DISARMAMENT & INTERNATIONAL SECURITY COMMITTEE (DISEC)

Topic 3: Monitoring the incorporation of artificial intelligence in warfare

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1. Definition of Key Terms

Artificial Intelligence (AI): the improvement of computer systems capable to achieve tasks regularly requiring human intelligence.

Pentagon: these are the headquarters of the Department of Defense of the United States of America. The Pentagon started many projects that deal with the incorporation of AI in warfare such as “Project Maven”.

DARPA: states for Defence Advanced Research Projects Agency. DARPA’s goal is the development of validated systems and technologies to use autonomous prototypes and sensing tools for warfare.

IBM: it stands for International Business Machines. This international company sells system hardware and offers consulting services for infrastructures. IBM has been dedicated to innovation in the AI industry worldwide.

Direct energy weapons: an umbrella term used to imply all technologies that can produce a joist of intense electromagnetic energy or atomic or sub-atomic molecules. A Directed-energy weapon may damage all rival facilities and equipment. Directed Energy Weapons are new military ammunitions that still need regulation but will be compelling for future warfare.

Cyber weapons: powerful strategic effectiveness of Cyber warfare which may cause significant death, destruction and catastrophic effects. The first cyber weapon was Stuxnet, a venomous software used to attack electro-mechanical equipment in the case of a major attack in Iran.

Hypersonic cruise missiles: a weapon that can travel at a speed bigger than Mach 5 (five times the speed of sound). These hypersonic weapons are an innovation of artificial intelligence and just US, Russia, China and North Korea are developing a long-rage hypersonic missile to create the most effective one.

Hypersonic Boost Glide vehicles (HGVs): (HGVs) are weapons lugged into the upper atmosphere with high-velocity rocket engines just like traditional ICBMs, but they’re often released at lower altitudes. HGVs use their speed and aerodynamic design to fly along the top of the atmosphere for up to 10,000 miles.

ML techniques (Machine Learning techniques): data analytics that teaches computers to do what living beings can do. Machine learning algorithms use methods to directly learn from data without relying on a predetermined equation as a model and the algorithm adapts to improve performance.

Cybersecurity: the protection of critical systems and sensitive information from digital aggressions. Cybersecurity systems are studied to cope with intimidations against accessible systems and applications, even if those threats originated from inside or outside of an organization.

2. Introduction

The incorporation of artificial intelligence (AI) into warfare has the potential to revolutionize military capabilities and increase the efficiency of military operations. However, it also raises significant ethical and strategic concerns.

One key problem with the incorporation of AI in warfare is the lack of accountability. Autonomous weapons systems, which are weapons that can select and engage targets without human intervention, raise concerns about who or what is responsible for the actions of these systems. There is also the potential for these systems to make decisions that are not in line with ethical or moral values. This raises questions about how to hold individuals or organizations accountable for the actions of AI in warfare.

Another problem with the incorporation of AI into warfare is the potential for an arms race. As nations seek to develop increasingly sophisticated AI systems, there is the risk that this could lead to a destabilization of the global balance of power and ultimately increase the risk of conflict. This could also lead to a proliferation of AI-powered weapons, which could make it more difficult to control and regulate their use.

There are also concerns about the potential for AI to be used to spread disinformation or engage in cyberattacks. For example, AI-powered bots could be used to spread misinformation or propaganda on social media or to launch cyberattacks against military targets. This could lead to confusion and chaos on the battlefield, as well as undermining trust in the integrity of information.

Finally, the incorporation of AI in warfare raises concerns about the impact on civilian populations. For example, the use of AI in targeted killings or drone strikes could lead to unintended civilian casualties. This could lead to public outrage and increase the risk of backlash against military operations.

Overall, the incorporation of AI in warfare raises significant ethical and strategic concerns that need to be carefully considered and addressed. It is pertinent to note that the development and use of AI in warfare are carefully regulated to ensure that it is used ethically and responsibly.

3. Timeline of Events

1950: During WWII Alan Turing already cracks the German's Enigma Machine encryption but this year, Turing states that computer programs can be taught to think like humans. He develops the "Turing Test to determine whether a computer has human intelligence. The experiment is so fundamental that it is still used today, not just in warfare, but also in health care.

1956: An American scientist called John McCarthy uses for the first time the definition "artificial intelligence" during a workshop at Dartmouth College to describe its development.

1958: The U.S. Department of Defense creates the Advanced Research Projects Agency (DARPA) to help innovation and development of military and industrial strategies.

1959-1962: Scientist Arthur Samuel coins the term "machine learning" and creates the first self-learning program, i.e. a game of checkers.

1960s: The U.S. Department of Defense begins to install computers which may do basic human gestures.

1970s-1980s: Researchers develop more expert systems with applications in the military.

1979: The Stanford Cart, the first computer-controlled autonomous vehicle, is created.

1991: The army of the US use the DARPA-funded Dynamic Analysis and Replanning Tool to set the transport of items to solve logistical problems. The US uses intelligent agents to support systems in the US Transportation and European Commands. Right from the start, this action has saved millions of dollars.

2006: Geoffrey Hinton uses the phrase “deep learning” to explain how new algorithms let computers recognize objects and text within images and videos.

2007: AI Professor Noel Sharkey warns of an “emerging arms race among high-tech nations to develop autonomous submarines, fighter jets, battleships, and tanks that can find their targets and apply violent force without the involvement of meaningful human decisions.”

2010: China becomes a top player in AI research.

2011: IBM’s Watson supercomputing system beats the two leading human players on the TV game show Jeopardy, demonstrating an ability to understand and answer nuanced questions that had previously stumped computer programs.

2013: Boston Dynamics unveils Atlas, an advanced humanoid robot designed for various search and rescue tasks. During the same year, a project in Japan has the goal of winning DARPA's Robotics Challenge Trials by performing disaster response tasks. This includes driving a vehicle, walking over debris, climbing a ladder, removing debris, walking through doors, cutting a wall, closing valves, and connecting a hose.

2014: The U.S. Department of Defense unveils “Third Offset Strategy,” positing that AI will define the future of warfare.

2015: Stephen Hawking, Elon Musk, Steve Wozniak, and 3000 other AI and robotics researchers call on governments to develop autonomous weapons in 2015. As a result, the UK government opposed a ban on lethal autonomous weapons but states that all weapons must be under human oversight and control.

2016: The U.S. Department of Defense increases its budget for investment in AI (from $5.6 billion in 2011 to $7.4 billion). During the same year, DARPA develops Sea Hunter, the prototype of a submarine able to autonomously patrol the seas for months at a fraction of current costs. Many scientists such as Julian Turner are still investigating its effects on submarine warfare.

2017: At the United Nations Convention on Conventional Weapons, 22 countries call for an outright ban on lethal automated weapons. Moreover, an article from Harvard’s Belfer Center suggests that AI has the power to be as effective as nuclear weapons.

Similarly, China presents a plan to achieve world dominance in AI which is predicted to be completed by 2030 under a program called "Next Generation Artificial Intelligence Development Plan".”.

In Russia, Vladimir Putin affirmed that AI will dominate the world in the next decades and predicts that future wars will be fought by drones and robots. Russians began improving their military robots with guns.

2018: Astronomers use AI to find 6,000 new craters on the surface of the moon.

4. Background Information

Artificial intelligence (AI) has the potential to revolutionize warfare by enhancing military capabilities and increasing the efficiency of military operations. However, the incorporation of AI in warfare also raises significant ethical and strategic concerns, as it has the potential to fundamentally change the nature of conflict.

One way in which AI is being used in warfare is through the development of autonomous weapons systems. These are weapons that can select and engage targets without human intervention. The use of autonomous weapons raises concerns about accountability, as it is unclear who or what is responsible for the actions of these systems. There are also concerns about the potential for these systems to make decisions that are not in line with ethical or moral values.

Another area where AI is being incorporated into warfare is through the use of intelligent systems for intelligence, surveillance, and reconnaissance (ISR). AI can be used to analyze large amounts of data, such as satellite imagery or intercepted communications, to identify patterns and trends that may be relevant to military operations. This can help military forces to make more informed decisions and respond more quickly to threats.

AI can also be used to improve the effectiveness of military logistics and supply chain management. For example, AI can be used to optimize the routing and scheduling of military logistics, as well as to predict maintenance and repair needs for military equipment. This can help to reduce costs and improve the efficiency of combat operations.

In addition to these practical applications, the incorporation of AI in warfare also raises significant strategic concerns. Some experts believe that the use of AI in warfare could lead to an arms race, as nations compete to develop increasingly sophisticated AI systems. This could lead to a destabilization of the global balance of power and increase the risk of conflict.

Overall, the incorporation of AI in warfare can enhance military capabilities significantly and increase the efficiency of military operations. However, it is imperative to note that the development and use of AI in warfare are carefully regulated to ensure that it is used ethically and responsibly.

5. Major Countries Involved

United States of America- The Department of Defense people proposes AI-related methods that embrace full descriptions of resources and investments related to the adoption of AI-enabled technologies. According to the US. Government Accountability Office (GAO), the defence has begun to spot and report on its AI activities, however with limitations, like the exclusion of classified activities. Defence officers affirm that these limitations are addressed in the ensuant phases of the AI inventory identification method. However, Defense has not nonetheless developed a high-level setup or roadmap that captures all needs and milestones. Such an idea would supply Defense with a high-level, end-to-end read of all the options necessary to accomplish the program's goal to produce a whole and correct inventory of AI activities to Congress and Defense call manufacturers.DOD organizations collaborate on AI activities, however, will additionally totally incorporate leading collaboration practices. Defence uses a spread of formal and informal cooperative mechanisms that GAO's previous work has known, like interagency teams. The defence has part incorporated leading collaboration practices, like distinctive leadership. However, Defense officers told the United States they're within the method of developing steerage and agreements that clearly outline the roles and responsibilities of Defense parties that participate in AI activities. By finalizing and issuing such steerage, Defense may facilitate and guarantee all participants agree upon responsibilities and higher cognitive processes on AI efforts across the department.

Source: GAO analysis of Department of Defense (DOD) information. | GAO-22-105834

Russian Federation- Russia is starting an AI strategy with heavy investments for developing its military, not only in state-sponsored actors but also in the private sector. Russia's increasing adoption of futuristic technologies and modern battlefield capabilities indeed Russia's AI strategy reach strength in 2014 when the Russian Ministry of Defence adopted the use of Robotic Systems for military use by 2030. In 2016, the plan for scientific and technological improvement of the country was accepted with the arrangement of the making of systems for Big Data. However, Russia is still behind US and China in terms of AI abilities, according to a report by the Center for Naval Analyses. Still, Russia used this technology for weaponizing itself for advanced cyber capabilities and became relevant for the international development of warfare. Russia has a lot of capabilities in advanced weapon systems, it is common to presume its rising in AI-enabled warfare. As a matter of fact, in 2018 the Russian MoD present a collaboration with the Ministry of Education and Science and the Russian Academy of Sciences, which have focused on innovative and AI-driven solutions. The next year, the AI Roadmap estimated an investment of $ 5.13 billion, which was later revised to $ 3.83 billion. Still, nowadays Russia is improving AI in its army and the authorities have emphasized the importance of integrating robotic weapon systems. This, according to the National Defence Management Centre was fundamental coordination between various military units.

Source: GAO analysis of Department of Defense (DOD) information. | GAO-22-105834

China- In 2020, after the Fifth Plenary Session of the 19th Central Committee of the Communist Party of China, Xu Qiliang proposed the promotion of the development of mechanization and informatization. Xu also underlines that China needs a solution for the acceleration of the improvement of technology systems to conceptualize and win a new type of warfare. A year later during the 20th Party Congress Beijing issued an arduous program to make China at the top of the AI warfare industry by 2030. Xi Jinping, the Secretary General of the CCP, has opened a strategy for the Chinese military, the People's Liberation Army (PLA). The PLA's strategic choices could influence the direction of Chinese military innovation and a lot of scientists and researchers are starting to debate and engage with safety and technical issues, but also legal and ethical considerations. However, Guo Ruobing, a member of the National Security College of the National Defense University of China, is deeply convinced that the PLA should have a unique way of powering warfighting, following Mao Zedong's ideals. He believes that only in this way the PLA may have success in military abilities to introduce a new force in the ordinary era. According to the Center for International Strategic and International Studies, China will develop its AI industry and some experts believe that China is on its way to becoming the most powerful one in the world.

North Korea- Since the end of the Korean War, North Korea has developed an asymmetric military plan on weapons and strength because its conventional military power is far lower than that of the US and South Korea. So in peacetime, North Korea launches low-intensity unconventional operations to disrupt the peaceful status quo and level up Pyongyang's control. For example, North Korean soldiers tried to assassinate the South Korean President, Park Chung-hee on 21 January 1968. This unsuccessful homicide is remembered as the Blue House raid.

In the past, North Korea's strategy has always focused on nuclear, chemical, and biological firearms. Still, the aspects of cyberspace and cyber warfare have accepted North Korea to pay more attention to the innovation of cyber abilities. At the same time, the international community has not imposed any sanctions against North Korea for its cyber activities. This is largely expected to the difficulty of attributing attacks to North Korea. North Korea's successful cyber strategy states that it may accomplish its strategy pillars without any threats of increment for economic sanctions by developing its cyber capabilities, instead of solely focusing on conventional weapons.

6. UN Involvement

The United Nations has been involved in monitoring the incorporation of artificial intelligence (AI) in warfare through its various arms control and disarmament committees and agencies.

One of the key ways in which the UN has addressed the issue of AI in warfare is through the development of international norms and guidelines. In 2018, the UN General Assembly adopted a resolution on lethal autonomous weapons systems, which called for further discussions on the development and deployment of these systems. The resolution also established an open-ended intergovernmental group of governmental experts (GGE) who will consider the ethical, legal, and societal implications of lethal autonomous weapons systems and to consider options for addressing the challenges posed by these systems.

In addition to these efforts, the UN has also established a Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space (UNGGE) to discuss the potential risks and challenges posed by emerging technologies, including AI, in the context of outer space. The UNGGE has held several meetings to discuss these issues and to consider potential transparency and confidence-building measures that could be put in place to address these challenges.

Overall, the UN has played an instrumental role in monitoring the incorporation of AI in warfare and in promoting the responsible use of these technologies. It has done so through its various arms control and disarmament committees and agencies, as well as through the development of international norms and guidelines.

7. Official documents and treaties about the issue

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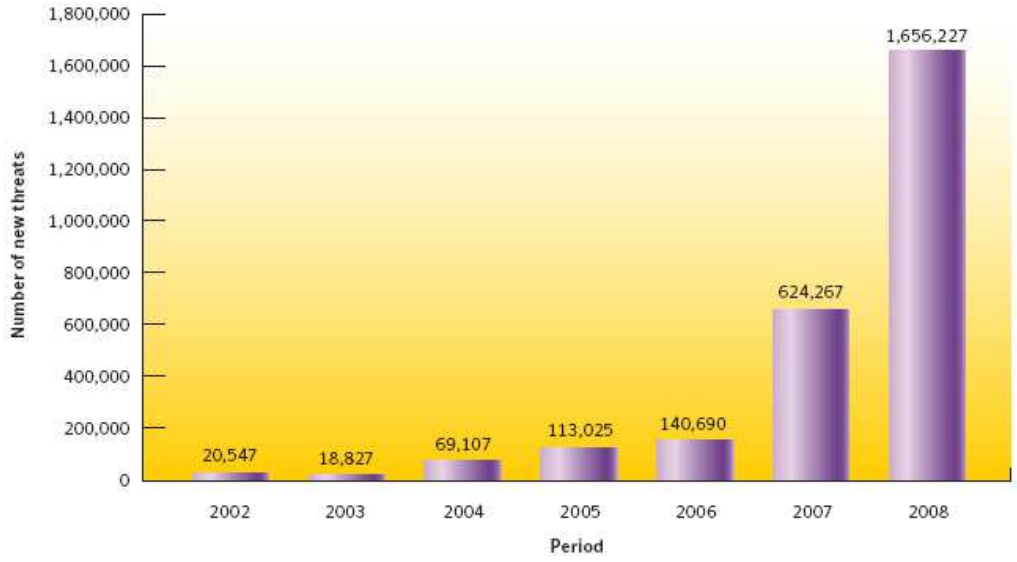
8. Impact of the issue

Artificial Intelligence is having a huge impact on international warfare. Technologies such as big data, robotics, and the Internet of Things, will remain technological innovators for some time to come.

Artificial Intelligence will have a huge impact on tomorrow's generations, especially in military operations in the future. However, it is simple to recognize that AI systems may cause disastrous outcomes if critical decisions are made. AI's ethical implications in war are one of the most critical ethical issues that society is still facing.



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