

United Nations Activities on Artificial Intelligence (AI)

2019



United Nations Activities on Artificial Intelligence (AI)

2019

Table of Contents

Foreword	v
Introduction	vi
Comprehensive Nuclear-Test-Ban Treaty Organization	1
The Food and Agriculture Organization	3
International Civil Aviation Organization	7
International Labour Organisation	9
International Maritime Organization	12
International Organization for Migration	15
International Telecommunication Union	19
United Nations Programme on HIV/AIDS	22
United Nations Conference on Trade and Development	24
United Nations Department of Economic and Social Affairs	26
United Nations Department of Political and Peacebuilding Affairs and Department of Peace Operations	27
United Nations Economic Commission for Europe	29
United Nations Environment Programme	32
United Nations Educational, Scientific and Cultural Organization	35
United Nations Framework Convention on Climate Change	37
United Nations Population Fund	38
United Nations Global Pulse	40
United Nations High Commissioner for Refugees	42
United Nations Children’s Fund	44
United Nations Interregional Crime and Justice Research Institute	46
United Nations Institute for Disarmament Research	48
United Nations Industrial Development Organization	50
United Nations Office for Disaster Risk Reduction	54
United Nations Institute for Training and Research	56
United Nations Office for Disarmament Affairs	58
United Nations Office at Vienna / United Nations Office on Drugs and Crime	60
United Nations Office for Outer Space Affairs	61
United Nations Research Institute for Social Development	63
United Nations University	65
United Nations Women	66
United Nations World Tourism Organization	68

World Food Programme	69
World Health Organization	71
World Intellectual Property Organization	73
World Meteorological Organization	74
World Bank Group	76



Very few topics have captured the imagination of the public and promised to transform humanity more than artificial intelligence. In this publication, more than 35 UN agencies and bodies describe how they are increasingly using AI to meet many of the world's most urgent challenges, from responding to humanitarian crises to tackling climate change.

Although it is still early days for AI, the agencies highlight the need to improve data literacy skills across their organizations and warn against the capability gap between developed and less-developed countries. They call for responsible innovation and a better understanding of the implications and potential benefits of AI.

For AI to be a force for good, it must face complex questions about trust and address challenges ranging from job displacement to autonomous weapons and potential bias in algorithms. What is clear is that no nation, company or organization can meet these challenges alone.

Each year, ITU's AI for Good Global Summit is the place where thousands of AI innovators and public and private-sector decision makers from around the world, including UN agencies, come together to identify practical applications of AI to accelerate progress towards meeting the United Nations Sustainable Development Goals.

The UN system has an important role to play in balancing technological progress with social progress and ITU, as the UN specialized agency for ICTs, is at the forefront of this critical endeavor. I commend this publication to all those committed to ensuring that artificial intelligence benefits all of humanity.

A handwritten signature in blue ink, which appears to be '赵厚群' (Zhao Houqun), the name of the Secretary-General.

Houlin Zhao
Secretary-General
International Telecommunication Union

Introductions

Recent progress in the development of Artificial Intelligence (AI) has been immense and is growing exponentially. The technology is making its way out of research labs and into our everyday lives, promising to help us tackle humanity's greatest challenges. As the UN specialized agency for information and communication technologies (ICTs), the International Telecommunication Union (ITU) believes in the power of AI for Good. In this spirit, ITU leads the organization of the annual "AI for Good Global Summit", aimed at building a common understanding of the capabilities of emerging AI technologies, in partnership with the United Nations (UN) Family.

The AI for Good Global Summit is the leading UN platform for global and inclusive dialogue on AI. Building on the success of previous years, the 2019 AI for Good Global Summit continued to collaborate with AI innovators and other stakeholders, including more than 37 UN agencies and bodies, to identify strategies to ensure that AI technologies are developed in a trusted, safe and inclusive manner, with equitable access to their benefits. In particular, the 2017 Summit shone a spotlight on AI projects in fields, including education, healthcare and wellbeing, social and economic equality, space research, as well as smart and safe mobility. It also gave rise to the 'AI commons', an enabling framework for collaboration to achieve global impact: comprising shared knowledge, data, resources and problem-solving approaches to stimulate the development and application of AI for good projects.

During the 2019 Summit, ITU and its 37 UN partners - namely CTBTO, FAO, ICAO, ILO, IMO, IOM, UNAIDS, UNCTAD, UNDESA, UNDP (former UNDP), UNECE, UNEP, UNESCO, UNFCCC, UNFPA, UNGP, UNHabitat, UNHCR, UNICEF, UNICRI, UNIDIR, UNIDO, UNDRR (former UNISDR), UNITAR, UNODA, UNODC, UNOOSA, UNOPS, UNRISD, UNU, UNWomen, UNWTO, WFP, WHO, WIPO, WMO and World Bank Group (WBG), met on 29 May 2019, to discuss their roles in AI. They explored key questions of relevance to the UN-wide partnership, specifically around the theme of AI and data sharing. Members noted that AI will continue to have many practical applications in the near future, with the strong potential to transform our economy and societies, as well as change the way the UN operates.

Agreed by all members of the AI for Good UN Partners, the 2019 version of the Compendium "UN Activities on Artificial Intelligence" has been updated, including the collection of 2-pager report from 36 UN agencies, providing further details on UN agencies experiments with AI to improve their response to global challenges. It outlines how AI is being used to fight hunger, ensure food security, mitigate climate change, advance health for all, and facilitate the transition to smart sustainable cities. It also offers insights into the challenges associated with AI, addressing ethical and human right implications, and so invites all stakeholders, including government, industry, academia and civil society, to consider how best to work together to ensure AI serves as a positive force for humanity.

This compendium was first presented and discussed at the AI for Good UN Partners Meeting, which took place at the UNWomen Headquarters in New York, on 23 September 2019, where all members agreed to share it with the members of the UN Chief Executive Board (CEB) and make it public.



Comprehensive Nuclear-Test-Ban Treaty Organization

1. Description of Activities on AI

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

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

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

As part of automatic data processing performed at the IDC, signals from seismic stations are classified to determine their seismic phase based on features measured automatically (amplitude, frequency content, particle motion parameters, etc.). In processing data from auxiliary seismic stations, a combination of Artificial Neural Networks (ANN) and Bayesian Classifiers are used to automatically assign one of 9 possible phase types to signals. The ANN and Bayesian Classifiers are trained on automatic signals reviewed and corrected by human analysts. This component has been used operationally for many years. On-going activities are related on one hand to re-training (tuning) the existing ANNs on a per-station basis, and on the other hand, to improving performance of the automatic classifiers by replacing the current combination of ANN and Bayes Classifiers with one (deeper) ANN. Methods are being explored for seismic phase identification directly from the waveform signal, without using any calculated features. We are also studying if the use of additional information, such as the raw waveform data, during classification, can further improve performance.

Another component of IDC automatic processing considers all signals detected at seismic, infrasound and hydro-acoustic stations of the IMS and determines the events that have caused these signals to be observed. At present, this type of processing, called network processing is performed by a rule-based system. Since 2011, the CTBTO, in co-operation with Professor Stuart Russell and Dr Nimar Arora from the University of California at Berkley, have been developing a machine-learning-based network processing software called NET-VISA (NETWORK processing Vertically Integrated Seismic Analysis). The theoretical underpinnings of NET-VISA are provided by the concept of "Open Universe Probability Model", an extension of the Bayesian Network formalism to handle uncertainty about the existence of the objects whose relationship the network encodes. Following extensive testing, the NET-VISA software was deployed in IDC operations, initially as a decision support tool for analysts, in 2017. It detects about 10-15 % more events than the current, rule-based system, while producing a similar percentage of false alarms as the current system. Current activities are focused on further improving NET-VISA and on completely replacing the current rule-based system with the machine-learning software in IDC Operations.

Experiments are under way in classifying radionuclide spectra by ANNs, trained on data reviewed by analysts. These efforts are not concluded.

A further initiative in the design and testing stage is an automated ‘triage’ mechanism to distribute certain trouble tickets based on their contents. This project is in the early stages.

Initial development and testing of applications of AI are also underway to support operations and sustainment of the IMS. In co-operation with Pacific National Northwest Laboratory (PNNL), USA, an application to monitor and assess noble gas monitoring system state-of-health (SOH) data has been developed that analyses and may assist in predicting failures at IMS stations based on extensive SOH parameters that are continuously collected and stored. The current version of the software uses statistical methods and a rule-based system to determine deviation from normal operations based on changes in measured parameters. In a second version, the use of ANNs and support vector machines for failure prediction are under investigation.

A central technique used in OSI is Seismic Aftershock Monitoring, using mini-arrays deployed in the inspection area. Seismic monitoring is conducted at the early stages of an on-site inspection to identify cavities and changes in the geological structures caused by a possible nuclear explosion. To cope with the problem of the large number of false positives that tend to be produced through automatic detection of very “weak” signals typical of Seismic Aftershock Monitoring, an AI-based technique was developed by Prof. Manfred Joswig from the Institute for Geophysics, University of Stuttgart, Germany and is being tested at the CTBTO. The technique transforms the raw waveform data recorded into sonograms (a variation of the spectrogram concept, with adaptive noise removal), then applies Self Organizing Map (SOM) techniques to classify “weak” detections produced by a conventional detector, separating noise from signals of interest (aftershocks).

An additional technology being explored for OSI is satellite monitoring. The CTBTO has tested the use of space-borne 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. In past field exercises, several techniques for automatic classification of MSIR were tested and compared. For instance, unsupervised and supervised pixel-based classification, as well as object-based classification (using decision rules and fuzzy-logic). Change detection techniques were applied directly on the images using Multivariate Alteration Detection (MAD) or on the classification products, using GIS (Geographic Information Systems) operations

2. Related Sustainable Development Goals (SDGs)

SDG 16. Peace, Justice and Strong Institutions

3. Relevant links

www.ctbto.org

Contact information

- Name: Tryggvi Edwald
- Email: Tryggvi.Edwald@ctbto.org
- Phone: + 43 699 1459 6565



Food and Agriculture Organization of the United Nations

The Food and Agriculture Organization

1. Description of Activities on AI

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

The FAMEWS global platform is an online resource 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 data and maps provide valuable insights on how FAW populations change over time with ecology in order to better understand its behaviour and guide best management practices.

(Status: In use, Partner: PlantVillage, Penn State, Links: <http://www.fao.org/fall-armyworm/monitoring-tools/famews-global-platform/en/>, <http://www.fao.org/3/CA1089EN/ca1089en.pdf>, <https://plantvillage.psu.edu/solutions>)

- **Project 2: 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**

iSharkFin is an expert system that uses machine learning techniques to identify shark species from shark fin shapes. The software was developed by FAO in collaboration with the University of Vigo with financial support from the Government of Japan and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). 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.

(Status: In use, Partner: University of Vigo, Spain, Links: <http://www.fao.org/ipoa-sharks/tools/software/isharkfin/en/>)

- **Project 3: Land cover/crop classification using satellite imagery, phenology and ground reference data**

WAPOR is supervised classification methodology is applied to assign a specific class to each pixel of the image. Training data consist of seasonal and long term metrics derived from dekadal NDVI time series, phenology and spectral reflectance data combined with reference data denoting the exact location of each of the classes.

(Status: In use, Partner: FRAME Consortium, Links: https://wapor.apps.fao.org/catalog/3/L3_LCC_BKA_D, <http://www.fao.org/3/CA1081EN/ca1081en.pdf>)

- **Project 4: Palm tree mapping from satellite imagery**

(Status: In use, Partner: Internal)

- **Project 5: Fleet estimation**

Used for improving fisheries statistics

(Status: In use, Partner: Internal)

- **Project 6: Fishing gear identification**

Based on vessel position movement patterns identifying the gear type and type of fishing activity.

(Status: In use, Partner: Global Fishing Watch, Links: <https://globalfishingwatch.org/vessel-tracking-data/>)

- **Project 7: Detecting Fall Armyworm infestations**

An innovative, talking app- Nuru- to help African farmers recognize Fall Armyworm, a new and fast-spreading crop pest in sub-Saharan Africa, so that they can take immediate steps to destroy it and curb its spread.

(Status: In use, Partner: Penn State University)

2. Description of Possible Projects on AI

- **Project 1: Chatbot for employment page (OHR)**

Using Dialog Flow, the idea is to provide a chat bot that could answer to the most common questions (FAQ) on employment process, using natural language processing.

(Status: In development, Partner: Prospecting phase- currently interested in DataMatics, Links: <https://bot.dialogflow.com/087f3871-be01-448d-a037-a553309e7873>)

- **Project 2: Animal diseases identification from images**

Part of the work of the company was showcased on Google I/O 2019 Keynotes

(Status: Planned, Partner: Hansu Mobile Innovation, Links: <https://youtu.be/LoLqSbV1ELU> (from 56:34 to 57:30), <https://hansumi.com/fapp.html>)

- **Project 3: Pelagic fishing**

Help to estimate the pelagic fishing fleet sizes and potential activity

(Status: Planned, Partner: Internal)

- **Project 4: Fish Species Identification**

Identification of fish species using image recognition and machine learning

(Status: Planned, Partner: Internal)

- **Project 5: Small Scale fishing activity based on mobile coverage**

Using the mobile phone coverage and distance from shore along with in and out of range to identify the fishing activity

(Status: In development, Partner: Prospecting)

- **Project 6: Aquaculture mapping**

Inventory mapping of Aquaculture sites and structures

(Status: In development, Partner: Google Earth Engine)

3. Challenges and Opportunities

There are claims that AI capabilities will someday exceed human capabilities, and in many areas, they already come close to this benchmark. With this in mind, we would like to comment on the seven AI principles. In general, we believe these principles are an excellent start. They are about a sine qua non condition, but are insufficient to cover all facets of this embryonic field on the fourth industrial revolution.

Therefore, FAO would like to highlight that Artificial Intelligence is an entire domain of knowledge and should not be seen only as a tool or a menace. We believe that more intensive learning and training is needed in this area to understand the technology and its implications. Today we see AI portrayed in a sensationalistic manner, and can be easily distracted by the rapid advancements and fantastic scenarios envisioned for future use, while we search for appropriate use cases in the core functions of our business. We need to understand that AI is a series of algorithms based on data (evidence or observations), which will continue to get smarter and more pervasive, eventually surpassing human capacities in many activities (faster and more precise) though never quite the same as human beings. That said, even today there are many areas of work aiming to build self-conscious machines. Therefore, to focus the core of this approach in one type of technology (AI) could be an error, and we propose to expand the scope of this approach, to understand the implications and potential benefits of technology more broadly, and how this could be oriented in terms of policymakers and principles.

The UN needs to exploit the topic widely in order to build a holistic approach local and globally. The most important role of AI is outside of the seven proposed principles and should be included as fundamental to our approach to AI. This role is the ability to use AI to predict unexpected events, threats and crises. Challenges such as hunger, climate change, and migration could be addressed before they become crises through early detection, prevention and mitigation of natural disasters, social conflicts or economic hazards.

Despite this caveat, we concur with the seven guiding principles, and will interpret them through the lens of the impact of AI on food security and ensuring that any programmes implemented by FAO do not increase the digital divide and risk creating or increasing food insecurity, especially for those at risk of being left behind.

There is no doubt that AI, and other technologies, and its applications will replace jobs^{4, 5}, and this is a widely accepted consequence of all technology that has resulted from the industrial revolution. However, this does not need to be seen as an entirely negative consequence, assuming that we can successfully promote other types of jobs. At FAO, we believe that AI policies and programmes of member states need to be oriented to contribute to job and entrepreneurship opportunities creation for Youth in developing countries. This development should induce young people to remain in the rural areas with employment perspective and suitable livelihoods conditions.

At FAO, we would like to see a better understanding in terms of the technologies (AI and others), as an incomplete understanding can lead to biased assumptions with regards to comprehension and analysis of strategies for consideration and implementation. The text indicated that AI is complex, and therefore, we are unnecessarily limiting our analysis in terms of understanding and capability to manage this technology. In general, AI is a set of algorithms and methodology to process data and use them to improve the precision and response time to make or support decision (classification, forecast, etc.). We propose that a better understanding will lead to the ability to provide a more fair and sound assessment. Therefore, we suggest that important training is provided to those who will create the UN's strategy for AI in terms of what the technology is, what it can do, and the implication for our business.

In terms of the four points mentioned: (a) infrastructure; (b) data; (c) human; and (d) policy/law/human rights, we concur with all of them. However, we consider that the infrastructure area is a topic by itself, because it is important to bring other capabilities, technologies and solutions to eliminate the digital divide and promote innovation, jobs and fairness. We recognize that this is a good-to-have for AI, but it is not a necessary condition, because AI solutions could also be used offline. Therefore, we propose to have a different, separate note dedicated to the need to increase connectivity and reduce the digital divide.

4. Related Sustainable Development Goals (SDGs)

SDG 1. No Poverty, SDG 2. Zero Hunger, SDG 3. Good Health and Well-Being, SDG 8. Decent Work and Economic Growth, SDG 9. Industry, Innovation and Infrastructure, SDG 10. Reduced inequalities, SDG 11. Sustainable Cities and Communities, and SDG 12. Responsible Consumption and Production.

5. Relevant Links

- e-Agriculture: <http://www.fao.org/e-agriculture/>
- 2019 International Seminar on Digital Agriculture Transformation: The challenges to be addressed: <http://www.fao.org/about/meetings/digital-agriculture-transformation/en/>
- 2019 Status Report on Digital Technologies in Agriculture and Rural Areas: <http://www.fao.org/3/ca4985en/ca4985en.pdf>
- 2019 Briefing Paper on the Status Report on Digital Technologies in Agriculture and Rural Areas: <http://www.fao.org/3/ca4887en/ca4887en.pdf>
- FAO Digital Services Portfolio: <http://www.fao.org/about/meetings/digital-agriculture-transformation/resources/fao-digital-services-portfolio/en/>
- Innovation at FAO: <http://www.fao.org/innovation/en/>
- 2018 Info Note on Tackling Poverty and Hunger through Digital Innovation: <http://www.fao.org/3/ca1040en/CA1040EN.pdf>
- 2018 International Symposium on Agricultural Innovation for Family Farmers: <http://www.fao.org/about/meetings/agricultural-innovation-family-farmers-symposium/en/>
- 2018 Innovation Fair: <http://www.fao.org/about/meetings/agricultural-innovation-family-farmers-symposium/innovation-fair/en/>
- 2018 Proceedings of the international symposium on agricultural innovation for family farmers: <http://www.fao.org/3/ca4781en/ca4781en.pdf>
- e-Agriculture in Action: Drones for Agriculture: <http://www.fao.org/3/i8494en/i8494EN.pdf>

Contact information

- Name: Samuel Varas, Director, Information Technology Division (CIO)
- Email: CIO-Director@fao.org
- Phone: +39 06 57051 (ext. 53690)



International Civil Aviation Organization

1. Description of Activities on AI

• Project 1: NORM

Deep learning model on criticality assessment of notices to airman (NOTAMS). Human classified messages were transformed to word vectors and used to train a recurrent neural network.

(Status: On-going, Partners: Project done in collaboration with OPSGROUP, Links: <https://www.icao.int/safety/iStars/Pages/Chat-with-NORM.aspx>)

• Project 2: AIWP

Natural language processing of working papers for 40th ICAO assembly to automatically summarize working papers and extract keywords. Sentences were extracted from over 500 working papers and classified using common corpus.

(Status: On-going, Partners: Internal ICAO project, Links: <https://www.icao.int/safety/iStars/Pages/AI-WPs.aspx>)

• Project 3: Long-landing detection

Recurrent neural network for the prediction of long landings using radar positions of approach path as predictors

(Status: Initial phase done, Partners: Internal ICAO project, Links: https://github.com/innovation4aviation/Impact_Of_Tailwind_On_Landings)

2. Description of Activities on AI

- Enhanced model for long landing prediction
- Document summarization
- Airport disaster situation detection

3. Challenges and Opportunities

- Integration of skill set into business activities
- Financing of IT infrastructure
- Collaboration with academia

4. Related Sustainable Development Goals (SDGs)

All SDGs where ICAO has relation with, see more <https://www.icao.int/about-icao/aviation-development/pages/sdg.aspx>

5. Relevant links

- <https://www.icao.int/safety/iStars/Pages/Chat-with-NORM.aspx>
- <https://www.icao.int/safety/iStars/Pages/AI-WPs.aspx>
- <https://github.com/innovation4aviation>



International Labour Organisation

1. Description of Activities on AI

- **Project 1: From industrial robots to deep learning robots: the impact on jobs and employment**

Until recently, robots were mainly deployed in industries to perform physical tasks by following a programmed algorithm which could be reprogrammed. The new generation of robots perform tasks by using artificial intelligence and deep learning, which allows them to perform complex tasks in unpredictable environments. Given that AI is a general purpose technology, smart robots can generate process innovations in all sectors of the economy, thus having the potential to augment productivity and change production modes in industries, services, agriculture and research. Furthermore, AI and deep learning robots can generate new economic activities, products and growth industries. These changes are expected to have transformative effects on jobs, occupations and employment.

This project undertakes two types of analysis. Firstly, it investigates empirically the rise of re-programmable industrial robots in developing countries and how they affected manufacturing employment during the past two decades. Secondly, it explores patent data in the two areas of robotics and artificial intelligence, and analyses this data at the levels of countries, sectors and enterprises. This will help to better understand the future impact of AI robots on jobs and employment.

(Status: Ongoing, Partners: WIPO, Geographical coverage: Global, Links: <https://www.researchgate.net/project/New-Technologies-innovation-and-future-of-jobs>, https://www.researchgate.net/publication/315408966_New_technologies_A_jobless_future_or_a_golden_age_of_job_creation)

- **Project 2: The economics of artificial intelligence: Implications for the future of work**

This research project aims to explore economics of AI and how it relates to the labour market. The current wave of technological change based on advancements in artificial intelligence (AI) has created widespread fear of job loss and further rises in inequality. This paper discusses the rationale for these fears, highlighting the specific nature of AI and comparing previous waves of automation and robotization with the current advancements made possible by a wide-spread adoption of AI. It argues that large opportunities in terms of increases in productivity can ensue, including for developing countries, given the vastly reduced costs of capital that some applications have demonstrated and the potential for productivity increases, especially among the low-skilled. At the same time, risks in the form of further increases in inequality need to be addressed if the benefits from AI-based technological progress are to be broadly shared. For this, skills policies are necessary but not sufficient. In addition, new forms of regulating the digital economy are called for that prevent further rises in market concentration, ensure proper data protection and privacy and help share the benefits of productivity growth through a combination of profit sharing, (digital) capital taxation and a reduction in working time. The paper calls for a moderately optimistic outlook on the opportunities and risks from artificial intelligence, provided policy-makers and social partners take the particular characteristics of these new technologies into account.

(Status: Finalised, Partners: Institute for Employment Research, Nuremberg, Germany, Geographical coverage: Global, Links: https://www.researchgate.net/publication/328353684_The_economics_of_artificial_intelligence_implications_for_the_future_of_work)

- **Project 3: Policy responses to the distributional consequences of AI**

Digital dystopias are overdone but inequality is rising. The answer lies in treating data as a commons and Big Data as a collective-action problem.

(Links: https://www.researchgate.net/publication/334138800_Big_Data_and_its_enclosure_of_the_commons)

- **Project 4: Skills strategies for future labour markets**

This project aims to help ILO constituents to develop forward looking strategies to more readily adapt skills training to labour market demand in response to industrial, sectoral, trade, technology and environmental developments, including Artificial Intelligence. The project in particular reviews broadly the existing literature on digitisation and changing skills demand, undertakes sector case studies and explores new methodologies. A joint report with UNESCO on digitalisation in TVET and skill systems will be published which includes the impact of AI on the delivery and assessment of education and training. The project also explores the use of big data for skill needs anticipation and matching.

(Status: Ongoing, Partners: UNESCO, Geographical coverage: Global, Links: <https://www.ilo.org/skills/areas/skills-training-for-poverty-reduction/lang--en/index.htm>)

2. Description of Possible Projects on AI

The ILO prepared a series of papers which explore the opportunities and challenges of new technologies and AI in different sectors of the economy in relationship to the future of work. These papers focus on the future of work in the field of health, education, skills development, migration and shopping:

- "The future of work and the teaching profession": https://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---sector/documents/meetingdocument/wcms_675238.pdf
- "Skills shortages and labour migration in the field of information and communication technology in India, Indonesia and Thailand". The International Telecommunication Union (ITU) provided inputs: https://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---sector/documents/publication/wcms_710031.pdf
- "The future of work in textiles, clothing, leather and footwear", including the Potential application and use of digital technologies: https://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---sector/documents/publication/wcms_669355.pdf
- "The Future of Shopping: personal consumption, sustainable development and decent work": <https://unfashionalliance.org/events/2019-regulating-for-decent-work-conference-research-on-the-textiles-and-clothing-sector/>

Sectoral Meetings attended by governments, employers and workers organisations will be organised in 2020 and 2021 to discuss issues of digitalization, including AI.

As a result of these activities, sector-specific projects may be developed to support ILO constituents in the area of AI, jobs, employment and decent work, taking into account the specificities and realities in the different sectors in developing and developed economies.

3. Related Sustainable Development Goals (SDGs)

SDG 8. Decent Work and Economic Growth, and also to SDG 1, 2, 3, 4, 5, 9, 10, 16 and 17.

Contact information

- Name: Irmgard Nübler
- Email: nubler@ilo.org
- Phone: +41 22 799 8756



International Maritime Organization

1. Description of Activities on AI

- **Project 1: Shipping digitalization/cooperation with ports and Maritime Single Window**

The new Facilitation (FAL) Convention requirement for all Public Authorities to establish systems for the electronic exchange of information related to maritime transport marks a significant move in the maritime industry and ports towards a digital maritime world, reducing the administrative burden and increasing the efficiency of maritime trade and transport. The new requirements came into effect on 8 April 2019 and require national governments to introduce electronic information exchange between ships and ports. The establishment of a maritime single window is recommended. The aim is to make cross-border trade simpler and the logistics chain more efficient, for more than 10 billion tons of goods which are traded by sea annually across the globe.

The cooperation and partnership building between ports and ships is especially crucial in relation to SDG 13 as ships use around 15% of their total fuel whilst in port or in a harbor.

Highlighting the importance of the ship-port partnership specifically towards SD13, IMO recently invited Member States to encourage voluntary cooperation between the port and shipping sectors to contribute to reducing GHG emissions from ships.

This could include regulatory, technical, operational and economic actions, such as the provision of: Onshore Power Supply (preferably from renewable sources); safe and efficient bunkering of alternative low-carbon and zero-carbon fuels; incentives promoting sustainable low-carbon and zero-carbon shipping; and support for the optimization of port calls including facilitation of just-in-time arrival of ships

Maritime Single Window

The Facilitation Convention encourages use of a "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. A successful IMO project promoted by Norway to establish a maritime "single window" in Antigua and Barbuda has been completed in 2019 and the source code for the system will now be made available to other countries who need it.

The IMO's single window software system is now globally available and is recommended by IMO's Facilitation Convention, the treaty which aims to reduce administrative burdens and make shipping and trade by sea more efficient. The services to be provided by this system typically relate to registering port calls and facilitating the clearance of ships, passengers and crew members.

Overview of IMO's work on Electronic business/E-certificates, Maritime Single Window: <http://www.imo.org/en/OurWork/Facilitation/Electronic%20Business/Pages/default.aspx>

Summary of the 43rd session of the Facilitation Committee:

<http://www.imo.org/en/MediaCentre/MeetingSummaries/FAL/Pages/FAL-43rd-Session.aspx>

Mandatory requirement for national governments to introduce electronic information exchange between ships and ports: <http://www.imo.org/en/MediaCentre/PressBriefings/Pages/06-electronic-information-exchange-.aspx>

Maritime Single Window Project: <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)**

A framework and methodology for the Maritime Safety Committee (MSC)'s on-going regulatory scoping exercise on MASS was approved by MSC 100 and is expected to be completed in 2020. The Legal Committee has decided to follow the same approach as MSC and a slightly adjusted framework and methodology for the LEG's regulatory scoping exercise was approved by LEG 106. The Facilitation Committee (FAL 43) agreed a similar process.

For each instrument related to maritime safety and security, facilitation and liability and compensation, and for each degree of autonomy, provisions will be identified which:

- apply to MASS and prevent MASS operations; or
- apply to MASS and do not prevent MASS operations and require no actions; or
- apply to MASS and do not prevent MASS operations but may need to be amended or clarified, and/or may contain gaps; or
- have no application to MASS operations.

Once the first step is completed, a second step will be conducted to analyze and determine the most appropriate way of addressing Maritime Autonomous Surface Ships (MASS) operations, taking into account, inter alia, human element, technology and operational factors. The analysis will identify the need for:

- Equivalences as provided for by the instruments or developing interpretations; and/or
- Amending existing instruments; and/or
- Developing new instruments; or
- None of the above as a result of the analysis.

The aim is to complete the regulatory scoping exercise in 2020.

The 101st session of IMO's Maritime Safety Committee (MSC) in 2019 has approved an initial set of guidelines for the conduct of Maritime Autonomous Surface Ships (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. Risks associated with the trials should be appropriately identified and measures to reduce the risks, to as low as reasonably practicable and acceptable, should be put in place. (For more information please see: <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." (For more information please see <http://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 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. A number of maritime companies are involved in this initiative.

IMO has been active in developing decision support tools for risk-based compliance monitoring and enforcement (CME) decision making to address marine biosafety issues and this resulted in development of GloBallast Risk Assessment Tools. The activities will now be extended to the new GloFouling Project to address marine biofouling.

- **Project 5: Digital Review**

Internally, 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.

2. Description of Possible Projects on AI

- Knowledge building: A seminar/workshop could be envisioned to strengthen knowledge of the maritime community/IMO staff, as well as delegates in relation.
- 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 sector so that no one will be left behind.

3. Related Sustainable Development Goals (SDGs)

- Maritime Single Window: SDGs 8, 9, 11 and 14
- Shipping digitalization/electronic interchange with ports: SDGs 8, 9, 13, 11 and 14
- MASS, e-navigation: SDG 8 and 9
- Cyber security: SDGs 3 and 16
- Digital review: SDGs 9, 13, 14, 16 and 17

Contact information

- Name: Gyorgyi Gurban, Senior Maritime Policy Adviser
- Email: ggurban@imo.org
- Phone: +44 (0)207 463 4003



International Organization for Migration

1. Description of Activities on AI

On-going initiatives regarding data science methods (such as artificial intelligence (AI) or machine learning (ML)) within IOM's Displacement Tracking Matrix (DTM) team, have two predominant work streams. The first focuses on developing ethics & guidance through inter-agency collaborations, and the second, as part of DTMs Global Internal Quality Control mechanisms for data management and analysis.

- **Project 1: Humanitarian Data Science and Ethics Group**

Group Summary – In 2018, IOM initiated the Humanitarian Data Science and Ethics group. Building on recent work and attention on ethical humanitarian data science methods and responsible data use, the Humanitarian Data Science and Ethics Group gathers key actors involved in data science, aid delivery and ethics to address the juncture between principles and practice. This group is working to bring key theoretical and practical actors to address the ethical issues behind humanitarian data science methods, and to establish practical frameworks with both technical and ethical considerations for the application of data science methods for humanitarian purposes.

This group was established to focus on the more practical issues related to the application and communication of advanced data science methods and better understanding the unidentified and unintended risks that may come with the good intended application of these methods that may go awry.

Group Objectives- To coordinate and collaboratively identify the potential benefits and risks of advanced data science applications for the humanitarian sector and to establish and strengthen existing ethical frameworks and standards behind the use of these methods specific for humanitarian purposes.

Many frameworks already exist regarding ethical considerations for Artificial Intelligence (AI) and machine learning from other sectors, and many humanitarian guides/frameworks exist for ethical data collection, information activities and data privacy & protection. However, through the regular group meetings there was an identified gap about strengthening the ethical considerations of applying advanced data science methods solely for humanitarian purposes whilst safeguarding the central tenants of humanitarian action: humanity, neutrality, impartiality and independence. Like how data should not be collected and analysed without minimum standards for ensuring the work is done responsibly, equally, data should not be plugged into advanced models without fully understanding the process, the ability to communicate the outcome, understanding who is accountable for the decision making based on the output, and how to tackle the overreliance on such processes. Subsequently, the activities of the group were developed to be:

Coordination – quarterly meetings are held to discuss key topics and concerns, with the group collaboratively trying to find solutions through an inter-agency manner with a practical, technical and ethical lens

Guidance -To develop and pilot a working framework pulling on existing frameworks from ethics-AI/machine learning, and humanitarian data responsibility, privacy, and protection guidelines. This brings the prospect of combining ethical considerations with more advanced data science techniques - bridging the gap and translating, as it were, between human values and data science/ engineering/ design. This framework is currently being drafted and is intended to be published later in 2019.

(Status: Ongoing, Partners: Participant of the group members to date have been data scientists, humanitarian program staff & ethic advocates from UN agencies, NGOs, think tanks and academic institutes, Geographical coverage: Global, Links: <https://displacement.iom.int/content/data-science-and-ethics-group>)

(Contact information: Robert Trigwell, Analytical, Knowledge and Output (AKO) Lead – Global DTM support Team, Email: rtrigwell@iom.int, Phone: +44 780 057 9404)

- **Project 2: Applying techniques for internal quality control within the Displacement Tracking Matrix (DTM) Global Team**

AI/Machine Learning techniques are applied by the DTM Global team for the following quality control procedures (some in development):

- Anomaly detection on migration data, and contextualisation of these data using #IDTECT.
- Rural / urban land classifications of displacement settings from DTMs central data warehouse
- Quality control routines (based on usual statistics, time-series models, NLP, aerial image recognition, etc.)
- AI for analysis of Drone imagery in displacement camps ML for Data-driven response
- Crisis severity measures on living condition in camps during natural disasters

DTM is committed to implementing effective and predictable tools for sustaining and enhancing quality data collection and analysis while preventing and mitigating errors in data products. Going forward, we seek to develop tools and process that utilizes AI to:

- Detect relevant information, including references, figures, populations, and geographical information (among other elements) to recognize material in external documents and platforms that refer to DTM's data or products.
- Bolster DTM's capacity to cross-check external citations regarding DTM data and products to information and data in DTM's publications.
- Cross checking of data sets and report drafts in draft documents prior to publication.
- NLP and sentiment analysis for the comments and open-text questions in DTM surveys.

For the side of analysis, IOM is still concerning on the uses of AI, since profiling and classifying populations and regions based on the collected must be follow and overcome all the ethical concerns.

(Contact information: Eduardo Zambrano, Data Scientist – DTM Global Support Team, Email: ezambrano@iom.int, Phone: +41 22 717 9476)

- **Project 3: IOM - Global Migration Data Analysis Centre (GMDAC)**

The exponential growth in the use of digital devices and internet services around the world mean that vast amounts of data that could offer relevant insights into human mobility are generated in real time and at little cost. An increasing number of applications show the potential of using data from mobile phone calls and social media activity to analyse patterns of displacement and mobility that are currently hard to capture through traditional data sources (censuses, surveys and administrative records). Still, this vast potential remains largely untapped due to access, privacy and ethical issues.

To address some of these challenges and facilitate investments in this area, in June 2018, IOM's GMDAC and the European Commission's Knowledge Centre on Migration and Demography (KCMD) launched the Big Data for Migration Alliance (BD4M). The Alliance aims to be a network of individuals working in different sectors – research, government, business, and civil society – who are interested in harnessing the potential of new data sources for public policy purposes. The BD4M aims to a) facilitate the development of new forms of partnerships between the private and the public sector for responsible sharing of data or analytical products; b) foster a dialogue between regulators, data

producers and data users to tackle confidentiality, security and ethical concerns related to use of privately-held data; c) bring together existing applications of new data sources in the field of migration and mobility to identify what works in which contexts; and d) provide support to countries interested in exploring ways to make use of new data sources to understand migration and mobility.

A few initiatives within the framework of the BD4M are already underway. One includes the creation of a repository of big data and migration applications, which will be hosted on the Migration Data Portal (<https://migrationdataportal.org/themes/big-data>). This will be a user-friendly, searchable curated repository of Big Data projects and initiatives, including information about the project objectives, lead and partner organizations, focus topics, data sources, SDG or GCM objectives targeted, results to date, and links to further information, among others. Development of the repository, as well as of a web page for the BD4M, is in progress.

Also, within the framework of the Alliance, IOM, the European Commission Joint Research Centre (JRC), and researchers at the Max Planck Institute for Demographic Research and the Qatar Computing Research Institute analysed how Facebook data can contribute to identifying trends in migrant stocks in selected countries (the working paper is available <https://publications.europa.eu/en/publication-detail/-/publication/a7ed9f5e-7ead-11e8-ac6a-01aa75ed71a1/language-en>).

Finally, GMDAC partnered with the JRC, the Governance Lab at New York University (GovLab) and Data2X to work on the demand side of data innovation and identify ten key policy questions related to migration, whose answers can be found in data and data science. This is part of the wider “100 Questions Initiative” by the GovLab. The ten key questions on migration will be sourced by leveraging a community of “bilinguals” – practitioners across sectors globally who possess both migration and data expertise. Activities are ongoing and the questions will be discussed during an expert workshop in the Fall of 2019.

(Contact information: Marzia Rango, Research and Data Officer, Email: mrango@iom.int, Phone: +49 171 547 9280)

2. Description of Possible Projects on AI

- **IOM’s Global Migration Data Analysis Centre: Strengthening national capacities to harness big data and novel methods for migration policy**

Together with partners such as the Flowminder Foundation, the WorldPop at the University of Southampton, and the UN Population Fund, IOM is proposing a programme to build national capacities in selected low- and middle-income countries to leverage new data sources, such as data from mobile phones, social media and satellite imagery, as well as new methods combining traditional and new sources, in migration analysis for policy. This will include a) capacity-strengthening and technical assistance in selected countries, b) the development of robust methods to estimate migration based on traditional and new sources, with a view to ensuring the sustainability of these activities, and c) the identification of concrete use-cases of new data sources, in close coordination with national counterparts. This project is at the initial proposal phase.

3. Challenges and Opportunities

- **Challenges:** Recognized lack of funding to formalize the discussion group. Challenges of working with new data sources and innovative methods on migration:
 - Access to data, largely held by the private sector, and data continuity
 - Privacy, ethical and security issues related to use of private data
 - Fragmentation of information about existing big data applications in the field of migration and human mobility
 - Selection bias inherent in use of big data sources, as these data are not

- representative of the population at large
- **Opportunities:** Lots of similar discussions and similar work on this, which supports a collaborative approach to move forward in a practical, ethical and technical manner. Opportunities provided by the Big Data for Migration Alliance:
 - Awareness-raising and sharing of knowledge on big data applications to analyse migration-related patterns
 - Building a network of practitioners and experts across sectors who are interested in harnessing the potential of new data sources and innovative methodologies to improve understanding of migration and human mobility. This will facilitate partnerships and collaborations across sectors, which are critical to progress in this area.
 - Enhancing capacities to utilize new data sources and innovative methods in low- and middle-income countries where resources for traditional statistical activities may be particularly limited, contributing to informed policymaking and to monitoring progress towards global commitments

4. Related Sustainable Development Goals (SDGs)

SDG 7. Affordable and Clean Energy, SDG 10. Reduced Inequalities, and SDG 17. Partnerships for the goals

5. Relevant links

- Migration Data Portal – thematic page on big data: <https://migrationdataportal.org/themes/big-data>
- Global Migration Group (2017) [Handbook for Improving the Production and Use of Migration Data for Development](http://www.un.org/en/development/desa/population/migration/events/coordination/15/documents/Final%20Handbook%2030.06.16_AS4.pdf) (Chapter 1c Innovative data sources (mobile phones, social media)): http://www.un.org/en/development/desa/population/migration/events/coordination/15/documents/Final Handbook 30.06.16_AS4.pdf
- Spyrtos, S. et al. (2018) [Migration Data Using Social Media: A European Perspective](https://publications.europa.eu/en/publication-detail/-/publication/a7ed9f5e-7ead-11e8-ac6a-01aa75ed71a1/language-en): <https://publications.europa.eu/en/publication-detail/-/publication/a7ed9f5e-7ead-11e8-ac6a-01aa75ed71a1/language-en>
- Big Data for Migration Alliance: <https://gmdac.iom.int/launch-big-data-migration-alliance>
- Big data and alternative data sources on migration: from case-studies to policy support (2017): workshop documents: <https://bluehub.jrc.ec.europa.eu/bigdata4migration>
- The 100 Questions initiative: <https://medium.com/data-stewards-network/the-govlab-at-nyu-tandon-announces-the-100-questions-initiative-76253882aded>

Contact information

- Name: Nuno Nunes, Global DTM Coordinator
- Email: nnunes@iom.int
- Phone: +41 79 433 5878



International Telecommunication Union

1. Description of Activities on AI

- **The AI for Good Global Summit**

The AI for Good Global Summit series identifies practical applications of AI with the potential to accelerate progress towards the United Nations' Sustainable Development Goals. 37 UN organizations joined as partners for the third [AI for Good Global Summit in Geneva](#), 28-31 May 2019, with over 2300 participants. The third Summit gave rise to 'AI Commons', a framework for collaboration to achieve global impact. The Commons will assist AI development and application in building on the state of the art, enabling AI solutions to scale with the help of shared datasets, testing and simulation environments, AI models and associated software, and storage and computing resources. See relevant ITU News story. The 4th AI for Good Global Summit will take place 4- 8 May 2020 in Geneva.

A joint-effort between ITU and 37 UN agencies and bodies, all partners of the 2019 AI for Good Global Summit, [the 2018 report on "UN Activities on Artificial Intelligence"](#) has been updated. The 2019 version of the report includes the collection of 2-pager activity report from 36 UN agencies, providing details on UN agencies experiments with AI to improve their response to global challenges. This report was first presented and discussed at the AI for Good UN Partners Meeting, which took place at the UNWomen Headquarters in New York, on 23 September 2019, where all members agreed to share it with the members of the UN Chief Executive Board (CEB) and make it public.

- **Focus Group on Artificial Intelligence for Health (FG AI2H)**

The ITU [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 12 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.

- **Focus Group on Machine Learning for Future Networks including 5G (FG ML5G)**

The ITU [Focus Group on Machine Learning for Future Networks including 5G \(FG ML5G\)](#) is proposing standardization strategies to assist machine learning in contributing to the efficiency of emerging 5G systems. The group is defining the requirements of machine learning as they relate to interfaces, protocols, algorithms, data formats and network architectures. One of the Focus Group's ambitions is to address the challenges surrounding the availability and quality of the data required to fuel machine learning algorithms. A new ITU standard has established a basis for the cost-effective integration of Machine Learning into 5G and future networks. The standard describes an architectural framework for networks to accommodate current as well as future use cases of Machine Learning. ITU News story: [New ITU standard to introduce Machine Learning into 5G networks](#).

- **Focus Group on Environmental Efficiency for AI and other Emerging Technologies (FG AI4EE)**

The ITU Focus Group on Environmental Efficiency for AI and other Emerging Technologies (FG AI4EE) – scheduled to meet for the first time in Vienna, Austria, on 15 October 2019 – will study environmental efficiency in the age of Artificial Intelligence, increasing automation, and smart manufacturing. The group's work is also expected to support ITU's ongoing studies of the environmental requirements of 5G systems. 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. See relevant [ITU Press Release](#).

- **The ITU Kaleidoscope**

The 10th edition of the ITU Kaleidoscope, an Academic Conference with peer-reviewed papers, [Kaleidoscope 2018: Machine Learning for a 5G future](#), was held in Santa Fe, Argentina, 26-28 November 2018, hosted by Universidad Tecnológica Nacional. The winning paper, authored by researchers at Japan's National Institute of Information and Communications Technology, highlighted Machine Learning's potential to support automated network slicing.

- **The ITU Publications**

A special issue of the ITU Journal dedicated to the theme 'Data for Good' published original academic papers investigating the technical, business and policy challenges underlying effective data management and analysis. Upcoming special issues will address radiowave propagation and the future of video and immersive media.

A report published by ITU in June 2019 reveals how AI could be used during the process of making distributing television content. One example from the report describes that in 2018, BBC Four carried out two full days of programming that were entirely selected and scheduled by AI algorithms to optimize to the user demographic. Included in these two days of AI motivated broadcast were portions of content that were generated solely by select AI algorithms. Full story: [Artificial Intelligence systems for programme production and exchange](#).

- **The World Telecommunication/ICT Policy Forum (WTPF)**

ITU will hold the sixth World Telecommunication/ICT Policy Forum (WTPF) in 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 theme for WTPF-21 will be "Policies for mobilizing new and emerging telecommunications/ICTs for sustainable development". AI will be among the sub-themes under discussion.

- **Project - Virtual AI Center in UAE**

ITU, through its Development Bureau, is collaborating with Microsoft and UAE on potentially establishing a virtual AI Center. Aimed at assisting Member States especially from developing countries, activities include capacity building, sharing of resources and hands-on experimentation.

- **Supporting the UN Chief Executives Board for Coordination (CEB)**

The UN CEB (Chief Executives Board for Coordination) approved a "UN system-wide strategic approach and roadmap for supporting capacity development on artificial intelligence"- especially for developing countries, with particular emphasis on the bottom billion. As agreed, ITU, as the lead agency for the development of the strategic approach and roadmap for action, to continue to serve as the institutional focal point for promoting coordinated implementation.

2. **Related Sustainable Development Goals (SDGs)**

All SDGs, especially SDG17. Partnerships to achieve the goals

3. Relevant links

- The AI for Good Global Summit: <https://aiforgood.itu.int/>
- Focus Group on AI for Health: <https://ibb.co/ZmzYZvg>,
- WHO and ITU establish benchmarking process for artificial intelligence in health:
[https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(19\)30762-7/fulltext?dgcid=raven_jbs_etoc_email](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(19)30762-7/fulltext?dgcid=raven_jbs_etoc_email)
- Focus Group on Machine Learning for Future Networks including 5G: <https://www.itu.int/en/ITU-T/focusgroups/ml5g/Pages/default.aspx>
- New ITU standard to introduce Machine Learning into 5G networks:
<https://news.itu.int/new-itu-standard-machine-learning-5g-networks/>
- Focus Group on Environmental Efficiency for AI and other Emerging Technologies:
<https://www.itu.int/en/ITU-T/focusgroups/ai4ee/Pages/default.aspx>
- Kaleidoscope 2018: Machine Learning for a 5G future:
<https://www.itu.int/en/ITU-T/academia/kaleidoscope/2018/Pages/default.aspx>
- ITU Journal on “Data for Good”: <https://www.itu.int/en/journal/002/Pages/default.aspx>
- Report on “Artificial Intelligence systems for programme production and exchange”
<https://www.itu.int/pub/R-REP-BT.2447-2019>

Contact Information

- Name: Preetam Maloor, Head of Emerging Technologies Division
- Email: Preetam.maloor@itu.int
- Phone: +41 22 730 5417



United Nations Programme on HIV/AIDS

1. Description of Activities on AI

- **Project 1: Meet Marlo**

With conversations about sex and HIV largely still remaining taboo in Indonesia and the limited existing information often being unclear and contradictory, the UNAIDS Country Office in Indonesia has developed Tanya Marlo (a.k.a. Ask Marlo). Ask Marlo is a chatbot powered by artificial intelligence and designed to be the primary source for all HIV-related queries.

In order to reach the young people in Jakarta that are not reached through traditional programming and are often turning towards new technology platforms to seek answers to their health and well-being questions, Marlo provides basic information about HIV through user-friendly content such as infographics, quizzes and FAQs. Ask Marlo users can also conveniently book HIV testing center across Jakarta, Indonesia. For those that are looking for a more in-depth conversation, Ask Marlo is able to connect them to real counsellors that are waiting on standby, to provide counselling and guidance towards specialized services. This is done through integration into the LINE chat messaging application, an application used by over 90 million users in Indonesia, majority of them being young people using LINE Today to obtain news, information and make online purchases.

Ask Marlo has received endorsements from university students, young professionals, communities, civil society activists and Ministry of Health. Along with endorsements with several social media influencers and YouTube personalities, this has helped to promote the chatbot to a larger audience with the next step being to expand to offer testing in other major cities across Indonesia.

- **Project 2: Health Innovation Exchange & TimBre**

The Health Innovation Exchange is a new platform established by UNAIDS with partners to identify challenges faced by implementers and connect them with innovations that have high potential for impact. The platform also links with investors to scale up the efforts and develop sustainable solutions. This involves innovators like Docturnal, which is a social, for profit medtech start-up that provides point of care & non-invasive screening for Tuberculosis & other Lung based ailments offering real-time results leveraging machine/deep learning over aural and clinical inputs under the umbrella of telemedicine. Their flagship product is called “TimBre”, which performs TB screening by the sound of the person’s cough.

2. Description of Possible Projects on AI

- **Project: AIR-TB**

UNAIDS has partnered with Harvard Medical School on using artificial intelligence as a solution towards providing systematic screening for TB in high-risk groups and limiting the burden on healthcare providers. The solution, ‘Artificial Intelligence to Reach TB (AIR-TB)’, screens Tuberculosis based on chest x-rays. Once developed, the explainable AI solution is expected to fill the resource gap in high TB burden countries through interpretation of medical images at physician-level and accurately predicting patient outcomes at minimal incremental cost. UNAIDS will assist other partners in the field testing of the developed algorithm phase and international partnership building. An MOU has been signed between the Indian Council of Medical Research, UNAIDS and HMS for pilot testing the tool in India.

3. Related Sustainable Development Goals (SDGs)

SDG 3. Good health and well-being, SDG 4. Quality Education, SDG 9. Industry, Innovation and Infrastructure, and SDG 17. Partnerships for the goals

4. Relevant links

- Twitter: <https://twitter.com/unaidsinno> (@UNAIDSInno)
- Meet Marlo: <https://ibb.co/ZmzYZvg>,
- https://www.unaids.org/en/resources/presscentre/featurestories/2019/march/20190329_ask_marl
- Health Innovation Exchange: www.healthinnovation2030.org

Contact information

- Name: Pradeep Kakkattil, Director, Innovations Office
- Email: KakkattilP@unaids.org
- Phone: +41 79 500 6514



United Nations Conference on Trade and Development

1. Description of Activities on AI

UNCTAD, through its Division on Technology and Logistics (DTL), aims to enhance the economic development and competitiveness in developing countries- in particular Least Developed Countries- through science, technology and innovation, including in the use, adoption, adaptation, dissemination and development of frontier technologies such as AI.

- **Project 1: United Nations Commission on Science and Technology for Development (CSTD)**

UNCTAD is the secretariat of the United Nations Commission on Science and Technology for Development (CSTD), a functional commission of ECOSOC. The CSTD is the focal point within the United Nations for science, technology and innovation (STI) for development. As such, it plays a central role in analysing how STI, including frontier technologies such as AI, serve as enablers of the 2030 Agenda. In 2018, one of the two priority themes considered by the CSTD was “The impact of rapid technological change on sustainable development,” and the CSTD recognized that rapid technological change, including in AI, can accelerate the implementation of the 2030 Agenda by providing new solutions to economic, social and environmental obstacles. At the same time, it poses considerable challenges for legal, social, and cultural norms regarding issues ranging from the integrity of human life to privacy, security, and the prevention of new forms of discrimination. For its 23rd session in 2020, the CSTD will consider, as one of its priority themes, “Harnessing rapid technological change for inclusive and sustainable development.”

- **Project 2: Technology and Innovation Report (TIR)**

UNCTAD’s flagship Technology and Innovation Report (TIR) address issues in science, technology and innovation that are topical and important for developing countries in a comprehensive way with an emphasis on policy-relevant analysis and conclusions. Technology and Innovation Report 2018 addressed the of harnessing frontier technologies for sustainable development, which included AI and other technologies such as Big data, Internet of Things, 3D Printing, Biotech, Nanotech, Renewable Energy, Drones, and Satellites. The Technology and Innovation Report 2020 will critically examine the possibility of frontier technologies such as AI widening existing inequalities and creating new ones. It will extend the usual treatment given to this topic beyond the context of developed countries and will also analyze the potential effect of rapid technological change on developing and least developed countries, as well as on the most vulnerable segments of societies.

- **Project 3: Interagency coordination on STI for SDGs**

UNCTAD co-leads together with DESA the UN interagency task team on STI for the SDGs, which is part of the Technology Facilitation Mechanism of the Agenda 2030. The interagency task prepared the Multistakeholder STI Forum 2019 in May 2019 under the guidance of the two co-chairs from Barbados and the Czech Republic. The STI Forum discussed the impact of key rapid technological changes on the achievement of the Sustainable Development Goals.

Common to all these activities is the continuous broad discussion with the involvement of all stakeholders on the impacts of new technologies and the need for technical assessments of these impacts that systematically use models, scenarios and foresight exercises to make clear the assumptions and the most relevant policy areas when considering the impact of these technologies.

2. Related Sustainable Development Goals

All SDGs

3. Relevant links

- Technology and Innovation Report 2018: Harnessing Frontier Technologies for Sustainable Development <http://unctad.org/en/pages/PublicationWebflyer.aspx?publicationid=2110>
- Commission on Science and Technology for Development, twenty-second session: <https://unctad.org/en/pages/MeetingDetails.aspx?meetingid=1892>
- STI Forum 2019: <https://sustainabledevelopment.un.org/TFM/STIForum2019>

Contact information

- Name: Angel González Sanz, Chief, Science, Technology and ICT Branch; Clovis Freire, Economic Affairs Officer
- Email: angel.gonzalez-sanz@un.org; freire@un.org
- Phone: +41 22 917 5508 ; +41 22 917 7916



United Nations Department of Economic and Social Affairs

1. Description of Activities on AI

The DPIDG has been working on various initiatives related to artificial intelligence. Below are a few brief descriptions of the latest work carried out by DPIDG on the topic of AI.

- E-Government Survey, Chapter 8: DPIDG published a chapter within the United Nations E-Government Survey 2018 entitled “Fast-evolving technologies in e-government: Government Platforms, Artificial Intelligence and People.” This chapter 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.
- ICEGOV Australia 2019: DGB selected “artificial intelligence” as one of the research activities of the Branch as preparations for the upcoming 2020 United Nations E-Government Survey. Mr. Denis Susar, under the guidance of Mr. Vincenzo Aquaro, wrote a paper titled “Artificial Intelligence: Opportunities and Challenges for the Public Sector,” which was submitted as a conference paper to the recent ICEGOV, coordinated by the United Nations University Operating Unit on Policy-Driven Electronic Governance (UNU-EGOV).

2. Description of Possible Projects on AI

United Nations E-Government Survey 2020 will continue to analyze the use of AI by governments, including application of AI in local government settings.

3. Challenges and Opportunities

Challenge: Developing indicators to measure how AI is used in public administration.

4. Related Sustainable Development Goals

SDG 16. Peace, Justice, and Strong Institutions and SDG 17. Partnerships for the Goals.

5. Relevant links

- DPIDG UN DESA: <https://publicadministration.un.org/en/>
- UN E-Government Survey 2018: <https://publicadministration.un.org/en/research/un-e-government-surveys>
- ICEGOV 2019: <http://www.icegov.org/about/>

Contact information

- Name: Denis Susar, Governance and Public Administration Officer
- Email: susar@un.org
- Phone: +1 212 963 8421



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

1. Description of Activities on AI

- **Project 1: Toolkit on Digital Technologies and Mediation in Armed Conflict**

Project assesses the opportunities and risk of using digital technologies, including AI, in mediation.

For mediators and their teams, machine learning has the potential to increase efficiency by making analytical processes faster, smarter, and cheaper and generate predictions of behaviour that might be useful to a mediation process. However, the risks and challenges of using these AI applications in such contexts are significant. Significant resources are required to train machine learning programmes (data, human, financial). The data that machines are fed can reinforce or amplify existing cognitive and social biases and promote or engender discrimination towards traditionally-excluded groups and vulnerable communities. Context and technical experts (e.g., human rights lawyers, sociologists, anthropologists, linguists, computer and data scientists) would be required to correct and adjust the machine learning process and contribute their knowledge and analysis to improve accuracy.

Moreover, these systems do not know how to integrate the abstract knowledge and rational thinking required of a mediator to make informed decisions. Any use of machine learning and more complex systems in mediation contexts- for example for predictive purposes- would likely require the agreement of the conflict parties on the models.

(Status: Ongoing, Partners: Centre for Humanitarian Dialogue, Geographical Coverage: Word-wide, Links: <https://peacemaker.un.org/digitaltoolkit>)

- **Project 2: Sentiment Analysis and Digital Focus Groups**

Project combines Low Resource Natural Language Processing with text mining and graph analytics.

Launched in 2018, DPPA-DPO/MED's Sentiment Analysis and Digital Focus Groups Project marked the Middle East Division's entry into using social media analytics (including graph/network analytics techniques) as a form of remote sensing in areas where the UN System either lacked an on-the-ground political presence or where a prospective SPM would benefit from a secondary source of analysis.

The project began with an initial survey of the "off-the-shelf" tools on the market, some of which were open-source and others that were "blackboxes" in their methodology. In both cases, existing tools did not offer sufficient insights on the specific, fine, and granular political questions UN principals and analysts were asking. Additionally, when it came Arabic-language content—and especially content that was either in Arabic dialect or written in coded terms to protect authors from the consequences of expressing their opinions online—existing tools were very poor.

As a result, after conducting a literature review of the field of Arabic language computational linguistics, the project began working with a cross-university research team led by four of the field's leading academics (respectively based at MIT/Max Planck Institute, the University of Edinburgh, American University of Beirut, and Birzeit University in Palestine).

The goal of the cross-university research team is to build a machine learning-based system for detecting and analyzing public opinions in the Arab world, initially with online written content and

then expanding to audio and video content (including local radio and television through the use of speech to text algorithms). Specifically, the project is initially focusing on building machines that understand Arabic dialects at a high-level of accuracy. The chosen set of Arabic dialects in this early phase are ones that have strategic conflict-context value to the UN (e.g. Bahraini, Yemeni, Iraqi, Syrian).

Following this, the cross-university research team will collaborate with a private sector partner to augment and customize an existing AI focus group tool that the private sector partner has developed and made available to the UN's Peace and Security Pillar for free. This tool allows 1 machine-assisted human moderator to conduct a largescale live digital focus group with 1000 individuals in real-time. The cross-university research team is working to integrate its "Arabic-dialect-machines" directly into this scalable focus groups tool.

Thus, within a conflict context, this work will allow a prospective lead mediator to conduct live digital focus groups with thousands of individuals in real-time in Arabic dialect. Critically, this effort will yield three main benefits: 1) by bringing the public into the conversation, such a tool can expand the scope and inclusivity of peace processes through the use of AI and new technologies; 2) an inclusive peace process is more likely to yield peace agreements that are more robust and resilient in the long term; and 3) having access to a means to transparently collect real-time data on the political views of thousands of members of the public in local dialect increases the leverage of a prospective representative of the Secretary-General vis-à-vis the conflict parties and adds a potentially game changing tool to her/his/their mediation toolkit.

(Status: Ongoing, Partners: MIT, Max Planck Institute, American University of Beirut, Birzeit University, University of Edinburgh, Remesh.io, Geographical Coverage: Arabic-speaking countries)

2. Challenges and Opportunities

• Challenges:

- Limited Funding and technical resources
- Absence of annotated Arabic dialect corpora against which to train algorithms

• Opportunities:

- Free access to Intellectual Property due to agreement with private sector partner
- University researcher teams willing to do more with small grants than potential private sector partners

3. Related Sustainable Development Goals (SDGs)

SDG 16. Peace, Justice and Strong Institutions

Contact information

- Name: Enrico Formica, Senior Mediation Officer
- Email: enrico.formica@un.org
- Phone: +1 646 578 6709



United Nations Economic Commission for Europe

1. Description of Activities on AI

• Project 1: Autonomous vehicles

- Regulatory work under the World Forum for Harmonization of Vehicle Regulations (WP.29)

The UNECE Sustainable Transport Division provides the secretariat services to WP.29, the World Forum that incorporates into its regulatory framework the technological innovations of vehicles to make them safer and more environmentally sound.

Since November 2014, WP.29 has been working on technical regulations for automated and autonomous vehicles. In this context, the screening of vehicle technologies showed that AI has found some prominent applications in the automotive sector. Some of these applications are related to infotainment and vehicle management (as Human Machine Interface (HMI) enhancement) e.g. infotainment management (incl. destination entry in the navigation systems). Some applications are related to the development of the vehicle self-driving capability

WP.29, being the regulatory body managing the three Multilateral Frameworks related to the construction of vehicles, their subsystems and parts as well as the periodic technical inspection of road vehicles, is monitoring these technological developments. WP.29 did not take any action framing the use of AI in vehicles to avoid limitations to innovation and technological development, as regulatory measures would be premature. WP.29 adopted the Framework Document for Automated Vehicles drafted by the China, European Union, Japan and the United States of America. It contains the Safety Vision for automated Driving as well as Key Safety Aspects relevant for these products.

- The yearly Future Networked Car Symposium

During the 2019 event of the Future Networked Car (FNC) event organized by UNECE and ITU, held on the first public day of the Geneva International Motor Show, representatives of vehicle manufacturers, the automotive and information and communication technology (ICT) industries, governments and their regulators to discuss the status and future of vehicle communications and automated driving. The Future Networked Car examined advances in connected vehicles, from the perspectives of business, technology and policy. One session was dedicated to AI with a presentation of the UNICRI Centre for Artificial Intelligence and Robotics and a report of the IEEE Global Initiative for Ethical Considerations in Artificial Intelligence and Autonomous Systems.

During the 2019 session, the FNC explored automated capabilities and AI in the vehicle, their status and the corresponding expectations.

• Project 2: The United for Smart Sustainable Cities initiative (U4SSC)

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

- **Project 3: Application of machine learning to the production of official statistics**

The objective of this initiative is to advance the research, development and application of machine learning techniques to add value to the production of official statistics.

It gathers 29 participants from 14 organizations and 12 countries under the high-level group for modernization of official statistics, which reports to UNECE's Conference of European Statisticians.

The interest in the use of Machine Learning (ML) for official statistics is rapidly growing. For the processing of some secondary data sources (including administrative sources, big data and Internet of Things), it seems essential to look into opportunities offered by modern ML techniques, while also for primary data ML techniques might offer added value, as illustrated in the ML position paper mentioned above. Although ML seems promising there is only limited experience with concrete applications in the UNECE statistical community, and some issues relating to e.g. quality and transparency of results obtained from ML still have to be solved.

Objectives:

- Investigate and demonstrate the value added of ML in the production of official statistics, where value added is an increase in relevance, better overall quality or a reduction of lower costs;
- Advance the capability of ML to add value to the production of official statistics;
- Advance the capability of national statistical organizations to use ML in the production of official statistics;
- Enhance the collaboration between statistical organizations on the topic of ML.

The ML initiative will achieve these objectives through:

- (Work package 1) Conducting concrete pilot studies in, i) two common statistical processing steps: classification and coding; edit and imputation; and ii) the use of alternative data sources: images and web/sentiment
- (Work package 2) Conducting research and development in ML data quality, notably on accuracy (how to measure or indicate)
- Combining key results from the above activities and other organizational aspects in the development of ML into lessons learned

The first work package is now conducting pilot studies on four themes:

- Classification and coding on more traditional data (survey, census, administrative/register); led by UK- ONS
- Edit and imputation on more traditional data; lead to be identified
- Imagery; led by Mexico- INEGI

- Web and sentiment data; led by Poland- Statistics Poland

A pilot study will be considered successful if it can demonstrate that ML can be used to:

- Increase the relevance of statistical output (produce new relevant statistics or allow the production of existing statistics at a finer level of geographic or demographic detail);
- Improve the timeliness;
- Improve the accuracy;
- Improve accessibility; or,
- Improve on other key aspects in the production of official statistics, e.g. reduced costs.

It is important to assess the advantages and drawbacks of ML applications, and to communicate them in a clear and transparent manner to allow overall fitness-for-use analysis.

- **Project 4: Trade facilitation**

UNECE's Centre for Trade Facilitation and Electronic Business (UN/CEFACT) recently approved the mandate and terms of reference for an Advisory Group on Advanced Technologies in Trade and Logistics.

This Advisory Group would cover the use of technologies such as AI, Blockchain and the Internet-of-Things in trade and logistics (key elements in the economic development of countries).

In addition, UNECE participated to the 2019 AI for Good Global Summit, and gave a presentation on Road Safety and AI.

2. Description of Possible Projects on AI

- **On vehicle automation:**

WP.29 did not take any action framing the use of AI in vehicles to avoid limitations to innovation and technological development, as regulatory measures would be premature. Activities remain collaboration activities involving external stakeholders such as the experts from the Member States.

3. Related Sustainable Development Goals

SDG 3, SDG 11, SDG 13, and SDG 17

4. Relevant links

- <http://www.unece.org/automated-vehicles>
- <http://www.unece.org/housing-and-land-management/united-4-smart-sustainable-cities-u4ssc.html>
- <https://statswiki.unece.org/display/hlgbas/2018+Workshop+on+the+Modernisation+of+Official+Statistics?preview=/223150364/232390744/The%20use%20of%20machine%20learning%20in%20official%20statistics.pdf>

Contact information

- Name: François E. Guichard, Engineer, Secretary of the Working Party on Automated/Autonomous and Connected Vehicles
- Email: francois.guichard@un.org
- Phone: +41 22 917 1112



United Nations Environment Programme

1. Description of Activities on AI

UNEP's AI activities are in the early development stages with the aim of growing exponentially because of the potential and need for AI to be part of the solution to environmental challenges.

UNEP has a two-pronged approach to AI adoption:

- 1) Mainstreaming AI within UNEP, particularly in the areas of machine learning, deep learning and augmented analytics by empowering staff members in identifying and implementing small-scale AI-based projects and using interactive visual algorithm modeling tools that are increasingly available. These will typically be done in-house led by the corporate IT team (Enterprise Solutions Section) of UNEP; or by UNEP substantive / programmatic project managers or organizational functional leads.
- 2) Implementing large-scale and complex projects that require collaboration with larger players in the AI arena. These will typically be projects with very large environmental datasets and complex analysis that requires larger scale hardware capacity, carried out in partnerships with various parties, including big data providers, and AI technology providers. Projects of this scale aim to present solutions of best practice and integrated in nature to complex challenges raised in relation to the environment.

- **Project 1: Water Related Ecosystems – SDG 6.6.1**

A water-related ecosystems monitoring project, aided by Google Earth Engine and the European Commission's Joint Research Center. It works through the application of computer vision and machine learning algorithms to recognize water bodies in satellite image data and map reservoir trends over time.

(Status: Ongoing, Partners: European Commission's Joint Research Centre and Google, Geographical Coverage: Worldwide, Countries of Implementation: UN Member States, Links: <https://www.sdg661.app/>)

- **Project 2: Funding Analysis and Prediction platform**

The experimental project implements the use of machine learning algorithms based on Microsoft's Azure Machine Learning Studio to analyze and predict global funding trends in the areas of environmental protection by donors and member states. It aims to leverage the potential of IATIs (International Aid Transparency Initiative) rich and publicly available historical data, as well as other data sources to provide information that will aid in better planning and decision-making.

(Status: Ongoing, Partners: Implemented internally, Geographical Coverage: Worldwide, Countries of Implementation: UN Member States)

2. Description of Possible Projects on AI

There is huge potential and opportunity for applying AI and machine learning to tackle environmental issues, from reducing greenhouse gas emissions, to monitoring endangered species, to optimizing crops, to helping society adapt to a changing climate, and to handling disaster management. Advances in the predictive power of AI and machine learning are allowing us to make better data-driven models of

environmental processes to improve our ability to study current and future trends of the environment. More and more organizations are coming up with AI based solutions for environmental problems.

UNEP has started with the freshwater ecosystems monitoring project. However, as the leading global environmental authority that sets the global environmental agenda, and serves as an authoritative advocate for the global environment, UNEP has a vast opportunity to do more in applying AI for addressing environmental problems. The nature of the larger-scale AI based environmental projects requiring robust infrastructure and data can be limitless. However, as mentioned in other parts of this paper, for the larger-scale projects, UNEP can only do this through partnerships with relevant parties, including big earth data producers, and AI system and technology providers.

As for the smaller-scale AI projects, UNEP will continue to make use of available interactive algorithm modelling tools, focusing both on environmental problems, as well as on the more work efficiency related challenges. Two of them that are currently undergoing feasibility study are:

- **Project 1: UNEP Q & A Chatbot**

These are conversational agents designed to initiate dialogue with and respond to user queries through an electronic interface. They are enabled by artificial intelligence and therefore not only facilitate personalized assistance but also exhibit intelligent problem-solving through learning, minimize errors in service delivery, promote accessibility and availability, encourage faster onboarding for new users, and promote work automation.

- **Project 2: UNEP Robotic Process Automation**

UNEP is looking into the benefit of robotics process automation within the organization and particularly application of an article writing bot to expedite the generation of standard and low-value documents. An AI Article Writing Bot applies the use of Natural Language Generation and machine learning capabilities to create content out of the available data. This is highly beneficial for efficient and scalable elimination of the manual and redundant process of coming up with standard organizational reports, promotional material and articles.

3. Challenges and Opportunities

- **Challenges**

- More datasets are required to make a prediction in funding trends which drives the need to collaborate with external providers.
- Current lack of in-depth expertise within the organization. Hence a need to engage AI experts to grow UN Environment's capacity in AI through training and project consultancy.
- The visual modelling / algorithm tool has limitations for complex issues.
- Lack of systems infrastructure necessary for building and deploying these applications.

- **Opportunities**

- There is potential to scale the application of the machine learning tools to similar projects to the use cases above within the organization.
- Staff members across the organization at UNEP have shown a great interest in understanding how AI can support their work and applying its capabilities in support of the environmental agenda.
- Acquisition of an expert from an established organization in the AI domain to facilitate AI capacity building, consultancy and training within the organization.

- Strategic partnerships with industry players with the relevant technical expertise, as well as earth-related big datasets. As the leading global environmental authority that sets the global environmental agenda, UNEP has the capacity to provide the partners with substantive knowledge related to the environment.

4. Related Sustainable Development Goals (SDGs)

SDG 6. Clean water and sanitation and SDG 17. Partnerships for the goals

Contact information

- Name: Saiful Ridwan, Chief Enterprise Solutions
- Email: saiful.ridwan@un.org
- Phone: +254 70 9023649



United Nations Educational, Scientific and Cultural Organization

1. Description of Activities on AI

UNESCO is continuing its focus on ethics, policy and capacity building, across all of our sectors. Recognising AI's potential to effect changes across all sectors, UNESCO has further set up an intersectoral AI Task Team to develop a coordinated AI strategy.

a. Setting ethical norms and standards (for SHS to elaborate)

The World Commission on the Ethics of Scientific Knowledge and Technology (COMEST) prepared a preliminary study on the ethics of AI, which was considered by the Executive Board at its 206th session. UNESCO's General Conference will consider in November 2019 whether to develop a standard setting instrument on the ethics of AI over the next two years.

Aligning with its mandate on human rights, UNESCO's CI sector will be releasing a publication on the application of ROAM principles (human rights, openness, access and multistakeholder approach) to AI, which will serve as a comprehensive tool for policymakers to consider both the opportunities and challenges of AI, and reflect on some possible policy solutions.

b. Positioning UNESCO as a platform for international intellectual debate

Building on UNESCO's earlier events reflecting on AI, including panel discussions and roundtables, UNESCO has organised even more events to exchange knowledge about AI in 2019, focusing on the ethical dimension of AI. This includes discussions and workshops about AI's human rights implications, and the consequent challenges of governance, such as the panel discussion on AI and Human Rights in November 2018. The Gender sector has also released the widely-noted 'I'd Blush If I Could', a report on the gendered implications of AI and other new technologies, including subservient female voice assistants which gave lacklustre responses to verbal sexual harassment.

c. Fostering policy dialogue

UNESCO further uses these debates as a means to inform policymakers, hosting an information meeting on AI for member states in January 2019, followed by a larger-scale global conference on Humanistic Principles for AI in March 2019, which brought together stakeholders from the government, experts, private sector, international organisations and civil society to discuss the policy implications of AI. UNESCO also brings this human-centred policy perspective to discussions organised by other organisations, such as the WGS Global Governance of AI Summit in Dubai in February 2019, and the AI for Good Global Summit in Geneva in May 2019.

d. Capacity Building

In addition to fostering high-level intellectual debate around AI, UNESCO is also committed to building capacity in AI. Our annual Mobile Learning Week had a focus on AI for sustainable development, bringing together many innovators who have developed AI applications for education, and giving them a platform to share their applications with a wider community. The CI sector organised a symposium on AI and the next generation of competencies in July 2019, where academics and practitioners discussed the impact of technologies on employment and examined how the future workforce can be equipped with skills necessary in the new economy. The Education sector is also currently working

with Microsoft to develop an AI in Education Readiness Index, and to facilitate capacity building for education policymakers in integration of AI in education.

UNESCO places a particularly strong focus on developing AI capacity in Africa, which not only includes encouraging debate, but also building networks of stakeholders within the continent. In December 2018, we organised a Forum on AI in Africa in Benguerir, Morocco, which brought together high-level experts and policymakers to explore the opportunities and challenges that AI presents for development. In August 2019, the CI sector will be furthering our work in this area by co-organising the Deep Learning Indaba in Kenya, bringing an important policy focus to the previously technical meeting.

e. Upcoming AI events (to be updated)

- TICAD7 Side Event on AI (28-30 Aug 2019, Yokohama, Japan)
- Deep Learning Indaba (25-30 August 2019, Nairobi, Kenya): the CI sector will organise a session on ethical implications on AI at the annual meeting of the African machine learning community.
- 40th General Conference Side Event on AI (18 November 2019, UNESCO HQ): part of the side event will be dedicated to fostering dialogue between African youth and policymakers on how AI is impacting human rights and development.

2. Related Sustainable Development Goals (SDGs)

SDG 4, SDG 16, SDG 17, SDG 9, and SDG 11

Contact information

- Name: Clare Stark; Dafna Feinholz; Fenchung Miao
- Email: c.stark@unesco.org; d.feinholz@unesco.org; f.miao@unesco.org
- Phone: + 33 1 45 819 86; +33 1 45 681 736; +33 1 45 680 936



United Nations Climate Change

United Nations Framework Convention on Climate Change

1. Description of Activities on AI

Project: RISK TALK – an exchange on climate risk transfer solutions

RISK TALK is an online community and open to anyone who needs to know more about climate impact related risk transfer and risk transfer solutions. The RISK TALK community employs artificial intelligence to build a neural network by mapping the expertise of each user by its interactions – answering and commenting questions and rating existing answers. New questions will be redirected to the users who the system considers an expert based on the past interactions.

(Status: Implemented, Partners: [InsuResilience Secretariat](#), Geographical Coverage: Global, Links: <http://unfccc-clearinghouse.org/find-solution>)

2. Description of Possible Projects on AI

- Streamlining internal workflows
- Text mining and managing
- Speech recognition and translation

3. Related Sustainable Development Goals (SDGs)

SDG2. Zero Hunger, SDG11. Sustainable Cities and Communities, and SDG13. Climate Action

Contact information

- Name: David Oehmen, Associate Programme Officer
- Email: doehmen@unfccc.int
- Phone: +49 228 815 1343



United Nations Population Fund

1. Description of Activities on AI

One UNFPA example is “ECHO: Amplifying citizen`s voices for the SDGs”. 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.

The process will be cover groups of population of Medellin, Bogotá and Cartagena, three different zones and two of the largest cities of Colombia.

2. Description of Possible Projects on AI

• **Project 1: Social Media Data Scraper (ongoing)**

UNFPA has also created projects that could impact directly in the achievement of the SDGs, including SDG 3 on Health. We are experimenting with data scraping on social media, in particular tweets generated around sexual and reproductive health, including ideas around correct and incorrect ways to prevent pregnancy, and notions around relationships and the use of contraception. With the help of AI specifically with Natural Language Processing, we might understand what people are thinking about on myths and misconceptions around contraception use. One natural language processing tool that we can do is sentiment analysis, which tells us the level of polarity of a text, which refers to knowing whether a text is positive or negative. With this data and adding data of entity recognition, we can get a very good approach on what is the belief about some contraceptives and what entities are related to those beliefs. With these insights generated, we can make design more targeted and

effective behavioral change interventions and campaigns to get people to change misconceptions of contraceptive methods.

- **Project 2: Semantic correctness analyzer for ECHO's answers (on going)**

We also figured out that ECHO system cannot determine when an answer given by user is semantically correct by itself. ECHO's models select the most probably SDGs for every answer but these never could say how many accurate is each selected SDG. For this reason, we want to start another project with one individual task which is basically to measure the certainty weight using grammar correction models and semantic deep analysis of phrases.

3. Challenges and Opportunities

- **Challenges:**

- The urgency to achieve our organizational priority areas and leverage the power of AI toward that end
- The prevalence of myths and misconceptions about contraceptives
- The prevalence data and visualization
- Humanitarian crisis: internal and external migration

- **Opportunities:**

- To accelerate our mandate through AI and cutting edge technologies
- To improve our impact including BC and C4D campaigns through among others the internet and social network messages, radio, public tv channels, public spaces, etc.

3. Related Sustainable Development Goals (SDGs)

This project impacts the entire Agenda because it is a system that aims to better public policies through an innovative tool to generate awareness about the agenda. But this is notably related to SDG 17. Partnerships for the Goals, in the way to bring bridges between people in terms of Languages and the agenda for development.

4. Relevant links

- ECHO INTERVIEWER SYSTEM: www.echo.carinalab.co
- ECHO VISUAL ANALYTICS PAGE (ongoing): <https://echo.carinalab.co/#/mMedellin1>
(if you are interested and want to get access please write an email to nieto@unfpa.org)
- SOCIAL MEDIA DATA SCRAPER (BETA): <http://165.227.124.98/tweetsunfpa/>

Contact information

- Name: Jaime Aguirre, Innovation Coordinator- UNFPA Colombia Country Office
- Email: jaaguirre@unfpa.org
- Phone: +57 315 612 5389



United Nations Global Pulse

1. Description of Activities on AI

- **Project 1: Supporting Development of Ethical AI frameworks in the Global South**

In order to accelerate the adoption of AI innovations for the SDGs and to inform the roadmap and planning of the development of a blueprint for national AI strategies in Africa, Global Pulse is working both in AI policy and AI innovation in target African countries. Global Pulse is hosting national and regional consultations and dialogues with stakeholders in countries such as Ghana and Uganda to develop national AI strategies.

- **Project 2: Developing Ethical Frameworks to Support Human Rights-Based Approaches to AI**

UN Global Pulse is putting together an international group of expert stakeholders on ethics to work together with the UN Global Pulse Privacy Advisory Group to develop a first draft of a code of ethics for AI focusing on the Human Rights.

- **Project 3: Automated Speech Generation from UN General Assembly Statements: Mapping Risks in AI Generated Texts**

UN Global Pulse explored the risks that can arise from the malicious use of automated text generation software in a study where data from UN General Assembly speeches was used to build a fake UN speech generator. The study raises an alarm about the dangers of AI text generation to peace and political stability. It includes recommendations for those in the scientific and policy spheres working to address these challenges. (Read more: <http://bit.ly/2XCTi5I>)

- **Project 4: Using Deep Learning on Social Media Imagery to Nowcast Air Pollution**

Air pollution is a growing health issue in Indonesia. Pulse Lab Jakarta has been researching how to deploy a model to nowcast air quality using social media imagery. Selected as one of 17 challenge winners, the Lab presented their project at the Computer Vision for Global Challenges workshop. (Read more: <http://bit.ly/2YIlu7X>)

- **Project 5: Managing Information for Natural Disasters**

Responding to natural disasters effectively is vital for saving lives and limiting disaster impact. Pulse Lab Jakarta launched an automated, open source platform to aid logistics planning and information management following natural disasters. The platform is built on an automated data pipeline, allowing it to stream and analyse several non-traditional data sets - like social media, open source, google search results, all in one place. (Read more: <http://bit.ly/2NvV7Rs>)

- **Project 6: Using Radio and AI to Leave No Voice Behind**

Pulse Lab Kampala has been applying cutting-edge AI tech to radio broadcasts to gain greater insight into how to better serve citizens, especially those with little access to modern technology. In order to do that, they developed Qatalog, a data mining tool that can extract, analyse, and visualize data from social media and from radio shows. The tool allows users to extract useful information from large volumes of publicly available data and to analyse it for topics of interest using a combination of

optimized manual annotations techniques and automatic helpers that include translation, geo-location and text classification. (Read more: <http://bit.ly/2JaO6Bn>)

- **Project 7: PulseSatellite AI - A Tool to Detect Structures in Satellite Images**

UN Global Pulse and UNOSAT developed an automated tool to identify and count structures in settlements of refugees and displaced persons in high resolution satellite imagery using artificial intelligence. The prototype tool maintains a strong emphasis on making use of human input relevant to maximize accuracy. (Read more: <https://royalsocietypublishing.org/doi/abs/10.1098/rsta.2017.0363>)

2. Related Sustainable Development Goals (SDGs)

All 17 SDGs and humanitarian efforts

Contact information

- Name: Miguel Luengo Oroz
- Email: miguel@unglobalpulse.org



United Nations High Commissioner for Refugees

1. Description of Activities on AI

• Project 1: Project Jetson

Project Jetson is a predictive analytics experiment aimed at providing predictions on the movement of displaced populations within and outside of Somalia. It's a project initiated and launched by UNHCR's Innovation Service. Jetson technology is machine learning-based and it provides predictions on the movement(s) of displaced people. This experiment also combines data science, statistical processes, design-thinking techniques, and qualitative research methods. Jetson actively seeks new data sources, new narratives, and new collaborations in order to keep iterating, and improving. It has further underlined the importance of partnership, of collaboration, and of transparency.

(Status: Active, under current revamping/review, Geographical Coverage: East Horn of Africa, Countries of Implementation: Somalia and Southern Border with Ethiopia, Dollo Ado, Links: <http://jetson.unhcr.org>, Partners and Data Sources, listed below)

- Academia: University of Essex- Human Rights, Big Data & Technology Project (HRBDT)
- Non-profit: ACLED data, main conflict data source
- UN System: UN Global Pulse, FAO SWALIM, FAO FSNAU, UNHCR-NRC Protection and Return Monitoring Network (PRMN), WMO-ICPAC
- Private sector (capacity-building): uptake.org (Uptake Foundation)

• Project 2: ARiN - DHR Artificial Intelligence Project

ARiN is a web application developed by UNHCR Innovation Service for the affiliate partnerships and recruitment section (APRS) within the division of human resources (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 (<https://www.unhcr.org/talent-pools.html>) that receive on average 8000 applications per month, which are majority text-based. 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 elements.

(Status: Active, in development, Geographical Coverage: Global, Links: <https://medium.com/unhcr-innovation-service/revolutionising-recruitment-a-test-for-ai-in-the-united-nations-4456df0b1431>, Partners- Internal: DHR, APRS team and UN System (knowledge sharing): WIPRO, ATAC team)

2. Description of Possible Projects on AI

- Protection monitoring: classifying protection incidents categories and subcategories from mission reports (free-text)
- Donor-related data classification

3. Challenges and Opportunities

• Challenges

- Availability of data ready for A.I. applications
- Managing expectations of A.I. uses and applications – not everything is automated and lots of data pre-work is needed.
- Data literacy: improve data literacy skills across the organization.
- A.I. expertise: improve and introduce A.I. expertise and skills and development of applications for internal uses or to adapt external applications for internal uses for business-as-usual processes/support.
- Implementing standard support structures for A.I.
- Organizational culture, more innovative and pushing for change. People cannot implement what they don't fully understand its functioning and there is resistance for implementation.
- Communication issues: to counter negative perceptions.

4. Related Sustainable Development Goals (SDGs)

SDG17.18: By 2020, enhance capacity building support to developing countries, including for LDCs and SIDS, to increase significantly the availability of high-quality, timely and reliable data disaggregated by income, gender, age, race, ethnicity, migratory status, disability, geographic location and other characteristics relevant in national contexts.

5. Relevant links

- Twitter: @unhcrinnovation
- Medium: <https://medium.com/unhcr-innovation-service/artificialintelligence/home>
- Website: <https://www.unhcr.org/innovation/>

Contact information

- Name: Chris Earney, Deputy, UNHCR Innovation Service
- Email: earneyc@unhcr.org
- Phone: +41 22 739 7638



United Nations Children's Fund

1. Description of Activities on AI

Emerging technology, and in particular Artificial Intelligence (AI), has the capacity to accelerate positive change towards results for children, and to “leapfrog” certain fundamental infrastructure or capacity gaps – but technology alone is not sufficient. UNICEF’s work on AI focuses in three main areas:

a. USING AI TO ACCELERATE RESULTS FOR CHILDREN

Prototyping and scaling solutions that allow us to adapt faster to the growing needs of children

AI can help UNICEF accelerate its work across different programme areas and achieve its strategic goals. In particular, AI can help us making sense of large amounts of data by finding new patterns and relationships more quickly and/or better and it can also help us become more efficient by optimizing processes. In addition, AI can also create internal organizational efficiencies by using UNICEF data to actually drive results.

UNICEF is prototyping and scaling solutions that allow us to adapt faster to the growing needs of children. Some examples of the ongoing work are:

- Using human mobility data to create risk maps for the spread of diseases
- Using satellite imagery and other data to understand poverty
- Together with ESA and WFP, mapping crops in Malawi using drone imagery and AI
- Collaborating with academia to create new techniques that can help reach the most vulnerable children
- Providing policy guidance so that AI protects and empowers children.

Underlying these solutions, UNICEF, together with partners, is building the core AI infrastructure that will allow the organization to exploit the potential of AI.

b. BRINGING CHILDREN TO THE CENTER OF THE FUTURE OF AI

Creating policies that protect children’s rights and bring the attention of the scientific community to the most vulnerable

While there are many uncertainties around Artificial Intelligence, we know that it will impact almost every part of our lives. In many cases the impacts will be greatest for children- from how they are conceived, to the services they can access, how they learn, and the jobs they will train for. This reality brings a tremendous amount of opportunity and risk. Without specific attention to children, the evolution of this technology may proceed without considering children’s specific needs and rights.

UNICEF is therefore creating policies that protect children’s rights and bring the attention of the scientific community to the most vulnerable. We do this in collaboration with multiple stakeholders and in partnership with IEEE, Berkman Klein Centre and WEF. UNICEF’s AI policy work is:

- Sharing Rights-based values with government and industry.

- Creating a platform for dialogue with the public and private sectors.
- Ensuring that the rights of young people-- especially the most vulnerable-- are the center of AI debate and national strategies and policies.
- Engaging the scientific community-- generating and advocating for equitable datasets, to enable fair algorithms inclusive to the most vulnerable and developing standards for AI applications.

c. ENSURING THAT EVERY CHILD CAN BENEFIT FROM THE POTENTIAL OF AI

Providing young people with the information, skills and services they need to shape the future they want

Artificial Intelligence has the potential to create opportunities to accelerate sustainable development. However, at the moment, there are deep inequalities in access to technology and digital products, the lack of which can sometimes further deepen inequalities. According to the World Economic Forum, nearly 4 billion people remain unconnected from the internet, and by extension unconnected to digital products- including AI technologies- that could dramatically improve or even save their lives. Adding to this challenge, estimates suggest that by 2030 the population of adolescents and young people will reach 2 billion.

In order to make sure that this rapidly growing group can benefit from the potential of AI, UNICEF is working on providing them with the information, skills and services they need to shape the future they want. To achieve this goal, UNICEF, alongside partners, is:

- Using AI to map every school in the world, and their connectivity level
- Exploring new ways to bring together global financial partners, technology experts and business and network operators to provide internet access to all schools no matter where they are
- Empowering young entrepreneurs and promoting locally built solutions by investing in data science and AI startups in emerging markets. This is done through UNICEF's Venture Fund (<https://unicefinnovationfund.org/>), a US\$17.9 million investment fund that makes \$50-100K early stage investments in technologies for children developed by UNICEF country offices or companies in UNICEF programme countries.
- Working on development digital skills and literacies of young people and children, including data and AI literacy.

2. Related Sustainable Development Goals (SDGs)

UNICEF's strategic plan primarily focuses on work in SDGs 1, 2, 3, 4, 5, 6, 9, 10, 13, 16 and 17

3. Relevant links

- <https://www.unicef.org/innovation/>
- <https://www.projectconnect.world/>
- <https://unicefinnovationfund.org>

Contact information

- Name: Naroa Zurutuza, Programme Specialist
- Email: nzurutuza@unicef.org and joestergaard@unicef.org
- Phone: +1 646 468 8847



United Nations Interregional Crime and Justice Research Institute

1. Description of Activities on AI

In 2014, the United Nations Interregional Crime and Justice Research Institute (UNICRI) launched its programme on AI and robotics. In 2017, UNICRI signed a Host Country Agreement with the Kingdom of the Netherlands, paving the way for opening a specialized Centre for AI and Robotics in The Hague, The Netherlands. The Centre is committed to advancing understanding of AI, robotics and related technologies within this ecosystem from the perspective of crime, justice and security and to exploring their use for social good and contributing to a future free of violence and crime.

Since then, UNICRI has built a solid knowledge base and an extensive international network of partners and stakeholders that it utilises to carry out activities and convene meetings, including on the margins of the United Nations General Assembly, expert-level gatherings, training courses and workshops. UNICRI has also studied various aspects of AI and robotics, including the application of AI by law enforcement, social economic considerations and national strategies.

2. Recent Concrete Activities

a. INTERPOL-UNICRI Global Meetings on AI and Law Enforcement

On 2-4 July, INTERPOL and UNICRI convened the 2nd Global Meeting on Artificial Intelligence for Law Enforcement in Singapore. Participants from law enforcement agencies of UN and Interpol Member States discussed AI technology domains, examining their relevance for law enforcement. The ethical, legal and social implications of the use of AI by law enforcement were also discussed as a central theme of the meeting. This is the second gathering of this international forum. The 3rd Global Meeting will take place in The Hague, the Netherlands, in 2020.

b. Hackaton for Peace, Justice and Security (on 16 June, 2019)

The Hague, UNICRI organized an AI challenge and invited more than 150 highly skilled “hackers” to find technical solutions to support law enforcement, security agencies, the judiciary, media and general public to detect manipulated videos, such as deepfakes, and verify the authenticity of images and videos. The “True or False” Challenge took place within the framework of the 2nd edition of the Hackathon for Peace, Justice and Security.

c. High-Level Meeting: Artificial Intelligence and Robotics - Reshaping the Future of Crime, Terrorism and Security (on 2 April, 2019)

UNICRI, together with INTERPOL and the Permanent Missions to the United Nations of Georgia, the Kingdom of the Netherlands and the United Arab Emirates, convened a high-level event at the United Nations Headquarters in New York. The meeting focused on the role AI and robotics can play in preventing and countering crime and terrorism, and strengthening security, as well the challenges that come with this. A joint UNICRI-INTERPOL report on AI and Robotics for Law Enforcement was also launched at this event.

d. Technical Workshop: Artificial Intelligence – Reshaping National Security.

From 17-18 December, UNICRI and the Shanghai Institutes for International Studies (SIIS) jointly hosted an workshop in Shanghai, China, examining the role of artificial intelligence (AI) in reshaping

national security, including, broadly speaking, economic security, cyber security, domestic security, border security, food security etc. During the workshop, experts, including representatives from government, private sector, academia and civil society, discussed the challenges and opportunities AI presents in this regard.

3. Description of Possible Projects on AI

- On a policy level, the UNICRI Centre is working with INTERPOL's Global Complex for Innovation to develop a set of guiding principles for law enforcement agencies in Member States to guide their the use of AI in a lawful and trustworthy manner. In parallel it seeks to work with Judiciary and provide training on what these technologies means for the courts.
- On a technical level, the UNICRI Centre is working with technical partners, other UN entities (such as the UN Office of Information and Communications Technology) and Member States to develop and pilot several practical AI-based tools to address specific challenges, such as corruption, human trafficking, child pornography, the financing of terrorism, as well as a range of maritime crimes including smuggling and illegal fishing. It is also looking to develop solutions for possible new threats that this technology can bring, including video manipulation technologies, or so-called deepfake videos.

4. Challenges and Opportunities

- **Challenges:** Building trust in the use of AI by law enforcement, assessing the true scope of the risk of the malicious use of AI by criminals and terrorist groups, ensuring pilot tools developed do not only remain in pilot phase and actually go into implementation.
- **Opportunities:** Awareness-raising, knowledge development, developing innovative technical solutions to traditional problems, training and education, collaboration across public and private sector.

5. Related Sustainable Development Goals (SDGs)

SDG 16. Peace, Justice and Strong Institution- promoting peaceful, just and inclusive societies, free from crime and violence.

6. Relevant links

- UNICRI-INTERPOL Report – AI and Robotics for Law Enforcement: http://www.unicri.it/news/files/ARTIFICIAL_INTELLIGENCE_ROBOTICS_LAW%20ENFORCEMENT_WEB.pdf
- Recording of High-Level Event- Artificial Intelligence and Robotics: Reshaping the Future of Crime, Terrorism and Security, New York, April 2, 2019: <http://webtv.un.org/watch/artificial-intelligence-and-robotics-reshaping-the-future-of-crime-terrorism-and-security/6021845869001/>

Contact information

- Name: Irakli Beridze, Head Centre for Artificial Intelligence and Robotics
- Email: Irakli.beridze@un.org
- Phone: +31 62 740 4326



United Nations Institute for Disarmament Research

1. Description of Activities on AI

In order to harness the short- and long-term benefits of AI to improve the economic and social development of all peoples and achieve the Sustainable Development Goals, governments will need to address AI risks and challenges—from lack of trust and vulnerability, to manipulation, to concerns about weaponization—that could create fear or inhibit development and deployment of AI for beneficial purposes.

Within its Security and Technology Research Programme (2019-2021), UNIDIR is focusing on the impact of AI on International Security and has a dedicated workstream on Artificial Intelligence and increasing autonomy in weapon systems. This workstream promotes a fact-based, technologically sound dialogue between policymakers, the tech community, the private sector and other stakeholders to ensure that international regulatory responses to military applications of AI do not retard or hinder the beneficial economic and social benefits of these technologies.

Discussions on Lethal Autonomous Weapon Systems (LAWS), underway in the Convention on Certain Conventional Weapons (CCW) framework since 2014, have coalesced around critical concepts such as human control and responsibility, the human-machine interface, and the predictability and reliability of AI-enabled conventional weapon systems.

These discussions, while critical, focus almost entirely on autonomous conventional weapons systems. Broader applications for AI in military systems—particularly in decision-making support tools, cyber operations, and nuclear command and control—raise novel concerns about explainability, reliability and predictability; the potential for unintended interactions or outcomes; and susceptibility of these systems to manipulation. The rate of AI security and defence technological development 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 work within its Security and Technology Programme will seek to a) support understanding of the implications of autonomy in weapon systems and b) explore the options available for AI arms control.

2. Description of Possible Projects on AI

- **Project: Trust but Verif-AI (ongoing)**

AI security and defense technologies are being developed and deployed—there is even talk of an “AI Arms Race”. There is a need for the international community to understand the available options for “AI Arms Control”, including the benefits and drawbacks of different types of regulatory regimes. This project brings together AI technologists, arms control practitioners and other experts in regulatory and technology control policies in order to develop an understanding of the ways that AI arms control might be necessary and feasible.

(Links: <http://www.unidir.org/programmes/security-and-technology/trust-but-verif-ai-options-for-regulating-defence-and-security-ai-technologies>)

3. Challenges and Opportunities

- **Challenge:** low technological literacy of many policy makers and a reluctance to adopt multi-stakeholder approaches (particularly in cooperation with the private sector and technical community) to international security challenges
- **Opportunities:** demand is high for UNIDIR primers, briefings and events, such as the Innovations Dialogue (<http://unidir.org/programmes/security-and-technology/2019-innovations-dialogue-digital-technologies-and-international-security>) where we seek to create spaces to 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.

4. Related Sustainable Development Goals (SDGs)

Goal 16: Peace, Justice and Strong Institutions

5. Relevant links

- <http://www.unidir.org/programmes/security-and-technology>
- <http://www.unidir.org/programmes/security-and-technology/trust-but-verif-ai-options-for-regulating-defence-and-security-ai-technologies>

Contact information

- Name: Giacomo Persi Paoli (as of 16 September 2019), Lead, Security and Technology Programme
- Email: sectec-unidir@un.org
- Phone: +41 22 917 1141



United Nations Industrial Development Organization

1. Description of Activities on AI

Several advanced economies, most prominently, Germany, the United States of America, Japan and the Republic of Korea, have formulated strategies for fostering the uptake of the fourth Industrial revolution (4IR), also referred to as Industry 4.0, technologies to enhance global industrial competitiveness. Increasingly, companies are applying innovative solutions through the deployment of Industry 4.0 technologies, such as Industrial Artificial Intelligence (IAI), the Industrial Internet of Things (IIoT), cloud computing, data analytics, miniaturization, sensors and additive manufacturing (3D printing), as well as new materials stemming from the advancement of convergent technologies and sciences (nanotechnology, biotechnology, information technology and cognitive and social sciences- NBICS).

The fourth Industrial revolution (4IR) involves a paradigm shift from mass production to mass customization, centralized to decentralized decision making, and fully-integrated and collaborative manufacturing systems that respond in real time to changing demands and conditions in the factory, in the global supply and value chains, and to customer needs. It refers to the integration of a set of convergent technologies that create manufacturing systems comprised of intelligent, autonomous and decentralized factories and integrated smart products using advanced materials and services, leading to smart factories, smart manufacturing and smart industries.

Smart manufacturing is at the forefront of the 4IR transformation. The 4IR technologies are shaping the future of manufacturing and the future of work, creating opportunities for manufacturers to generate new value added, increase capacity, improve margins, cut costs and become energy and material resource efficient. Smart manufacturing employs a high level of automation, uses biodegradable materials and huge volumes of data and interacts with customers for production processes and delivery of products and services with high-knowledge content. In a smart factory, machines interconnected in networks are equipped with sensors and software functionalities to communicate with people and with each other, becoming smarter in working out solutions.

UNIDO smooths the way to 4IR

As a leading UN agency with a mandate to foster inclusive and sustainable industrial development (ISID), UNIDO leads the way in addressing opportunities, challenges and risks stemming from 4IR technologies and their impact on inclusive and sustainable industrial development. As a convener, knowledge and partnership broker, policy advisor and provider of practical technological solutions, UNIDO enables a smooth transformation towards 4IR for countries with varying levels of economic development.

To realize its mission of fostering ISID, UNIDO promotes development, transfer and adaptation of advanced technology on global, regional, national and sectoral level and supports countries in their effort to formulate and update such frameworks. The demand for interventions to foster uptake of 4IR technologies, particularly IAI has increased throughout the years. Industrial AI is a systematic discipline, which focuses on developing, validating and deploying various machine learning algorithms for industrial applications with sustainable performance. Modern sensor technologies connected with manufacturing machines and equipment can produce a whole new value for companies. In such an environment, the inevitable introduction of Industrial AI demonstrates the value from the increasing

convergence of sciences and technologies. Industrial AI can be characterized by its key elements: Analytics technology (A), Big data technology (B), Cloud or Cyber technology (C), Domain knowhow (D) and Evidence (E). Analytics is the core of AI, which can only bring value if other elements are present.

Awareness raising and technological learning and innovation is a pressing issue when it comes to frontier technologies. UNIDO global forum activities on 4IR contribute to the establishment of multi stakeholder knowledge-sharing platforms to create awareness on 4IR Technologies including IAI, as well as on the opportunities and challenges they present for pursuing inclusive and sustainable industrial and economic development. Numerous global and regional conferences, seminars and workshops have been organized over the last year on preparing for the 4IR, including on Industry 4.0 and Creative Economy: Promoting Inclusive Ecosystem in the Digital Era; Regional Conferences on unlocking Industry 4.0 for Asia and the Pacific, Africa and Eastern European countries; Industry 4.0 the future of industrial skills, Industry 4.0 and Clean Energy; Industry 4.0 in sustainable and smart cities; Industry 4.0 and industrial upgrading and modernization of value chains.

UNIDO technical cooperation projects aim at the establishment of demonstration and learning pilot factories and innovation centers, which act as knowledge and innovation hubs. In those demonstration and innovation centers, all technologies are put to their use and serve as tool for innovation by beneficiaries, often small and medium sized enterprises (SMEs). UNIDO cooperates with leading private sector technology providers and research institutions to identify the best solutions for introducing IAI systems in companies undergoing a digital transformation. An excellence center is currently being established in Belarus, under the auspices of the association of robotics and AI to use the natural synergies of these fields.

Other UNIDO technical cooperation projects aim at leveraging IAI for industrial modernization and upgrading focusing on specific industrial sectors such as automotive industry, heavy machinery, agrofood, textile and garment, electronics, and air space industry.

Developing countries with a diverse regional coverage remain the focus of the work in regards to ensuring smooth transformation to 4IR, and related technological fields. UNIDO projects are therefore being developed for countries in South East Asia, Africa, South America and Eastern Europe.

Further, in order to mainstream and enhance the effectiveness of UNIDO interventions, a comprehensive strategy for ensuring smooth transformation to 4IR and all its related technologies including Industrial AI is being introduced in the organization. UNIDO programmes enabling a smooth transformation to the 4IR for developing countries, especially the least developed countries (LDCs), focus on promoting smart agrofood, smart energy, smart manufacturing and smart circular economy; fostering technological learning and innovation among small and medium-size enterprises, youth and women; the development of science, industry and technology parks and areas of innovation; ensuring industrial safety and security and the timely adaptation of institutions (norms, standards, regulations) to rapid technology change.

Challenges for transformation to 4IR, and Industrial AI in particular, remain. The readiness of certain industrial sectors for uptake of 4IR technologies and IAI has to be established, and action plans ensuring smooth transformation to smart manufacturing need to be designed tailored to the specific industrial sector, country and regional context.

2. Description of Possible Project on AI

- **Project 1: Industry 4.0 project in India**

To build India's requisite capacity to longitudinally—with repeated evidence-based inputs over a long period—address Industry 4.0 challenges, the project proposes to create and operationalize the Industry 4.0 Observatory in New Delhi. During its incubation phase, the Observatory will be hosted in UNIDO and will coordinate with IITD-AIA FSM (Indian Institute of Technology Delhi-Automation Industry Association Foundation for Smart Manufacturing), as a part of UNIDO's learning-by-doing knowledge transfer approach that was successfully applied in other UNIDO projects in India.

Demonstration and visualization sessions on Industry 4.0 tools and concepts at IITD-AIA FSM Cyber Physical Lab and Cyber Physical Factory: The project would make use of the Common Engineering Facility Centre for Smart Technology Enabled Manufacturing (CEFC), which consists of the Cyber Physical Lab at the Hauz Khas campus, and the Cyber Physical Factory, Sonapat in Haryana, as a part of the partnership with IITD-AIA FSM.

- **Project 2: Industry 4.0 in the Philippines**

The project builds the blocks that allow for better understanding the requirements for the successful uptake of 4IR technologies (such as IAI) and business models in the Philippines' industrial sector context. To this end, the project assesses preparedness of the Philippines industry for uptake of 4IR technologies focusing on food, automotive, semi-conductor, electronics and aerospace industrial sector; develops roadmaps for industrial upgrading and modernization through the uptake of 4IR technologies in the selected industrial sectors; builds the industrial innovation ecosystem in food, automotive, semi-conductor, electronics and aerospace industrial sector; prepares feasibility study for pilot, demonstration and learning factory; establishes an academy and innovation center for small and medium-sized enterprises (SMEs) with focus on the above-mentioned priority industries, and produces and roll out an 4IR awareness and capacity building program for government officials and staff, industry associations and business development services providers.

- **Project 3: Belarus and Industry 4.0**

UNIDO develops a project on fostering uptake of 4IR smart industrial technologies and business models for industrial innovation and upgrading, through the establishment of regional demonstration, learning and innovation centers in three regions of the Republic of Belarus: Brest, Vitebsk and Mogilev.

The project will serve as model for replication and scaling up in other regions in Belarus as well as in other countries of the Eurasian Economic Union (EEU). The project will also serve as a platform for exchange of experience and technology transfer among the Eurasian Economic Union (EEU) countries, thus contributing to strengthening regional economic cooperation in the EEU.

- **Project 4: Building the capacity for the uptake of Industry 4.0 in Vietnam**

The Vietnamese government has set 4IR as a top national priority and it is increasingly seen as last opportunity to dodge the middle-income trap. An education strategy, that matches the skills of students with the needs of industry, underpinned by curricula development, promotion of science, technology, engineering and mathematics (STEM), and close linkages and partnerships among academia, meso-level institutions such as R&D centers, and industry actors, is required. Despite growing awareness among Vietnamese enterprises on the 4IR many businesses, particularly SMEs still underestimate 4IR and its impacts, as they overestimate their abilities to leapfrog into the new area and do not adequately acknowledge that the 4IR will change the face of industry.

- **Project 5: Industry 4.0 in Indonesia**

In the readiness for the future of production report (WEF and AT Kearney) Indonesia is thus classified as a country in the legacy category, with a currently strong production base, which is at risk in the future. In its strategy, the Government defined five priority sectors with high potential for the adoption of 4IR technologies, and which already are important drivers of the Indonesian economy, these include food and beverages, chemical, electronics, textile, automotive.

When it comes to empowering SMEs to transition to 4IR, they first need to understand what it is about and where they stand with regard to 4IR technology adoption, as well as the potential it entails. To assist SMEs with this daunting task, the Government of Indonesia has recently launched the Indonesia Industry 4.0 Readiness Index (INDI 4.0).

3. Challenges and Opportunities

- **Challenges** to the organization is the exponential progress of 4IR technological change. Keeping up with technological developments during the design and implementation phases of a project is a challenging task every time a new request is being submitted.
- **The opportunities** make those challenges worth the effort. Digital maturity and 4IR maturity and readiness in general, are well received where use cases are established and demonstrated. The follow up demand for continuous improvement on a technology and equipment level, are testimony to the topical work UNIDO provides.

4. Related Sustainable Development Goals (SDGs)

SDG 7, SDG 9, SDG 11, SDG 12, and SDG 16

5. Relevant links

- <https://www.unido.org/news/unido-and-indonesia-promote-industry-40-and-creative-economy>
- <https://www.unido.org/events/ensuring-industrial-safety-role-government-regulations-standards-and-new-technologies>
- <https://www.unido.org/news/unido-organized-lean-management-industry-40-conference-minsk>
- <https://www.unido.org/news/conference-industry-40-and-upgrading-belarus>
- <https://www.unido.org/bridge-for-cities>
- www.unido.org/bridge

Contact information

- Name: Olga Memedovic, Chief, Business Environment, Cluster and Innovation Division
- Email: o.memedovic@unido.org
- Phone: +43 1 26026 4676



United Nations Office for Disaster Risk Reduction

1. Description of Activities on AI

AI, machine learning, and deep learning technologies and their application offer enormous potential for the work of The United Nations Office for Disaster Risk Reduction (UNDRR) and Member States in implementing the Sendai Framework for Disaster Risk Reduction 2015-2030 and pursuing risk informed sustainable development

The application of AI will be an instrumental tool for the Global Risk Assessment Framework (GRAF). The GRAF aims to improve the understanding of future risk conditions to better manage uncertainties and guide risk-informed decision-making, innovation and finance by:

- fostering interdisciplinary systems-risk-thinking, at all scales, with a shared methodology, and
- enabling the identification of anomalies and precursor signals, as well as the interlinkages, relationships, correlations and dependencies across systems to build a shared understanding and enable decision-makers to act.

AI and machine learning is expected to be an enabling tool to identify some of these signals – explicitly, adopting and integrating AI into understanding risk and developing actionable risk information, risk management tools and scenarios. In so doing, the GRAF can build collective intelligence to steer societies towards risk-informed implementation of the 2030 Agenda, the Sendai Framework, the Paris Agreement and the New Urban Agenda.

Through engagement of stakeholders and ultimately citizens and communities, the GRAF will support the transition to systems based approaches to improve the solving of complex problems. By actively designing for AI, UNDRR can aim to accelerate the processing and computation of complexity to provide a much richer understanding of the options that are available ex-ante to decision-makers.

In applying AI – for example to process large volumes of data– people can be empowered identify possibilities and understand repercussions that might not otherwise be evident.

The GRAF creates a collaborative space in which risk modelling and assessment capabilities, impact analyses, risk knowledge and tools can be braided together. The GRAF seeks to:

- To provide decision makers with actionable insights and access to products, tools, demonstrations and scenarios at all scales (spatial and temporal) to better understand systems impacts and consequences to prevent risk creation, manage and reduce existing risk, including systemic risk, transition risks and emerging risks
- To support national governments to maximize synergies across the implementation and achievement of the targets and goals of the 2030 Agenda, the Paris Agreement, the New Urban Agenda and the Sendai Framework
- To increase trust in the multi-science foundation of risk assessments in an inclusive, open process, building on existing processes and data to the greatest extent possible
- To foster a culture of inclusive, collaborative, and proactive behaviour based on interdisciplinary systems thinking

- To mobilize finance and de-risk investments to enable risk-informed sustainable development

The combination of AI and human intelligence is providing the basis for the adoption of systems-based approaches that will influence behaviours, enable self-organization and emergent learning.

2. Related Sustainable Development Goals (SDGs)

Being a crosscutting issue, disaster risk reduction (DRR) is relevant for all SDGs. Specific DRR- related indicators are included in SDGs 1, 11 and 13

3. Relevant links

- www.unisdr.org
- www.preventionweb.net
- gar.undrr.org
- <https://www.preventionweb.net/disaster-risk/graf>



United Nations Institute for Training and Research

1. Description of Activities on AI

UNITAR has multiple activities of interest within the areas of artificial intelligence and satellite imagery analysis that will further progress to the Sustainable Development Goals (SDGs). Since 2000, UNITAR has developed its Operational Satellite Applications Programme (UNOSAT), which has focused on satellite imagery analysis in support of UN-related operations within the areas of disaster response, human rights, security, and development, and capacity development within these areas. This has allowed UNOSAT to develop decades of in-house expertise in satellite imagery analyses on issues vital to UN operations. Just as important, UNOSAT has for many years produced a robust collection of vector datasets with its analysis results that prove extremely useful as training data for AI and related development. Much of the success of UNOSAT computing activities result from excellent major collaborations with CERN Openlab (<https://openlab.cern/>) and UN Global Pulse, UNICEF Innovation, UNHCR Innovation, ITU, and other partners.

UNOSAT projects in development in these thematic areas include the development of specific algorithms as well as tool development for analyzing satellite imagery across the UN system. These different aspects are described in greater detail below.

- **Project 1: Algorithm development**

With decades of experience analyzing satellite imagery and mapping natural disasters, refugee settlements, conflict, and related issues UNOSAT has emerged as a primary partner for organizations wishing to explore AI for humanitarian applications. In addition, large amounts of UNOSAT analyses are publicly available in vector format both from its website and the [Humanitarian Data Exchange](#), and this has proven valuable for organizations seeking training data for AI development. In turn, multiple such organizations have reached out to UNOSAT for guidance on imagery analysis, allowing UNOSAT to learn a great deal about the state of the field. This partnership model has been very effective in particular with UN Global Pulse and the two organizations have collaborated extensively to develop algorithms that can identify and map refugee shelters in satellite imagery. Importantly, UNOSAT and Pulse have paid particular attention to the accuracy of outputs of these algorithms given the high-threshold of accuracy UNOSAT requires for its operations. This process and results were detailed in a [2018 academic paper by Pulse and UNOSAT](#). Currently, UNOSAT is also pursuing algorithm development for flood detection in satellite imagery, as well as change detections which would help enable various analyses such as landslide detection and damage assessments. Finally, UNOSAT together with CERN and European Space Agency will engage in a challenge over the next several months to extract building footprints from satellite imagery.

- **Project 2: Tool development**

Concurrently with algorithm development UNOSAT and Pulse are working to develop a cloud-based infrastructure for processing and analyzing satellite imagery using AI models. This tool is in an 'early beta' phase and has been shared with a few UN partners for testing. UNOSAT is providing feedback on usability from the perspective of an 'expert GIS' user. Eventually this tool is intended to provide access to large amounts of satellite imagery as well as AI-based analysis methods for the UN community to use without requiring any specialized hardware or software themselves.

2. Description of Possible Projects on AI

UNOSAT has a large 'toolkit' of analytical methods that it has developed and used over its history, and eventually almost all of these analysis methods could be candidate for AI model development. Additionally, UNOSAT would prefer to pursue the wider issue of tracking algorithm development and applications to the SDGs as discussed in the 2019 AI for Good summit.

3. Challenges and Opportunities

UNOSAT together with its partners has made quite impressive progress on developing AI methods for satellite imagery analysis, but additional funding is needed in order to scale up the efforts, which would likely achieve amazing results. The before mentioned training data coupled with in-house expertise and understanding of requirements are the basis for excellent opportunities in advancing AI for satellite imagery analysis.

4. Related Sustainable Development Goals (SDGs)

Earth observation and satellite imagery analysis activities at UNOSAT relate to SDGs 1, 2, 3, 4, 6, 8, 9, 10, 11, 12, 13, 15, 16, and 17.

5. Relevant links

A paper published jointly by UNOSAT and UN Global Pulse is here: <https://royalsocietypublishing.org/doi/10.1098/rsta.2017.0363>

Contact information

- Name: Dr. Einar Bjorgo, Director, Division for Satellite Analysis and Applied Research Manager
- Email: einar.bjorgo@unitar.org
- Phone: +41 76 691 0106



United Nations Office for Disarmament Affairs

1. Description of Activities on AI

The Office for Disarmament Affairs (ODA) has supported 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), since its first formal meeting in 2017 following the establishment by the Fifth Review Conference of High Contracting Parties to the CCW (2016). At the conclusion of its 2018 session, the Group was able to agree on ten possible guiding principles related to LAWS. These ten principles covered, inter alia, the applicability of international humanitarian law, the retention of human responsibility and the applicability of international law in the development or acquisition of new weapons systems based on emerging technologies in the areas of LAWS. In 2019, the Group met for seven days from 25-29 March and 20-21 August.

In February 2018, the Member States of the Conference on Disarmament established five subsidiary bodies, including on emerging and other issues relevant to the substantive work of the Conference, which discussed – inter alia – the on weaponization of artificial intelligence and cyber security.

In the context of the Biological Weapons Convention Meeting of Experts (2018 and 2019) discussions have taken place on how advances in machine learning and artificial intelligence might impact on the development, production and use of biological weapons.

As requested by United Nations General Assembly resolutions 72/28 and 73/32, the United Nations Secretary-General reported to the 73rd and 74th sessions 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 (A/73/177 and A/74/122)).

On 24 May 2018, the Secretary-General released his agenda for disarmament, *Securing Our Common Future*. A priority is “Disarmament for Future Generations”, which seeks to address the possible challenges new weapon technologies pose to existing legal, humanitarian and ethical norms; non-proliferation; international stability; and peace and security. This includes the implications of the increasing autonomy of weapons and the potential weaponization of AI. Throughout 2018, ODA has worked to implement the Agenda’s AI-related action point: “The Secretary-General will support the efforts of Member States to elaborate new measures, including through political or legally binding arrangements, to ensure that humans remain at all times in control over the use of force.”

In August 2018, the Office for Disarmament Affairs, together with the UN Office in Geneva, organized an informal dialogue between the Conference of Disarmament and civil society: *A Civil Society Forum* was initiated in 2016. The 2018 edition focused on new technologies, with a focus on artificial intelligence, and their impact on international security issues.

In November 2018 ODA co-organized an event with Switzerland and Article 36 on “Remaining Vigilant. The UN SGs Report on science and technology: Avenues for engagement”.

In May of 2019, ODA contributed a chapter to a publication by the Stockholm International Peace Research Institute on “The Impact of Artificial Intelligence on Strategic Stability and Nuclear Risk”.

In August 2019, ODA, together with partners from the Stanley Foundation and the Stimson Center, held a “multistakeholder” closed, informal workshop for States, and the private and research sectors, on the peace and security implications of artificial intelligence.

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 the weaponization of artificial intelligence.

Together with the UN Library, Geneva, ODA is developing a disarmament research guide on science and emerging technologies to inform diplomats and the public about relevant resources available concerning technology and arms control, including artificial intelligence.

2. Related Sustainable Development Goals (SDGs)

SDG16. Peace, justice and strong institutions

3. Relevant links

- [https://www.unog.ch/80256EE600585943/\(httpPages\)/8FA3C2562A60FF81C1257CE600393DF6?OpenDocument](https://www.unog.ch/80256EE600585943/(httpPages)/8FA3C2562A60FF81C1257CE600393DF6?OpenDocument)
- <https://undocs.org/en/CCW/GGE.1/2018/3>
- <https://undocs.org/A/73/177>
- <https://undocs.org/A/74/122>
- <https://www.un.org/disarmament/sg-agenda/>
- <https://www.un.org/sg/en/content/sg/statement/2018-03-23/secretary-general%E2%80%99s-remarks-turtle-bay-security-roundtable-managing>
- <https://s3.amazonaws.com/unoda-web/wp-content/uploads/2019/03/hr-address-high-level-panel-berlin-conference-rethinking-arms-control-15-03-2019-final.pdf>
- <https://s3.amazonaws.com/unoda-web/wp-content/uploads/2019/03/Keynote-speech-by-the-High-Representative-for-Disarmament-Affairs-Ms.-Izumi-Nakamitsu-at-high-level-event-on-frontier-technologies-for-accelerating-Sustainable-Development.pdf>
- <https://s3.amazonaws.com/unoda-web/wp-content/uploads/2019/01/HR-address-IIT-Jan-20194.pdf>
- [https://www.unog.ch/80256EE600585943/\(httpPages\)/BF18ABFEFE5D344DC1256F3100311CE9?OpenDocument](https://www.unog.ch/80256EE600585943/(httpPages)/BF18ABFEFE5D344DC1256F3100311CE9?OpenDocument)
- <https://www.sipri.org/sites/default/files/2019-05/sipri1905-ai-strategic-stability-nuclear-risk.pdf>

Contact information

- Name: Anja Kaspersen (Geneva); Chris King (New York)
- Email: anja.kaspersen@un.org; King6@un.org
- Phone: +41 22 927 3440; +1 212 963 5537



UNOV
United Nations Office at Vienna



UNODC
United Nations Office on Drugs and Crime

United Nations Office at Vienna / United Nations Office on Drugs and Crime

1. Description of Activities on AI

We are currently in the mapping and planning phases, preparing for implementation so we do not have any activities to report at this time.

2. Description of Possible Projects on AI

- Use of AI to undertake trend analysis to assess the flow of illicit activities and facilitate programmatic decision-making and enhance technical support.
- Exploration of the use of new technologies to automate processes and increase efficiency, cost effectiveness, and ultimately further augment organization's positive impact.

4. Challenges and Opportunities

- Two main challenges for UNOV/UNODC in terms of activities on artificial intelligence include availability of allocated staff and dedicated financial resources to support and scale initiatives.
- Opportunities: UNOV/UNODC is a global leader in the fight against illicit drugs, organized crime and terrorism and directly assists Member States in these areas.

5. Related Sustainable Development Goals (SDGs)

SDG 16. Peace, Justice and Strong Institutions, SDG 3. Good Health and Well-Being, SDG 5. Gender Equality, and SDG 11. Sustainable Cities and Communities

Contact information

- Name: Peter Erhart, Senior Programme Coordinator
- Email: erhart@un.org
- Phone: +43 1 26060 4393



UNITED NATIONS Office for Outer Space Affairs

United Nations Office for Outer Space Affairs

1. Description of Activities on AI

Acknowledging the high value products generated by Artificial Intelligence when applied to large quantities of data, such as the ones generated by medium to very high-resolution sensors on board space probes, including commercial satellites, and their relevance to monitor and fulfil the Sustainable Development Goals (SDGs). UNOOSA is working with space agencies and the private space sector to facilitate access to such products to States and associated end-users. Along this line, UNOOSA has signed a MoU with the European Space Agency on data exchange for what concern products that could support the monitoring and achievement of the SDGs targets. This is part of a broader effort to bring space-related services and products closer to the end-users, including States and United Nations entities, and raise awareness about the opportunities offered by space technologies to meet the global agendas. UNOOSA continues working in partnership with governmental and commercial entities to generate best practices on the use of their data, providing end-users the information of what can be achieved with specific products. The amount of data available from space missions (including Earth Observation Satellites) is in the order of Petabytes and is constantly increasing. This vast amount of data can only be analyzed comprehensively through automation, ML and AI tools, which could revert back to society in other domains. UNOOSA is vigilant on the applications and potential new uses of these spin-offs for sustainable development and besides using such technology to augment our ongoing capacity building activities also plays an advisory role to the wider UN system through UNOOSA membership of the Reference Group to the Secretary General's New Technologies Strategy.

UNOOSA continues working on the Space Based Information Platform for Disaster Management and Emergency Response (UN-SPIDER) programme (www.un-spider.org) which year after year is conducting hands-on capacity building to enhance awareness and ability to access, analyse and use big data and automated tools in disaster management and for disaster risk reduction and policy implementation in more than 40 vulnerable countries, following up on earlier fact-finding technical advisory missions at the invitation of those countries.

Under the auspices of UNOOSA and presented in the Committee on the Peaceful Uses of Outer Space in 2016, the Open Universe Initiative aims at resurfacing space science data and becoming the one-stop-shop for space science data and processing tools. The Open Universe infrastructure is based in a distributed infrastructure composed of Open Universe Nodes which provide either storage, processing or are contributing data to the initiative. The Initiative uses docker containers to ease the access to the necessary processing chains for the data, encapsulating them and rendering them user-friendly. Therefore, lowering the barriers to exploit this type of data and increasing their exposure, supporting SDG4 "Quality education" and SDG 9 "Industry, Infrastructure and Innovation".

2. Description of Possible Projects on AI

UNOOSA is working with our partners from the space sector to explore the development integrated AI and Space Data products that can be tailored to the specific decision making and policy needs of the requesting entity. These projects are at the early stages of development with a pilot project being established with UNHRD.

3. Challenges and Opportunities

- **Challenge:** Data fragmentation- It is difficult to find relevant data sources due to fragmentation and format (e.g. SDG database is provided in CSV format or RData), while other databases provide an API, while other databases do not provide export functionalities.
- **Opportunity:** Availability of earth observation data and data on space-related services and technologies through UNOOSA

4. Related Sustainable Development Goals (SDGs)

SDG1. No poverty, SDG2. Zero hunger, SDG 3. Good health and well-being, SDG 4. Quality education, SDG 9. Industry, innovation and infrastructure, and SDG 17. Partnership for the goals

5. Relevant links

- www.un-spider.org
- www.openuniverse.asi.it
- www.unoosa.org/oosa/en/oosadoc/data/documents/2016/aac.1052016crp/aac.1052016crp.6_0.html
- www.unoosa.org/oosa/en/oosadoc/data/documents/2018/aac.105/aac.1051175_0.html

Contact information

- Name: Jorge Del Rio Vera, Scientific Affairs Officer; Ian Freeman, Associate Programme Officer
- Email: Jorge.delrioвера@un.org; ian.freeman@un.org
- Phone: +43 26 060 4948; +43 26 060 8789



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 detail [here](#))

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

Challenge: Great interest in the topic, but difficult to convert into solid funding for holistic and critical research enquiries.

Contact Information

- Name: Paul Ladd, Director
- Email: paul.ladd@un.org
- Phone: + 41 (0)22 917 2949



United Nations University

1. Description of Activities on AI

Research and Foresight Analysis on AI Convergence (Related to SDG16)

In a landmark [report](#) of May 2019, the United Nations University's Centre for Policy Research (CPR) proposed an approach for understanding AI and technological converging risks, using scenario-based foresight to evaluate the implications for future conflicts, also exploring possible policy responses by a range of actors. This work builds on CPR's Platform on AI and Global Governance which has begun to build a stronger connection between the private sector and the UN around key themes of AI convergence.

The New Geopolitics of Converging Risks: The UN and Prevention in the Era of AI

Synopsis: We are entering an era of hybrid opportunities and threats generated by the combination of artificial intelligence (AI) and other powerful dual-use technologies, with implications for nearly every aspect of daily lives. The convergence of AI and affective computing, cyber and biotechnologies, robotics and additive manufacturing raises complex global implications that are poorly understood, leaving the multilateral system with limited tools to anticipate and prevent emerging risks. At the same time, the spread of AI convergence across a wide range of States, non-State and transnational actors and entities means that the challenges of tomorrow must be addressed collectively and innovatively.

How can the multilateral system better understand and anticipate risks as AI convergence with dual-use technologies intrudes increasingly into the political, social, economic, and security spheres, creating new potential for systemic vulnerabilities and distributive inequalities? How can actors within the multilateral system build better anticipation and prevention capacities in the face of these risks?

This report is the first step in developing a common understanding of the emerging impacts of AI convergence on the United Nations' prevention agenda. It provides: an analysis of current trends in AI convergence; scenarios that examine emerging opportunities and risks; principles to guide how innovation should be deployed responsibly by actors in the multilateral system; and a recommendation for a foresight capacity housed within the UN and shared across key communities.

The author, Eleonore Pauwels, proposes a path for the UN to build, guide and lead a Global Foresight Observatory for AI Convergence. The Observatory would be a constellation of key public and private sector stakeholders convened by a strategic foresight team within the UN to implement a shared foresight methodology. The Observatory would equip the UN to articulate tailored and robust scenarios from which innovative strategies can emerge; map and involve key stakeholders that reflect the unique ways in which technologies are converging; and develop coherent and responsible approaches to leverage innovation and technology for prevention. (<https://i.unu.edu/media/cpr.unu.edu/attachment/3472/PauwelsAIgeopolitics.pdf>)

Contact information

- Name: Eleonore Pauwels, Research Fellow on Emerging Cybertechnologies
- Email: pauwels@unu.edu; Phone: +1 202 330 1181



United Nations Women

1. Description of Activities on AI

Artificial intelligence is shaping gender relations across the world much more than we think. Without the meaningful inclusion of women at all stages of the development and implementation of AI and machine learning systems, we will fail to bridge the digital gender divide and make gender equality a reality.

- The design of AI systems involves human inputs at various stages, which if left unchecked are all opening the door to reinforcing the risk of bias and unintended discrimination for women. Gender bias can be found:
 - in the definition of the “solution” to be identified
 - in the data, especially when relying on datasets that reflect existing prejudices
 - in preparing the data, which involves selecting which attributes you want the algorithm to consider.
- The AI world today is almost entirely dominated by men. A recent WEF study revealed that only 22% of AI professionals in the world are women, and the numbers for GAFAs (Google, Apple, Facebook, Amazon) are even lower at around 10%. In this field, women are more likely to hold positions of data analyst, researcher or teacher while men are better represented in positions of higher hierarchical level and generally more lucrative roles, such as head of product development, chief AI officer or business owner.

UN Women is actively working on these issues and in September 2018 launched the Gender Innovation Principles to set standards for a gender-responsive approach to innovation. These principles aim to guide private sector, academic and non-profit institutions to go beyond acknowledging the need for gender equality in innovation and acting throughout the innovation cycle to ensure that women play a key role at every stage. Signatories are encouraged to share tools used to make sure women’s and men’s concerns and experience are equally integrated in the design of AI and machine learning systems and that due consideration is given to gender norms. The principles recommend to:

- 1) *Make a high-level corporate commitment to adopt a gender-responsive approach to innovation*
- 2) *Design innovations that include women as end users*
- 3) *Adapt implementation approaches to ensure innovations meet the needs of women*
- 4) *Evaluate gender-responsive impacts by using a data-driven approach*
- 5) *Scale innovations that provide sustainable solutions to meet the needs of women and girls*

Digital finance is one specific area where UN Women strongly advocates to raise awareness on the risks of gender bias and discrimination associated with the use of AI. The use of AI and Big Data is pervasive in the development and delivery of digital financial services, with banks expected to spend \$5.6 billion on AI solutions in 2019. UN Women Executive Director is one of the 16 members of the UN Secretary-General Task Force on Digital Financing of the Sustainable Development Goals and is committed to supporting the Task Force to further explore how the digitization of finance impacts gender.

In September 2019, a policy paper will be launched by UN Women, identifying recommendations to mitigate the risk associated with AI and digital finance. This includes advocating for societal values to be reflected in algorithms and AI technologies and making sure that companies and people using algorithms can be held accountable and that their decisions are transparent. It also includes recommending companies to audit their algorithms to prevent the development of biased services based on datasets where a group of individuals appears more frequently or using biased criteria for selecting attributes. These audits would identify programmes that have train themselves to optimize the services for a specific group only, due to bias datasets. Without these audits, new services and products could not only be failing women, they would be failing to capture the complexity of gender and to offer fair services to other underserved populations.

2. Related Sustainable Development Goals (SDGs)

SDG5. Gender Equality, SDG9. Industry, Innovation and Infrastructure, and SDG17. Partnerships to achieve the goal

3. Relevant links

- <https://digitalfinancingtaskforce.org/>
- <https://www.giccprinciples.org/the-principles>

Contact Information

- Name: Helene Molinier, Rector of Innovation Facility, Senior Policy Advisor on Innovation
- Email: helene.molinier@unwomen.org
- Phone: +1 646 781 4467



United Nations World Tourism Organization

1. Description of Activities on AI

- **Project: Global Startup Competition**

Opportunity to select top startups that use AI as a way to predict and analyze tourist behavior (Status: In process. We will launch the II initiative within the framework of the GA, Partners: Globalia, Google, Telefónica, MasterCard, Amazon, IE University, Amadeus, Geographical Coverage: Global, Countries of Implementation: 160, Links: www.tourismstartup.org)

2. Related Sustainable Development Goals (SDGs)

SDG on private partnerships and innovation

Contact Information

- Name: Natalia Bayona, Senior Expert on Innovation and Digital Transformation
- Email: nbayona@unwto.org



World Food Programme

1. Description of Activities on AI

The WFP Innovation Accelerator is currently supporting several projects that use Artificial Intelligence (AI) and Machine Learning (ML) at the core of their product, including:

- a. **Skai (formerly known as RUDA)** – Artificial Intelligence and Aerial Imagery platform for Rapid Data Analysis in Emergencies. In this project, we use state-of-the-art Deep Learning techniques and processing units to dramatically speed up the process of understanding what has happened, what to expect on the ground, and what kind of support is needed after a disaster strike. Project website
- b. **MEZA** – WFP nutrition project that uses AI to digitize paper-based health records in low-resource health clinics in order to track progress of nutrition programs and tailor them to a specific location using insights extracted from the collected data.
- c. **Crop detection** – Uses satellite imagery and ML for country-wide assessment of the crops in high crop diversity settings. The project is developed by WFP’s Vulnerability Analysis and Mapping unit (VAM) in collaboration with European Space Agency (ESA) and Mozambique’s Ministry of Agriculture.

2. Description of Possible Projects on AI

- **Project 1: AI and ethics**

The influence of AI is growing substantially in the context of humanitarian crises. In the field of humanitarian assistance, AI is used – among others – in such diverse fields as forecasting and detecting upcoming disasters, targeting of aid, analyzing damaged and destroyed infrastructure, determining children’s nutrition status, and scaling NGOs’ efforts to communicate and understand displaced peoples’ needs through chatbots. However, the employment of these new technologies not only results in the desired effects, but it also comes along with numerous challenges and negative externalities as well as dilemma situations.

This project aims to build a framework for AI governance in humanitarian aid answering such questions as: “How can AI based humanitarian risk assessments fuel armed conflict? How can we ensure that data that is collected from beneficiaries is not misused for political purposes?”

- **Project 2: Retail product recognition**

WFP is currently exploring a taxonomy for food items via a machine learning platform that would help recognise which foods and products are being bought by families receiving cash-transfers. This would also help build more extensive analytics and compare different retailers’ prices.

3. Challenges and Opportunities

- **Challenges:** Amid conflict and natural disasters, it will take bold ideas to end hunger by 2030. To identify these, and nurture them into global solutions, WFP’s Innovation Accelerator was created. 48 projects have been supported to date. Eight of these are being scaled up globally and could help more than a million of the world’s most vulnerable people by year-end.
- **Opportunities:** Artificial intelligence, along with mobile technology, new nutrition and farming approaches, blockchain, and innovative business models have the potential to strengthen food

systems, shorten humanitarian response times, deliver assistance more efficiently, and make funds stretch further.

4. Related Sustainable Development Goals (SDGs)

SDG2. Zero hunger and SDG17. Partnerships for the goals

5. Relevant links

- Innovation Accelerator website: <https://innovation.wfp.org/>
- Innovation Accelerator- 2018 Year in Review: <https://sway.office.com/ozuWibTKDPtKTnlo>

Contact information

- Name: Bernhard Kowatsch, Head of Innovation Accelerator
- Email: bernhard.kowatsch@wfp.org
- Phone: +49 151 5356 1915



**World Health
Organization**

World Health Organization

1. Description of Activities on AI

Following the WHO Resolution WHA 71.1 on Digital Health, WHO has created a new department of Digital health to harness the power and steer digital health and is developing a Global Strategy on Digital Health including the work on progressing the governance, capacity building and collaboration for digital health including AI for health.

In March 2019, WHO and ITU jointly published a brief commentary on the “WHO and ITU establish benchmarking process for artificial intelligence in health” in the premier medical journal, *The Lancet*. The commentary provides a description of the ongoing work on the Focus Group on Artificial Intelligence for Health (FG-AI4H) that was established in July 2018.

In May 2019, WHO co-facilitated the health track of the AI for Good summit and continues to operationalize the AI for health focus group activities.

Under the AI for health workstream, WHO is setting up an expert group on Ethics of AI for health and is in the process of setting up an expert group on creating framework on Regulations of AI for health and has also setup a high level Technical Advisory Group on Digital Health to advise on Digital health potential including frontier technology such as AI and others.

Earlier in 2019, the Central Tuberculosis Division of the Ministry of Health and Family Welfare of Government of India has signed a Memorandum of Understanding (MoU) with an Artificial Intelligence entity to explore the application AI in early detection and management of TB cases. The Revised National TB Control Programme is adopting innovative approaches such as AI that provides a unique opportunity for the health sector, bringing efficiency, saving resources and bringing accuracy in interpretation and enhancing quality of service delivery. The Government of India is committed to ending TB by 2025, five years ahead of the Global Sustainable Development targets. WHO is working closely with the Ministry of Health and Family Welfare of Government of India to provide technical support for artificial intelligence initiatives under this effort.

In April 2019, WHO provided technical support to facilitate the “2019 Artificial Intelligence for Health Summit,” held in Shanghai Expo Center. This summit was an example of public-private partnership in AI and Healthcare. It was sponsored by the WHO, ITU and supported by the Ministry of Industry and Information Technology, the National Health Commission, the National Medical Products Administration, and Shanghai Municipal Government, hosted by China Academy of Information and Communications Technology (CAICT), International Health Exchange and Cooperation Center of National Health Commission of China (IHECC of NHC), Shanghai Municipal Commission of Economy and Informational (SHEITC), Shanghai Shenkang Hospital Development Center (SSHDC), China Association for Medical Devices Industry (CAMDI), co-organized by Internet Medical Health Industry Alliance (Research center on health bigdata and network innovation), East China Branch of CAICT, China Biotechnology Industry Alliance, IMT-2020 (5G) promotion group, Alliance of Industrial Internet, Shanghai Precision Medical School of International Studies, Android Green Alliance, IDCNOVA, mhealthchina.org and Shanghai Bofang Medical Health Care co., Ltd. The Summit was attended by researchers, engineers, practitioners, entrepreneurs and policy makers to discuss industrial development of AI for health.

2. Description of Possible Projects on AI

Partnering with WHO's newly established Digital Health department to harness the power and steer digital health to contribute to the attainment of all people to the highest level of health through the GPW13 triple billion goals and SDG3.

3. Challenges and Opportunities

No challenges. WHO (globally) has widely recognized the value of AI in healthcare and is making efforts provide training to mid-career professionals in expanding their understanding on appropriate ethical use of AI in healthcare.

4. Related Sustainable Development Goals (SDGs)

SDG3. Good health and well-being

Contact information

- Name: Bernardo Mariano, CEO and Director of Digital Health; Ramesh Krishnamurthy, Senior Advisor; Sameer Pujari, Manager
- Email: bmariano@who.int; krishnamurthyr@who.int; pujaris@who.int
- Phone: +41 22 791 1405; +41 22 791 3314



World Intellectual Property Organization

1. Description of Activities on AI

WIPO has developed several AI tools. These include a machine translation tool (WIPO Translate), a trademark image similarity search tool in the Global Brand Database, and an automatic patent classification tool (IPCCAT). These are available for use on the WIPO web site and shared with national patent offices. WIPO Translate has been provided to several UN organizations and a few other intergovernmental organizations with customization based on domain information. WIPO continues to investigate the development of new AI tools.

In view of the dynamically changing and complex nature of AI technologies, WIPO published the WIPO Technology Trends (WITT) on AI in January 2019. The WITT showed that there is a large demand for intellectual property (IP) rights in AI technologies. It presents the analysis of more than 340,000 AI-related patent applications and 1.6 million scientific papers published since the 1950s. The WITT also contains comments and suggestions made by 27 world leaders in the field. The publication and more information are available at www.wipo.int/tech_trends/en/artificial_intelligence/.

As the result of the discussions held between WIPO and Member States at the meeting of IP offices in 2018, several projects have been started by relevant bodies in WIPO, such as the Committee on WIPO Standards and the Standing Committee on the Law of Patents.

WIPO will continue the conversation about IP and AI amongst Member States in September 2019. The objective of the WIPO Conversation on IP and AI is to provide Member States with an opportunity to exchange views on various topics regarding AI and to formulate questions with respect to the possible impact of AI on the IP system. A background document can be found on the website at www.wipo.int/meetings/en/details.jsp?meeting_id=51767.

2. Related Sustainable Development Goals (SDGs)

SDG9. Industry, innovation and infrastructure and SDG17. Partnerships for the goals

3. Relevant links

WIPO has a web site dedicated to AI related studies and tools at www.wipo.int/about-ip/en/artificial_intelligence/.

Contact information

- Name: Dalila Hamou, Director, External Relations Division; Victor Owade, Assistant External Relations Officer; Alica Daly, Associate Policy Officer on Artificial Intelligence and Data; Bruno Pouliquen, Head of Advanced Technologies Application Center
- Email: Dalila.hamou@wipo.int; victor.owade@wipo.int; alica.daly@wipo.int; [Bruno.Pouliquen@wipo.int](mailto: Bruno.Pouliquen@wipo.int)



WORLD
METEOROLOGICAL
ORGANIZATION

World Meteorological Organization

1. Description of Activities on AI

Progress in environmental monitoring and numerical weather and climate prediction has been intimately connected with the progress in supercomputing. Over the last several decades, advances in computing power have enabled us to increase the skill and detail of our forecasts through increasing spatial resolution, enhancing realism by adding more detailed representations of physical processes, coupling with more Earth-system components and investing in ensemble techniques to characterize the uncertainty of both initial conditions and forecasts (Bauer et al. 2015).

The need and urgency of a concerted effort between weather and climate science and computational science requires a visible representation of this topic in UN's strategic thinking. The core of this effort would be to develop and share methodologies and technologies for the cost-effective production of forecasts and the collection/dissemination of large data volumes with increasingly complex high-resolution prediction systems across all scales.

Detailed recommendations for a revised strategy include:

- Establish scientific methodologies exploring enhanced parallelism and reduced data movement when employing extreme-scale HPC infrastructures.
- Support standardisation of portable code structures and programming models ensuring efficiency and code readability, and exploiting the future range of processor and system-level technologies; including metrics for code testing, performance analysis and benchmarking.
- Design portable data handling frameworks for observational data pre-processing and model output post-processing as well as product dissemination.
- Support open and distributed, cloud-based computing and data management infrastructures dealing with all steps in the forecast production workflow, including easy access, information discovery and visualization for end-users.
- Support adaptation of artificial intelligence methods (e.g. deep learning) to facilitate increasingly diverse observational data processing, user-dependent information extraction from increasingly complex model output data, and development of surrogate model components reducing computational cost.
- Establish capacity building and training at the interface between applied science and computational science to facilitate uptake of new technologies and methodologies by the community.
- Engage in public-private partnerships for methodological developments around the exploitation of big data volumes and novel observations for the benefit of public services.

Almost all application areas in the weather and climate prediction community will benefit from this strategy as the new computing and data handling capabilities will enable new scientific discovery, cost-effective operation, and enhanced knowledge transfer from experts to the wide user base.

(Status: Full project under development. Some elements advanced, Partner: WMO Members, Geographical Coverage: Global, Links <https://public.wmo.int/en/programmes/world-weather-research-programme>)

2. Description of Possible Projects on AI

The re-emergence of artificial intelligence methods sponsored by large-scale commercial applications has created opportunities for contributing to the much-needed efficiency gains. Big companies like IBM and Microsoft (supporting AccuWeather) advertise their ambition to deliver highly specialized solutions for customers ingesting the available output from operational national and international centers in addition to their own forecasting products. This has become feasible because of purpose-built processors assembled at large scale and deep learning software allowing to grind through vast amounts of data from both models and observations for extracting meteorological features to be forecast.

The replacement of physics based prediction systems by deep learning all together seems unlikely as the number of degrees of freedom and the non-linearity of the Earth-system would require very complex neural networks that will be very difficult to train and potentially inefficient to run on computers (Düben and Bauer 2018).

3. Challenges and Opportunities

Due to the complexity of the challenge, research needs to collaborate closely with the computing technology industry, and weather and climate science needs to collaborate closely with impact sectors like water, energy, food and agriculture and risk management sectors.

The use of AI poses the risk that the capability gap between more and less developed countries will widen, as developing countries require a unique level of expertise, co-design between research and industry, and significant technological support for both software and hardware. International collaboration, fostered by organizations like WMO, will be crucial support knowledge transfer between different areas of expertise, and across countries and continents.

Part of the challenge for neural networks when targeting globally valid forecasts across medium, seasonal and climate scales will be to produce physically consistent forecasts, maintaining both closed budgets and conservation of fluxes. Dealing with biases and errors in training data adds significantly to that challenge.

However, the use of such techniques for observational data pre-processing and model output post-processing can help to better distribute the data handling workload along the workflow, to extract useful information more effectively from large data volumes, and to reduce the computational burden of selected prediction model components by replacing them with surrogate neural networks for example. These applications are areas of active research at present but have already been recognized in the past (e.g. Lee et al. 2018, Hsieh and Tang 1998).

4. Related Sustainable Development Goals (SDGs)

SDGs 9, 11, 13, and 17

5. Relevant links

- <https://public.wmo.int/en/programmes/world-weather-research-programme>
- <https://public.wmo.int/en/programmes/global-atmosphere-watch-programme>
- <https://public.wmo.int/en/programmes/world-climate-research-programme>

Contact information

- Name: Paolo Ruti, Chief, World Weather Research Division
- Email: pruti@wmo.int
- Phone: +41 (0)22 730 8071



World Bank Group

1. Description of Activities on AI

a. Creating Global Public Goods

Artemis Pilots – Famine Action Mechanisms. The Famine Early Action Mechanism, a joint WBG-UN initiative, engaged in partnerships with global technology firms such as Amazon, Google, and Microsoft, as well as such data providers and technology experts to, support the development of AI/Machine Learning driven models predicting probabilities of food crisis. A real time prediction for Somalia is in test phase.

Participate in developing EU Ethical Guidelines for Trustworthy AI, by the Independent High-Level Expert Group on AI.

b. Developing Knowledge and Policies

Enabling better “poverty mapping”- Development Analytics & Tools (DECAT), using strong data science capabilities and data to create data fusion and machine learning products for robust, high resolution measures to train/validate algorithms to deliver new value propositions that make all data work better for development. DECAT uses modern privacy-preserving methods, standards and ethical practices for responsible use the data (e.g. synthetic anonymized training data for machine learning).

Developing a policy-making guide for developing countries examining new policy and regulatory pathways for harnessing AI to meet human and economic development objectives in developing and less developed countries by (1) analyzing emerging practices in the AI policymaking landscape globally, including developing countries, (2) identifying upsides for development as well as downside risks (inequality, threats to employment, privacy, security, agency, inclusion and human dignity), and (3) synthesizing these inputs into an actionable enabling policy making framework.

c. Piloting Disruptive Technologies in World Bank operations

The World Bank Group’s Technology & Innovation Lab works with internal operational teams across various sectors by applying technology to solve business challenges, for example, to prototype and create proofs of value (PoVs) in the operational context using a range of emerging technologies (e.g., machine learning, neural networks, natural language processing (NLP), assistive technologies (bots), BI, data modelling/analytics, data science, and advanced data management).

These include: (1) procurement- using AI to create efficiencies in the work of procurement specialists via a prototype that will allow them to scan documents and data sets to monitor fund usage and compliance; (2) data mining- “mine” 15+ years of emerging market data in IFC’s Environmental, Social & Governance (ESG) unit to reduce risk and create performance benchmarks to attract investors to emerging markets; and (3) jobs- a job matching platform to benefit both employers and disadvantaged youth in South Africa as a pilot. Other interventions include NLP for Audit Reporting in the WBG’s Governance unit, and the use of Chatbots/cognitive assistants for staff searching for information within the institution.

d. The Disruptive Technology for Development (DT4D) Trust Fund is real-testing AI approaches to tackle operational development challenges in WBG projects where traditional solutions have not

worked. Current tests include AI solutions applied to DRM preparedness, Infrastructure maintenance, forecasting of crisis and micro education solutions. When successful, these test AI test cases will be applied across the WBG portfolio.

2. Description of Possible Projects on AI

- Education- Use AI for Learning through Games
- Solar Energy- Use of AI to gather data from IoT devices from solar grids to predict and lower the cost per kWh
- Due Diligence- Predicting accounting Red-Flags from external financial reports
- Livestock Tracking- Use of IoT and AI to track livestock in an ethical way to ensure sustainability

3. Challenges and Opportunities

• Challenges include:

- Provability- Decision making through algorithmic models must involve human judgement and thus responsibility.
- Data Privacy & Security- The reliance on data prompts the WBG to engage externally and obliges internally strict guidelines on data privacy, in addition to adhering to global standards of data privacy such as EU's GDPR
- Data Scarcity- lack of standardized datasets and thus volume requires data scientist to use new methodologies to attain enough data, these include: Supervised learning, Active Learning, and Transfer Learning methodologies
- Algorithm Bias: Biased datasets generate biased outputs. Human interaction to minimize outliers in datasets can minimize their influence, however can be time consuming.

• Opportunities:

Teams are steadfast to understand and test theories of AI where lessons can be learned and shared with experts around the world. In addition to experimenting, the World Bank will also engage with policy makers around the world towards a future with AI at the forefront of achieving SDGs.

4. Related Sustainable Development Goals (SDGs)

SDG1. No poverty, SDG2. Zero hunger, SDG3. Good health and well-being, 9 Industry, innovation & infrastructure, SDG10. Reduced inequality, SDG11. Sustainable cities & communities, SDG13. Climate action, and SDG16. Rule of law

5. Relevant links

<https://www.devcommittee.org/sites/www.devcommittee.org/files/download/Documents/2019-04/DC2019-0002-Mainstreaming%20disruptive%20%204-13.pdf>

Contact information

- Name: David Satola, Lead Counsel
- Email: dsatola@worldbank.org
- Phone: +1 202 458 0015

International
Telecommunication Union
Place des Nations
CH-1211 Geneva 20
Switzerland

ISBN 978-92-61-29601-8



9 789261 296018

Published in Switzerland
Geneva, 2019

Photo credits: Shutterstock