interventions.
- Unit/GP leading: Trade and Regional Integration Unit; Macroeconomics, Trade, and Investment Unit
- Project type: Research report
- Project status: Active
- Project start year: 2022
- Project end year: 2023
- Related SDGs
- Partners (internal and external to WBG): DEVELOPMENT DATA GROUP
- Any publicly available URL links/multimedia: N/A
- Project lead contact: Daniel Saslavsky (dsaslavsky@worldbank.org); Satya Prasad Sahu (ssahu8@worldbank.org)

### Project 17: Monitoring hate speech and misinformation on social media in Nigeria

- Project/initiative description: The World Bank Development Impact Evaluation Department (DIME) and the Nigeria team of the UK Foreign, Commonwealth and Development Office (FCDO) have launched a collaboration to track and understand the spread and impact of misinformation, fake news, hate speech and divisive narratives in Nigeria. This interactive dashboard highlights trends in the proliferation of hate speech and fake news on Twitter and patterns of internet searches containing references to ethnic or religious groups and general terms associated with politics and potential conflict.
- Department/Division: Development Impact Evaluation Unit (DIME) and Data Analytics and Tools Unit (DECAT)
- Project type: Research report and national dashboardProject status: Ongoing
- Project start year: September 2021
- Project end year: September 2023
- Related SDGs: 11/16
- Partners (internal and external to WBG): UK Foreign, Commonwealth and Development Office (FCDO)
- Any publicly available URL links/multimedia: https://datanalytics.worldbank.org/ng-social-media-analytics/
- Project lead contact: Sam Fraiberger (sfraiberger@worldbank.org); Victor Orozco (vorozco@worldbank.org)

### Project 18: Impact of artificial intelligence in developing countries

- **Project/initiative description**: The objective of this report is to inform the policy debate around AI in developing countries and help them prepare for the future. The first part of this report will provide an overview of the technology, the AI value-chain, and the supporting infrastructure needed to enable AI applications and solutions. The second part of the report will explore AI applications in developing countries, including a review of economic opportunities and risks as well as opportunities and risks in social development. The third part of this report will present an overview of AI policy options and different approaches to governance models in a selection of leading AI countries. The final part of this report will present an approach to support the design of policy responses in developing countries.

- Unit/GP leading: Digital Development Unit
- Project type: Research Report
- Project status: Ongoing
- Project start year: 2021
- Project end year: 2023
- Related SDGs: SDG 8, 9, 10
- Partners: Jain Family Institute
- Any publicly available URL links/multimedia
- Project lead contact: Rong Chen (rchen5@worldbank.org)

### Project 19: Artificial Intelligence in the Public Sector: Maximizing Opportunities, Managing Risks

- **Project/initiative description**: This report provides a preliminary synthesis of the existing opportunities, risks, and building blocks required for implementing and integrating AI in government operations. The report also highlights policy, governance, and people aspects necessary for AI implementation. It draws on the accumulated literature, case studies, and emerging trends to provide guidance to World Bank teams working in this field.
- Unit/GP leading: Equitable Growth, Finance, and Institutions (Governance Unit)
- Project type: Research Report
- Project status: Completed
- Project start year: 2019
- Project end year: 2020
- Related SDGs: 16
- Partners: GovTech Global Partnership
- Any publicly available URL links/multimedia: https://documents1.worldbank.org/curated/en/809611616042736565/pdf/Artificial-Intelligence-in-the-Public-Sector-Maximizing-Opportunities-Managing-Risks.pdf
- Project lead contact: Khuram Farooq (kfarooq@worldbank.org)

### Project 20: Risk Assessment Framework to Identify and Classify Ethical Risks from AI use in World Bank Projects

- **Project/initiative description**: This initiatives aims to develop a risk assessment framework to identify and classify ethical risks that might be present in World Bank projects, using the OECD Framework for the Classification of AI Systems as a basis for AI tasks classification. Approaches to AI risk assessment frameworks by other multi-lateral development banks and related institutions will also be reviewed.
- Unit/GP leading: Digital Development
- Project type: Research Report
- Project status: Ongoing
- Project start year: 2021
- Project end year: 2024
- Related SDGs:
- Partners: Jain Family Institute
- Any publicly available URL links/multimedia
- Project lead contact: Rami Amin (ramin3@worldbank.org)

### Project 21: Starting Points for Trustworthy AI at the World Bank, using the WBG's Environmental and Social Framework (ESF)

- **Project/initiative description**: This report explores artificial intelligence in the context of the Bank's Environmental and Social Framework (ESF), which has emerged as the primary lens through which the Bank assesses risks and social impacts. The purpose of this report is to identify key ethical commitments relating specifically to artificial intelligence within the ESF and related frameworks at the Bank. Approaches by other multi-lateral development banks and related institutions to develop trustworthy AI will also be reviewed.
- Unit/GP leading: Digital Development
- Project type: Research Report
- Project status: Ongoing
- Project start year: 2021
- Project end year: 2024
- Related SDGs:
- Partners: Jain Family Institute
- Any publicly available URL links/multimedia
- Project lead contact: Rami Amin (ramin3@worldbank.org)

### Project 22: Tools for Identifying Human Rights Impact and Ensuring Algorithmic Accountability in World Bank Operations Using Artificial Intelligence and Big Data Analytics

- **Project/initiative description**: Building on the rights-based trust framework proposed by the WDR and based on the experiences of COVID-19 operations, this proposal is aimed at ensuring that staff working on World Bank operations have the tools to (i) identify when AI elements of components might impact human rights, and (ii) ensure that appropriate and proportionate rights-ensuring "algorithmic accountability" elements are included in such operations.
- Unit/GP leading: Digital Development Unit; Legal Unit (LEGOP)
- Project type: Research Report
- Project status: Ongoing
- Project start year: 2022
- Project end year: 2024
- Related SDGs: 16
- Partners (internal and external to WBG)
- Any publicly available URL links/multimedia
- Project lead contact: Rami Amin (ramin3@worldbank.org)

## 2. Related Sustainable Development Goals (SDGs)

SDGs 1, 2, 3, 4, 5, 8, 9, 10, 13, 16, 17

## 3. Related Links

https://www.worldbank.org/en/home

Contact information

Dr. Rami Amin, Digital Development Practice, The World Bank (ramin3@worldbank.org), Tel +1 202 473 3072

International Telecommunication Union
Telecommunication Development Bureau
Place des Nations
CH-1211 Geneva 20
Switzerland

ISBN: 978-92-61-37301-6

9 789261 373016

Published in Switzerland
Geneva, 2023