

Forum: General Assembly 1

Issue: Regulating the use of Artificial Intelligence in national defense and military applications

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Introduction

Artificial Intelligence (AI) is one of the technological concepts in human history of the most complex composition and greatest impact. By definition, it refers to the study to deconstruct and stimulate the intelligence of human beings, and apply it in the field of computer science. Since the emergence of the concept in the 1950s, the impact of AI has been gradually expanding. Until today, the impact of AI has far exceeded beyond computer science and is already closely related to every aspect of human life and civilization, including the field of military and warfare.

From strategic information-gathering and command systems to the intelligent parts of individual planes and ships, the application of AI in the military field is deep and overarching. Currently, AI is already playing a huge role in the information-gathering(reconnaissance) and decision-making parts, which is a crucial part in determining the ballot of warfare, in the national defense systems of most militarily powerful countries. In the predictable future, the impact of AI in the military would go even beyond that, into the actual performance of warfare.

The essence of warfare and weapons always remained the same throughout history. Human always persists in their pursuit of more and more effective ways to destroy their own kind. Historically, any technologies that are reaching its maturity and extensively applied in different fields of human life are always applied in warfare, for the higher effectiveness of killing. Sometimes these technologies could change the feature or pattern of warfare, often in an unexpected way. AI obviously cannot escape from this law.

Definition of Key Terms

Artificial Intelligence

The theory and development of computer systems able to perform tasks that normally require human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages.

AI Ethics

The issues that AI stakeholders such as engineers and government officials must consider to ensure that the technology is developed and used responsibly. This means adopting and implementing systems that support a safe, secure, unbiased, and environmentally friendly approach to artificial intelligence.

Algorithm

A sequence of rules given to an AI machine to perform a task or solve a problem. Common algorithms include classification, regression, and clustering.

Image recognition

The process of identifying an object, person, place, or text in an image or video.

National defense

The military forces and security-related facilities a nation possesses in order to defend its sovereignty and resist possible foreign invasion.

Reconnaissance

Military observation of a region to locate an enemy or ascertain strategic features to gather information for military purposes.

Reinforcement learning

A type of machine learning in which an algorithm learns by interacting with its environment and then is either rewarded or penalized based on its actions.

Weapon system

A combination of one or more weapons with all related equipment, materials, services, personnel, and means of delivery and deployment (if applicable) required for self-sufficiency.

Background

The History of AI

Similar ideas to AI have appeared in mythologies and philosophies of many ancient civilizations. However, the emergence of real modern-meaning AI did not happen until the 1950s.

In the past 70 years, especially the past 30 years, although having some tough periods, AI technology generally experienced a fast development.

Origin (1940s-50s)

In 1950, Alan Turing, the "father of AI", first defined the term "AI": If a machine can communicate with humans (via telex equipment) without being able to identify its machine identity, then it is said that the machine has intelligence. In the same year, Turing also prophesied the possibility of creating machines with true intelligence. Therefore, the year 1950 is known as the year when AI started.

In 1954, George Deval from the US designed the world's first programmable robot.

In the summer of 1956, Dartmouth College of the US held the first AI seminar, which was considered the symbol of the birth of AI. At the meeting, McCarthy proposed the concept of "AI" for the first time, while Newell and Simon demonstrated the logical theory machine they had written.

Golden Age (1960s-early 70s)

Between 1966 and 1972, the Stanford International Research Institute in the United States developed the robot Shakey, which was the first mobile robot that could autonomously perceive, model the environment, plan behavior, and execute tasks (such as finding wooden boxes and pushing them to designated destinations). Many consider it to be the first robot using AI.

In 1966, the Massachusetts Institute of Technology (MIT) released the world's first Chatbot ELIZA. ELIZA's intelligence lies in her ability to understand simple natural languages through scripts and generate human-like interactions.

Trough period (late 1970s)

In the early 1970s, AI encountered bottlenecks. At that time, the limited memory and processing speed of computers were not enough to solve any practical AI problems. The requirement for programs to have a child-level understanding of the world was quickly discovered by researchers to be too high: no one could create such a huge database in 1970, and no one knew how a program could learn such rich information. Due to a lack of progress, institutions that provide funding for AI, such as the UK government, the US Department of Defense Advanced Research Projects Agency, and the US National Science Council, have gradually ceased funding for directionless AI research. The National Science Commission (NSC) of the United States has suspended funding after allocating \$20 million.

Prosperity period (1980-87)

In 1981, the Japanese Ministry of Economy, Trade and Industry allocated \$850 million to develop the fifth-generation computer project, which was then known as AI computers. Subsequently, the United Kingdom and the United States responded by providing significant funding for research in the field of information technology.

In 1984, led by Douglas Lynette, the Cyc project was launched with the goal of enabling AI applications to work in a way similar to human reasoning.

“Winter of AI” (1987-93)

The term "Winter of AI" was coined by AI researchers who experienced budget cuts in 1974. They have noticed a frenzy for expert systems and expect people to turn to disappointment soon. Unfortunately, they claim that the practicality of expert systems is limited to certain specific scenarios. In the late 1980s, the new leader of the Defense Advanced Research Projects Agency (DARPA) in the United States believed that AI was not the "next wave" and that funding would lean towards projects that seemed more likely to yield results.

Real Spring of AI (1993-2014)

On May 11, 1997, IBM's computer "Deep Blue" defeated the world chess champion Kasparov, becoming the first computer system to defeat the world chess champion within the standard competition time frame. (Image shown below)



In 2011, Watson participated in the American Intelligence Q&A program as an AI program developed by IBM that uses natural language to answer questions, defeating two human champions and winning a prize of \$1 million.

In 2012, a team of Canadian neuroscientists created a virtual brain with simple cognitive abilities and 2.5 million simulated 'neurons', named 'Spaun', and passed the most basic intelligence tests.

In 2013, Facebook, Google, and Baidu began to widely apply deep learning algorithms in product development.

Modern Era of AI (2015-Today)

In 2015, “The Year of AI Breakthroughs”, Google opened up Tensor Flow, a second-generation machine learning platform that utilizes a large amount of data to directly train computers to complete tasks; The establishment of the Institute of AI at the University of Cambridge.

On March 9, 2016, in South Korea, the human-machine Go battle between the world's top Go player Lee Sek Seok's and the AlphaGo system made by Google attracted global attention. Lee was defeated after a 150-minute battle, which astonished the world and was widely seen as a sign of AI's exceeding of human intelligence in certain fields.

In November 2022, OpenAI launched a new Natural language processing tool ChatGPT driven by AI technology. Due to its complete and diverse functionality and its ability to simulate real human speech. This event was followed by the emergence of many similar apps and websites by different companies in different nations. Therefore, it enhanced a new round of development and popularization of AI technologies.

As Antonio Guterres, the current Secretariat General of the UN once said, "The speed and reach of today's AI technology are unprecedented. The paradox is that in the future, it will never move as slowly as today."

The Application of AI in Military and Warfare

To a military force, a battle simply looks like the cycle from information gathering, to decision-making of the headquarter based on that information, and to the carrying out of specific combat tasks carried out by specific units according to the decisions. In actual combat, whichever side gets to do the cycle faster would have a better combat effectiveness, and therefore gets a higher chance of winning.

In the status quo

Currently, in the national defense system of most countries with the technical capability, has AI components in the information gathering and decision-making parts.

The former is reconnoiter units such as recon vessels, drones, or satellites that recognize essential information such as the position of enemies or the environment of battlefields. This is done mostly through taking pictures or videos, and possibly processing those by identifying key elements, such as enemy units. These units mostly either have internal AI components that help them to function, or are themselves part of a larger system operated by AI. Currently, the information-gathering part is already generally taken over by AI. AI systems, and non-artificial units operated by it such as drones, can give information about enemy position to human operators or commanders, to let the latter decide whether to carry out actions.

The latter looks like an information processing system in the commanding quarter assisted by AI technologies that process fragmentary pieces of information reported by various units into a brief account of information and several decisions to make. Regularly, the conversion from pieces of primary information into decisions for units to carry out would require huge amounts of artificial work by staff officers, but with the assistance of AI, human officers would only need to refer to brief information and make a few key decisions.

AI has even partially participated in the actual combat part in warfare, under the control of human operators. For instance, in many videos or documents published from the Russo-Ukrainian battlefield, there are drones that. Although the process is mainly controlled by human operators, AI components still play a huge part as it automatically searches for, locks on, and destroys (through ways like missile or suicidal attack) enemy targets.

In the future

In the future, the development of AI will gradually reduce the participation of human operators in warfare.

Aside from the reconnaissance and decision-making parts, AI could also potentially participate in the actual carry-out part of warfare. Currently, weapons that can perform attacks to enemy objects without human involvement, such as drones carrying missiles, already exist. Under the operation of AI, these weapons could be autonomized to the extent that the process from finding to destroying targets can all be automatically done, while human operators only need to press the confirm button, or even this step could be left out if there are no moral concerns.

Furthermore, military forces mainly or even solely composed of machines, such as robot armies or drone forces in science fiction under AI command are theoretically possible. The technology of combat robots or no-man fighter jets in many countries is gradually developing toward maturity. Due to AI's ability to study by itself, AI systems and units would be able to develop, become smarter and stronger in battle processes, without the need for humans to update or improve them. Therefore, it is really a great possibility to consider that AI will be able to combat by itself to an extremely large extent in the future.

Challenges brought

Increased severity of warfare

The greatest challenge brought to humanity by the application of AI in military fields is obviously the increase of severity and casualties of warfare. As previously said, the application of AI in warfare is due to human's pursuit of greater combat effectiveness, and war is essentially killing and destruction. Therefore, just like the application of any new technologies, the application of AI in warfare is essentially an increase in the effectiveness of killing, and thus the severity and casualties of warfare would largely increase with the intervention of AI.

Technological monopoly

Another potential challenge could be the monopoly of powerful nations to military-related AI technologies, just like what happened to nuclear weapons. This is highly likely to happen since the technological threshold to better AI technology is extremely high. Therefore, its accessibility to countries with greater technological abilities, including more scientists, better lab conditions, more technological resources, etc.,

would be significantly higher than that to other countries. Although AI itself is already accessible to almost everyone in the world right now, this could cause a monopoly of higher AI technology over other countries. There would be a gap in military power between them and other countries, and the other countries' ability to defend themselves from these countries' possible threats or invasions would be largely weakened.

AI itself as a threat

Although this sounds too early to consider at this point, but AI itself could potentially become a threat to humanity. If humanity as a whole, represented by governments, does not implement regulations and control toward AI's development that are strict enough, it is possible for AI to somehow break away from human control, and consciously or unconsciously harm humans at some point. This might not come to the degree in some science fiction when a robot army starts to violently rebel against humanity as a whole. However, this is still something to consider. AI's wrong interpretation or wrong performance of human instructions due to technological problems or errors could bring disastrous impacts to humans. Furthermore, in the future when some AI programs start to have some authority to choose their own solutions to problems, their consideration about cost might be insufficient. Therefore, they could potentially choose to solve one problem but in a way that causes greater damage.

Major Parties Involved

USA

The USA has always been in the frontier of militarization of AI. Although the country's government has not officially admitted it, much evidence indicates that the USA has provided Ukraine with huge amounts of military equipment with AI technology. The Russo-Ukrainian battlefield is to some extent made into a testing ground for AI technology in the USA. The US military also put forward many AI-related novel combat concepts, within which some have already started to be put into practice. Meanwhile, the Political Declaration on Responsible Military Use of Artificial Intelligence and Autonomy by the US Department of State declares that Military use of AI can and should be ethical, responsible, and enhance international security. Military use of AI must be in compliance with applicable international law.

China

The Chinese government recently attaches great importance in the field of AI, and is currently enhancing the application of AI technology in different fields within the country. Internationally, China proposed multiple times the important claim that every country, no matter strong or weak, should all have equal access to AI technology. China also supported the idea of a global effort to regulate and govern AI. However, it is criticized by some Western opinions that China is currently using AI as a means of national control.

Russia

Although not proposing any important ideas, Russia is also an unignorable factor to consider as it is currently using AI technology in warfare. In its war with Ukraine, Russia applied many weapons involving AI such as using military drones that are partially operated by AI to reconnoiter or attack Ukrainian targets. There are many videos published by different sides from the Russo-Ukrainian battlefield that show signs of that.

UK

The UK plays an important role in the development of AI technology due to its abundant technological foundation. Furthermore, the UK hosted the first global AI safety summit and has recently shown great ambition in participating even more in the field of AI.

UN Commission of Scientific and Technological Developments (CSTD)

CTSD is one of the nine functional committees of the United Nations Economic and Social Council, established in 1979. Its mission is to assist the General Assembly in formulating guidelines and coordinating policies related to scientific and technological activities within the UN system, in order to contribute to the establishment of a new international economic and technological order. It is an important platform to utilize in the discussion of this particular issue, as this issue is closely associated with technology.

International AI Agency (IAIA) (possible in future)

In June 2023, UN Secretary General Antonio Guterres expressed his support for the establishment of an international AI regulatory agency similar to the International Atomic Energy Agency. Delegates could propose the implementation of this appeal during the conference as it could create another effective platform for discussion of related issues and implementation of solutions.

Private companies

Private tech companies of different countries such as Google, Microsoft, and Baidu play a huge role in the development of AI technologies, and therefore is an unignorable respect in the discussion of this topic. Their greatest pursuit is their financial interest. Therefore, while implementing regulations to prevent them from doing wrong things and becoming part of the problem, it is as important to incentivize them by financial interest to make the right decisions and help the addressing of the problem.

Previous Attempts to Resolve the Issue

From November 1st to 2nd, 2023, high-level representatives of the governments and significant tech companies in 28 countries, along with experts, gathered in Bletchley Park, Buckinghamshire, England, to hold the

first AI safety summit. The park is where “the father of AI,” Alan Turing, historically cracked the Enigma code used by the Nazi German military during WWII. The summit aimed to discuss the potential risks of AI frontier development, and ways to ensure that AI is developed in a way that is safe, responsible, and beneficial to the global community. The summit passed the Bletchley Declaration on AI Safety. While recognizing the contributions of AI towards the well-being of humanity, the declaration urges a global awareness of potential risks brought by AI and a joint effort to prevent it. The summit will happen once a year in different countries afterward. The declaration is the first document on the guidelines of AI safety that is passed globally.

The UN fully affirmed the ideas and efforts of this summit. Antonios Guterres, the Secretariat General of the UN, said, “It will report back by the end of this year with preliminary recommendations in three areas: Strengthening international cooperation on AI governance; building scientific consensus on risks and challenges; and making AI work for all of humanity. These recommendations will embed AI governance into intergovernmental processes, and an established global Summit. The United Nations is ready to play its part.”

Furthermore, efforts to regulate the development and deployment of AI have also started in the UN framework. On November 25, 2021, all the Member states of the UN Educational, Scientific and Cultural Organization (UNESCO) adopted a historic agreement that defines the common values and principles needed to ensure the healthy development of AI. While affirming the positive effects of AI, the agreement also urges the world to address some unprecedented challenges brought up by AI. The agreement aims to guide the construction of the necessary legal infrastructure to ensure the ethical development of this technology. The document code of the agreement is SHS/IGM-AIETHICS/2021/JUN/3 Rev.2.

Possible Solutions

Restricting or regulating the technological development of military-related AI technologies. This could be done through directly calling upon countries to restrict their research and development of AI technologies, by restricting their number of labs, scale of personnel, or budget on such research. Furthermore, this could also be done through establishing and propagating moral guidelines in the international field of science, by persuading scientists that AI-related military technologies are threatening world peace and would induce the harm of warfare in their occurrence so that scientists as individuals would be less likely to participate or fully devote into such research. The role AI plays in military systems in the status quo is largely limited in largely indirect parts such as reconnaissance, information-gathering, and assistance of decision-making, instead of directly participating in combats as combat units. Although theoretically possible, the participation of AI in real combat is still largely unrealistic as prerequisite technologies are immature. Therefore, the stopping or delaying of the development of relevant technologies could stop or delay the process of AI being militarized. However, this would most likely be a short-term solution, since no countries are incentivized to slow down their strengthening of military combat effectiveness.

Making countries sign treaties that regulate the use of AI-related technology in warfare. This could effectively decrease the casualties in warfare as it could decrease the fierceness of battles. This could be done by the signing of

treaties that regulate the methods of AI's usage in warfare, similar to those regulating the use of gas and depleted uranium bombs. This looks like banning the use of AI in certain scenarios or toward certain groups (eg. civilian targets), or restricting the use of certain types of AI-involved weapons or weapon systems. Banning the use of AI as a whole in warfare is probably impossible since AI is already extremely closely related to every aspect of human life, but similar ideas could be considered. Practicability is as important as moral correctness when discussing on solutions.

Restricting the spread of military-related AI technologies to countries that does not currently possess them that much. This can refer to the Nuclear Non-proliferation Treaty signed in 1968. In the case of the 1968 treaty first proposed by the USA, USSR, and UK, it is aimed not only to prevent the spread of nuclear weapon technology from owners of these weapons to countries that do not own them but also to legislatively prevent the latter to research and develop nuclear weapons themselves. With currently 169 member states signed, although with a few countries like North Korea violated, but this treaty overall effectively and significantly prevented the proliferation of nuclear weapons, and largely reduced the likelihood of the occurrence of nuclear warfare. If this treaty did not exist, there would probably be more countries owning nuclear weapons, and even small-scale regional warfare between small countries could become nuclear warfare, creating much more casualties and destruction and much worse impact. As the situation we currently face is similar to the issue of nuclear weapons addressed by that treaty as AI and nuclear weapons are both something that can induce the severity of warfare if being used, an analogy could be made between them, and a similar treaty could be signed. Doing so could restrict the military impact of AI within countries that currently possess the technology, preventing it from spreading to more countries. However, this is debatable as it could cause a technological monopoly.

Breaking the monopoly of high-level military-related AI technologies by powerful nations. This could be done by making these technologies accessible to smaller, weaker, or less developed countries so that the gap between them and more powerful countries would be decreased. By doing this, it would make it easier for them to defend themselves from military invasions or threats from more powerful countries. For instance, if Ukraine had better access to AI-related military technologies, its gap in military strength with Russia would be smaller, so that it would have been easier for them to defend themselves against Russian invasion, or it would have been a harder decision for Vladimir Putin to make to launch the invasion in the first place. This is contradictory to the solution above. Countries often choose to support either one based on their political stances, situations, and interests. More militarily powerful countries would be more likely to support the one above, while less powerful ones would support this one.

Keeping AI systems themselves under human control. This is a totally new perspective compared to the ones before, but is still a necessary one to consider because if AI weapon systems get out of human control, the harm would definitely be disastrous. Meanwhile, unconscious, accidental harm done by AI to humans is also something to prevent. This could be done through regulations to AI developers that special instructions of top priority that force any AI systems to prioritize the interest of humans or humanity over any other instructions, or companies and governments as a whole could control AI systems through the cloud or internet to prevent them as a whole doing anything that violates human interest. The Three Laws of Robots promoted by Issac Asimov could be referred to here. Moreover, it is crucial to establish a moral guideline both in the manufacturing of all AI systems and within scientists, companies, and governments that the role of AI technology

should never go beyond a mean of humans to create peace and prosperity, and that AI should never do anything that violates the interest of humanity as a whole.

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