**Briefing on: “AI Trends and SDGs”**

**Session: UNDESA--Action Line C1, C11: The Role of Private Sector in Mobilizing ICTs for SDGs**

Your Excellencies, ITU partners, and honored delegates. Thank you, it’s a pleasure to be here and I want to welcome everyone. I’m Stephen Ibaraki, and I will be speaking on “Artificial Intelligence (AI) Trends and alignment with SDGs”.

Driven by the rapid progress in AI research, we will in the near future see large parts of our lives influenced by Artificial Intelligence (AI).

AI innovation will be central in solving humanity's grand challenges by capitalizing on the unprecedented quantities of data now being generated on human health, commerce, communications, transportation, migration and more.

It is therefore important that all stakeholders work together to evaluate the opportunities presented by AI, ensuring that AI benefits all of humanity.

Now, let me begin by discussing AI Trends [Switch slides]

There is a predication that the next AI breakthrough through a Master AI Algorithm would produce a company worth 10 Microsofts’ or more than 5 Trillion dollars in market capitalization.

From mobile and cloud first, we now have AI first as the current enterprise strategy exceeding in all sectors $40bn in 2018. IDC predicted [revenues](http://www.idc.com/getdoc.jsp?containerId=prUS41878616) of nearly $50 bn in 2020 at 55% CAGR. In 2016, $5bn was invested in nearly 660 companies, more than 60% increase over 2015.

China has a startup investment fund of $337B, an amount greater than the GDP of over 80% of countries with a key focus on robotics and AI. The World Economic Forum has identified Artificial Intelligence (AI) as one of the top 6 trends shaping our society. [Gartner’s 2016 Hype Cycle](http://www.gartner.com/newsroom/id/3412017) for Emerging Technologies has the “perceptual smart machine age” as a top 3 trend. All the major technology vendors are deploying easily used AI software tools or AI specialty hardware. There are a proliferation of open source AI including the 1 billion dollar funded OpenAI platform by Elon Musk and others. The financial services roundtable or FSR, a trade organization consisting of the 100 top CEOs in financial services, who manage more assets at 91.7 Trillion USD than the annual global economy, held their Fintech Ideas Festival in January 2017 where AI was a major theme and its implications to financial inclusion and the future workforce.

Data volumes are growing to 44 zetabytes (or 44 billion trillion bytes) by 2020, doubling every year in the future, 50x greater than 2010. Since 2015, there is more data created by billions of IoT, mobile devices, and the internet than in the entire history of humanity. Only AI has the power to analyze this data to solve grand challenges and problems guiding our future.

AI underpins the work of two MIT professors Erik Brynjolfsson and Andrew McAfee who believe we are in a “Second Machine Age” with dramatic economic growth driven by smart machines, artificial intelligence, networked communication, digitization of just about everything. The evidence is here with: Driverless cars and automated drones, robots scanning and understanding environments, the HoloLens augmented reality, Skype language translation, computers writing reviews/resumes/grading essays, creating music, poetry, classical art.

The Fourth Industrial Revolution is a book by Prof Klaus Schwab founder, executive chairman World Economic Forum and the subject of a white paper by UBS. Industrial revolutions are driven by automation and connectivity and the 4th is unusual with EXTREME or HYPER automation and connectivity merging into cyber-physical systems driven by AI and robots.

**The impact of AI will be:** economic, cultural, social, … endless disruption. For examples of areas of impact, we have:

**Labour** (according to McKinsey in the US, 58% of jobs can be automated now with Natural Language Processing at average human levels). This was forecasted by Martin Ford in his seminal writings culminating in the 2015 New York Times Best Seller, Financial Times and McKinsey book of the year, Rise of the Robots.

Elon Musk has noted, "we should be very careful about artificial intelligence... it is perhaps our biggest existential threat."

But what is AI, and is our wariness of the concept and unintended consequences obstructing our view of the great benefits it could bring humanity? Is [AI creating a digital quake](http://www.itworldcanada.com/blog/aoe-the-ai-of-everything/385131) where 80 percent of companies and jobs will need to change or fail? What are the implications to society, economic development, and path to prosperity? Could technical standards for Artificial Intelligence help us to achieve the Sustainable Development Goals?

It’s an unprecedented era of AI driven:

1. Hyper time compression in the emergence of new disruptive innovations—measured in days and weeks rather than years.
2. Extreme convergence of multiple domains: physical, digital, biological – where there are overlapping amplification of value.
3. Exponential accelerating automation – triggered by smart sensors and the IoT (can be up to 11 trillion USD by 2025 according to McKinsey).
4. Universal connectivity linked by a digital AI mesh – through the rapid deployment of machine learning.

The future will see large parts of our lives influenced by AI of Everything ([AoE](http://www.itworldcanada.com/blog/aoe-the-ai-of-everything-part-two/385223))--the global AI mesh spawning a Digital Quake driving the Knowledge Synthesis of Everything (KSE), an inflection point for humankind and the SDGs.

The evidence is everywhere around us with Singapore launching their first self-driving taxis in September 2016. Telefonica and BigML are using AI to select startups. The Norwegian Telco, Telenor is creating an AI and Big Data lab. Deep Knowledge Ventures has an AI with equal vote with their board members in making investment decisions. GE is betting their survival on transforming into a software company with AI embedded everywhere. Baidu has a medical voice-translation virtual robot, AskADoctor, which knows 520 different diseases gives diagnosis with odds, links to nearby specialists. They also have their AI StockMaster which analyses news, markets predicting sectors, stocks or markets changes. There is the controversy where AI pickups human biases of racism and sexism.

When the UN released in 2000 the 8 Millennium Development Goals they did not anticipate the impact of technology such as the internet, broadband, wifi, smartphones/tablets, cloud computing, Big Data and Analytics, social media, social networks, cybersecurity challenges, and artificial intelligence through machine learning and deep learning. We missed so much in 2000 and change is accelerating. What will we miss in our future? Just two years ago, how many you would have predicated a Chatbot, would need to shut down twice due to inflammatory comments? Or a machine learning system, AlphGo, would beat the champion Go player in 2016 and again in 2017—an event predicted to happen in 2040 and not 2017!

AI innovation will be central to the achievement of the United Nations’ 17 [Sustainable Development Goals](https://sustainabledevelopment.un.org/?menu=1300) (SDGs) by capitalizing on the unprecedented quantities of data now being generated on sentiment behavior, human health, commerce, communications, migration and more.

As an example, tracking poverty in developing regions often requires slow, manual and at times dangerous data collection however using satellite imagery and a machine-learning technique called “convolutional neural networks” provides an alternative: [mapping poverty from space](http://www.sciencemag.org/news/2016/08/satellite-images-can-map-poverty?utm_source=MIT+TR+Newsletters&utm_campaign=a1d16c504c-The_Download_August_19_2016&utm_medium=email&utm_term=0_997ed6f472-a1d16c504c-153835113&goal=0_997ed6f472-a1d16c504c-153835113&mc_cid=a1d16c504c&mc_eid=f1f1c47f99) (SDG1). Machine learning and reasoning can extend medical care to remote regions through automated diagnosis and effective exploitation of limited medical expertise and transportation resources (SDG3). Methods developed within the AI community will help to unearth causal influences within large-scale development programs, helping us to build a better understanding of how we might design more effective education systems (SDG4). Ideas and tools created at the intersection of AI and electronic commerce will uncover new ways to enhance novel economic concepts, such as micro-finance and micro-work (SDG8).  AI will also serve as a key resource in curbing greenhouse gas emissions in urban environments and supporting the development of smart cities (SDGs 11 & 13). Global partnerships (SDG 17) will offer crucial support to our pursuit of all of these goals. Cooperation among the UN family, for example between ITU and WHO on health, ILO on labor and automation, UNESCO on education and FAO on agriculture, as well as with other stakeholders, will be critical to leverage AI in delivering effective services for the benefit of all nations.

Every industry sector will be affected by the rise of AI, including ITU-T’s standardization work.

ITU also recently signed a partnership with the [IBM Watson AI XPRIZE](http://ai.xprize.org/). The 5 million USD prize aims to accelerate the adoption of AI technologies from diverse and open sources, and spark creative, innovative, bold demonstrations of technologies with the potential to become truly scalable and capable of solving some of the most pressing challenges to our societies and economies.

Moreover, hosted by ITU, XPRIZE and more than 20 UN agencies partnered on the AI for Good Global Summit last week in Geneva where 500 top experts collaborated.

This year Bill Gates suggests robots that takes jobs should be taxed – but which drew rebuttals from, for example. The Economist (“[Why taxing robots is not a good idea](http://www.economist.com/news/finance-and-economics/21717374-bill-gatess-proposal-revealing-about-challenge-automation-poses-why-taxing)”).

An earlier draft [report by the European Parliament](http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML%2BCOMPARL%2BPE-582.443%2B01%2BDOC%2BPDF%2BV0//EN) discusses the creation of a specific legal status for AI enabled robots. According to the report, the most sophisticated autonomous robots could be assigned the status of electronic persons with specific rights and obligations, including the responsibility to make amends for any damage that they may cause. Robots have great potential to increase our economies’ productivity, and we see evidence of this in governments’ discussions around how we could go about taxing robots’ earnings. Should robots ever become self-aware, the report suggests that these robots would need to apply the moral code outlined by the “Three Laws of Robotics” devised by science fiction writer Isaac Asimov. Gates [suggests](https://www.youtube.com/watch?v=nccryZOcrUg) robots that takes jobs should be taxed.

Liability rules are called for by the [European Parliament](http://www.europarl.europa.eu/news/en/news-room/20170210IPR61808/robots-and-artificial-intelligence-meps-call-for-eu-wide-liability-rules), in February 2017. Members of the European Parliament or MEPs voted on a resolution where “EU-wide rules are needed for the fast-evolving field of robotics, e.g. to enforce ethical standards or establish liability for accidents involving driverless cars. MEPs ask the EU Commission to propose rules on robotics and artificial intelligence, in order to fully exploit their economic potential and to guarantee a standard level of safety and security.” Areas of focus included liability rules, the impact of robots on the workforce, a Code of Ethical Conduct and a new European Agency for robotics.

The ACM, Association for Computing Machinery, the top global computing science organization, issued in a news release in January 2017, seven principles to foster algorithmic transparency and accountability. “A few examples of potential algorithmic bias that have been featured in government reports and news articles include: (1) Job hunting web sites: Do these sites send more listings of high paying jobs to men than to women? (2) Credit reporting bureaus: Does the data set that algorithms weigh in determining credit scores contain prejudicial information? (3) Social media sites: What factors go into determining the news items that are served up to users? (4) The criminal justice system: Are computer generated reports that influence sentencing and parole decisions biased against African Americans?”

The development and adoption of relevant international standards can help us to realize the benefits of AI advances on a global scale, assisting us in the pursuit of the UN sustainable development goals. Perhaps we can capitalize on the work of the [IEEE](http://techethics.ieee.org/events/the-hague-2016) who is working on a [code of conduct for AI](http://www.cvent.com/events/symposium-on-ethics-of-autonomous-systems-seas-europe-/event-summary-28d5322779454a6780b19c07b28023de.aspx), or [the British Standards Institute BS8611 guide to the ethical design and application of robots and robot systems](http://shop.bsigroup.com/ProductDetail?pid=000000000030320089), and collaborate with the [Stanford project](http://www.seattletimes.com/business/technology/real-ethics-for-artificial-intelligence/?utm_source=RSS&utm_medium=Referral&utm_campaign=RSS_all), One Hundred Year Study, who came out with a report with concerns on regulation.

From [September](http://money.cnn.com/2016/09/28/technology/partnership-on-ai/index.html) 2016, we have the founding partners Amazon, Apple, DeepMind, Facebook, Google, IBM, Microsoft for the [Partnership on AI](https://www.techinasia.com/google-microsoft-facebook-ibm-amazon-form-ai-partnership-startups-react-hope-fear) to Benefit People and Society to work on best practices for AI. The [partnership](https://www.partnershiponai.org/) now includes: the AAAI (Association for the Advancement of AI), ACLU (American Civil Liberties Union), AI FORUM NEW ZEALAND, THE ALLEN INSTITUTE FOR ARTIFICIAL INTELLIGENCE (AI2), CENTER FOR DEMOCRACY & TECHNOLOGY (CDT), LEVERHULME CENTRE FOR THE FUTURE OF INTELLIGENCE (CFI), COGITAI, DATA & SOCIETY RESEARCH INSTITUTE, DIGITAL ASIA HUB, eBAY, ELECTRONIC FRONTIER FOUNDATION (EFF), THE FUTURE OF HUMANITY, THE FUTURE OF PRIVACY FORUM, HUMAN RIGHTS WATCH, INTEL, MCKINSEY & COMPANY, OpenAI, SALESFORCE, SAP, SONY, UNICEF, UPTURN, XPRIZE, ZALANDO.

In Oct, the US Whitehouse released two reports on AI: PREPARING FOR THE FUTURE OF ARTIFICIAL INTELLIGENCE and THE NATIONAL ARTIFICIAL INTELLIGENCE RESEARCH AND DEVELOPMENT STRATEGIC PLAN.

What do we need to do to protect ourselves from the Cybersecurity risks stemming from AI while still growing the economy?

AI has received increased attention in recent years following news of progress in the field and the prospect of new, tangible, innovation such as self-driving cars.

The Internet has played an important role in these developments, particularly as the platform for AI enabled services – some with significant implications for the continued development of a trusted Internet. It is worth remembering that AI is also used for ordinary day-to-day applications that we are all familiar with such as:

Email filtering: Email services use artificial intelligence to filter incoming emails. Users can train their spam filters by marking emails as “spam”.

Personalization: Online services use artificial intelligence to personalize your experience. Services, like Amazon or Netflix, “learn” from your previous purchases and the purchases of other users to recommend relevant content for you.

Fraud detection: Banks use artificial intelligence to determine if there is strange activity on your account.

Speech recognition: Applications use artificial intelligence to optimize speech recognition functions. Examples include intelligent personal assistants.

Image/video recognition: Applications use image recognition to identify criminals in Airports and in Policing. It is used on Social
Media platforms to label and identify images and now video.

Autonomous vehicles: By 2020, there will be wide applications of autonomous cars, trucks, and drones.

Robots: Robots are proliferating in factories, used to support humans in social settings such as for the Aged and increasingly consumer facing.

Human/machine hybrids: Already, there are more than 10 billion mobile devices, wearables, embedded devices, and sensors assisting humans.

CASL – classic, augmented, synthetic Life: By 2030, there will co-exist standard life like us today, augmented life using AR/VR, and totally synthetic.

Data, security, privacy, trust: Data is the lifeblood of AI and huge quantities are being generated by 38.5 billion sensors, and IoTs devices by 2020 which impacts privacy, security, and trust.

AI is a technology that could make the world a better place, but there are many risks (internet Society Policy Paper 26 April 2017).

What are some of the risks, and how can we mitigate against them?

Cybersecurity is a risk that faces everybody, and none more than the Information Society.

Should those that provide ICT solutions must be held to a standard where they provide safe solutions that do no harm. Is this increasingly important in the age of the Fourth Industrial revolution with the proliferation of Artificial Intelligence (AI), Robotics, the Internet of Things (IoT) and Machine Learning, all of which have the power to make everyone’s lives easier, and can provide economic opportunity, but come with a concomitant risk?

E-commerce is an economic enabler. Could your economy improve if online shopping was safe, and privacy guaranteed?

Vast armies of bots crawl the net for vulnerable IoT devices – it takes less than two minutes to find a new device and infect it. (Symantec Internet Security Report Volume 22). How can our citizens benefit from the inter-connectedness of the Internet of Thing (IoT), without being put at risk?

AI uses Machine Learning. Put simply Machine Learning is using algorithms to create algorithms. Again, this technology has immense power. How do we ensure it is used for the good of society and is not used for nefarious purposes?

What are the partnerships that can be built between governments, civil society organizations and IFIP to ensure the provisioning is trustworthy and ethical. There is much to consider…

I encourage you to join the discussion to share your questions on how you would like to see the international community approaching the biggest questions surrounding the future of AI and, by extension, the future of humanity and the inherent Cybersecurity risk and to mitigate those risks.

This completes my presentation and I want to point to some resources. The ACM Learning Center, articles in IDG-IT World, my keynote presentation from ICSE, plus over 1000 interviews I have conducted.

Finally, we call for global cooperation so that AI can help solve humanity’s grandest challenges in an environment of privacy, security, trust and ICT professionalism.