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Please consider the environment before printing this report.

Foreword

With COVID-19 having set back efforts to achieve the 2030 Agenda for Sustainable Development, the 2021 UN Activities on Artificial Intelligence (AI) Report features over 200 projects, developed by 40 UN agencies and bodies, to accelerate progress on the United Nations Sustainable Development Goals (SDGs).

More UN entities have participated in this year's report than ever before, demonstrating the UN system's determination to use its expertise and network to develop and deploy AI solutions that can connect everyone and bring the power of technology to all.

The projects presented in this report illustrate the importance of investing in multi-stakeholder partnerships for producing concrete outcome-driven processes and deliverables in areas ranging from health and infrastructure to inequality and the environment.

An analysis of the key trends contained in this report also highlights the areas where the UN system needs to invest more effort.

At ITU, we strive to build common understanding and trust around the use of AI for environmental efficiency, health, 5G, autonomous and assisted driving, and several others. We spare no effort to work with all stakeholders inside and outside the UN system to build a more fair, sustainable and inclusive digital future.

Ensuring that all voices are heard is central to ITU activities, starting with AI for Good, our year-round digital platform where AI innovators and problem owners learn, build and connect to help identify practical AI solutions to advance the SDGs. Organized by ITU in partnership with 38 sister UN Agencies and others, AI for Good is the leading action-oriented UN platform on AI.

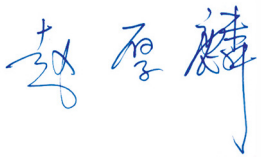
2022 will see the launch of the AI for Good Neural Network, an AI powered community networking and content platform whose aim is to accelerate innovation and collaboration to achieve the SDGs.

ITU is also co-leading with UNESCO the UN Inter-agency Working Group on AI to coordinate the UN system's expertise on AI and facilitate current and future system-wide efforts on AI.

We stand at a critical juncture, with global digital transformation accelerating while crucial development progress has been set back.

As we look to the future and aim to connect and empower all people by 2030, there is no longer any doubt that AI and other emerging technologies will play a key role.

I congratulate all 40 UN agencies and bodies on their AI activities and recommend this publication to all those committed to ensuring that AI serves as a positive force for all humanity.



Houlin Zhao
Secretary-General
International Telecommunication Union

Executive Summary

Highlights

- *40 entities participated, 228 projects presented*
- *Strong focus on SDGs 3 (Good Health and Well-being), 9 (Industry, Innovation and Infrastructure), 10 (Reduced Inequalities), 13 (Responsible Consumption and Production) and 17 (Partnership for the Goals)*
- *More focus needed on SDGs 2 (Zero Hunger), 6 (Clean Water and Sanitation), 7 (Affordable and Clean Energy), 14 (Life Below Water) and 15 (Life on Land)*
- *Over 15% of the projects reported are working on COVID-19-related AI solutions or pandemic preparedness and response.*
- *Multi-stakeholder collaborations:*
    - *Almost two-thirds of projects featured collaborations with the UN, academia, civil society, or other international organizations*
    - *Almost one third of projects collaborated with private sector actors*
- *Datasets and software tools 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) also decided to establish an interagency working group on AI (IAWG-AI), co-led by UNESCO and ITU, 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 to identify the gaps in UN AI-related activities in order to help the UN system prioritize strategic actions.

This gap analysis has been complementary to and informed by the annual Compendium on UN Activities on AI. Since 2018, ITU, the UN's specialized agency on telecommunications/ICTs, has been coordinating the compilation of an annual up-to-date directory of all the AI-related projects, initiatives, events and processes within the UN system.

Methodology:

- Projects were submitted by each of the participating UN bodies and agencies using a standardized submission form.
- For 7 entities which were not able to provide updated inputs this year, projects from the 2020 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/duration.
- All inputs received by 18 November 2021 using the standardized submission form have been included in the Executive Summary analysis.

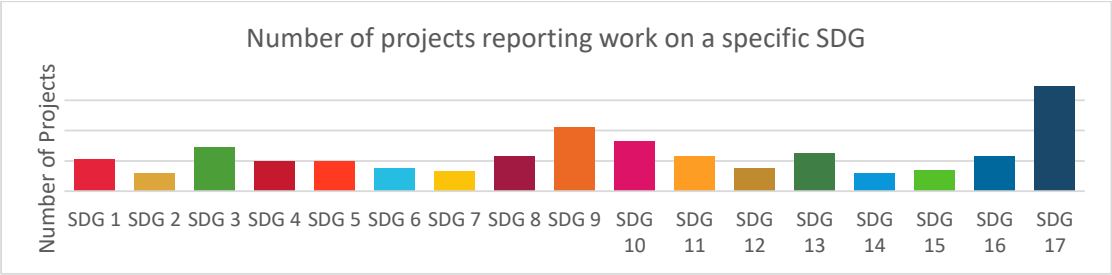
Now referred to as the 2021 UN Activities on Artificial Intelligence (AI) Report, this directory is a joint effort between ITU and 46 UN agencies and bodies, all partners of AI for Good or members of the UN Interagency Working Group on AI. The Report usually presents over 200 cases and projects run by the UN system, in areas covering all 17 SDGs and ranging from smart agriculture and food systems to transportation, financial services, healthcare and AI solutions to combat COVID-19. 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 this edition, 46 UN entities were contacted, 40 entities have participated, and 228 projects have been presented. A brief analysis of the key tracks and trends arising from the submissions are provided below with a view 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.

This Report is being released at the 7th AI for Good UN Partners Meeting on 16 December 2021. 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

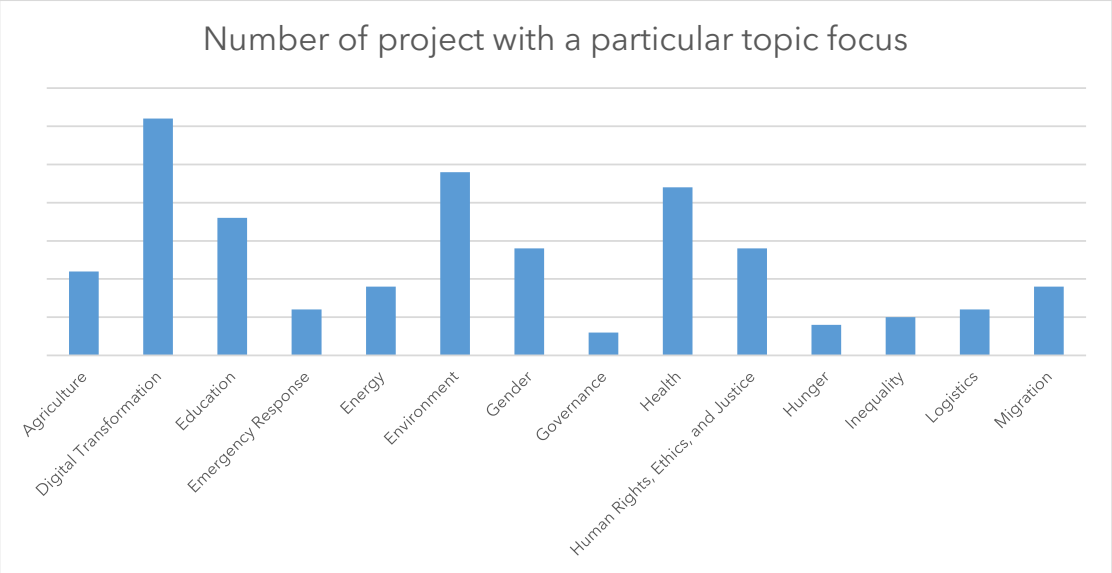
1. SDG Mapping



The overwhelming majority of UN projects address more than one SDG, signaling holistic, multidimensional projects.

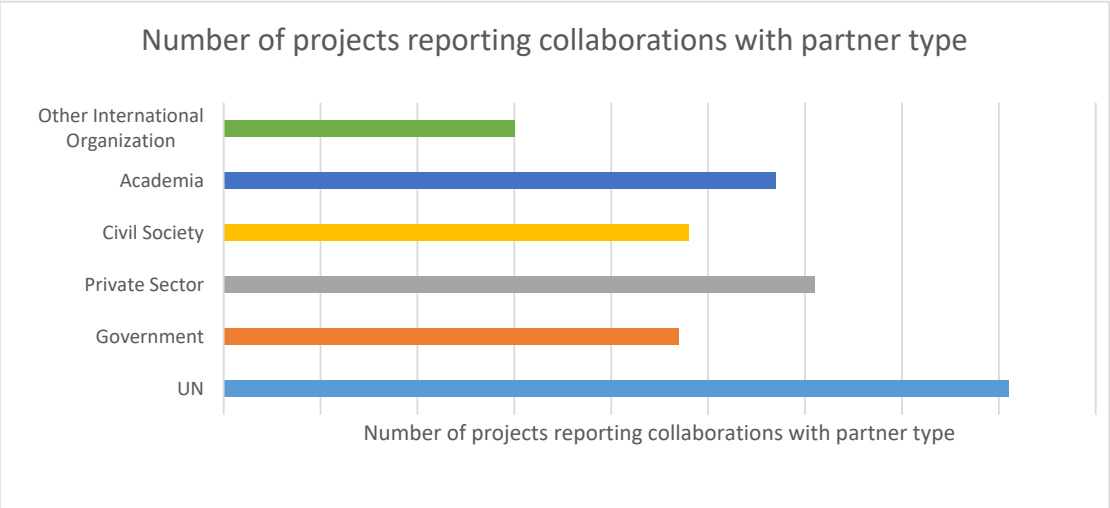
SDGs 3 (Good Health and Well-being), 9 (Industry, Innovation and Infrastructure), 10 (Reduced Inequalities), 13 (Responsible Consumption and Production) and 17 (Partnership for the Goals) are currently the top five most common SDGs addressed by the UN AI initiatives. There remains scope for more targeted action to be taken across SDGs 2 (Zero Hunger), 6 (Clean Water and Sanitation), 7 (Affordable and Clean Energy), 14 (Life Below Water) and 15 (Life on Land).

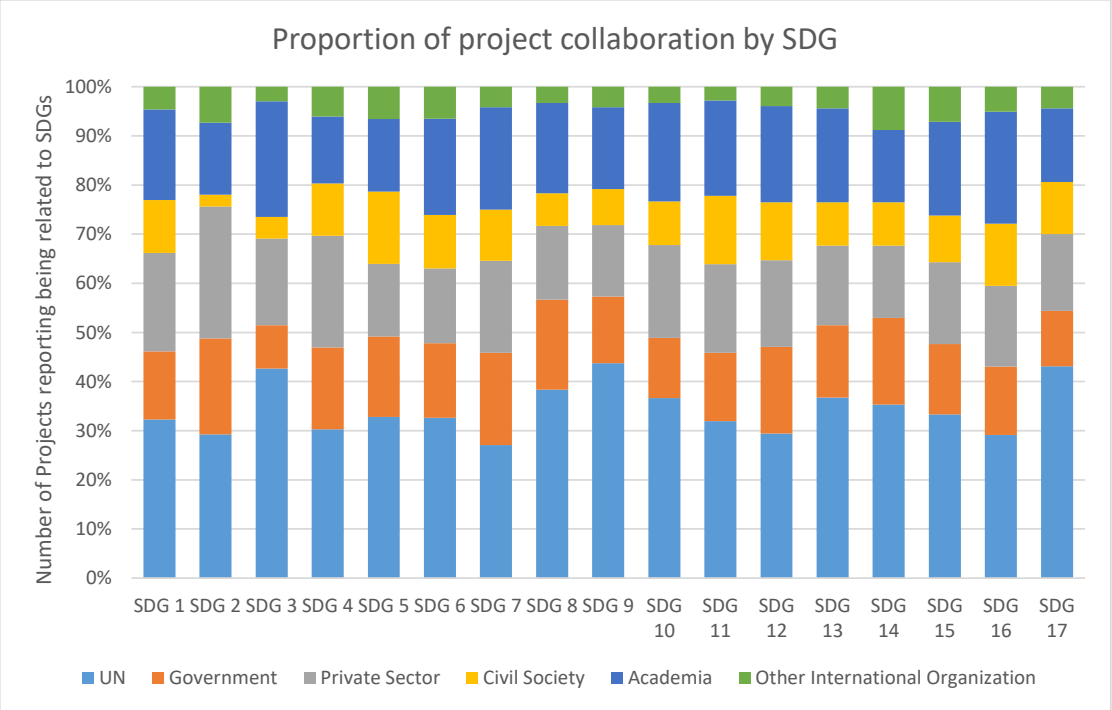
2. Project Subject Areas



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. In most cases, the projects are often reported as addressing multiple areas along with driving forward impact on multiple SDGs. "Digital Transformation" projects referred to in this chart include infrastructure and digitalization projects. Several health-related projects have also been reported for addressing the COVID-19 pandemic.

3. Driving Multi-stakeholder Collaboration

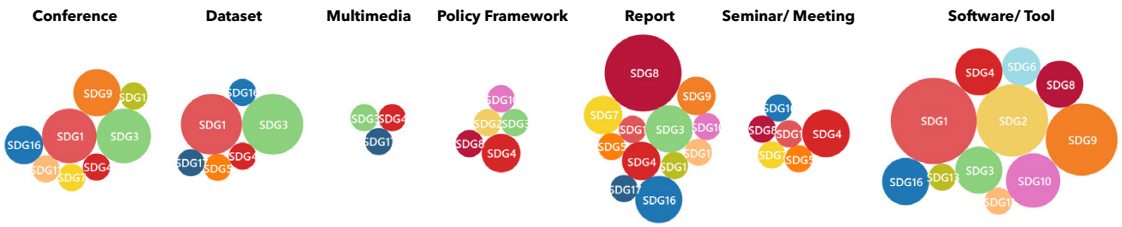




Almost all the UN projects have reported collaborations within the UN system, the private sector, governments, civil society, academia, or with another international organization, demonstrating the UN's focus on maintaining strong partnership with internal and external stakeholders.

4. Concrete data and software tools to address challenges

Project Outputs by SDGs



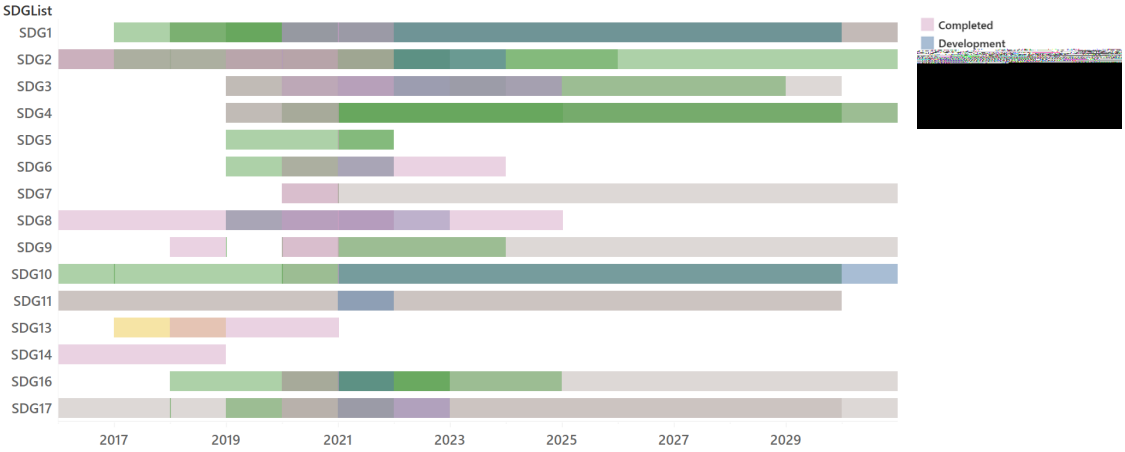
(bubble size = number of projects)

This year, a significant number of the UN projects have focused on outcome-driven products and deliverables such as reports or software tools.

As of now, many of the current reports produced by UN entities relate to AI and SDG 8 (Decent Work and Economic Growth), and software tools to AI and SDGs 1 (No Poverty), 2 (Zero Hunger), and 9 (Industry, Innovation, and Infrastructure).

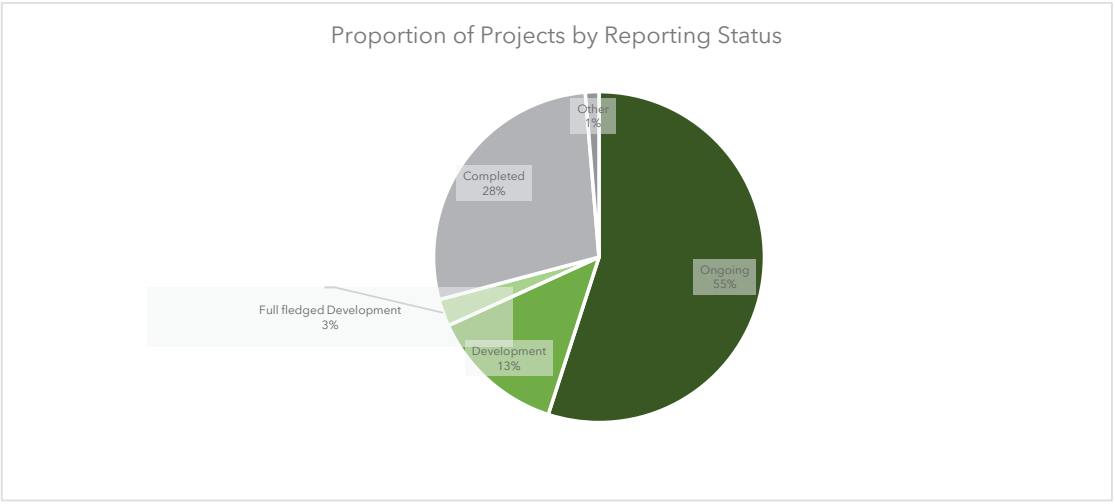
5. Looking forward to 2030

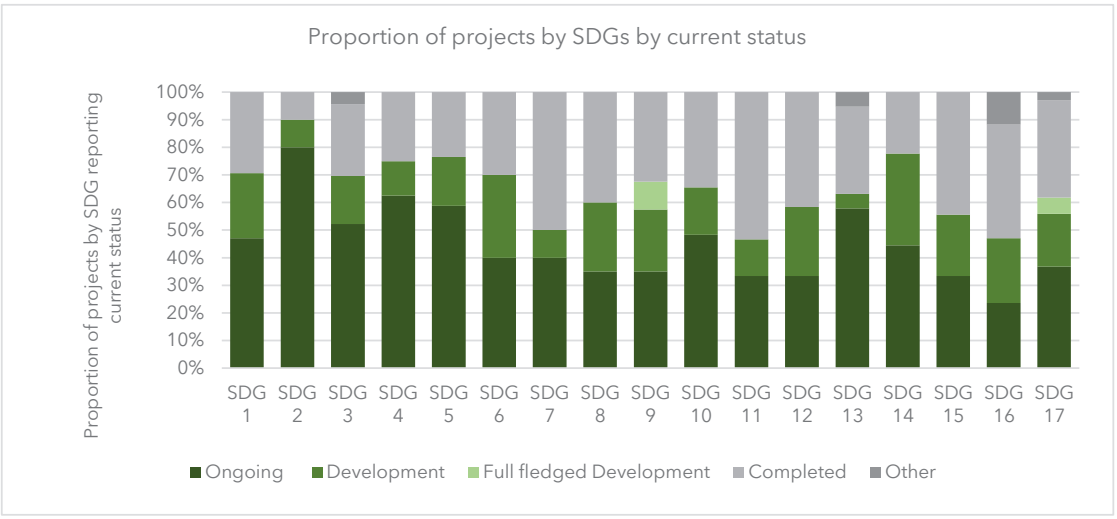
Project Status by SDG



A number of projects did not report specific end dates, or in some cases, the project duration.

Projects related to SDG 4 (Quality Education) seem to have reported the most defined timelines in the Report, whereas those related to SDG 7 (Affordable and Clean Energy) and SDG 17 (Partnership for the Goals) are underrepresented in terms of submissions that included timeline information.





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 7 (Affordable and Clean Energy) and SDG 11 (Sustainable Cities and Communities) reporting the most completed projects, often representing completed software tools, reports, and conferences.

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.

In 2020, the UN Activities on AI Report had presented around 260 projects whereas this year, despite the participation of more agencies, the Report presents about 228 projects. There could be several reasons for this change, including that UN agencies are experimenting with shorter term prototype initiatives/projects/cases as a way to test viability and impact prior to engaging in long term activities, or that many of the activities in the past were events/meetings/conferences designed to seek inputs from different stakeholders on AI-related activities. The nature and status of the UN AI activities merits further analysis that will be explored in future editions of the Report.

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Comprehensive Nuclear-Test-Ban Treaty Organization

CTBTO
PREPARATORY COMMISSION

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 2020 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 2020 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 2020 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 2020 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 2020 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 2020 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 2020 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 more important role in agriculture. 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 and the cost-effective maintenance and sustainability of different FAO geospatial applications. Machining learning and AI are used in cutting edge quantitative remote sensing in agriculture; world class cloud computing capabilities; enabling unprecedented crosssectoral 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, Complete
- Project Start Year: 2020
- Project End Year: 2021
- 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/market.
- Publicly Available Data: Yes
- Technology/Platform: Google Cloud Platform; TerriaJS; GeoNetwork; CKAN
- Reported as part of 2020 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
- Lesson Learned: Data federation supported by standardization make data sharing a big difference. Open data sharing enables various users to contribute and get good results to solve 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 calendar 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 2020 Compendium on UN AI Activities? No
- 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 users who are 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 2020 Compendium on UN AI Activities? No
- 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, Mr. Oscar Rojas

Project 4: FAO Data Lab

- Project Description: The Data Lab developed and implemented a new set of tools in order to assist the 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 satiate imagery, Government policies
- Publicly Available Data: Yes
- Technology/Platform: R, Jupyter, Python, running on the Google Cloud Platform
- Reported as part of 2020 Compendium on UN AI Activities? No
- 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 are designed to expand with the evolving needs of farmers, analysts and decision-makers. Both are freely accessible and are helping reduce crop yield losses and risk of further introduction and spread of FAW.
- Department/Division: lant Production and Protection Division (NSP)
- Project Type/Output: Dataset
- Project Status: Ongoing
- Project Start Year: 2019
- Project End Year: 2022
- Project Domain: Agriculture
- Data Source:
- Field scouting geo-referenced data.
- Pheromone traps data
- Picture of FAW damage from the field.

- Link to Data:
  - https://app.powerbi.com/view?r=eyJrIjoiZDViYTBkMjctN2IyNi00NWM0LWJkOTUtNTQzN2NiY2NiZWM0IiwidCI6IjE2M2FjNDY4LWFiYjgtNDRkMC04MWZkLWQ5ZGIxNWUzYWY5NiIsImMiOjh9&pageName=ReportSection018d4484050280890bb1
  - https://data.apps.fao.org/
- Publicly Available Data: Yes
- Technology/Platform: Google AI, TensorFlow
- Reported as part of 2020 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:
  - https://www.fao.org/fall-armyworm/monitoring-tools/famewsglobal-platform/en/
  - https://www.fao.org/fall-armyworm/monitoring-tools/famewsmobile-app/en/
  - http://www.fao.org/3/CA1089EN/ca1089en.pdf.
- Lesson Learned:
  - The most important challenge was the promoting of 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 promoting the system without any financial support.
  - The accuracy of the collected data also was a challenge as it is crowed sourced data.
- Contact information: Maged Elkahky (maged.elkahky@fao.org)

Project 6: FAO Digital Portfolio

- Project Description: Internal effort to apply machine-learning and natural language processing to transform FAO project related data into global digital trends, insights and an organization' wide portfolio of products for reuse and reinvestment in future projects. Current effort is focused on taking FAO project descriptions as input and producing the related business and technology thematic areas the projects relate to as output.
- Department/Division: Digitalization and Informatics Division
- 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 2020 Compendium on UN AI Activities? No
- 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 takes 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 automatically analyze the information and tell you 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 containing information of shark species. The iSharkFin algorithm is built on a decision tree, that even if is one of the oldest methods in machine learning, it is accurate and is recommended before any more complex learning algorithm is tried.
- Reported as part of 2020 Compendium on UN AI Activities? No
- 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
- Links and Multimedia:
    - https://www.fao.org/ipoa-sharks/tools/software/isharkfin/en/
- Lesson 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, 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 takes into account 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: Completed
- 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
- Publicly Available Data: Yes
- Technology/Platform: Google Cloud services, Python, Jupyter
- Reported as part of 2020 Compendium on UN AI Activities? Yes/No
- 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: AI for Atoms – Report from the IAEA Technical Meeting on AI for Nuclear Technology and Applications

Project Description: As the output of the 2021 Technical Meeting on AI for Nuclear Technology and Applications, this report will serve as a roadmap of ideas and opportunities where IAEA can have a supporting and transformative role in aiding progress towards the realization of the transformative impacts of AI in nuclear science, technology, and applications.

Further objectives of the report are:

- To provide a synopsis of the current state of the art, outline challenges and identify opportunities for accelerating progress on the applications of AI in nuclear science, technology, and applications.
- To serve as a scoping reference for AI in nuclear science, technology, and applications.
- To foster international, cross-cutting cooperation in the field, leading to more focused efforts in specific areas under the IAEA's stewardship.
- To promote and facilitate the exchange of information on AI applications, methodologies, tools and enabling infrastructure in nuclear science, technology, and applications.

The report will encompass the development studies and applications of AI in nuclear science, technology and applications – including ethics, food and agriculture, human health, nuclear data, nuclear fusion, nuclear physics, nuclear power, nuclear security, radiation protection, safeguards verification, water and environment.

The report will be made freely available online on the IAEA's website upon completion.

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, and SDG 17 – Partnerships for the Goals

Links and Multimedia:

- Technical Meeting website: https://conferences.iaea.org/event/245/
- *AI for Atoms website:* https://nucleus-new.iaea.org/sites/ai4atoms/

Contact information: AI for Atoms Team (ai4atoms@iaea.org)

Project 2: IAEA Technical Meeting on AI for Nuclear Technology and Applications

Project Description: The IAEA Technical Meeting on Artificial Intelligence for Nuclear Technology and Application provided an international, cross-cutting forum to discuss, identify and foster cooperation on AI applications, methodologies, tools and enabling infrastructure that have the potential to advance nuclear science, technology and applications.

The event programme consisted of:

- plenary cross-cut sessions focused on open data science, standardized frameworks, comprehensive data management, uncertainty quantification, data curation, high performance computing, advanced manufacturing, educational and training activities, and ethics; and advanced modelling and simulation methods in computing, including integrated modelling, multi-physics multiscale modelling, virtual systems and digital twin technology, optimized system design, improved system performance and user experience; and
- working group sessions dedicated to the following thematic areas:
    - Ethics

      Keywords: trustworthiness; human rights; sustainability objectives; AI ethics (water ethics, climate ethics, ethics and health, AI and nuclear safety, AI-energy ethics).
    - Food and Agriculture

      Keywords: food authentication; food safety early warning systems; soil type prediction; insect screening; plant viability screening.
    - Human Health

      Keywords: diagnosis and treatment of cancer; image interpretation; treatment plans and contouring; adaptive radiotherapy; medical processes.
    - Nuclear Data

      Keywords: nuclear, atomic and molecular data; data analysis; verification; uncertainty quantification; anomaly detection; information discovery.
    - Nuclear Fusion

      Keywords: plasma prediction; control system; model generation.
    - Nuclear Physics

      Keywords: data analysis; data management; experimental design and optimization; facility operation.
    - Nuclear Power

      Keywords: outage; maintenance; planning; scheduling; inspection; training; engineering assessment; risk assessment; machine learning.
    - Nuclear Security

      Keywords: 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.
    - Radiation Protection

      Keywords: computer simulations including work simulations; processes including radiation exposure with algorithms; health and safety in workplaces; radiological data

across machines; radiation protection programmes; online dosimetry; optimization; planning and training; validation by measurements; instrumentation; robotics.

- Safeguards Verification

  Keywords: nuclear measurements; surveillance; non-destructive assay; tampering detection; gamma spectroscopy; spent fuel verification; Cerenkov light; Dynamic calorimetry; fissile mass quantification.

- Water and Environment

  Keywords: water security and protection; complex data analysis – spatial and temporal; groundwater modelling; study of the hydrological cycle; climate models.

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, and SDG 17 – Partnerships for the Goals

Links and Multimedia:

- Technical Meeting website: https://conferences.iaea.org/event/245/
- *AI for Atoms website:* https://nucleus-new.iaea.org/sites/ai4atoms/

Contact information: AI for Atoms Team, (ai4atoms@iaea.org)

Project 3: Working Group on the Ethics of Nuclear and AI (WG-ENAI)

Project Description: The Working Group (WG) – established in connection with the IAEA Technical Meeting on AI for Nuclear Technology and Applications – is working towards developing a new Project Domain of normative applied ethics at the intersection of AI and nuclear science, technology and applications, referred to as the Ethics of Nuclear and AI (ENAI).

More specifically, the WG is seeking to:

- Establish new transdisciplinary Project Domain of providing societally accepted and ethically informed decision-making regarding AI in nuclear science, technology, and applications;
- Create awareness among practitioners (also from early age) about ethical implications of the convergence of the AI and the nuclear fields;
- Enhance dialogue with important societal stakeholders;
- Formulate guidance on the ENAI.

Department/Division: Department of Nuclear Sciences and Applications/Division of Physical and Chemical Sciences

Project Status: Development

Project Domain: Ethics of Nuclear and AI (ENAI)

Related Sustainable Development Goals (SDGs): SDG 17 – Partnerships for the Goals

Links and Multimedia: https://nucleus-new.iaea.org/sites/ai4atoms/SitePages/WG-ENAI.aspx

Contact information: Matteo Barbarino (m.barbarino@iaea.org)

Project 4: Working Group on AI for Nuclear Fusion (WG-AI4NF)

Project Description: The Working Group on AI for Nuclear Fusion (WG-AI4NF) – established in connection with the IAEA Technical Meeting on AI for Nuclear Technology and Applications – focuses on AI for enabling prediction and control solutions necessary for sustained, safe, and efficient future fusion power plant operation, as well as the opportunities and associated needs in AI areas that would help address challenges in nuclear fusion research through targeted collaborations. The WG-AI4NF is developing three Work Packages (WPs) which will be executed inside an IAEA-sponsored activity/framework (IAEA Coordinated Research Project) planned to start by the end of 2022. These WPs are:

- WP1: Machine Learning for Real-time MFE System Behavior Prediction, Identification & Optimization.
- WP2: Improve Inertial Confinement Fusion Physics Understanding Through Simulation, Theory and Experiment Using ML/AI Methods.
- WP3: Development of ML/AI-focused Activities to Support Education, Training, and Capacity Building Accelerating Workforce Development to Cover Nuclear Fusion R&D Gaps.

Department/Division: Department of Nuclear Sciences and Applications/Division of Physical and Chemical Sciences

Project Status: Ongoing

Project Domain: Energy and Nuclear Fusion

Related Sustainable Development Goals (SDGs): SDG 7 – Affordable and Clean Energy; SDG 17 – Partnerships for the Goals

Links and Multimedia: https://nucleus-new.iaea.org/sites/ai4atoms/SitePages/WG-AI4NF.aspx

Contact information: Matteo Barbarino (m.barbarino@iaea.org)

Project 5: Artificial intelligence 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 indicates that the stable water isotopes of global lakes are highly relevant indicators that integrate multiple processes at the watershed scale and are sensitive to the hydroclimate response of both lakes and their catchment system. Stable isotope assays provide a low-cost efficacious 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.

Department/Division: Department of Nuclear Sciences and Applications/Division of Physical and Chemical Sciences

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*

Related Sustainable Development Goals (SDGs): SDG 6 – Clean Water and Sanitation

Contact information: Yuliya Vystavna (y.vystavna@iaea.org), Astrid Harjung (a.harjung@iaea.org)

Project 6: Working Group on Artificial Intelligence for Water and Environment

Project Description: The Working Group (WG) on Artificial Intelligence for Water and Environment – established in connection with the IAEA Technical Meeting on Artificial Intelligence (AI) for Nuclear Technology and Application – 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.

Taking the IAEA Technical Meeting as a starting point, the WG intends to create a platform for scientists working with AI tools at the interface of isotope hydrology, water resources protection and management. This will facilitate 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.

Department/Division: Department of Nuclear Sciences and Applications/Division of Physical and Chemical Sciences

Project Status: Completed

Project Domain: Environment

Related Sustainable Development Goals (SDGs) SDG 6 – Clean Water and Sanitation

Links and Multimedia:

- Technical Meeting website: https://conferences.iaea.org/event/245/
- *Working Group on AI for Water website:* https://nucleus-new.iaea.org/sites/ai4atoms/SitePages/WG-AI4WE.aspx

Contact information: David Soto (d.soto@iaea.org), Astrid Harjung (a.harjung@iaea.org), Yuliya Vystavna (y.vystavna@iaea.org)

Project 7: 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. 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 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.

Department/Division: Department of Safeguards

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)

Project 8: Working Group on AI for Nuclear Security (AI4NS)

Project Description: The Working Group (WG) on Artificial Intelligence for Nuclear Security (AI4NS) – established in connection with the IAEA Technical Meeting on Artificial Intelligence (AI) for Nuclear Technology and Application – discussed AI across different areas of nuclear

security, including cyber and information security, forensics, detection, material security, and insider threats. During the AI4NS 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 NS 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; adversarial AI.

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

- 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 NS purposes;
- Increase confidence in the utilization of AI technologies within Nuclear Security functions through a graded approach that supports defense in depth.

Department/Division: Department of Nuclear Safety and Security/Division of Nuclear Security

Project Status: Complete

Project Domain: Agriculture, Energy, Environment, Health, Justice, Technology and Applications, Nuclear Security, Cyber Security, Infrastructure, Data

Related Sustainable Development Goals (SDGs): SDG 2 – No Hunger; SDG 3 – Good Health and Well-Being; SDG 7 – Affordable and Clean Energy; SDG 9 – Industry, Innovation, and Infrastructure; SDG 13 – Climate Action; SDG 17 – Partnerships for the Goals

Links and Multimedia:

- Technical Meeting website: https://conferences.iaea.org/event/245/
- AI for Atoms website: https://nucleus-new.iaea.org/sites/ai4atoms/SitePages/WG-AI4NS.aspx
- IAEA NUSEC for WG on AI4NS materials:
- https://nusec.iaea.org/portal/ (also https://www.iaea.org/resources/databases/nusec)
- Content from the WG on AI4NS is available on the IAEA NUSEC portal

Contact information: Charles Massey (c.massey@iaea.org)

Project 9: Working Group on Artificial Intelligence for Nuclear Power

Project Description: The Working Group on Artificial Intelligence for Nuclear Power– established in connection with the IAEA Technical Meeting on Artificial Intelligence (AI) for Nuclear Technology and Application – 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. The broad areas applications such as automation, optimization, analytics, prediction, and insights that can be leveraged to enhance the development and deployment of nuclear power were discussed. AI methods and various data science approaches can be leveraged to predict events, including failures, and assess current asset conditions, such as remaining useful life. It can also be leveraged to expedite the characterization and validation of materials for newer generation designs, reducing the time and cost of the necessary materials research. In addition, to optimize complex processes, plans and strategies such as inventory management, outage scheduling and fuel cycle parameters. Several challenges with respect to deployment were also identified, and suggestions were collected for IAEA with the objective of accelerating progress, including both R&D phase as well as the transition from R&D through deployment. The working group serves as an effective platform to share the ideas and put forth the vision for possible activities in the area of AI for nuclear power.

Department/Division: Department of Nuclear Energy/Division of Nuclear Power

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:

- Technical Meeting website: https://conferences.iaea.org/event/245/
- AI for Atoms website: https://nucleus-new.iaea.org/sites/ai4atoms/SitePages/WG-AI4NP.aspx

Contact information: Chirayu Batra (chirayu.batra@iaea.org), Janos Eiler (j.eiler@iaea.org)

Project 10: Working Group on Artificial Intelligence for Food and Agriculture

Project Description: The Working Group on AI for Food and Agriculture – established in connection with the IAEA Technical Meeting on AI for Nuclear Technology and Applications – aimed to promote and enable the use of nuclear and related techniques with AI tools to make agri-food systems sustainable and climate change resilient. Decision-making about agriculture approaches and food production requires gathering extensive information at all scales. Over the past years enhanced data availability through the implementation of open data policies and innovative data acquisition methods enabled the use of Artificial Intelligence to inform policies in the food and agriculture sector. The Working Group on AI for Food and Agriculture highlighted some examples of the use of Artificial Intelligence techniques in applications, such as the estimation of soil moisture through nuclear techniques, but also the remediation of environmental pollution, and the monitoring and prediction of food fraud events. These examples presented opportunities already in hand but also key aspects that

still need to be considered to fully exploit the potential of Artificial Intelligence in Food and Agriculture applications.

The expected outcomes of the IAEA's activities in accelerating the use of AI in Food and Agriculture are that AI would help to fuse and integrate data and datasets from a local to global scale; AI would innovate model development for enhanced decision support and enforcement in a scientific and ethical way (based on FAIR principles - findability, accessibility, interoperability, and reusability); AI would become a mainstream tool for better use of nuclear and isotopic data; and AI will be integrated into education programmes at all levels.

Department/Division: Department of Nuclear Sciences and Applications/Joint FAO/IAEA Centre of Nuclear Techniques in Food and Agriculture

Project Status: Completed

Project Domain: Food and Agriculture

Related Sustainable Development Goals (SDGs): SDG 2 – Zero Hunger, SDG 3 – Good Health and Well-Being

Links and Multimedia:

- Technical Meeting website: https://conferences.iaea.org/event/245/

Contact information: Simon Kelly (s.kelly@iaea.org), Gerd Dercon (g.dercon@iaea.org)

Project 11: 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.

Department/Division: Department of Nuclear Sciences and Applications/ Division of Human Health

Project Status: Ongoing

Project Domain: Health

Related Sustainable Development Goals (SDGs): SDG 3 – Good Health and Well-Being

Links and Multimedia: https://nucleus-new.iaea.org/sites/ai4atoms/SitePages/WG-AI4HH.aspx

Contact information: Yaroslav Pynda (y.pynda@iaea.org)

2. Related Sustainable Development Goals

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

3. Relevant Links

https://

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 2020 Compendium on UN AI Activities? No
- 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: Development
- Project Start Year: January 2021
- Project End Year: December 2022
- Reported as part of 2020 Compendium on UN AI Activities? No
- 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 2020 Compendium on UN AI Activities? No
- 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 2020 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 2020 Compendium on UN AI Activities? No

- 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 2020 Compendium on UN AI Activities? No
- 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 2020 Compendium on UN AI Activities? No
- 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 2020 Compendium on UN AI Activities? No
- 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 2020 Compendium on UN AI Activities? No
- 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: Developed
- Project Start Year: 2020
- Reported as part of 2020 Compendium on UN AI Activities? No
- 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: Issues paper for the 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".

  The meeting will discuss challenges and opportunities relating to the impact of digitalization on the future of work in the financial sector. There will be a particular focus on global trends and on policies, strategies and good practices to advance decent work in the sector.

  This 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 Type/Output: Seminar/meeting
- Project Status: Ongoing
- Project Start Year: 2019
- Project End Year: 2021
- Reported as part of 2020 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 2020 Compendium on UN AI Activities? No
- 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

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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 2020 Compendium on UN AI Activities? No

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: Shipping digitalization/cooperation with ports and Maritime Single Window

"Single window" for data, to enable all the information required by public authorities in connection with the arrival, stay and departure of ships, persons and cargo, to be submitted via a single portal, without duplication. In Antigua and Barbuda the window was completed in 2019 and the source code for the system will now be made available to other countries who need it. The single window was created to reduce the administrative burden in the manual exchange of information related to maritime transport

- Project Type (Status): Software product (Deployed)
- Project Domain: Shipping
- AI Approach: Software development
- 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 14 Life below Water
- Reported as part of 2020 Compendium on UN AI Activities? Yes
- Project Website (links): http://www.imo.org/en/MediaCentre/MeetingSummaries/FAL/Pages/FAL-43rd-Session.aspx; http://www.imo.org/en/MediaCentre/PressBriefings/Pages/07-IMO-maritime-data-solution-available-after-launch-in-Antigua-and-Barbuda-.aspx

Project 2: Maritime Autonomous Surface Ships (MASS)

Set of 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

- Project Type (Status): Framework/Strategy/Policy (Development)
- Project Domain: Shipping
- AI Approach: Framework/Strategy/Methodology Formation
- 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 2020 Compendium on UN AI Activities? Yes
- Project Website (links): http://www.imo.org/en/MediaCentre/MeetingSummaries/MSC/Pages/MSC-101st-session.aspx

Project 3: E-Navigation

Number of circulars related to e-navigation were approved in 2019 by the 101st session of IMO's Maritime Safety Committee (MSC). E-navigation is defined as "the harmonized collection, integration, exchange, presentation and analysis of marine information on board and ashore by electronic means to enhance berth to berth navigation and related services for safety and security at sea and protection of the marine environment.

- Project Type (Status): Other (Closed)
- Project Domain: Shipping
- AI Approach: Publication
- Datasets: Marine information on on-board and ashore activities
- Related Sustainable Development Goals (SDGs): SDG 8 Decent work and Economic growth; SDG 9 Industry, Innovation and Infrastructure
- Reported as part of 2020 Compendium on UN AI Activities? Yes
- Project Website (links): www.imo.org/en/MediaCentre/MeetingSummaries/MSC/Pages/MSC-101st-session.aspx

Project 4: Marine Environmental Protection and AI

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

- Project Type (Status): Ideation
- Project Domain: Marine bio safety
- Datasets: AIS data and Port specific data
- Related Sustainable Development Goals (SDGs): SDG 3 Good health and Well-being; SDG 16 Peace, Justice and Strong Institutions
- Project Partners: Internal - Global Industry Alliance (GIA)
- Reported as part of 2020 Compendium on UN AI Activities? Yes

Project 5: 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
- Project Partners: Internal - Global Industry Alliance (GIA)
- Reported as part of 2020 Compendium on UN AI Activities? Yes

Project 6: 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 2020 Compendium on UN AI Activities? Yes

Project 7: 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 2020 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

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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 of data collection and analysis processes, despite possessing context-specific knowledge relevant to humanitarian operations. This project, pilots a novel form of Collective Intelligence (CI) by enabling returnees in Iraq to validate and improve data collection processes and analysis related to conditions in their local area. Collective Intelligence (CI) has been recognised as a transformative mode of knowledge production because it elevates the crowd above experts as a source of information (Büscher et al., 2014). Scholars such as James Surowiecki (2005) have emphasized the 'wisdom of crowds' because the aggregation of independent conclusions drawn from a large sample may be more accurate than those collected from a single expert.

  In doing so, the CI methodology allows for more meaningful participation by affected populations than typically afforded and improves accountability and transparency. By collecting data through digital channels, this initiative examined whether a larger and more diverse cross-section of returnees could be engaged to validate findings from key informant (KI) data collection. Using GPS technology, location-specific conclusions drawn from existing data collection activities were shared with affected communities to confirm, reject and provide open-ended, qualitative input. To aid in classification of text-based responses, an AI trained model was included in the analysis. This project used the Valence Aware Dictionary and Sentiment Reasoner (VADER) algorithm to classify feedback messages in the survey based on its polarity (negative, neutral and positive) and on the intensity of the polarity categories.

  The study finds that the demographics of respondents were more diverse than the existing pool of KIs. While the number of respondents in each location prevented attainment of statistically significant results for some areas, indicative findings point to the potential of CI methods for evaluating and improving assessment tools by identifying areas of disagreement between KIs and CI participants across different indicators and demographic groups.

  Key words: Key Informants (Key Informants), Collective Intelligence (CI), Humanitarian Data Collection, Accountability to Affected Populations (AAP), Participation Revolution
- Department/Division : Department of Operations and Emergencies (DoE) – Displacement Tracking Matrix
- Project Type/Output: White Paper, this project has also been submitted as a Peer Review Journal
- 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 2020 Compendium on UN AI Activities? No
- 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

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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.
- Project Type: Platform/Event/Report/Meeting
- Project Status: Ongoing
- Project Start Year: 2017
- Reported as Part of 2020 Compendium on AI Activities? Yes
- Related Sustainable Development Goals (SDGs): All SDGs
- Partnership: AI for Good is organized by ITU in partnership with 38 UN Sister Agencies, XPRIZE Foundation, ACM and co-convened with Switzerland.
- Project Website (links): https://aiforgood.itu.int/
- 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 2021 version of the report includes the collection of activity report from 41 UN agencies, providing details on UN agencies experiments with AI to improve their response to global challenges. This year, the report will be more extensive, by including 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 2020 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://aiforgood.itu.int/about/un-ai-actions/
- Contact Information: Sadhvi Saran (sadhvi.saran@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 currently working on 20 topic areas ("use cases") addressing health issues including breast cancer, neurodegenerative diseases, autism, vision loss, skin lesions, cardiovascular diseases, and venomous snakebites. A summary of the current status of the work 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.
- An Ad-hoc Group on Digital Technologies for COVID Health Emergencies (AHG-DT4HE) has also been established to review the role of AI (and other digital technologies) in combatting COVID-19 throughout an epidemic's life cycle.
- Project Status: Ongoing
- Project Start Year: 2018
- Reported as Part of 2020 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/Pages/default.aspx
- Contact Information: Simao Campos (simao.campos@itu.int), Bastiaan Quast (bastiaan.quast@itu.int)

Project 4: AI in radiocommunications

- Project Description: 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.
- Project Domain: Communication
- Reported as Part of 2020 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)

Project 5: 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 studies 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 aims 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 is quickly raising attention from public and private entities and is becoming a popular forum for discussion.

Expected outcomes are:

- "Automated driving safety data protocol – Specification"
- "Automated driving safety data protocol – Public safety benefits of continual monitoring"
- "Automated driving safety data protocol – Practical demonstrators"

The Focus Group is also pioneering the discussion on what is referred to by "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 new initiative will also support 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
- Reported as Part of 2020 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/Pages/default.aspx
- Contact Information: Stefan Polidori (stefano.polidori@itu.int)

Project 6: 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 studying environmental efficiency in the age of AI, increasing automation, and smart manufacturing. The Focus Group aims to provide guidance on the environmentally efficient operation of emerging technologies, as well as the influence of these technologies on the environmental efficiency of the broader ICT ecosystem. The group's work also supports ITU's ongoing studies of the

environmental requirements of IMT-2020 (5G) systems. FG-AI4EE is working on over 20 deliverables which cover topics related to requirements, assessment, measurement and implementation guidelines of the environmental efficiency of AI and other emerging technologies. Participation is open; there are no membership requirements.

- Project Start Year: 2019
- Reported as Part of 2020 Compendium on AI Activities? Yes
- Project Domain: Environment
- AI Approach: Framework/Strategy/Methodology Formation
- Project Website (links): https://www.itu.int/en/ITU-T/focusgroups/ai4ee/Pages/default.aspx
- Contact Information: Charlyne Restivo, (charlyne.restivo@itu.int)

Project 7: 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 2020 Compendium on AI Activities? No
- 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/Pages/default.aspx
- Contact Information: Mythili Menon (mythili.menon@itu.int)

Project 8: 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), will explore 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 will cooperate 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 2020 Compendium on AI Activities? No
- 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/Pages/default.aspx
- Contact Information: Mythili Menon (mythili.menon@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 2020 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: The World Telecommunication/ICT Policy Forum (WTPF)

- Project Description: ITU will hold the Sixth World Telecommunication/ICT Policy Forum (WTPF) from 16-18 December 2021, intended to help create a shared vision among policymakers on the issues arising from the emergence of new telecommunication/ICT services and technologies. The outcomes of the WTPF are non-prescriptive Opinions agreed by multistakeholder consensus. The theme for WTPF-21 is "Policies for mobilizing new and emerging telecommunications/ICTs for sustainable development: The WTPF-21 would discuss how new and emerging digital technologies and trends are enablers of the global transition to the digital economy. Themes for consideration include AI, IoT, 5G, Big Data, OTTs etc. In this regard, the WTPF-21 will focus on opportunities, challenges and policies to foster sustainable development." A multistakeholder informal expert group led the 2-year preparatory process for the Forum.
- Project Type/Output: Event/Consensus Policy Opinions
- Project Status: Ongoing

- Project Start Year: September 2019
- Project End Year: December 2021
- Reported as part of 2020 Compendium on UN AI Activities? Yes
- Project Domain: Emerging Technologies
- Data Source: Multistakeholder agreement on Consensus Policy Opinions
- Publicly available data: Yes
- Related Sustainable Development Goals (SDGs): All SDGs
- Partnerships: Open to all stakeholders (governments, private sector, technical community, civil society, IGOs, Academia)
- Relevant Links and Multimedia: www.itu.int/wtpf
- Contact information: Preetam Maloor (Preetam.maloor@itu.int)

Project 11: AI Competitions ("Challenges")

- **Project Description:** Hundreds of students and professionals are competing in the ITU AI/Machine Learning in 5G Challenge. In 2020, participants came from over 60 countries; in 2021, from over 80 countries. Participants compete for global recognition and for monetary prizes. 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. Tools, data resources and problem statements were contributed by industry and academia in Brazil, China, India, Ireland, Japan, Russia, Spain, Turkey and the United States. The Challenge offered participants an opportunity to showcase their talent, test their concepts on real data and real-world problems, and compete for global recognition. The solutions can be accessed in several repositories on the Challenge GitHub: https://github.com/ITU-AI-ML-in-5G-Challenge.

  Many solutions submitted to the Challenge were innovative and improvements with respect to the baselines. To share the solutions with the larger community, ITU issued 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 submitted 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. After rigorous review by reviewers in conjunction with guest editors, 10 papers form the 2020 competition were accepted for publication: https://www.itu.int/pub/S-JNL-VOL2.ISSUE4.

  ITU has issued a call for papers resulting from the 2021 competition: https://www.itu.int/en/journal/j-fet/2022/004/Pages/default.aspx. The deadline to submit papers is 31 January 2021.

  In 2021, ITU is calling for GeoAI problem statements to launch the AI for Good GeoAI Challenge. Geospatial AI (or GeoAI for short) is the discipline that uses AI to analyze datasets which include a spatial (location) component, i.e., a component that can be located by a coordinate system. Most data sets have location coordinates: https://aiforgood.itu.int/about/geoai-challenge/

- Project Type/Output: Dataset

"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 with machine learning.

- Project Status: Ongoing

  The first AI Competition was the "ITU AI/Machine Learning in 5G Challenge" in 2020. The 2nd edition of this Challenge is taking place in 2021, and the 3rd edition for 2022 is being planned. In addition, in 2022 a GeoAI (Geospatial) AI Challenge is being planned; we are inviting problem statements that analyze datasets with a location component (and most of the data have a location component). A competition is organized into three phases: (1) Curation phase: the problem statements and the datasets are being defined. The curation phase takes about six months; (2) Competition phase: students and professionals around the world compete to solve the problem statements. The competition phase takes about 3 months. (3) Evaluation phase: the submitted solutions are being evaluated by a jury. The evaluation phase takes about 3 months.

- Project Start Year: 2020
- Project End Year: each competition has a 12-months cycle.
- Reported as part of 2020 Compendium on UN AI Activities? Yes
- Project updates: The ITU AI/Machine Learning in 5G Challenge is being run for the 2nd time in 2021. For 2022, the 3rd edition is being planned, as well as a new GeoAI Challenge.
- 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.
- Link to data: https://aiforgood.itu.int/about/aiml-in-5g-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: for the GeoAI Challenge in 2022, UN partners are UNGGIM (United Nations Global Geospatial Information Management) Academic Network and the UN Open GIS (Geographic Information System) Initiatives
  - 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
- Links:
  - ITU AI/Machine Learning in 5G Challenge: https://aiforgood.itu.int/about/aiml-in-5g-challenge/
  - GeoAI Challenge: https://aiforgood.itu.int/about/geoai-challenge/
- Multimedia: https://www.youtube.com/watch?v=-o1B2qHwQV8 : 41 second trailer to advertise the 2021 edition of the ITU AI/Machine Learning in 5G Challenge

- Lessons Learned: We are hoping to offer in 2022 computing resources to participants who might not have the support of a rich university or company. Training machine learning models can take a lot of time, and several participants informed us that they don't have the resources to run meaningful models.
- Contact information: Reinhard Scholl (reinhard.scholl@itu.int)

Project 12: Emerging Technology for Connectivity: Accelerating Digital Transformation in LDCs, LLDCs, and SIDS

- Project Description: The event was conducted from 5th July to 16th July with a focus on the Least Developed Countries (LDCs), Landlocked Developing Countries (LLDCs) and Small Island Developing States (SIDS).

  Accelerating Digital Transformation in LDCs, LLDCs and SIDS, ITU's Global event on Emerging Technology for Connectivity was held from 5-9 July 2021, followed by Capacity Building on Emerging Technology which was organized from 12th July to 16 July 2021.

  The event's overall objective was to promote the wide-scale deployment of emerging technologies to contribute towards achieving the Sustainable Development Goals (SDGs). This year the focus was on the Least Developed Countries (LDCs), Landlocked Developing Countries (LLDCs), and Small Island Developing States (SIDS)and targets SDG 4 (Quality Education), SDG 9 (Industry, Innovation and Infrastructure), SDG11 (Sustainable Cities and Communities) and SDG 17 (Partnerships for the Goals).

  Aligned with the objectives of the 5th United Nations Conference on the Least Developed Countries (LDC5), the event provided a platform to discuss and engage in the use of emerging technology for connectivity in order to accelerate the digital transformation of LDCs, LLDCs and SIDS and close the digital divide.

  The event touched upon the fundamental features of emerging technology for connectivity, as well as specific application fields for Artificial Intelligence, IoT, Big Data, low earth orbit satellites, 5G, digital government, block chain among others.

  The event highlighted potential challenges and solutions, as countries plan for economic recovery and prepare for the new normal. It showcased the best practices, broadened the space for participation and supported efforts to leverage emerging technology in endeavors to achieve the 2030 Agenda for Sustainable Development.

  This event has built partnerships and fostered reflections on emerging technology through the exchange of experiences and solutions, and engaged a diverse range of international, regional, and national stakeholders.
- Project Type/Output: Event
- Project Status: Ongoing
- Project Domain: Emerging Technologies, Capacity Building, Challenge
- Related Sustainable Development Goals (SDGs): SDG 4 – Quality Education; SDG 9 – Industry, Innovation and Infrastructure; SDG11 – Sustainable Cities and Communities; and SDG 17 – Partnerships for the Goals
- Links and Multimedia: https://www.itu.int/en/ITU-D/Conferences/ET/2021/Pages/Default.aspx
- Contact Information: Aminata A. Garba (aminata.amadou-garba@itu.int)

Project 13: 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 17 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 are: 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, digital transformation for people-oriented cities. 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 92 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.
- Project Type/Output: Multi-agency partnership
- Project Status: Ongoing
- Project Domain: Sustainable urban development
- Project Status: Ongoing
- Project Start Year: 2016
- Reported as part of 2020 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: 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://www.itu.int/en/ITU-T/ssc/united/Pages/default.aspx
- Contact information: Cristina Bueti (cristina.bueti@itu.int)
  Gulnara Roll (gulnara.roll@un.org)

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 2020 Compendium on UN AI Activities? Yes
- Contacts: Mr Scott Campbell, Senior Human Rights Officer (scampbell@ohchr.org)

Project 2: 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

- Reported as part of 2020 Compendium on UN AI Activities? Yes
- Contacts: Mr Scott Campbell, Senior Human Rights Officer (scampbell@ohchr.org)

Project 3: B-Tech Project

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 2020 Compendium on UN AI Activities? Yes
- Contacts: Mr Scott Campbell, Senior Human Rights Officer (scampbell@ohchr.org)

Project 4: 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 diligence in the context of developing, deploying and using new technologies (A/74/821).

- Project Type (Status): Full fledged development (Framework/Strategy/Policy)
- Project Domain: Human rights
- Reported as part of 2020 Compendium on UN AI Activities? Yes
- Contacts: Mr Scott Campbell, Senior Human Rights Officer (scampbell@ohchr.org)

Project 5: 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 2020 Compendium on UN AI Activities? Yes
- Contacts: Mr Scott Campbell, Senior Human Rights Officer (scampbell@ohchr.org)

Project 6: 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 (scampbell@ohchr.org)

Project 7: 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 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 2020 Compendium on UN AI Activities? Yes
- Contacts: Mr Scott Campbell, Senior Human Rights Officer (scampbell@ohchr.org)

Human Rights Council, Advisory Committee

Project 8: Report of the Advisory Committee of the Human Rights Council on New and Emerging Digital Technologies and Human Rights

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 is mandated to prepare 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 and to present the report to the Council at its forty-seventh session (June 2021). The report will address a range of issues linked to the use of AI.

- Project Type (Status): Full fledged development (Report)
- Project Domain: Human rights
- Reported as part of 2020 Compendium on UN AI Activities? Yes
- Contacts: Mr Eric Tistounet, Chief, Human Rights Council Branch (etistounet@ohchr.org), Mr Scott Campbell, Senior Human Rights Officer (scampbell@ohchr.org)

Special Procedures of the Human Rights Council

Project 9: 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
- Contacts: Mr Beatriz Balbin Chamorro, Chief, Special Procedures Branch (bbalbin@ohchr.org), Mr Scott Campbell, Senior Human Rights Officer (scampbell@ohchr.org)

Human Rights Committee

Project 10: 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 2020 Compendium on UN AI Activities? Yes
- Contacts: Ibrahim Salama, Chief, Human Rights Treaties Branch (isalama@ohchr.org); Scott Campbell, Senior Human Rights Officer (scampbell@ohchr.org)

Committee on the Rights of the Child

Project 11: Committee on the Rights of the Child - Drafting of a General Comment on children's rights in relation to the digital environment

The Committee on the Rights of the Child is currently drafting a general comment on children's rights in relation to the digital environment. This comment also touches upon issues relating to AI.

- 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 2020 Compendium on UN AI Activities? Yes
- Contacts: Ibrahim Salama, Chief, Human Rights Treaties Branch (isalama@ohchr.org); Scott Campbell, Senior Human Rights Officer (scampbell@ohchr.org)

Committee on the Elimination of Racial Discrimination

Project 12: CERD - drafting of a General recommendation No. 36 on Preventing and Combating Racial Profiling

During its 98th session, from 23 April to 10 May 2019, the Committee on the Elimination of Racial Discrimination initiated the drafting process of general recommendation n° 36 on preventing and combatting racial profiling. Algorithmic profiling is one of the topics that are being considered by the Committee.

- 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 2020 Compendium on UN AI Activities? Yes
- Contacts: Ibrahim Salama, Chief, Human Rights Treaties Branch (isalama@ohchr.org); Scott Campbell, Senior Human Rights Officer (scampbell@ohchr.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)

Office of the Secretary-General's Envoy on Technology

United Nations | 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 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 2020 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: UNESCO, Global Pulse – Co-Champions of multistakeholder Roundtable; ITU, UNESCO – Co-Chairs of Inter-Agency Working Group on AI
    - Government: Finland, France – Co-Champions of multistakeholder Roundtable
    - 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)

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 gets 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 2020 Compendium on UN AI Activities? No
- Project updates: Project has started in September 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.

- 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

UNITED NATIONS
UNCTAD

1. Description of Activities on AI

Project 1: Digital Economy Report 2021

- Project Description: The Digital Economy Report 2021, with the title of "Cross-border data flows and development: For whom the data flow", focuses on the international dimension of digital data, which are the main ingredient for artificial intelligence. The Report takes stock of recent trends in the global data-driven digital landscape and examines opportunities and challenges for developing countries to benefit from it. It also highlights the links to the impacts of the Covid-19 pandemic as this has led to an acceleration of digitalization trends and cross-border data flows have significantly increased during the pandemic. The Report considers the ongoing discussions and provides a review of the literature on the implications of cross-border data flows and their regulation, with a focus on the development perspective. It also looks at the different policies that countries are applying in what regards cross-border data flows, exploring their advantages and disadvantages, particularly for developing countries. The Report then discusses the evolution of the different approaches to regulate cross-border data flows at the international and regional level. It concludes by providing policy recommendations for finding a balancing approach that may allow for moving forward in the regulation of cross-border data flows in a productive manner.
- Department/Division: E-Commerce and Digital Economy Branch/Division of Technology and Logistics
- Project Type/Output: Report
- Project Status: Completed
- Project Start Year: 2020
- Project End Year: 2021
- Reported as part of 2020 Compendium on UN AI Activities? No
- Project Domain: Human Rights; Telecommunications; Trade
- 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
- Partnership(s)/Collaborator(s):
  - UN Partners: Inputs received from the Economic Commission for Europe, the Economic Commission for Latin America and the Caribbean, the Economic and Social Commission for Asia and the Pacific, and the Economic and Social Commission for Western Asia, the Office of the United Nations Envoy on Technology; the United Nations Commission on International Trade Law; the United Nations Educational, Scientific and Cultural Organization; the United Nations Industrial Development Organization; and the United Nations Office for the Coordination of Humanitarian Affairs.
  - Civil Society: Center for International Governance Innovation, Research ICT Africa, the Internet and Jurisdiction Policy Network.
- Links and Multimedia: https://unctad.org/webflyer/digital-economy-report-2021

- Contact information: Pilar Fajarnes (pilar.fajarnes@unctad.org)

Project 2: Technology and Innovation Report 2021

- Project Description: The Technology and Innovation Report 2021, titled "Catching technological waves: Innovation with equity," critically examines the possibility of frontier technologies such as AI, robotics and gene-editing widening existing inequalities and creating new ones. The Report focuses on low and middle-income developing countries and least developed countries, as well as on the most vulnerable segments of societies, while providing discussion on the effects on high-income countries as parts of the broader context and major drivers of frontier technologies. The Report argues that frontier technologies are essential for sustainable development, but they also could accentuate initial inequalities. It is up to policies to reduce this risk and make frontier technologies contribute to increasing equality. Low- and middle-income developing countries and the least developing countries cannot afford to miss the new wave of rapid technological change. Harnessing this new technological revolution will require countries to promote the use, adoption and adaptation of frontier technologies. A balanced approach building a robust industrial base and promoting frontier technologies is a must for success in the twenty-first century.
- Department/Division: Science, Technology and ICT Branch/Division of Technology and Logistics
- Project Type/Output: Report
- Project Status: Completed
- Project Start Year: 2020
- Project End Year: 2021
- Reported as part of 2020 Compendium on UN AI Activities? Yes
- Project Updates: Project was completed.
- Project Domain: Telecommunications; Inequalities; Sustainable development; Technological gaps
- Data Source: Data on innovation and technology. It also contains an index of readiness of countries to inclusive use, adoption and adaptation of frontier technologies.
- 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/technology-and-innovation-report-2021;
- https://youtu.be/8DF5v895J50?list=PL4m6ro9BgRm-0MTW8-OzWbYncPx-zpb4W ; https://youtu.be/w5aUlqX3_kA; https://youtu.be/wtUZ0OOHFNc
- 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, Science, Technology and ICT Branch, 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.

  Against this backdrop, the Division is running a pilot research project on the use of advanced machine learning algorithms for complex network analysis to create clusters of UN Member States based on detected socio-economic similarities, using the most updated publicly available data sets of socio-economic and development indicators. The clusters identified from the network analysis will provide a new and accurate rating tool to reinterpret and benchmarking digital transformation among similar Member States, through 2022 the E-Government Development Index (EGDI).
- 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: 2022
- Reported as part of 2020 Compendium on UN AI Activities? No
- 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: Nowadays, UN EGDI rankings and ratings and their related indexes are promoted and used by governments to evaluate country performances on digital development, providing also strategic data-driven approaches for policy makers. Although EGDI rankings allow a direct and quantitative comparison of Member States, still they provide a rather oversimplified representation, in which relevant national qualitative aspects related to socio-economic development are either not properly considered or still analyzed in silos. In this future work, the team is going to experiment an AI cutting-edge technology to enable new use of public indicators to generate value for multiple stakeholders. Proposing a complex network framework based on a comprehensive dataset of publicly available development indicators design, this project aims to add value to digital development at country level.
- Contact information: Vincenzo Aquaro (aquaro@un.org)

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

Chapter 8 within the United Nations E-Government Survey 2018 discusses transformative technologies, such as data analytics, Artificial Intelligence including cognitive analytics, robotics, bots, high-performance and quantum computing. It explains how forces driving such technologies are the result of long-term and painstaking research and development, their use by businesses and citizens as well as the increased processing power of hardware, increasing data availability and society's driving needs and expectations.

- Project Type (Status): Other (Other)
- Project Domain: Towards Data-Centric E-Government" of the UN E-Government Survey 2020
- 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; https://publicadministration.un.org/egovkb/Portals/egovkb/Documents/un/2020-Survey/2020%20UN%20E-Government%20Survey%20(Full%20Report).pdf
- 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: Mr Deniz Susar, Governance and Public Administration Officer (susar@un.org)

Project 3: Artificial Intelligence opportunities and challenges for the public Sector

Conference paper to the recent ICEGOV 2019 on AI opportunities and challenges for the Public Sector

- Project Type (Status): Study paper (Closed) United Nations Activities on Artificial Intelligence (AI) 37
- Project Domain: Towards Data-Centric E-Government" of the UN E-Government Survey 2020
- Related SDGs: All SDGs, specifically SDG 16 Peace, Justice and Strong Institutions
- Contacts: Mr Deniz Susar, Governance and Public Administration Officer (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 2020 Compendium on UN AI Activities? No
- 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: Ongoing
- 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 2020 Compendium on UN AI Activities? No
- 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 2020 Compendium on UN AI Activities? Yes, the project was featured as part of the 2020 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 2020 Compendium on UN AI Activities? No
- 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 2020 Compendium on UN AI Activities? No
- 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 2020 Compendium on UN AI Activities? No
- 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 2020 Compendium on UN AI Activities? No
- 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 2020 Compendium on UN AI Activities? No
- 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 2020 Compendium on UN AI Activities? No
- 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 2020 Compendium on UN AI Activities? No
- 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 2020 Compendium on UN AI Activities? No
- 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 2020 Compendium on UN AI Activities? No
- 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: Ongoing
- 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 2020 Compendium on UN AI Activities? No
- 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)

2. Related Sustainable Development Goals

All 17 SDGs

3. Relevant links

https://www.undp.org/

Contact Information

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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

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United Nations Economic Commission for Europe

1. Description of Activities on AI

Project 1: UK Office of National Statistics (ONS) – UNECE Machine Learning Group 2021

- Project Description: The ONS-UNECE Machine Learning Group 2021 (ML 2021) is an initiative building on the momentum of the 2019-2020 UNECE HLG-MOS Machine Learning Project. The initiative was launched in January 2021, is led by the ONS Data Science Campus in partnership with the UNECE. ML 2021 provides a platform for the global statistical community to develop research, build skills and share common challenges and solutions on machine learning developments and applications in the official statistics space. It consists of 5 Work Streams (WSs): 1) Pilot Studies, from Idea to Valid Solutions; 2) From Valid solution to Production; 3) Data Ethics and Governance; 4) On the Quality of Training Data; 5) On the Quality Framework for Statistical Algorithm.
- Department/Division: Statistics
- Project Type/Output: Community of expertise
- Project Status: Ongoing. The ML2021 Group consists of activities at various stages (from PoC, MVP to deployment)
- Project Start Year: 2019
- Project Domain: Statistics
- Data Source: Survey data, web-scraped data, satellite imagery data (LandSat, Sentinel), etc.
- Data Publicly available: No
- Reported as part of 2020 Compendium on UN AI Activities? Yes
- Project Updates: The project has evolved into an online community or platform where people can work together, coordinate efforts, present and discuss results. It is an experimental mode on collaboration building on the results of the preceding project.
- 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 ML2021 Group, the group itself consists of more than 200 members from various national and international organizations
- Relevant Links and Multimedia: https://statswiki.unece.org/display/ML/Machine+Learning+Group+2021
- 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
- Project Start Year: 2019
- End Year: 2022
- Project Domain: Automotive
- Technology/Platform: performance based, technology neutral
- Reported as part of 2020 Compendium on UN AI Activities? No
- 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: https://wiki.unece.org/pages/viewpage.action?pageId=87622236
- Contact information: Francois E. Guichard (francois.guichard@un.org)

Project 3: 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 ECE 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)
- Project Status: Ongoing
- Project Start Year: 2021
- Project End Year: 2022
- Project Domain: Energy
- Data Source: Publicly available data sources.
- Reported as part of 2020 Compendium on UN AI Activities? No
- 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
- Contact information: Igor LITVINYUK (litvinyuk@un.org)

Project 4 : Working paper "Digitalization: enabling the new phase of energy efficiency" (GEEE-7/2020/INF.3)

- Project Description: Digitalization is an emerging trend revamping the energy landscape and enabling progress toward continuous energy efficiency improvements. It is argued that digitalization, from its various dimensions, shall be considered as part of policy development to ensure overall net benefit to the system and its participants.

  Recognizing this, an unofficial document "Digitalization: enabling the new phase of energy efficiency" (GEEE-7/2020/INF.3) was developed and presented at the seventh session of the Group of Experts on Energy Efficiency.

  The document examines the role of digitalization and how it can help improve the efficiency of the overall energy system, while aiming to provide a clear, concise and balanced view on the matter to policymakers and other stakeholders. It presents some sectoral opportunities along with privacy and security risks and touches upon such aspects

as data ownership, hosting, and management issues that have significant potential to optimize the overall energy infrastructure. The paper also briefly highlights the potential impact that digitalization of energy system may have on the economy and society, especially in terms of jobs and skills and why reskilling and upskilling will be critical for a sustainable energy future.

Authors also called on the subsidiary bodies of the Committee on Sustainable Energy to join efforts in exploring benefits and obstacles of digitalization of energy system and on the Committee on Sustainable Energy to recognize this area in its future deliberations, and proposed establishment of a dedicated Task Force under the auspices of the Group of Experts on Energy Efficiency to take charge of the related activities. The Task Force on Digitalization in Energy was further established in 2020 (with the mandate for 2021-2022 and possibility for extension), to enable constructive subject-matter technical and policy dialogue to help bridge the gap between academic research, industrial innovations, and policy needs and achieve higher levels of efficiency in the energy system.

- Department/Division: Sustainable Energy Division
- Project Type/Output: Report
- Project Status: Complete
- Project Start Year: 2020
- Project End Year: 2020
- Project Domain: Energy; Telecommunications
- Data Source: Publicly available data sources.
- Reported as part of 2020 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 – Partnership for the Goals
- Partnership(s)/Collaborator(s):
    - UN Partners: UNEP-DTU Partnership, Copenhagen Centre on Energy Efficiency
    - Government: N/A
    - Private Sector: Energy Policy Group, PAN DATA GmbH, North American Electric Reliability Corporation, Microsoft, Hydro-Quebec
    - Academia: International Energy Research Centre, University of Bayreuth, Institute for Energy Efficiency in Production (EEP)
- Relevant Links and Multimedia: https://unece.org/sites/default/files/2020-12/GEEE-7.2020.INF_.3.pdf
- Contact information: Igor LITVINYUK (litvinyuk@un.org)

Project 5: Improving Efficiency of Buildings through Digitalization – Policy Recommendations from the Task Force on Digitalization in Energy (ECE/ENERGY/GE.6/2021/5)

- Project Description: The building sector globally represents over one-third of total final energy consumption. Despite significant increase of energy efficiency in buildings over the last decades, a potential for further improvement remains. Many technologies and solutions to achieve higher energy performance of residential, commercial, and industrial buildings at any stages of their lifecycle (construction, occupancy, or retrofitting) exist, and many of these are enabled by digitalization. Unlocking the energy efficiency potential of buildings through digitalization, however, in many cases requires advancement of relevant policies.

The evidence-based document "Improving Efficiency of Buildings through Digitalization – Policy Recommendations from the Task Force on Digitalization in Energy" (ECE/ENERGY/GE.6/2021/5), developed by the Task Force on Digitalization in Energy, elaborates on the role that application of digital technologies could play to increase energy efficiency in buildings. It contains key recommendations for further consideration by the Group of Experts on Energy Efficiency and the Committee on Sustainable Energy.

The document, i.a., elaborates on synergy between energy-related Big Data and Artificial Intelligence techniques. It argues that given the soaring increase of Big Data, a more advanced approach of analyzing data is needed, i.e. artificial intelligence (AI). There is a very strong symbiotic relationship between Big Data and AI: the value of Big Data cannot be exploited without AI and AI needs access to a huge volume of data to increase the accuracy of its outputs.

Other examples show that during the pre-construction phase, 3D scanning (e.g., Geographic Information Systems (GIS) positioning of a building) enables to optimize buildings for solar heat gains depending on the climatic zone, as well as to optimize project management and logistics to save resources. During operation and maintenance of a building, digitalization may enable an "active" energy system: this includes active and fully automated control of electricity and heat demand and the switch from self-consumption to grid supply. Buildings can make a significant contribution to balancing the fluctuating supply of renewable energy sources. In this context, e.g., applications of AI may help to predict individual needs, and hence, enable a predictive operation and increase overall energy security along with ensuring integration of renewable energy sources

- Department/Division: Sustainable Energy Division
- Project Type/Output: Report
- Project Status: Complete
- Project Start Year: 2021
- Project End Year: 2021
- Project Domain: Environment; Energy; Telecommunications
- Data Source: Publicly available data sources.
- Reported as part of 2020 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-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/sed/documents/2021/06/working-documents/improving-efficiency-buildings-through-digitalization
- Contact information: Igor LITVINYUK (litvinyuk@un.org)

Project 6: 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
- Reported as part of 2020 Compendium on UN AI Activities? No
- 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: www.wiki.unece.org/pages/viewpage.action?pageId=60361611
- Contact information: Francois E. Guichard (francois.guichard@un.org)

Project 7: 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" (ECE/TRADE/C/CEFACT/2021/19)
  - 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 2020 Compendium on UN AI Activities? No

- 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: Lance Thompson (lance.thompson@un.org)

Project 8: 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 2020 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)

Project 9: Online Workshop on Real-Time Upstream Emissions of Electric Vehicles During Recharge

- Project Description: Electric vehicle fleet increased significantly, alongside expansion of charging infrastructure. Coupled with technology advances and favourable regulatory

and fiscal measures, uptake of EVs is expected to accelerate. Powered by electric motors, EVs have zero tailpipe emissions, yet EVs virtually emit GHG when being charged – as electricity production generates these. An approach considerate of time and location of EVs charging, is thought expedient for assessing real environmental footprint of EVs. Achievement of this is reliant on improved vehicle connectivity, real-time electricity mix, carbon content data reporting by power generation, and decision-making support for more economically rational and environmentally favourable EVs recharging options – all enabled by ICT and digitalization, while keeping data privacy and security a must have to ensure end-user adoption.

The workshop assembled experts from the power generation and transmission side, and brought expertise from the ICT, recharging infrastructure, and vehicle sides. It helped assess how digital technologies could enable more accurate measurement and reporting of real-time carbon emissions of EVs, while giving due consideration to pathways for a balanced integration of electric mobility to ensure overall net benefit to energy system and its actors.

Key outcomes of the workshop are as follows:

- More transparent and harmonized data streams and calculation methodologies from both electricity providers and connected vehicle features make the quantification of real-time recharging emissions technically feasible, though with due consideration given to data privacy and security;
- Intelligent charging management systems and connected vehicles, coupled with hourly forecasts, market signals and consumer preference data, are key to minimize the upstream emissions of EVs and reap related benefits (reducing peak power generation capacity needs, integrating variable renewables and making EVs more attractive to end-users from a financial and environmental perspective). Harmonized communication protocols between countries and actors involved would ensure success of low-carbon recharge procedure.
- A number of challenges needs to be addressed, especially related to regulations (implementing real-time electricity tariffs, including upstream emissions from all energy types used for mobility purposes), load management (through enhanced connectivity, or Artificial Intelligence algorithms) or consumer engagement (through infrastructure development and innovative business models that will make the case for sustainable charging practices).

- Department/Division: Sustainable Energy Division
- Project Type/Output: Seminar/meeting
- Project Status: Completed
- Project Start Year:2021
- Project End Year: 2021
- Project Domain: Energy; Telecommunications
- Data Source: Publicly available data sources.
- Publicly available data: Yes
- Reported as part of 2020 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
- 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/info/Sustainable-Energy/Energy-Efficiency/events/355533
- Contact information: Igor Litvinyuk (litvinyuk@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.

- 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 2020 Compendium on UN AI Activities? No
- 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 2020 Compendium on UN AI Activities? No
- 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 2020 Compendium on UN AI Activities? No
- 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 2020 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 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. A web platform was developed as an aid tool to analyze text document via an algorithm and rate relation to each of the 17 SDGs. The tool can now be further developed to integrate websites as a plugin/module that can analyze databases and web content.
- 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 2020 Compendium on UN AI Activities? Yes
- Project Updates:
    - Incorporation of BERT "fine-tuning" layer, bringing the following enhancements:
        - Less training data required: thanks to pre-trained weights method we were able to fine-tune functions on a much smaller dataset than would be required in a model that is built from scratch.
        - Better results: fine-tuning procedure (typically adding one fully-connected layer on top of BERT and training for a few epochs) was carried out to achieve better results.
        - (linked to question 7) Changing the training set (text generated from the texts of the objectives of each SDG, which resulted in poor text quality) to automatic extraction of text and their labels (webscrapping) to articles from IISD-SDG website, labelled by experts.
        - Deployment of the tool into a pilot website https://unepsdg.000webhostapp.com/
        - A dedicated Powerstation computer with GPU (NVIDIA GeForce RTX 309) was procured for the learning process of the model.
- 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 - https://unepsdg.000webhostapp.com/
- Lesson Learned:
    - Challenges:
        - Limitation of the size of the text to process with the Google BERT algorithm (512 words or 2 pages)
        - A global shortage of graphics cards made it difficult to purchase specialized hardware at reasonable price and short delays.
    - Future work: 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) 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 2020 Compendium on UN AI Activities? No
- 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

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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. The course focuses on how freedom of expression, right to privacy and the right to equality are impacted using AI. Users will be aware of the implications of AI for freedom of expression, right to privacy and the right to equality, through interactive exercises users will identify and engage with practical examples of uses of AI, which are problematic from a Human Rights perspective.

  The course is available in English and Russian and will be available in French, Spanish and Chinese in 2021.
- Department/Division: Sector for Communication and Information
- Project Type/Output: Other: Online course
- Project Status: Completed
- Project Start Year: 2020
- Project End Year: 2021
- Reported as part of 2020 Compendium on UN AI Activities? No
- Project Domain: Education; Human Rights; Artificial Intelligence - Artificial Intelligence will disrupt/impact almost all industries and society.
- Related Sustainable Development Goals SDGs: SDG 17 – Partnerships for the Goals
- Partnership(s)/Collaborator(s): UNITAR (Co-partner)
- Links and Multimedia: https://en.unesco.org/news/join- unesco-and-unitars-ai-and-human-rights-course
- Contact information: Prateek Sibal (p.sibal@unesco.org)

Project 2: AI and the Rule of Law Massive Open Online Course (MOOC)

- 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 is now developing training on AI and the Rule of Law. This training will be available in 7 languages will be structured around six introductory modules that unpack AI's application and impact in the administration of justice. It has a unique format as it includes sitting judges from Supreme Courts, Human Rights Courts, Legal Experts and Technology experts, all coming together to share their knowledge. Importantly, the experts teaching the course come from India, Senegal, Kenya, Netherlands, United States, Chile, Brazil to China.
- Department/Division: Sector for Communication and Information

- Project Type/Output: Massive Open Online Course (MOOC)
- Project Status: Development
- Project Start Year: 2021
- Project End Year: March 2022
- Reported as part of 2020 Compendium on UN AI Activities? Yes
- Project updates: The online training is being recorded and registration will begin in November 2021.
- Project Domain: Artificial Intelligence - Artificial Intelligence will disrupt/impact almost all industries and society.
- Related Sustainable Development Goals (SDGs): 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: Prateek Sibal (p.sibal@unesco.org), Guliherme Canela De Souza Godoi (g.godoi@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 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 2000 people worldwide from more than 100 countries have joined the digital events, which has highlighted a number of interesting 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.
- Department/Division: Sector for Communication and Information
- Project Type/Output: Conference (multiple meetings on a theme)
- Project Status: Completed
- Project Start Year: 2021
- Project End Year: 2021
- Reported as part of 2020 Compendium on UN AI Activities? No
- Project Domain: Environment; Artificial Intelligence - Artificial Intelligence will disrupt/impact almost all industries and society.
- Related Sustainable Development Goals (SDGs): SDG 13 – Climate Action; SDG 17 – Partnerships for the Goals
- Partnership(s)/Collaborator(s)
    - UN Partners: UNEP
    - Private Sector: Startupinside, Microsoft
- Links and Multimedia:
    - www.aifortheplanet.org/en/

  - https://en.unesco.org/news/ai-planet-highlighting-ai-innovations-accelerate-impact
- Contact information: Vanessa Dreier (v.dreier@unesco.org)

Project 4: Activating Collective Intelligence for Artificial Intelligence Policies - AI Participatory Workshops and Protocols

- Project Description: With Innovation for Policy, UNESCO is facilitating community consultations and white paper to provide advice to governments on inclusive and multistakeholder driven processes for the development of AI policies. Through an iterative series of multi-stakeholder learning and co-creation workshops, i4Policy and UNESCO will develop a report on Activating Collective Intelligence for Artificial Intelligence Policy Frameworks.

  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: 2021
- Reported as part of 2020 Compendium on UN AI Activities? No
- Project Domain: Human Rights; Artificial Intelligence - Artificial Intelligence will disrupt/impact almost all industries and society.
- Related Sustainable Development Goals (SDGs): SDG 4 – Quality Education and SDG – 17 Partnership for the Goals
- Partnership(s)/Collaborator(s): I4policy Foundation (Co-partner)
- Links and Multimedia: https://events.unesco.org/event/?id=4180394255&lang=1033
- Contact information: Vanessa Dreier (v.dreier @unesco.org)

Project 5: Comic Strip on Artificial Intelligence

- Project Description: In the framework of the work of UNESCO to support capacity building in emerging technologies for Sustainable development, this comic strip is targeted at the wider public. Artificial intelligence is often reduced to pure technology, so the goal of the publication is to showcase the consequences of technology on freedom of expression and human rights. It will inform and educate the public on AI and issues related to AI, namely AI and Sustainable Development, AI Professions, as well as Ethical and Responsible AI.

  The publication will go way beyond theoretical understanding of a topic and is shows the everyday parts in which we are already confronted with AI, what challenges linked to AI are (i.e. biased AI), what their origin is and how they can be addressed. Moreover, AI in relation to the SDGs and UNESCO's ROAM principles will be further elaborated in the publication.

  In this original work, examples will respect geographical diversity and gender distribution by showing one example respectively from Asia, Africa, Europe or the USA, Latin America or Oceania; half of the examples are carried by women. The screenwriters and graphic designers will also be from different world regions ensuring inclusion.

  The comic strip will be published in early 2022.
- Project Type/Output: Graphic Novel
- Project Status: Ongoing

- Project Start Year: 2021
- Project End Year: 2022
- Reported as part of 2020 Compendium on UN AI Activities? No
- Project Domain: Environment; Gender; Human Rights; Justice; Artificial Intelligence - Artificial Intelligence will disrupt/impact almost all industries and society.
- Related Sustainable Development Goals (SDGs): SDG 17 – Partnership for the Goals
- Partnership(s)/Collaborator(s):
    - Katherine Evans (Writer and AI Expert)
    - Bimot Media (Illustration and Publication)
- Contact information: 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 readily available information 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: Completed
- Project Start Year: 2021
- Project End Year: 2021
- Reported as part of 2020 Compendium on UN AI Activities? No
- 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: Prateek Sibal (p.sibal@unesco.org); Vanessa Dreier (v.dreier@unesco.org)

Project 7: Gaps in AI Policy and Programme Development

- 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: 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 will bring together visionary 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 paper
- Project Status: Ongoing
- Project Start Year: 2020
- Project End Year: December 2021
- Reported as part of 2020 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):
  - Government: Government of Canada
  - Civil Society: MILA - Quebec Artificial Intelligence Institute
- Contact information: Vanessa Dreier (v.dreier@unesco.org)

Project 8: Joint Report on The Effects of AI on the Female Labor Market

- Project Description: UNESCO, Organisation for Economic Co-operation and Development (OECD), Inter-American Development Bank (IADB) and Oxford Internet Institute (OII) are developing a joint report concerning the effects of AI on the female labor market. The report is intended to raise general awareness on 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 will be published in early 2022, in English, Spanish and French.
- Department/Division: Sector for Communication and Information
- Project Type/Output: Report
- Project Status: Ongoing
- Project Start Year: 2021
- Project End Year: 2022
- Reported as part of 2020 Compendium on UN AI Activities? No

- Project Domain: Artificial Intelligence
- Related Sustainable Development Goals (SDGs): SDG 5 – Gender Equality; 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)
    - Oxford Internet Institute (Authoring)
- Contact information: Vanessa Dreier (v.dreier@unesco.org); Prateek Sibal (p.sibal@unesco.org)

Project 9: AI Capacity Building Needs Assessment Survey Africa

- Project Description: From the global debates around the development and use of AI, we know that there is heterogeneity in the development needs and capacities of countries around the world. There is also a gap in information on AI policies and strategies from developing countries. We wanted to address this gap and learn directly understand from our member states about their policy priorities and capacity building needs for AI.

  The AI Needs Assessment Survey in Africa is a unique initiative that captures the policy priorities and capacity building needs of 32 countries in Africa. There are some common needs, for instance:

    - Policy initiatives for AI governance need strengthening - This can be in the form of AI strategies and policies, enactment of legislation, establishment of Centers of Excellence on AI, and through the development of ethical guidelines for AI.
    - Legal and regulatory frameworks for AI governance need to be fostered
    - The need for enhancing capacities for AI Governance is widely recognized - at the level of the legislature, executive and the judiciary

  AI priorities for countries in Africa are varied but offer an opportunity for cooperation. These priorities include the need for attention to:

    - Personal data protection and data governance - is an urgent and important area of work for 71 per cent of the countries, i.e., 23 countries, while another five consider it to be important but not urgent.
    - Leveraging AI for economic growth, development and digital transformation - is of urgent importance for 22 countries. Similarly encouraging digital innovation and start-ups working on AI is an urgent and important concern for 65 per cent of the responding countries.
    - Updating education, skills and training systems - to strengthen human and institutional capacities for the development and use of AI is important for 84 per cent of the responding countries.
    - Facilitating AI research and development - is important for 84 per cent, i.e., 27 countries out of 32, who responded

  The survey is now being used not only by UNESCO but also our international and regional partners to better support member states.
- Department/Division: Sector for Communication and Information

- Project Type/Output: Report
- Project Status: Completed
- Project Start Year: 2020
- Project End Year: 2021
- Reported as part of 2020 Compendium on UN AI Activities? Yes
- Project updates: The survey was completed and results have been reported.
- Project Domain: Artificial Intelligence - Artificial Intelligence will disrupt/impact almost all industries and society.
- Related Sustainable Development Goals (SDGs): SDG 16 – Peace, Justice, and Strong Institutions; SDG 17 – Partnership for the Goals
- Partnership(s)/Collaborator(s):
    - IDRC
    - K4A
    - A14D Network
- Links and Multimedia:
    - https://en.unesco.org/news/unesco-launches-artificial-intelligence-capacity-building-needs-assessment-survey-africa-region
    - https://en.unesco.org/news/unesco-launches-artificial-intelligence-capacity-building-needs-assessment-survey-africa-region
- Contact information: Bhanu Neupane (b.neupane @unesco.org); Prateek Sibal (p.sibal@unesco.org)

Project 10: 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 2020 Compendium on UN AI Activities? No
- Project updates: Development of a guiding framework on AI competencies is underway.
- In December 2020, UNESCO organized the International Forum on AI and the Futures of Education 'Developing Competencies for the AI Era' and produced a synthesis report.

  In 2021, UNESCO carried out two surveys on government-approved AI curriculum targeting UNESCO Member States and non-governmental organizations, which provide AI curricula. The results of these surveys will inform the development of a guiding framework on AI competencies.

  - Two surveys on the use of AI in education in response to the COVID-19 pandemic

- UNESCO launched a call for applications on the use of AI to support education during the COVID-19 pandemic by non-governmental agencies and a survey for UNESCO Member States. The results of this exercise will inform a report on the main areas of AI use in education and help examine the effectiveness of these tools in supporting education during and beyond the COVID-19 learning crisis.

  - 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.

- 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 11: AI and Education: Guidance for Policy-Makers

- Project Description: This publication 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: definitions, techniques and technologies. It continues with a detailed analysis of the emerging trends and implications of AI for teaching and learning, including how we can ensure the ethical, inclusive and equitable use of AI in education, how education can prepare humans to live and work with AI, and how AI can be applied to enhance education. It finally 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.

- Project Type/Output: Report/Policy Framework/Capacity building activities based on the Guidance are under development.
- Project Status: Completed
- Project Start Year: 2019
- Project End Year: 2021
- Reported as part of 2020 Compendium on UN AI Activities? Yes
- Project updates: The Guidance for policy makers has been published in March 2021, it is expected to be available in 6 UN languages.
- During the workshops on ICT in education policies and OER development the Guidance has been presented to Member Stated. Launch event and capacity building activities around the Guidance are envisaged.
- 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 12: Recommendation on the Ethics of Artificial Intelligence

- Project Description: The Recommendation on the Ethics of Artificial Intelligence is the first-ever global normative instrument on the ethics of artificial intelligence. It is a novel, anticipatory, and transformative framework, offering concrete policy actions that are anchored in universal values and principles, to ensure that AI systems work for the good of humanity. The Recommendation will be a blueprint for global consensus on the 'what,' as well as the 'how' of ethical regulation of this game-changing technology, and serve as a shared reference point for leaders around the world on how to control the risks and harness these new technologies as a force for good. . It will provide concrete mechanisms, such as the Ethical Impact Assessment and Readiness Benchmarking Methodology and various capacity-building mechanisms to help countries evaluate benefits and risks of AI systems, put in place risk prevention, mitigation and monitoring measures, and to deploy various redress mechanisms for those who have been adversely affected by these new technologies.
- Department/Division: Sector for Social and Human Sciences
- Project Type/Output: Policy Framework
- Project Status: Ongoing
- Project Start Year: November 2019
- Project End Year: November 2021
- Reported as part of 2020 Compendium on UN AI Activities? Yes
- Project updates: Members States provided their comments on the first draft of the Recommendation on the Ethics of Artificial Intelligence in late 2020. A final report and the revised draft text of the Recommendation was produced by the secretariat based on their comments and submitted for the negotiations within the intergovernmental meeting of the Special Committee of technical and legal experts nominated by Member States (Category II) that convened over two sessions in April and June 2021. The draft text was

negotiated and finalized by the Special Committee and will be presented for its possible adoption at UNESCO's 41st General Conference in November 2021.

- 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: HLCP
    - Government: Arab Republic of Egypt Ministery of Communications and Information; Canadian Commission for UNESCO, Government of Japan; Fonds de recherche du Québec; Government of Kuwait; Government of Quebec; Kingdom of the Netherlands; Ministère des Relations internationales et de la Francophonie du Québec, Ministry of Education, Science and Sport of the Republic of Slovenia, Ministry of Higher Education, Research and Innovation of the Republic of Senegal; National Commission for UNESCO of the Democratic Republic of the Congo; National Research Council Canada; Republic of Korea; Rwanda National Commission for UNESCO; Slovenian National Commission for UNESCO; South African National Commission for UNESCO; Government of Barbados, National Commission of Argentina.Social Science and Humanities Research Council of Canada
    - Private Sector: Algora, Mila
    - Academia: Beirut Arab University; Centre for AI Research; Rathenau Institut; Université de Montréal; University of Pretoria; University of Stellenbosch
- Links and Multimedia:
    - https://en.unesco.org/artificial-intelligence/ethics
    - https://en.unesco.org/artificial-intelligence/ethics
- Contact information : Dr. Dafna Feinholz (d.feinholz@unesco.org)

Project 13: Teaching Artificial Intelligence at School project

- Project Description: The connection between AI and education involves three areas: learning with AI (e.g. the use of AI-powered tools in classrooms), learning about AI (its technologies and techniques) and preparing for AI (e.g. enabling all citizens to better understand the potential impact of AI on human lives). The "Teaching artificial intelligence at school" project currently focuses on the latter two connections. The goal is to contribute to mainstreaming both the human and technical aspects of AI into training programmes for school students. It begins with piloting capacity development of curriculum developers and master trainers from selected national institutions to empower young people.

  The following three lines of action are planned for the project:
    - Development of an AI skills framework for schools;

- Development and management of an online repository to host curated AI-related training resources, AI national curricula and other key digital skill training courses;
- Workshops to support the integration of AI training into national or institutional school curriculum in a selected number of countries.

UNESCO is currently developing an online repository to provide a hub for Member States who are considering how best to teach their young people about Artificial Intelligence – how it works, how it might be used, and how it might affect humanity. The specific objectives of the repository are to support curriculum designers to upskill in their AI knowledge, and facilitate them to integrate AI skills development modules/courses into the curriculum of schools or other education institutions; facilitate the preparation of (master) trainers; provide openly accessible curated resources on AI in education for all. The repository will soon be available.

The AI training workshops for national or institutional school curriculum is targeted to teachers and curriculum developers. This will be designed by teachers and specialists in curriculum development, artificial intelligence and workshop developers. This project is implemented by UNESCO, currently in partnership with Ericsson, and open to a multi-stakeholder partnership approach.

- Department/Division: Sector for Education
- Project Type/Output: Seminar/meeting
- Development of an AI skills framework for schools;
- Development and management of an online repository to host curated AI-related training resources, AI national curricula and other key digital skill training courses;
- 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 2020 Compendium on UN AI Activities? No
- Project updates: We have completed mapping of AI curricula and will now develop an AI framework for school.
- 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 14: AI animations: empowering youth through knowledge sharing

- Project Description: UNESCO developed by the end of 2020 a series of 7 short AI animations based on the UNESCO publication Steering AI and Advanced ICTs for Knowledge Societies – a Rights, Openness, Access, and Multi-stakeholder (ROAM) perspective to promote a better understanding of the basic concepts related to AI, as well as the guiding human rights and ethical principles underpinning its development. Each animation contains a key message illustrating the importance of ROAM principles. To promote access to information for all through digital technologies, UNESCO engaged with youth groups and volunteers to translate the animations into over 20 languages,

including indigenous. The translated subtitles and audio files will be made public online, granting access to the local communities to up-to-date knowledge on AI in their own languages.

- Entity Name: UNESCO Bangkok Office
- Department/Division: Communication and Information Unit
- Project Type/Output: Animation videos (with subtitles/audio tracks in different languages, including indigenous languages)
- Project Status: Ongoing
- Project Start Year: 2020
- Project End Year: 2021
- Reported as part of 2020 Compendium on UN AI Activities? Yes
- Project updates: Youth, including indigenous youth, from Asia were engaged to translate the AI animations into their native languages, which facilitates the sharing of AI basic concepts and the important ethical and human rights principles among diverse youth groups and local communities in Asia.
- Project Domain: Education; Gender; Human Rights; Youth, Indigenous Languages
- Technology/Platform: Platform: YouTube
- Related Sustainable Development Goals (SDGs): SDG 4 – Quality Education; SDG 5 – Gender Equality; SDG 9 – Industry, Innovation and Infrastructure; SDG 10 – Reduced Inequality; SDG 11 – Sustainable Cities and Communities; SDG 16 – Peace, Justice, and Strong Institutions
- Partnership(s)/Collaborator(s):
    - Civil Society: Indigenous communities in Vietnam and Cambodia
- Lessons Learned: For the translation of the animations, it was hard to decide which languages should be translated into, and it was hard to control the quality of translation when we tried to engage youth as the translators. Various platforms were used to attract more youth to participate and contribute to the project, including the online UNV platform and social media platforms. We also mobilized colleagues from different Field Offices and youth from indigenous network to proofread the translation. Another challenge is that some indigenous languages do not have written scripts, which limited the potential reach of the animations. Therefore, maximizing the new function of having different audio tracks on YouTube platforms, UNESCO decided to proceed with audio translations in 11 languages to share the important knowledge on AI and ethics to 11 more indigenous communities.
- Links and Multimedia:
    - https://bangkok.unesco.org/content/7-minutes-understand-ai-and-key-roam-x-principles-applying-its-development
    - GIFs:https://unesco.sharepoint.com/sites/UNESCOBangkokTeam/Shared%20Documents/0%20CI/AI%20animation/GIFs
- Contact information: Misako Ito (m.ito@unesco.org)

Project 15: AI for Girls – Girls in ICT Day Thailand training track

- Project Description: To promote Artificial Intelligence for social good, and enhance the participation of women and youth in the development of AI, UNESCO organized a series of online training on AI for girls within the framework of the Girls in ICT Day Thailand. In collaboration with Microsoft Thailand, 5 webinars were organized reaching about 90 participants in total. The project aimed to inspire and stimulate girls and young women's interests to engage in the design and development of AI in Thailand and share with them the important ethical and human rights principles for AI development through interactive

training activities. It was a good opportunity not only to equip the girls with knowledge on AI and its ethical principles but also with confidence so that they engage in studies and careers related to AI development.

- Department/Division: CI/BGK
- Project Type/Output: Seminar/meeting
- Project Status: Completed
- Project Start Year: 2021
- Project End Year: 2021
- Reported as part of 2020 Compendium on UN AI Activities? No
- Project Domain: Education; Gender; Human Rights
- Technology/Platform: The webinars took place via Zoom. Several free and open source AI tools and platforms, such as SUZIAI, Mozilla Common Voice, etc., as well as Microsoft Azure were presented during the training sessions.
- 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 Inequalities; SDG 11 – Sustainable Cities and Communities; SDG 16 – Peace, Justice, and Strong Institutions; SDG 17 – Partnerships for the Goals
- Partnership(s)/Collaborator(s):
    - UN Partners: ITU
    - Private Sector: Microsoft Thailand
- Lessons Learned: The biggest challenge was to maintain the same group of participants for the continuity of the training sessions. As the training was open for registration online, it attracted a big number of people to register before the first session. However, the number of participants was not stable, and not all participants have continued to follow all the sessions.
- Links and Media:
    - https://bangkok.unesco.org/content/unesco-supports-women-ai
    - https://www.facebook.com/GirlsinictasiapacificTH/
- Contact information: Ms Misako Ito (m.ito@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

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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: Ongoing
- Project Start Year: 2019
- Project End Year: 2021
- Reported as part of 2020 Compendium on UN AI Activities? Yes, but with an iteration
- 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 be cover groups of population 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 2020 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.

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**:**

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United Nations Global Pulse

1. Description of Activities on AI

Project 1: Using machine learning to tackle the spread of COVID-19

- Project updates: Over the past year we have continued to catalogue ongoing research and elaborate on lessons learned, pitfalls and ways forward to use AI to effectively and safely tackly current and future public health crises. We have published several papers in journals and conferences on this topic in order to provide a reference point for the wider community.
- Project Description: Since March last year, many works have been published/proposed which attempt to use AI to tackle the COVID-19 pandemic. Last year UN Global Pulse worked with researchers from the World Health Organization (WHO) and the MILA-Quebec AI Institute to map the landscape of such AI applications. The research focused on three specific areas: individual patent diagnosis and treatment, protein and drug discovery related research, and the socio-economic impact of the disease. This work also explains main challenges and opportunities for AI cooperation against COVID-19. We have since continued to catalogue ongoing research and elaborate on lessons learned, pitfalls and ways forward as a community to use AI to effectively and safely tackly current and future public health crises.
- Department/Division: Executive Office of the Secretary General
- Project Type/Output: Academic paper
- Project Status: Publications written with more to be added as needed on specific topics
- Project Start Year: 2020
- Reported as part of 2020 Compendium on UN AI Activities? Yes (partially)
- Project Domain: Health
- Data Source: Scientific publications
- Related Sustainable Development Goals (SDGs): SDG 3 – Good Health and Well-being; SDG 16 – Peace, Justice, and Strong Institutions; SDG 17 – Partnership for the Goals
- Partnership(s)/Collaborator(s):
    - UN Partners: WHO
    - Academia: Durham University, MILA, University of Montreal
- Links:https://www.jair.org/index.php/jair/article/view/12162 , https://www.nature.com/articles/s42256-020-0184-3 , https://arxiv.org/abs/2008.09043 , https://ieeexplore.ieee.org/abstract/document/9379034 , https://arxiv.org/abs/2108.10791
- Contact information: Miguel Luengo-Oroz (miguel@unglobalpulse.org)

Project 2: Operational response simulation tool for epidemics in refugee and IDP settlements

- Project Description: The spread of infectious diseases presents many challenges to healthcare systems and infrastructures 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.

  We seek to understand how COVID-19 spreads in settlements. We initially focussed our efforts on the Cox's Bazar settlement in Bangladesh, and have since begun modeling 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.

  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.
- 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 2020 Compendium on UN AI Activities? No
- Project Domain: Health
- Data Source: Census, epidemiological and survey data
- Publicly Available Data: No
- 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
- 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 a result, we are seeking to bring together a community of modelers, public health experts, and settlement staff to address these gaps and promote a greater degree of work and cooperation to support those most at risk. Through workshops and discussions, we have identified key lessons learned from our work, and that of others, including the challenges of working in different operational settings, data access and partnership challenges, as well as possible ways forward for the community. This work will be published in the near future. In addition, we are continuing to work with decision makers from settlements around the world to provide modeling support.
- Links:
  - https://www.unglobalpulse.org/microsite/epidemic-modelling-in-settlements/
  - https://www.medrxiv.org/content/10.1101/2021.01.27.21250611v2
  - https://epimodel.unglobalpulse.net
- Contact information: Joseph Aylett-Bullock (joseph@unglobalpulse.org)

Project 3: 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 a research collaboration with the WHO and Stanford University we are planning to test interventions to reduce vaccine hesitancy among social media users. Machine learning will be used to segment users into different vaccine hesitancy types, and a contextual bandits experiment will be used to dynamically assign treatments to reduce vaccine hesitancy according to the user type.
- Project Type/Output: Report
- Project Status: Ongoing
- Project Start Year: 2020
- Project End Year: 2022
- Reported as part of 2020 Compendium on UN AI Activities? No
- Project Domain: Health
- Data Source: Our social media listening relies on data collected from platforms such as Twitter, blogs, and news media. Our experiments will use 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 experiments 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 4: 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.
- Project Type/Output: Policy Framework/Academic paper
- Project Status: Ongoing
- Project Start Year: 2020
- Project End Year: Ongoing
- Reported as part of 2020 Compendium on UN AI Activities? No
- 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: UN Global Pulse
- Links: http://unglobalpulse.net/predictingdisplacement/
- 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 5: 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 2020 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 now been used to produce the UN's first AI generated flood maps which have been used in operational contexts. We have also opened up PulseSatellite to the wider UN system, and worked with multiple other UN agencies including UNHCR, WHO and UN HABITAT to help assist in the use of AI powered satellite image analysis.
- 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
    - Academia: Durham University
- Links: https://www.unglobalpulse.org/microsite/pulsesatellite/
- 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 6: Radio monitoring for public health social listening

- 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 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 is designed to be used by infodemic managers and decision makers to inform public health interventions and communication strategies.
- 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: 2021
- Reported as part of 2020 Compendium on UN AI Activities? Yes
- Project updates: Over the past year we have been working closely with WHO infodemic managers in several countries in the Afro region to incorporate local radio stations into our pipelines. Our radio monitoring tool now covers radio stations across a range of countries in both English and French. We are also now undergoing user testing of our frontend dashboard which allows users to query the transcribed database of text and explore the results through a series of NLP techniques including topic modelling, word frequency and similarity analysis, and sentiment analysis.
- 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
- 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 over the past year has been the wide variability in quality of speech-to-text machine learning models which are able to be used on 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 recently been conducting user testing of the dashboard with WHO infodemic managers which have 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 hosting our own platform for radio analysis for use in different contexts.
- Contact information: Merie Kannampuzha (merie.kannampuzha@un.org)

Project 7: 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 access 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: Ongoing
- Project Start Year: 2021
- Project End Year: 2021
- Reported as part of 2020 Compendium on UN AI Activities? No
- 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: Cannot disclose
- 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 8: 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, particularly once COVID-19-related border restrictions are lifted. 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 2020 Compendium on UN AI Activities? No
- 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 simulation tool has been coded using the Altair library for Python.
- 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)

2. Related Sustainable Development Goals

SDG 3, 8, 10, 13, 16, and 17

3. Relevant links

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United Nations Habitat

UN HABITAT
FOR A BETTER URBAN FUTURE

1. Description of Activities on AI

Project: 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 is expected to provide a description of AI and AI-based technologies and discuss the ethical concerns with the use of AI systems. It will explore examples of AI use cases and AI case studies in cities and what lessons can be drawn from such projects. The paper will conclude with a set of recommendations to guide urban managers looking to introduce AI solutions in their cities.
- 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 2020 Compendium on UN AI Activities? Yes Related Sustainable Development Goals (SDGs): SDG 11 – Sustainable Cities and Communities
- Partnership(s)/Collaborator(s)
    - Civil Society: MILA

2. Related Sustainable Development Goals

SDG 11

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: Epidemic Simulation Modeling 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 Status: Ongoing
- Project Start Year:2020
- 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: Python 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 2020 Compendium on UN AI Activities? No
- 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 Bangladesh Teams
  - Academia: Durham University, MITIBM Watson AI Lab
- 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 2: Predictive Analytics for UNHCR Improved Contingency Planning

- Project Description: This project seeks to forecast the number of people who cross the border in Brazil and the shelter capacity in Boa Vista and Pacaraima, the Brazil border with Venezuela. This project consists of three computer-based solutions using different techniques: a queueing modeling tool for simulating border crossings 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).

  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. 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. For example, UNHCR is 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: Jupyter notebook, Python
- Reported as part of 2020 Compendium on UN AI Activities? No
- 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

- Relevant Links and Multimedia: https://brazil-venezuela-flows.unglobalpulse.net/
- 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 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
- 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: R Markdown notebook, R several packages, including R-shiny https://unhcrinnovation.shinyapps.io/Somalia/

- Reported as part of 2020 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: 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 modeling, 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 utilized 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 2020 Compendium on UN AI Activities? No
- 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 5: 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 2020 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/

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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 En-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 is in the process of developing 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. Intending to offer this tool to support offices' existing review process (e.g. providing initial screening before manual reviews), this tool should help achieve efficiency gain and improve the quality of final reports.
- Department/Division: Division of Data, Analytics, Planning and Monitoring (DAPM)
- Project Type/Software tool
- Project Status: Ongoing
- Project Start Year: 2021
- Project End Year: 2022
- Reported as part of 2020 Compendium on UN AI Activities? No
- 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: Jieru Zheng, Timothy Takona (jzheng@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 2020 Compendium on UN AI Activities? No
- 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 2020 Compendium on UN AI Activities? No
- 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 2020 Compendium on UN AI Activities? No
- 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 2020 Compendium on UN AI Activities? No
- 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 is leading a two-year project to better understand how Artificial Intelligence (AI) systems can protect, provide for, and empower children. Key to this project is 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 have been consulted in 5 regions, and almost 250 children have been 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 2020 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 are being released as case studies and a version 2 of the Policy Guidance on AI for Children will be published on 30 November during the first-even Global Forum on AI for Children.
- 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 2020 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

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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".
- Department/Division: Centre for Artificial Intelligence and Robotics
- Project Type/Output: Multi-stakeholder platform- A 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.
- Project Status: Ongoing
- Project Start Year: 2018
- Project End Year: 2023
- Project Domain: Justice
- Reported as part of 2020 Compendium on UN AI Activities? Yes
- Project Updates: In 2020, UNICRI together with INTERPOL identified a core group of experts from law enforcement, academia, private sector and civil society to support and guide the project and ensure that it meets the needs of law enforcement. Progress was made in conceptualization of a "Toolkit for Responsible Artificial Intelligence Innovation

in Law Enforcement" and Two Virtual Discussion Rooms (VDR) were held with the core group of experts to discuss topics that will help shape the work on the toolkit. The first VDR focused on law enforcement use cases of AI and the second VDR focused on principles for responsible AI in law enforcement. In cooperation with INTERPOL, the World Economic Forum, and the Netherlands National Police, UNICRI developed a proposed policy framework for the responsible use of facial recognition technology in criminal investigations.

- Related Sustainable Development Goals (SDGs): SDG 16 –Peace, Justice, and Strong Institutions
- 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 four VDRs on AI for Law Enforcement
- 4th Global Meeting on AI for Law Enforcement in April 2022 (TBC)
- Release of draft Toolkit and consultation process late 2022 (TBC)
- Piloting of facial recognition technology policy framework in cooperation with Netherlands National Police in early 2022 (TBC)

- Contact Information: Irakli Beridze (irakli.beridze@un.org)

Project 2: Working with Law Enforcement to Build Capacities for the use of Artificial Intelligence to Combat Online Child Sexual Abuse Material

- 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 and related authorities to prevent and combat a wide range of forms of violence, exploitation and abuse against children online.

  Online child sexual exploitation has been growing exponentially over the last decades and has experienced a further increase during 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, 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: 2022
- Project Domain: Justice
- Data Source: AI tools that can be leveraged by law enforcement agencies in preventing, detecting, and prosecuting online child sexual exploitation, including open-source approaches.
- Data publicly available: No
- Technology/Platform: Microsoft SharePoint
- Reported as part of 2020 Compendium on UN AI Activities? Yes
- Project Updates:

  Since the launch of the AI for Safer Children Initiative in late 2019, UNICRI has:

  - Conceptualized and started developing the pilot of the platform dedicated to support law enforcement in leveraging AI to combat online child sexual exploitation, 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.
  - Held several meetings, including an inaugural meeting of the Advisory Board of the initiative, on 23 March 2021, and the Stakeholder Meetings for law enforcement agencies on 15 and 17 June 2021.
  - 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.
  - Related Sustainable Development Goals (SDGs): SDG 16 – Peace, Justice, And Strong Institutions

- Partnership(s)/Collaborator(s):

  - UN Partners: UNICEF
  - Government: Ministry of Interior of the UAE
  - Private Sector: Griffeye, SafeToNet

  - 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
  - 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:
  - http://www.unicri.it/topics/AI-online-child-sexual-abuse-CSAM
  - Twitter: @AISaferChildren
  - https://youtu.be/aYJJ2m2Y29g
- Lesson Learned:
  - Challenges:
    - Ensuring 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.
    - Heterogenous level of technical capabilities and the level of 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.
  - Future work:
    - Development of the AI for Safer Children Global Hub and population with AI tools.
    - Pilot of the Global Hub in cooperation with law enforcement agencies.
- Contact Information:Irakli Beridze (irakli.beridze@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 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 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 in late 2021.

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.

- Department/Division: Centre for Artificial Intelligence and Robotics
- Project Type/Output: Report
- Project Status: Ongoing
- Project Start Year: 2020
- Project End Year: 2021
- Project Domain: Justice
- Reported as part of 2020 Compendium on UN AI Activities? No
- Related Sustainable Development Goals (SDGs): SDG 16 –Peace, Justice, and Strong Institutions
- Partnership(s)/Collaborator(s) :
    - UN Partners: UNOCT/UNCCT
    - 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. 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.

2. Related Sustainable Development Goals

SDG 16

3. Relevant Links

http://www.unicri.it/

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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 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 security. This project directly supports the Convention on Certain Conventional Weapons Group of Government Experts on Emerging Technologies in the Area of Lethal Autonomous Weapon Systems 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 for AI in military systems—particularly in decision-making support tools, cyber operations, and nuclear 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.

  In the period 2019–2021, UNIDIR's AI and autonomy workstream sought to a) support understanding of the implications of autonomy in weapon systems and b) explore the options available for AI arms control. While continuing its work on autonomy in weapon and military systems, in 2022, UNIDIR will adopt a new research agenda on AI and Autonomy that will focus on building an understanding of different types of AI, their different purposes and military use, 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 submission, 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 will 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 2021:

- Between September 2020 and June 2021, UNIDIR organized a series of six regional table-top exercises (TTX) on the Human Element and Autonomous Weapons Systems in Africa and the Middle East, the Asia–Pacific, Eastern Europe, Latin America, Western Europe, and North America. To support the development of a shared understanding of the nature and type of human– machine interaction in the context of the execution of an attack, the exercises focused on the interplay between introducing degrees autonomy in weapon systems and retaining human control in the context of varying scenarios. These TTXs brought together 198 individual technical, military and legal experts from 75 countries t (some nominated by their governments; others invited by UNIDIR as independent experts) to explore the complex interactions between what is technically feasible, what is militarily desirable and what is legally permissible. A report summarizing the key findings is available here: Table-Top Exercises on the Human Element and Autonomous Weapons System | UNIDIR
- Related Sustainable Development Goals (SDGs): SDG 16 – Peace, Justice, and Strong Institutions
- Reported as part of 2020 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
    - As part of this project, UNIDIR conducted a research study on Swarm Robotics and developed a video to provide an overview of robotic swarms. Available here: What are Robotic Swarms? An Overview - YouTube
- 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, such as the Innovations Dialogue (The 2021 Innovations Dialogue: Deepfakes, Trust and International Security | UNIDIR). 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. (https://unidir.org/events/2021-innovations-dialogue)
    - 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 engendering 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/

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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 2020 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, 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.
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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 data: https://unido.maps.arcgis.com/home/index.html 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 2020 Compendium on UN AI Activities? No
- 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
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  - 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)

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) Sibilla Sartori (S.SARTORI@unido.org)

United Nations Institute for Training and Research

1. Description of Activities on AI

Project 1: ML4 Floods Deployment Test

- Project Description: The United Nations Satellite Centre (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.
- Department/Division: United Nations Satellite Centre (UNOSAT)
- Project Type/Output: Software tool
- Project Status: Completed
- Project Start Year: 2021
- Project End 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 2020 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 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)

Project 2: 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 a damage assessment 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 2020 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
- Contact Information: Einar Bjorgo (einar.bjorgo@unitar.org)

Project 3: UNOSAT S-1 FloodAI

- Project Description: The United Nations Satellite Centre (UNOSAT) has recently launched 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 local 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 2020 Compendium on UN AI Activities?: Yes
- Project Updates: Previously reported in 2020 as "Project 1: 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)
- Relevant Links and Multimedia: https://www.mdpi.com/2072-4292/12/16/2532

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. The current objective of the group is to produce consensus recommendations to the Sixth Review Conference of the Convention on Certain Conventional Weapons, 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 2020 Compendium on UN AI Activities?: Yes
- Contact Information: Michael Spies (spiesm@un.org), Heegyun Jung (jung6@un.org)

Project 2: Report to 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 75/38, the United Nations Secretary-General will report to the 76th 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/76/182.
- 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 2020 Compendium on UN AI Activities?: Yes

- Relevant Links and Multimedia: https://www.un.org/disarmament/topics/scienceandtechnology/
- Contact Information: Michael Spies (spiesm@un.org) Heegyun Jung (jung6@un.org)

Project 3: Responsible Innovation for a Secure Environment – Asia and the Pacific

- Project Description: ODA, together with partners from the University of Tokyo, Singapore University of Technology and Design, Nanyang Technological University, National University of Singapore, Montreal AI Ethics Institute, the Responsible AI Institute, ASEAN Foundation, SAP, Vodafone and others, has been carrying out a series of interactive workshops and dialogues with Science, Technology, Engineering and Mathematics (STEM) students and young innovators from across Asia and the Pacific. It responds to action 28 of the Secretary-General's Disarmament Agenda.

  These workshops introduce participants not-traditionally exposed to disarmament issues to the key concepts in responsible innovation of science and technology. 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.
- 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): University of Tokyo, Singapore University of Technology and Design, Nanyang Technological University, National University of Singapore, Montreal AI Ethics Institute, the Responsible AI Institute, ASEAN Foundation, Vodafone (with support from Risshō Kōsei-Kai)
- Reported as part of 2020 Compendium on UN AI Activities?: Yes
- Relevant Links and Multimedia: https://www.un.org/disarmament/update/students-discuss-how-to-innovate-responsibly-with-artificial-intelligence/
- Contact Information: Michael Spies (spiesm@un.org) Heegyun Jung (jung6@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 2020 Compendium on UN AI Activities?: Yes
- Relevant Links and Multimedia: https://www.un.org/disarmament/hrstatement/
- Contact Information: Michael Spies (spiesm@un.org) Heegyun Jung (jung6@un.org)

2. Related Sustainable Development Goals

SDG 4, 5, 16

3. Related Links

https://www.un.org/disarmament/

Contact Information:

Heegyun Jung (jung6@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 2020 Compendium on UN AI Activities? No
- 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 over 470,000 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 has become critical to 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 are being deployed to ensure the delivery of real-time quantitative data.
- Project Type/Output: Report, Dataset, Software tool (There are a combination of products for this project which includes a dataset was well as several analytical briefs and software tool development.)
- Project Status: Ongoing
- Project Start Year: October 2019
- Project End Year: September 2022
- Project Domain: Drug Trafficking trends
- Data Source: webscraped open data on individual drug seizure events from media sites and official government websites.
- Publicly Available Data: No (webscraped data is publicly available however the Drugs Monitoring Platform itself is currently 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 2020 Compendium on UN AI Activities? No
- Related Sustainable Development Goals (SDGs): 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.
  - Opportunities exist for cross-fertilization for additional research endeavors across multiple crime areas
  - 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 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

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 2020 Compendium on UN AI Activities?: No
- 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 2020 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 2020 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)

United Nations University

1. Description of Activities on AI

Project 1: Global Antimicrobial Resistance Evidence – A One Health Rapid Review

- Project Description: WHO (2020) has identified increased human risk of antimicrobial resistance (AMR) resistance as a top ten urgent health problem for the next decade. While AMR occurs naturally, the WHO (2015) has found that humans are at increased risk of developing AMR due to increased, inappropriate or unnecessary antibiotic use for medical treatment or in industries such as agriculture. AMR additionally is further facilitated by actions, practices, behaviors, or lack thereof with regards to poor sector practices that result in the uncontrolled release of AMR organisms into the environment, as well as limited surveillance and stewardship efforts to address AMR exposure from health services, industry, and the environment comprehensively. Historically, AMR stewardship efforts focused primarily on health policies and practices to prevent and reduce AMR risk to society, the economy, and the environment. Using a text mining approach, over 12,000 title/abstracts have been reviewed to provide a rapid review and historical analysis of the past three decades of AMR research. It highlights how human health, animal health and industrial research and development increasingly have increasingly received greater attention in scientific endeavours. There, however, remains a significant gap of knowledge of the impact of AMR research and interventions with regards to the environment – especially, with regards to water-related exposure pathways. This research unpacks such gaps of knowledge in consideration of the need to develop a one health AMR stewardship framework that adequately addresses environmental water-related AMR risks.
- Division/Department: United Nations University Institute for Water, Environment and Health (UNU-INWEH)
- Project Type/Output: Academic paper, Dataset, Policy Framework
- Project Status: Development, Ongoing
- Project Start Year: June 2020
- Project End Year: December 2021
- Project Domain: Environment, Health, Water
- Data Source: Bibliographic data
- Technology/Platform: Python
- Reported as part of 2020 Compendium on UN AI Activities?: No
- Related Sustainable Development Goals (SDGs): SDG 3 – Good Health and Well-Being; SDG 6 – Clean Water and Sanitation; SDG 9 – Industry, Innovation, and Infrastructure; SDG 12 – Responsible Consumption and Production; SDG 14 – Life Below Water; SDG 15 – Life on Land
- Lessons Learned: The absence of a centralized repository to access the grey literature is a major challenge.
- Contact Information: Lina Taing (lina.taing@unu.edu)

Project 2: Cholera Risk Mapping – An Outbreak Analysis Approach in Nigeria

- Project Description: Cholera is an ancient disease that continues to plague vulnerable populations, especially in Asia and Africa (Troeger et al. 2017). Extremely virulent, it is endemic in 51 countries with an estimated global $2 billion USD lost per annum due to health care costs and lost productivity, with Sub-Saharan Africa accounting for the majority of burden (Ali et al. 2015; WHO 2017). While cholera is preventable (through increased WASH access) and treatable (through rehydration therapy), it kills an estimated 95 000 people annually, while a further 1.3 billion are at risk globally (Ali et al. 2015). Adding to these concerning statistics is the expectation that climate change will increase global climatic suitability for the transmission of cholera (Watts et al. 2019; WHO 2020a), thereby putting more people at risk of this highly infectious disease. Ending cholera is an important global health priority as cholera risk disproportionately aligns with populations experiencing extreme poverty and displacement due to post-conflict or disaster situations (Hassan and Nellums 2021; WHO 2017). In 2017, the World Health Organization's (WHO) Global Task Force on Cholera Control (GTFCC) established a multi-sector strategy to reduce cholera deaths by 90 percent and to eliminate disease transmission in 20 countries by 2030 (WHO 2017). Key to the multi-sectoral intervention is the effective coordination of WASH and public health resources amongst cholera-affected countries and local and global partners to prevent cholera through long-term WASH investments and oral vaccination and to contain outbreaks through early detection and rapid response.

  The objective of this project is to develop a model-based risk mapping tool for cholera which separately evaluates outbreak probability, outbreak transmission efficiency and population susceptibility to severe health outcomes based on a range of health, environmental and climatic, infrastructural (including WASH), and demographic data. Greater understanding of the interaction of different disease outcomes and variables and can inform the integrated development of multi-sectoral cholera control efforts. The tool will be presented as a spatial index-based decision support system that can be adapted: to visualize multiple dimensions of cholera risk; and for use in different countries to help inform context-appropriate allocation of public resources.
- Division/Department: United Nations University Institute for Water, Environment and Health (UNU-INWEH)
- Project Type/Output: Academic paper, Dataset, Policy Framework
- Project Status: Development, Ongoing
- Project Start Year: November 2020
- Project End Year: March 2022
- Project Domain: Health
- Data Source: Surveillance, satellite, infrastructural, demographic data
- Data Publicly Available: No, Surveillance data will not be publicly accessible.
- Technology/Platform: Python
- Reported as part of 2020 Compendium on UN AI Activities?: No
- Related Sustainable Development Goals (SDGs): SDG 3 – Good Health and Well-Being; SDG 6 – Clean Water and Sanitation
- Partnership(s)/Collaborator(s):
  - UN Partners: UNU-IIGH
- Lessons Learned: Access to the relevant data at the required resolution is a major challenge. This can be addressed by populating the open data access repositories at national and regional levels.
- Contact Information: Lina Taing (lina.taing@unu.edu)

Project 3: Enhancing Resilience to Flood Disasters in South Asia through the use of AI, Cloud Computing and Open Datasets

- Project Description: The Project has developed a 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 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 and Sentinel 2 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 FRPT uses AI models to generate current and future flood risk maps at the city, district, and river basin level for three climate change scenarios. The AI models are trained using the inundation maps generated by the HMFT and open datasets, including land use, land cover, precipitation, temperature, gender, and age-disaggregated socio-economic data.

  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.

  WSDSS differs from the available systems in a number of ways; it:

  - Improve the resolution of the inundations maps to 30 m, enabling analysis to be performed at the city level.
  - Focuses on Global South as a whole, where the data and information gaps are prominent and annual losses due to floods are high.
  - Improves the accuracy of the inundation maps by using data from multiple satellite sensors (harmonized Landsat Sentinel-2 data)
  - Improves accuracy and development time of flood risk maps by using AI models.
- Division/Department: United Nations University Institute for Water, Environment and Health
- 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 2 to reveal inundation 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 2020 Compendium on UN AI Activities?: No
- Related Sustainable Development Goals (SDGs): SDG 1 – No Poverty; SDG 6 – Clean Water and Sanitation; SDG 11 – Sustainable Cities and Communities; SDG 13 – Climate Action
- Partnership(s)/Collaborator(s):

  - UN Partners: UNESCO Madanjeet Singh Centre for South Asia Water Management Sri Lanka
  - Government: Water Resources Research and Development Centre Nepal and Directorate of Planning, Bangladesh

  - Private Sector: Google and MapBox
  - Civil Society: Asian Disaster Preparedness Center Thailand and Network of Disaster Management Practitioners Pakistan
  - Academia: McMaster University Canada and International Institute of Information Technology India
- 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: Hamid Mehmood (hamid.mehmood@unu.edu)

Project 4: UNU-Macau Conversation 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
- 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 2020 Compendium on UN AI Activities?: No
- 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: https://cs.unu.edu/events/archive/event/conversation-series-modeling-sustainable-development-bottom-up.html; https://cs.unu.edu/events/archive/event/conversation-series-codesigning-and-piloting-inclusive-participatory-procedures-for-enacting-the-sdgs-from-the-physical-cooplage-to-the-digital-coopilot.html. The video will be available soon on our YouTube account: https://www.youtube.com/channel/UCrqp_tRSYWyGosuCDaabhtg
- Contact Information: Serge Stinckwich (stinckwich@unu.edu)

Project 5: "Sustainable Decision-Making Tech" Research Team

- Project Description: The "Sustainable Decision-Making Tech" research team started his activities in 2021 at UNU-Macau. Sociotechnical systems – like telecommunication networks, power grids, large-scale manufacturing systems – are interacting ensembles of engineered artifacts embedded in society, but also linked with economies and connected with the environment. As these complex socio-technical systems emerge, Artificial Intelligence (AI) acquires an important societal dimension. AI has played an important role in achieving meaningful development and innovation across the world, bringing several positive impacts, such as automated diagnoses of diseases, growing efficiency in the workplace, and assistive technologies for education. However, at the same time, AI could potentially be used as a dangerous tool of oppression, discrimination, and surveillance. Many researchers point out ethical and legal concerns related to accountability, transparency, and responsibility in designing and using AI for different social sectors. In

this context, multilateral organizations such as the United Nations (UN) need to play a key role in building a framework and guideline for the sustainable development of AI.

Along with the UN-wide efforts to achieve the Sustainable Development Goals, this research team explore sustainable and inclusive decision-making socio-technical systems designs, which are conducted with the people, not only for the people. The current research activities include:

AI Governance & Ethics: This research aims to provide a participatory approach towards the design, implementation, and sustainability of AI governance in the health sector that embraces ethics where all key players from technical, civil society, public sector as well as the private sector are on the same decision-making table. The main objective of this research is to deliver an AI Governance model that embraces ethical values at its core.

Diversifying and operationalizing AI narratives :

The team aims to conduct a cross-cultural analysis of AI narratives to build an inclusive AI discourse, focusing on government policy papers on AI in East Asia. The results of this research will be developed into a serious game to showcase alternative AI narratives.

The researchers are part the DESC coalition (Digital-Environment System)and involved as co-leads in the IDAIR Next Pandemic scheme: https://ourworld.unu.edu/en/we-must-seize-the-moment-for-a-global-pandemic-surveillance-and-response-scheme to develop next generation of tools based on Artificial Intelligence and modular models for the next pandemic response and preparedness. The research team will expand its activities and recruit more researchers in 2022.

- Division/Department: United Nations University Institute in Macau
- Project Type/Output: Report, Academic paper, Policy Framework, Dataset, Seminar/meeting, Software tool
- Project Status: Development
- Project Start Year: 2021
- Project End Year: 2025
- Project Domain: Environment, Education, Gender, Health, Human Rights
- Reported as part of 2020 Compendium on UN AI Activities?: No
- Related Sustainable Development Goals (SDGs): SDG 3 – Good Health and Well-Being; SDG 5 – Gender Equality; SDG 11 – Sustainable Cities and Communities
- Partnership(s)/Collaborator(s):
- Civil Society:
    - Digital-Environment System Coalition (DESC), supported by UNESCO Chair in ICT for development: https://ict4d.org.uk/desc/
    - International Digital Health & AI Research (I-DAIR): https://www.i-dair.org/
- Relevant Links and Multimedia: https://cs.unu.edu/sustainable-decision-making-tech
- Contact Information: Serge Stinckwich (stinckwich@unu.edu)

2. Related Sustainable Development Goals

SDG 1, 3, 6, 9, 11, 12, 13, 14, 15

3. Relevant Link

https://unu.edu/

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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.

United Nations World Tourism Organization

1. Description of Activities on AI

Project 1: UNWTO Startup Competitions and Challenges - UNWTO Report: Travel and Tourism Tech Startup and Investment Landscape

- Project Description: Gathering all programmes carried out from 2018 to 2020, UNWTO has released its Report: Travel and Tourism Tech Startup and Investment Landscape, which highlights:
    - **Chapter 1: Travel and Tourism Tech Investment Landscape**: Provides an overview of the Investments during COVID-19; emphasizing on the investment by top travel and tourism industries, including community and lifestyle, commerce and shopping, transportation among others; and delivers an outline regarding Top Investors and Venture capitalists by geographical location.
    - **Chapter 2: Travel and tourism tech startup landscape**: This chapter aims to provide a complete overview of the tourism tech startups, segmenting it them by: key technological verticals as general research and book services, E-commerce and marketplace platforms and mobile applications; by geographic location emphasizing on the deals by region; by startup unicorns including the Top 50 travel tech unicorns per country; and by trends and venture capital outlook.
    - **Chapter 3: UNWTO Travel and Tourism Tech Startups:** This chapter seeks to provide insight on the activities being carried out by UNWTO and show new opportunities travel tech startups could contribute with for reviving tourism. In this regard, this chapter offers an overview of the UNWTO Innovation Ecosystem and the Impact of the UNWTO Startups challenges and Competitions. Furthermore, it is provided a summarized data of the top UNWTO tourism startups participants in terms of distribution by region, countries, and gender.
- Department/Division: Department of Innovation, Education and Investments
- Project Type/Output: Report
- Project Status: Ongoing
- Project Start Year: 2018
- Project End Year: 2021
- Project Domain: Agriculture, Environment, Education, Energy, Gender, Health, Human Rights, Justice, Poverty, Telecommunications, Trade, Weather
- Data Source: Data collected from UNWTO Startup Competitions and Innovation Challenges. Sourcing based on applications and evaluation processes.
- Data Publicly Available: Yes
- Technology/Platform: We used the UNWTO Platform

- Reported as part of 2020 Compendium on UN AI Activities?: No*

  *Results were present at that time. Now, we have an Official Report on them.
- Related Sustainable Development Goals (SDGs): All 17 SDGs
- Partnership(s)/Collaborator(s):
  - UN Partners: UN Innovation Network
  - Government: Qatar National Tourism Council, Government of Colombia, Inter-American Development Bank (IDB)
  - Private Sector: Globalia, Qatar Airways, Amazon Web Services, Globant, ClarkeModet, Google, Amadeus, Mastercard, and its innovation lab (IDB Lab), Telefónica, Plug and Play, Hosco.
  - Academia: IE University
- Relevant Links and Multimedia:
  - Report available at: https://webunwto.s3.eu-west-1.amazonaws.com/s3fs-public/2021-06/travel-and-tourism-tech-startup-ecosystem-and-investment-landscape.pdf
  - Annex: Top 100 innovators: highlighting key technologies including AI: https://webunwto.s3.eu-west-1.amazonaws.com/s3fs-public/2021-06/top-100-tourism-startups.pdf
  - Winners and finalists of UNWTO Programmes: https://www.unwto.org/finalists-from-unwto-innovation-competitions-and-challenges
- Contact Information: Natalia Bayona, Director of Innovation, Education and Investments (nbayona@unwto.org)

Project 2: UNWTO SDGs Global Startup Competition

- Project Description: The UNWTO SDGs Global Startup Competition was a world call to reach the most disruptive startups that directly contribute to accelerate the achievement of sustainable development. This Competition aimed to encourage the global innovation and entrepreneurship ecosystem to embrace sustainability and to deliver impact during the United Nations Decade of Action starting this year. Bringing together stakeholders from a variety of sectors across the economy, this initiative set out to reach a common goal, to set innovation at the forefront of sustainable development in corporations and destinations.

  During the open call for startups from all economic sectors, it received responses from 10,000 participants from 138 countries covering all world regions. The 25 winning projects entered a curated programme of benefits with the support of 21 partners and collaborators (such as Globalia, Qatar Airways, Qatar National Tourism Council, Government of Colombia, Amazon Web Services, Globant, ClarkeModet, Google, Amadeus, Mastercard, IE University, Inter-American Development Bank (IDB) and its innovation lab (IDB Lab), Telefónica, Plug and Play), including mentorship, access to technological support, connection to Member States, corporates, and investors for opening the doors to funding and pilot projects opportunities. Likewise, Top 25 Innovators Working for a More Sustainable and Innovative Tourism catalogue was created to facilitate Member States and private sector access to solutions.
- Department/Division: Department of Innovation, Education and Investments
- Project Type/Output: UNWTO Startup Competition/Innovation Programme
- Project Status: Completed
- Project Start Year: 2021

- Project End Year: 2021
- Project Domain: Agriculture, Environment, Education, Energy, Gender, Health, Human Rights, Justice, Poverty, Telecommunications, Trade, Weather
- Data Source: Data collected from UNWTO Startup Competitions and Innovation Challenges. Sourcing based on applications and evaluation processes.
- Data Publicly Available: Yes
- Technology/Platform: We made use of the UNWTO Platform and Plug and Play's Playbook Platform.
- Reported as part of 2020 Compendium on UN AI Activities?: Yes*

  *It was part of the report as a programmed that had been recently launched. Now, we provide its full results.
- Related Sustainable Development Goals (SDGs): All SDGs
- Partnership(s)/Collaborator(s):
  - UN Partners: UN Innovation Network
  - Government: Qatar National Tourism Council, Government of Colombia, Inter-American Development Bank (IDB)
  - Private Sector: Globalia, Qatar Airways, Amazon Web Services, Globant, ClarkeModet, Google, Amadeus, Mastercard, and its innovation lab (IDB Lab), Telefónica, Plug and Play, Hosco.
  - Academia: IE University
- Relevant Links and Multimedia:
  - https://webunwto.s3.eu-west-1.amazonaws.com/s3fs-public/2021-06/travel-and-tourism-tech-startup-ecosystem-and-investment-landscape.pdf
  - https://webunwto.s3.eu-west-1.amazonaws.com/s3fs-public/2021-06/top-100-tourism-startups.pdf
  - https://www.unwto.org/sdgs-global-startup-competition
  - https://webunwto.s3.eu-west-1.amazonaws.com/s3fs-public/2021-06/2021_IDT_25Startups.pdf
- Contact Information: Natalia Bayona, Director of Innovation, Education and Investments (nbayona@unwto.org)

Project 3: UNWTO Jobs Factory

- Project Description: UNWTO joined forces with Hosco, the professional network specially designed for the hospitality industry. A platform that will support and improve your competitiveness regarding job creation and help you leverage human capital development in your country and region, helping the tourism workforce access the best job opportunities.

  The UNWTO Jobs Factory harnesses the power of Hosco's machine learning to match candidates with suitable positions, connecting employers with the very best talent our sector has to offer. It will allow monitoring current and future skills development, facilitating intelligent labour market data collection, insights, and forecasting. In addition, to identifying trends and the shift in occupations due to the digital transformation, ensuring agile response to change in the educational and training institutions, and helping our Member States make important decisions to support jobs based on the latest, trusted data.
- Department/Division: Department of Innovation, Education and Investments

- Project Type/Output: AI-powered jobs matchmaking platform
- Project Status: Ongoing
- Project Start Year: 2021
- Project Domain: Agriculture, Environment, Education, Energy, Gender, Health, Human Rights, Justice, Poverty, Telecommunications, Trade, Weather
- Data Source: Data collected from UNWTO Startup Competitions and Innovation Challenges. Sourcing based on applications and evaluation processes.
- Data Publicly Available: Yes
- Technology/Platform: We made use of Hoco's Platform.
- Reported as part of 2020 Compendium on UN AI Activities?: No
- Related Sustainable Development Goals (SDGs): All 17 SDG
- Partnership(s)/ Collaborator(s):
    - UN Partners: UN Innovation Network
    - Government: Qatar National Tourism Council, Government of Colombia, Inter-American Development Bank (IDB)
    - Private Sector: Globalia, Qatar Airways, Amazon Web Services, Globant, ClarkeModet, Google, Amadeus, Mastercard, and its innovation lab (IDB Lab), Telefónica, Plug and Play, Hosco.
    - Academia: IE University
- Relevant Links and Multimedia:
    - https://webunwto.s3.eu-west-1.amazonaws.com/s3fs-public/2021-06/travel-and-tourism-tech-startup-ecosystem-and-investment-landscape.pdf
    - https://webunwto.s3.eu-west-1.amazonaws.com/s3fs-public/2021-06/top-100-tourism-startups.pdf
    - https://www.unwto.org/sdgs-global-startup-competition
    - https://webunwto.s3.eu-west-1.amazonaws.com/s3fs-public/2021-06/2021_IDT_25Startups.pdf
- Contact Information: Natalia Bayona, Director of Innovation, Education and Investments (nbayona@unwto.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 Link

https://www.unwto.org/

Contact Information

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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 2020 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 2020 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 2020 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
- End Year: Ongoing
- Reported as part of 2020 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 2020 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 2020 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 2020 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=FfYxlkp_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 2020 Compendium on UN AI Activities? No
- 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: Ongoing
- Project Duration: 2019- 2021
- Reported as part of 2020 Compendium on UN AI Activities? No
- 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: Development (Ideation, background research, concept note)
- Project Start Year: 2021
- End Year: 2021
- Reported as part of 2020 Compendium on UN AI Activities? No
- 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/

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World Health Organization

1. Description of Activities on AI

WHO's global strategy on digital health 2020–2025[1] 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. Specific outputs include but not limited to create governance for the ethical use of health data in technologies such as artificial intelligence and big data analytics; promote health innovations where appropriate including cutting-edge digital technologies, such as the use of artificial intelligence.

The digital transformation of healthcare and therapeutic development, including exploring Artificial Intelligence (AI) uses, has shown potential to enhance health outcomes by improving medical diagnosis, digital therapeutics, clinical trials, self-management of care and person-centered care, as well as creating more evidence-based knowledge, skills and competence for professionals to support health care. With the increasing availability of healthcare data and the rapid progress of analytics techniques, AI has the potential to transform the health sector, one of the most important sectors for societies and economies worldwide. The International Telecommunication Union (ITU) and the WHO have established the FG-AI4H to facilitate the safe and appropriate development and use of AI solutions in healthcare. To support its work, FG-AI4H created several working groups, including an ethics and governance and regulatory considerations of AI for Health working groups.

WHO recognizes that AI holds great promise for the practice of public health and medicine. WHO also recognizes that, to fully reap the benefits of AI, ethical challenges for health care systems, practitioners and beneficiaries of medical and public health services must be addressed. Therefore, the working group on Ethics and Governance of Artificial Intelligence for Health published a WHO Guidance to endorse a set of 6 key ethical principles focusing on: Protecting human autonomy, promoting human well-being and safety and the public interest, ensuring transparency, explain ability and intelligibility, fostering responsibility and accountability, ensuring inclusiveness and equity, and promoting AI that is responsive and sustainable. Finally, WHO hopes that these principles will be used as a basis for governments, technology developers, companies, civil society and inter-governmental organizations to adopt ethical approaches to appropriate use of AI for health. The guidance is published and available at the following link (https://www.who.int/publications/i/item/9789240029200)

The working group on Regulatory Considerations (WG-RC) consists of 90 vetted members including representatives from regulatory bodies, policy makers, academia, and industry who explored regulatory and health technology assessment considerations and emerging "good practices" for the development and use of AI in healthcare and therapeutic development. This

publication is aimed aims to deliver an Overview of Regulatory Considerations on Artificial Intelligence for Health publication 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. This WG-RC's overview is not intended as a guidance, regulation, or policy. Rather, it is 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. WHO is working on several use cases:

1. Cervical cancer as a use-case was used to illustrate the minimum standards for evidence, given the DG's Cervical cancer Initiative and the various AI projects ongoing in the AFRO/ SEARO regions and globally.
2. Diabetic retinopathy to set the benchmark to assess efficacy and validity of diabetes . The use cases will be used to develop guidance on Implementation and scale of AI for health

[1] 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)

[2] The 17 Goals - Sustainable Development. United Nations; (2020) (https://sdgs.un.org/goals)

[3] 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)

2. Relevant Links

https://www.who.int/

Contact information

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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 2020 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 2020 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 2020 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 2020 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 2020 Compendium on UN AI Activities?: Yes

- Project Updates: WIPO has expanded the scope of our 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/
- 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 2020 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 2020 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 2020 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. Description of Activities on AI

SDG 9, 17

3. Relevant Links

https://www.wipo.int/portal/en/index.html

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World Meteorological Organization

WORLD METEOROLOGICAL ORGANIZATION

1. Description of Activities on AI

Project: 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: Ongoing
- Project Start Year: 2020
- Project End Year: 2022
- Project Domain: Environment
- Reported as part of 2020 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 first Concept Note has currently been in review by WMO entities and wide community. The draft of the second Concept Note has been finalized and will start the review process soon. If you are interested in reviewing the concept notes, you can contact us.

  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. The WMO Research Board – Task Team on Exascale Computing, Data Handling and AI, that is leading the development of the concept notes, has started exploring collaboration with the Focus Group on AI activities.
- 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)

2. Related Sustainable Development Goals

SDG 9, SDG 11, SDG 13, SDG 17

3. Related Links

https://public.wmo.int/en

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World Bank Group

1. Description of Activities on AI

Project 1 Developing Knowledge and Policies

- Machine learning-based analytical projects:
  - Automated text analytics – Monitoring the scope and coverage of projects related to forced displacement by multilateral development banks through the use of machine learning.
  - Health data registries – Machine learning approaches are used to automatize the processing, analysis and interpretation of data registries to help assess the impacts and results of the centralized purchase of medications and strategies for hepatitis C virus.
  - Credit scoring – Machine learning-based credit scoring model is applied to study how and which characteristics and behaviors predict creditworthiness differently for women and men.
  - Measurements in land use - Remote sensing and machine learning is used to measure changes in land use to measure agricultural intensification in areas where administrative data is lacking, and data collection is costly.
- The International Finance Cooperation (IFC) has also prepared a series of though leadership pieces to guide investments in emerging markets. This year, IFC has published the following reports:
  - Artificial Intelligence in Emerging Markets – Opportunities, Trends and Emerging Business Models – second edition. (link)
  - How Artificial Intelligence Can Help Advance Post-Secondary Learning in Emerging Markets (link)

Project 2: Piloting AI in World Bank operations

The World Bank Group's Technology & Innovation Lab serves as a knowledge and advisory hub around emerging technologies. The Lab explores and provides technology advice on emerging technologies' potential for innovative problem-solving, and operationalization approaches in both WBG internal and external operations. The Lab has partnered with WBG teams across various sectors to solve development challenges by applying user-centric design and technology foresight, and through prototyping and exploration with AI capabilities [e.g., machine learning (ML), neural networks, natural language processing (NLP), assistive

technologies (chatbots), robotics] and other converging tech. This year, the Lab team helps in piloting AI in the following areas:

- Project 2A: Pakistan Low-Income House Financing - The World Bank Group's Technology & Innovation Lab, in collaboration with the IFC and World Bank Group's ITS Client Services in Pakistan have joined efforts to explore innovative tech-enabled ways and solutions leveraging machine learning to redesign the private banks' underwriting processes for loan disbursement for the low-income informal workers' segment in Pakistan to explore how technologies can improve the assessment of lending risks, and help deliver customized credit solutions, faster and with better customer engagement.
- Project 2B: Pakistan AI4Parcel Mapping ¬- The Lab and representatives of the Geospatial Unit (SURLN) in GPURL collaborated to test how feasible it would be to use Artificial Intelligence/Machine Learning to automate parcel mapping procedures in Punjab, Pakistan, where the team focused on exploring and testing suitable algorithms to extract and segment land parcel features.
- Project 2C: Climate Smart Mining - Climate Smart Mining (CSM) team (part of the World Bank Energy and Extraction Unit) teamed up with Technology & Innovation Lab to develop an AI-based prototype to better understand minerals supply chains, particularly in respect to developing countries and associated emissions of the minerals needed for Climate Action (SDG 13).
- Project 2D: DEC AI (4 Judicial Academy) – The World Bank Development Economics Team (DEC) and the Technology & Innovation Lab worked on together to understand the potential of emerging technologies such as Artificial Intelligence (AI), Machine Learning (ML) and Natural Language Processing (NLP) in the legal Project Domain and to support a shift to a case-based method of teaching in the Judicial Academy of Peru.
- Project 2E: AI Playbook – AI playbook which comprises of learnings from our exploration with AI and good practices to support World Bank operational teams in the operationalization of Emerging Technologies in the work with our clients.

Challenges and Opportunities

- Challenges: Challenges remain in the research and operationalization of AI-related projects at the World Bank. These include strengthening cybersecurity in client countries as more countries are more reliant on digital processes, expanding the evidence base to understand the potential impacts of AI and devising appropriate policy approaches to eliminate the risks of AI such as algorithmic bias and ethics, privacy and data governance, legitimacy, liability, concentration of market power, intellectual property rights, etc.
- Opportunities: As the adoption of AI accelerates in developed countries, there are increased opportunities for knowledge transfer from developed to developing countries in devising policy approaches that maximize the benefits of AI while reducing its risks. Moreover, there is an increasing demand from client countries to experiment and pilot AI solutions for development. Two new trust-funded initiatives have been launched that can complement AI initiatives at the WB. The first is the Cybersecurity Multi-Donor Trust Fund which provides knowledge, technical assistance and practical tools to help build cyber and digital security capabilities and capacity in developing countries. The second is a new Digital Development initiative at the WB Korea Office that strengthens the policy enabling environment and the management of risks for AI-related challenges such as cybersecurity and data protection.

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

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