Group of Twenty (G20)

Addressing the rise of artificial intelligence in government, medical and military applications

MODEL UNITED NATIONS
THE INTERNATIONAL SCHOOL OF THE HAGUE

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Forum	Group of Twenty (G20)
Issue:	Addressing the rise of artificial intelligence in government, medical and military applications
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Introduction

Arguably, the proliferation of artificial intelligence (AI) is changing the world, and already the rise of this technology is becoming more prominent across many nations. Despite this, many people are not familiar with the concept or applications of AI, and due to this, people also tend to have misleading preconceptions about it.

Globally, our conversation is now extending into how this powerful tool can be used to benefit all of humanity. Socially, economically, and politically, artificial intelligence has become an essential component of our daily lives and a powerful force that expedites globalisation. The majority of us encounter some forms of AI in our daily lives without even noticing - from social media to big data. As invisible as it may be, artificial intelligence has successfully increased the efficiency of everyday tasks by granting us the ability to access knowledge at the tip of our fingertips. AI has also helped analyse simple and complex decisions made in governments and corporations such as the United Nations.

Conflictingly, many remain uncertain about what the future of AI holds. In reality, many are against this technological leap due to fears of mass unemployment resulting from robots eventually replacing human workers by taking over jobs. Furthermore, many believe that despite programmers good intentions, the technology will evolve past a point of our control - where robots will become autonomous and result in consequences devastating for everyone. Due to the hackable nature of our digitalised world, critics argue that AI poses a growing threat to the security of nations. These legitimate concerns should not be overlooked and need to be addressed. Many nuances within artificial intelligence should become a topic of discussion. Today, delegates must come together to discuss and begin to recognise the benefits that artificial intelligence has yielded and the future benefits that they can bring, incredibly if researched and applied sensibly.

Definition of Key Terms

Artificial Intelligence

The ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings. The term is frequently applied to the project of developing systems endowed with the intellectual processes characteristic of humans, such as the ability to reason, discover meaning, generalise, or learn from experience.

Algorithm

A set of rules that a machine can follow to learn how to do a task. In the future algorithms could soon become so advanced that they will be able to learn and think by themselves without human interference.

Autonomous weapons systems (AWS)

Their human creators have empowered terminal devices to survey their surroundings, identify potential enemy targets, and independently attack those targets based on sophisticated algorithms. An example of AWS could be armed quadcopters that can search for and eliminate people meeting certain pre-defined criteria. It is vital to note that AWS does not include weapons such as cruise missiles or remotely piloted drones for which humans make all targeting decisions.

Lethal Autonomous Weapons (LAWs)

A type of autonomous military robot that can independently search for and engage targets based on programmed constraints and descriptions. We already use such weapons in battles today for example, several types of stationary sentry guns, which can fire at humans and vehicles autonomously are currently being used in South Korea and Israel.

Machine learning

A subfield of AI that aims to develop computers that can learn from experience, such as neural networks.

Medical Applications of AI

Medical artificial intelligence mainly uses computer techniques to perform clinical diagnoses and suggest treatments. AI can detect meaningful relationships in a data set and has been widely used in many clinical situations to diagnose, treat, and predict the results.

Neural network

A system of programs and data patterned on the operation of the human brain that learns from and adapts to initial rules and experience.

General Overview

The human brain is the most vital organ in the human body, acting as the centre of the nervous system in all vertebrates. Even some of the most complex networks are unable to outperform it. The goal of AI is to alter that actuality, by designing a computer mind that can think and act like a human brain. Artificial intelligence gives computers the ability to think, learn, reason, and even understand human emotions so that they can do more than just monotonous tasks. As mentioned before, this technology is growing exponentially and is making its way out of research labs and into our daily lives, turning them from ordinary to extraordinary.

Even though we have not (yet) succeeded in building a computer mind that thinks, learns and evolves like a human, experts predict that "the development of such a technology is highly likely by the year 2050" (Breyer). However, this does not mean that AI does not currently exist in our lives. Simple or limited AI systems have already been around for many years, and they do specific tasks better than any human could.

Due to this and the current rapid advancement of AI, the issue at hand is deciding what is ethical and what kind of applications we should accept or decline. While AI is an extraordinary asset towards the development of our societies, it also gives rise to significant ethical issues. How can we ensure that algorithms do not infringe upon fundamental human rights? Can freedom of certain actions be assured when our wants are assumed and managed by AI? How can we guarantee that social and cultural stereotypes are not replicated in AI programming regarding issues such as gender discrimination? Can values be programmed,

and by whom should this be done? Is it possible for us to ensure accountability when choices and actions are fully automated by AI, and upon whom does this accountability fall? How do we make sure that no one around the world is deprived of the benefits of these technologies? How do we ensure that AI is developed transparently so that the lives global citizens which it affects have a say in its progression?

To answer the above questions, it is imperative that we recognise the difference between the direct effects of AI on our societies, the consequences we are already experiencing, and its long-term repercussions. This requires delegates to shape a vision and a strategic plan of action collectively.

Government

From cybersecurity to workforce management, many governments utilise AI to make their jobs easier. However, numerous roadblocks can prevent governments from widespread AI adoption. Technology is not the most significant issue (despite popular belief) as technical challenges are the most straightforward to address and form just part of the task at hand. We can break these down into three main subcategories listed below.

Effective use of data

Digital technology has become very prominent in the world we live in; this also comes with a large amount of digital data, and this value only keeps increasing. Government establishments were not created to handle so much volume and variety of data, and it is becoming an issue. Due to this, answering simple questions such as which database contains what information or how data is collected in the first place can prove to be a challenge. Organisations that do not have data governance processes in place cannot take advantage of AI as they do not have the capabilities to understand and manage their data adequately enough.

Data and AI skills

Unfortunately, AI and data management skills are in short supply. Although the learning curve for data management is relatively surmountable, obtaining the required skills to develop AI solutions has proved to be complicated. Due to governments usually having a small hiring budget, recruiting professionals trained in AI is usually not manageable and training the staff already there is also costly. This involves risks such

as threatening constituents' rights, such as privacy, as well as the government's long-term ability to deploy AI with full public support.

Procurement mechanisms

Current procurement mechanisms do not address specific challenges, such as the private sector treating algorithms as internet protocol (IP). Governments who purchase AI algorithms are likely to want to customise them to best for their organisation; however, AI providers are likely to object to this. It also means it would be harder for governments to continuously update the algorithm with new data, significantly affecting its lifespan and relevancy. Furthermore, public procurement mechanisms are usually slow and complicated due to extensive terms and conditions and long wait times. These factors make it problematic for providers to respond, thus making it challenging for governments to acquire AI technology.

Military

Due to the destructive nature Autonomous weapon systems (AWS) can bring to the battlefield, many professionals have expressed their concerns over the weaponisation of AI. Many think that LAWS and AWS are unethical. There are concerns regarding the system's ability to distinguish between non-combatants and combatants. Having AI in control of dangerous weapons runs a risk of accidental or errors, leading to many deaths. These AI's are also vulnerable to cyberattacks or hacking that could cause the machine to malfunction. The weaponisation of AI has also been seen as revolutionary as nuclear weapons were when they were first introduced.

However, those in favour of the weaponisation of AI cite financial and ethical reasons. LAWs have the potential to operate faster than humans, which would save time and resources. Machines can process information faster and better than humans, so that it would be more effective for the military. Instead of having actual people fight each other, robots would fight instead, which would mean less loss of human life. LAWs also can perform more dangerous missions that humans can not do. In the future, it is very possible that AI technology will progress to a point where they would have to be banned from war due to their irrevocable power and mass destruction they would cause.

Medicine

The use of AI techniques in the medical field has proved to be successful. Thus, it is vital to note that this has been something present in the medical field for the past four decades. Additionally, AI systems are being more commonly integrated into healthcare all over the world. The goal of Artificial intelligence today is to help healthcare and support health care professionals. This means that artificial intelligence is being devised to assist doctors and not replace them.

The major advancements in computer technology have enhanced the viability of AI to tackle problems in medicine. Many applications of AI span an extensive and diverse range of fields in medicine. More conventional medical applications of AI such as therapy, diagnosis and rehabilitation. However, more contemporary applications incorporate diseased genes, hospital scheduling, medical robotics, surgery simulation and many more. Due to all these possible applications of AI, it has the possibility to greatly benefit the healthcare industry. For example, it can permit quicker and more precise diagnostics, diminish human errors and also lead to great cost reductions.

Artificial intelligence and the sustainable development goals

Sustainable Development Goals (SDGs) are a "universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity," according to the United Nations. These 17 goals have initially been a part of the Millennium Development Goals. However, they have expanded to include more aspects such as "climate change, economic inequality, innovation, sustainable consumption, peace and justice" ("Sustainable Development Goals"). In this context, sustainable development goals are precisely the areas where artificial intelligence can come into play. The United Nations are using technology to achieve these inherently interconnected development goals, and successfully tackling one will result in positive repercussions for the other benchmarks. Some examples of how we could utilise AI to solve these goals are some of the following.

SDG 1: End poverty in all its forms everywhere

More than 836 million people currently live in poverty and approximately one fifth of people in developing regions are living on "less than $1.25 per day" (World bank). By using artificial intelligence, we can provide real-time resource allocation through satellite mapping and data analysis of poverty. Because of this governments are able to find out specifically which places are in need of help, thereby making it easier to

target those regions and alleviate suffering on a wider scale. This can be especially useful for areas of turmoil and inaccessible areas.

SDG 3: Ensure healthy lives and promote well-being for all at all ages

Unfavourably, "more than six million children still die before their fifth birthday each year" and those born into poverty are "twice as likely to die" (SDG 3). Furthermore, maternal mortality is a prevalent issue in LEDCs for many mothers. Once again, we can use artificial intelligence to help solve some of these issues. It can analyse a vast amount of healthcare data in a short amount of time, and therefore this could lead to scientific breakthroughs that doctors would have otherwise missed. This could mean to more cures for all sorts of diseases, in turn, meaning more people are healthy or can recover.

SDG 5: Achieve gender equality and empower all women and girls

Only approximately two thirds of developing regions have achieved gender parity in primary education (SDG 5). Currently, sub-Saharan Africa, Oceania, and Western Asia, still prevent girls from receiving an adequate education, thereby barring them from becoming socially mobile. Artificial intelligence has progressed so much that it can now be used to accurately identify and correct the existing gender bias. Such recognition will be important in providing woman with equal opportunities in their education and workplace.

Major Parties Involved

AI for good

AI for good is an organisation known for hosting its annual summits at the International Telecommunication Union (ITU) in Geneva, Switzerland. It also provides a year-round digital platform where "AI innovators and problem owners learn, build and connect to identify practical AI solutions to advance the UN SDGs." The organisation is in partnership with 38 UN sister agencies. Although the organisation itself doesn't have any legitimate power, they have

supported numerous projects involving AI across the world. Their ultimate purpose is to come up with solutions to the 17 SDGs, so we can achieve them by the year 2030.

United Nations Educational, Scientific and Cultural Organisation (UNESCO)

UNESCO has a vital role to play in bridging existing divides that AI has further deepened. UNESCO's international dimensions and humanist mission have been the main reason they were appointed to lead the debate on the ethical issues around AI. They have already organised debates on AI in several regions of the world with experts from all over the world. Focusing on AI and Africa, the first debate took place in Marrakech, Morocco, on 12 December 2018. In the first half of 2019, a second international conference at the UNESCO headquarters in Paris.

Microsoft

Recently, Microsoft has taken steps towards embracing the rise of artificial intelligence. They have developed a machine-learning model that can analyse demographics, academic performance and historical data to predict which students were at risk of dropping out and prompting early intervention.

Google

Currently, Google has implemented artificial intelligence software – DeepMind – a data hub that responds immediately to increased usage or changing weather that helps to optimise energy efficiency. By doing so, artificial intelligence can reduce the data centre's energy consumption by 15 per cent. As a result, they can help be massively implemented by governments for more sustainable energy.

Military

Seeing as AI has become a more accessible option, many of the world's superpowers have started showing signs of an intensifying AI arms race. In particular, the United States, Russia, and China agree that AI will be critical in the future when defining national power.

Russia

Russia is one of the countries which is currently actively pursuing developments towards artificial military intelligence. Russia holds a positive stance towards the automation of weapons and has been testing different types of autonomous and semi-autonomous combat systems. The Russian government strongly rejects any ban on AWS and is highly in favour of AI.

China

China is also pursuing new AI technological developments. The Chinese military and government are trying to integrate commercial AI technology into their military. The government has committed $2 billion to an AI development park, and around $7 billion are privately invested annually towards AI. China is also the first permanent member of the United Nations Security Council to raise concerns over the lack of international law regarding autonomous weapons.

United States of America

The U.S. Department of Defense has increased investments in AI tech. The U.S. military has a various military arsenal of AI combat programs that can operate without human assistance. However, the U.S. is wary of having fully autonomous AWS implemented a temporary directive that requires a human operator to know when to take a human life. The United States privately invested $70 billion in AI in 2018.

Timeline of Key Events

Date	Description of event
1950	Alan Turing proposes the imitation game. He published a research paper that developed a framework for thinking about machine intelligence.
June 18th - August 17th, 1956	John McCarthy and Marvin Minsky host Dartmouth Summer Research Project on Artificial Intelligence (DSRPAI). Various leading experts in the field were brought together to collaborate in an open-ended discussion regarding AI.
1973	The AI winter - Funding for the AI industry was slashed; thus, progress was limited
2008	A breakthrough in AI technology resulting in speech recognition becoming widely available through a google app

2014	The robot 'Eugene Goostman' is the first-ever machine to pass Turing's test that would prove the intelligence of a machine - intelligent machines were now becoming an everyday reality
2015	Hawking, Musk, Wozniak + 3000 researchers in the artificial intelligence and robotics field wrote an open letter to ban the development and use of autonomous weapons
July 25th - 31st, 2015	24th International Joint Conference on Artificial Intelligence in Bueno Aires, Argentina
June 7th-9th, 2017	First-ever AI For Good Global Summit (Hosted at ITU in Geneva)
May 15th - 17th, 2018	Second ever AI for Good Global summit hosted (Hosted at ITU in Geneva)
March 29th, 2019	The majority of governments favoured a ban on LAWs at a UN meeting. A small minority of governments still opposed the ban.
28th - 31st May, 2019	Third AI for Good Global summit hosted (Hosted at ITU in Geneva)

UN involvement, Relevant Resolutions, Treaties and Events

- ITU AI for Good Annual Global summit in Geneva, (dates vary each year)

- Impact of rapid technological change on the achievement of the Sustainable Development Goals, 18 January 2018 (A/RES/72/242)

Previous Attempts to solve the Issue

As shown in the timeline, one of the most significant steps undertaken to utilise AI for the greater good was establishing the AI for good summits. The AI for Good Global Summit is the leading United Nations platform for global and inclusive dialogue on AI. They are actively involved in trying to develop ways to use AI to solve the SDGs - this means potentially using this upcoming technology to accelerate progress in government, military and medical applications alike. At the summit itself, numerous inspirational speakers from all over the world come together and talk about all the aspects of AI, ranging from possible applications to whether AI can be trusted. Since the first summit, the organisation has branched out. They also host webinars, competitions and debates, and build a community platform so that experts and people of all ages can join together and brainstorm and discuss this innovative

technology's potential uses. They also provide various academic resources to educate people of all ages on how AI works and how we use it so far. Furthermore, all this is accessible from their website, which is worth looking at.

It is worth noting that this is not the only summit or organisation working towards using AI. Although it is the most prominent one, others such as AI4ALL, foundation Botnar and Solve by MIT. Although not directly supported by the UN, these organisations also strive to push the boundaries of AI for the benefit of everyone. So far, all the organisations mentioned above have been highly successful in raising awareness and academia and coming up with new technology applications.

Military

Regarding current and past military applications of AI, there has been much opposition towards using the technology due to ethics. That is why an open letter signed by Tens of thousands of citizens and prominent experts in the field called for the ban of lethal AWS. Prominent people like Elon Musk, Stephen Hawking, and Steve Wozniak are just a few people who signed the letter. It was presented during the 24th International Joint Conference on Artificial Intelligence in Bueno Aires, Argentina. The letter warned the threat that an artificial intelligence arms race poses on current warfare. Although the letter had no direct consequences, it raised awareness about their concerns regarding using AI in warfare and layed out detailed research priorities in an accompanying twelve-page document.

Similarly, other groups have formed for the same reasons, such as the Campaign to Stop Killer Robots, a coalition of non-governmental organisations, to support the ban on LAWs. Some websites are available for the public to view regarding the effects that militarised AIs can do. The Holy See has also called for the ban of LAWs to preserve the power balance by the countries. On March 29, 2019, delegates came to meet at Geneva regarding the UN Convention on CCW. The majority supported the total ban of LAWs, but the substantial majority of the United States, Russia, Australia, Israel, and the United Kingdom opposed this ban.

Medical applications

Already AI is being used in medical practices worldwide, although currently, this technology is primarily available only to wealthy individuals as it is still vert expensive. As mentioned before, AI is already being used to aid doctors with diagnosis, therapy, rehabilitation and specific applications helping with disease genes, hospital scheduling, medical robotics,

surgery simulation, artificial consciousness, and much more. We often hear about it in the news; for example, a famous football player adopted AI to monitor his heart health more recently. Recently, new technology has also been developed that provides blind people with an accurate description of their current surroundings through AI in their phones, making it much easier for them to function in their day to day lives. As you can see, the possibilities are endless.

Possible Solutions

With all this said, it is clear that artificial intelligence can be highly beneficial to worldwide human advancement all over the world in all fields. However, it is crucial to note that there is still much more to be done. To begin, education is a primary concern currently leading to the many inequities in modern-day society. Simply revolutionising classrooms through individualised learning pathways or virtual tutors will not be sufficient. Therefore, Delegates Should develop ways to allocate resources for these programs to sprout, which can be achieved through various measures, such as foreign aid or having more developed Nations help with the birth of the technology sector for these less developed governments. By jump-starting these programs, it can lead LEDCs to become more advanced and capable of moving with the trend or even becoming a leader in the field in the upcoming years.

Furthermore, in the context of justice systems, artificial intelligence is also seen to eliminate the current forms of discrimination and human biases. Through a heavier reliance on algorithms and potentially robot judges, the criminal justice system in many nations, including more developed nations, can be improved. These are simply a few ideas that can be further developed in more meaningful ways.

Medical applications

Doctors see hundreds of patients per week, which can be exhausting considering each person requiring the doctors full attention and knowledge. AI can support doctors by eliminating human error and relieving them of these time-consuming, monotonous duties. AI assistants and programs could significantly decrease pharmaceutical costs by reducing office visits and replacing them with online care. Patients could be asked to frequently submit data more through online medical records. This would improve the line of communication between patients and doctors resulting in fewer office appointments. Cost reductions could also come from efficient artificial intelligence effectively diagnosing and screening high-risk patients as

using AI significantly reduces human errors in record keeping and diagnosis. Furthermore, utilising a remote presence robot would mean that doctors can engage with patients and staff without actually being present while still moving around and interacting almost as effectively as if they were present. This potential solution could allow specialist doctors to aid patients that may not be able to travel to see a particular doctor meaning their expertise is more accessible.

Poignantly, AI programs can also have a very important role in the process of scientific research as AI systems can learn and develop. This could potentially lead to the discovery of new phenomena and medical expertise. An example of this could be a computer system analysing large amounts of data and looking for intricate patterns that suggest previously unanticipated connections. Correspondingly, if an AI system was provided with a model of existing medical knowledge, such a system could be employed to show how a new set of experimental observations dispute certain existing theories.

Government

There are numerous ways governments can begin to implement more AI into their jobs and routines, but unfortunately, optimal implementation and adoption of AI pose the most significant challenge. There are numerous solutions; however, the most prominent ones currently suggested by experts seem to be some of the following. Funding could be increased for governments to afford hiring professionals trained in AI and training current employees to be able to manage the new technologies. Companies could also invest in upgrading and modernising their current IT infrastructure to limit unnecessary expenses in the long run and have the more expendable income to invest in AI. Governments could also invest more in data governance to fully take advantage of the upcoming data-intensive AI applications and develop collaborative partnerships with academia to initiate AI projects. Such academic institutions would be valuable partners for high-risk exploratory projects and other AI development initiatives.

Military

Although many advocate for a complete ban of LAWs, this will probably not be happening in the near future as many nations oppose such a ban. Nevertheless, efforts could definitely be made to propose partial bans as a first step towards eventually banning all LAWs - this leaves room for a partial ban or tighter regulations of AWS and LAWs. Having planned conferences for talks regarding the use of AI in wars would also help keep negotiations on the

table. Diplomatic negotiations to mitigate an arms race between the countries would be imperative to keep the balance of power and is arguably the best and most promising solution we have.

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Additional resources

- Understanding AI and what it is: https://towardsdatascience.com/ai-explained-easily-aa6f81574fd6
- AI statistics: https://www.semrush.com/blog/artificial-intelligence-stats/