How Military Use Artificial Intelligence and Robotics in Fighting Terrorism

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Abstract

Artificial intelligence (AI) and robotics are two technological areas that have grown rapidly and have been incorporated into various military operations by various governments worldwide. Artificial intelligence in the military is used to collect and analyze intelligence and data, command and control, and various cyber operations. On the other hand, Robotics is being used in logistics for different autonomous and semi-autonomous vehicles. This research paper explores how the military has applied technological advancements in the artificial intelligence and robotics area for national security reasons and to fight terrorism extremists (Burton & Soare, 2019). The military departments of world superpowers such as the United States and China are at the forefront of advancements in this area. This paper will discuss how the United States will benefit from using AI and robotics in its army to advance its war against the threat of terrorism. However, since AI is still a new technology, it faces some challenges and requires further modifications to suit better the war's complex needs and requirements against terrorism. Robotics are also not fully advanced, but due to the tireless efforts of present-day scientists, this area is quickly advancing. There are also varying views among expert analyses on the implications of technology in the fight against terror, where some think that on-site combat is the most effective. In contrast, others argue that incorporating AI and robotics will prove to be monumental over time.

Keywords: Artificial intelligence, robotics, war, terrorism.

Introduction

Artificial intelligence (AI) can be defined as a system developed using computer software and hardware that solves complex tasks requiring human abilities such as perception, cognitive thinking, and communication with minimal human oversight. AI gains experience and improves when exposed to data to approximate cognitive tasks through techniques such as machine learning (Hoadley & Lucas, 2018). AI has been incorporated in robotics to enable machines to perform human-like tasks such as planning and decision making, even in unpredictable situations. AI systems are made up of complex cognitive architecture and deep neural networks. The AI systems are programmed to analyze massive data sets at substantial data rates and identify patterns that are impossible for humans but crucial in the war against terrorism.

Artificial intelligence has been used in counter-terrorism operations by various

governments, majorly for data collection. Extremist terrorists have become skilled in using the internet and technology to advance their agenda and undertake their heinous acts of terror. It is therefore not sustainable to use traditional means to fight them. AI helps to identify them and prevent their plans before they are executed. AI systems sort through millions of random data and process them to provide relevant intelligence authorities with information about attack methods. When combined with physical surveillance, AI systems prove very effective since they learn and adapt to recognize suspicious behavior. Facial recognition software encoded in AI systems has helped in the capture of known terrorists.

AI is proving to be essential for matters concerning national security. Advancements in robotics have made it safer to operate in volatile regions using robots and autonomous vehicles (Coyne & Hall, 2018). Robotics and artificial intelligence, when combined, make the war against terror more efficient since these systems can analyze and respond to attacks faster than humans and reduce the instances of loss of lives. However, it should be noted that these systems do have downsides and ethical implications. AI systems tend to lack proper judgment and raise false alarms that lead to wrongful arrests, and due to increased instances of such events, sometimes these warnings are ignored, leading to calamities. These systems also pose the threat of invasion of privacy for the data of private citizens, which is a major concern for many.

Literature review

The history of artificial intelligence can be accredited to renowned mathematician and pioneer computer scientist Alan Turing. In his 1950 essay, "Computing Machinery and Intelligence," Turing implied the thought of machines having the ability to think. He designed a method he called an imitation game, today known as the Turing test. He insinuated that a computer could answer questions the same as a human or even better. Research and development in the field of artificial intelligence began in the 1990s. In 1997, IBM's intelligent system christened Big Blue defeated the then world chess champion, Gary Kasparov. The research has been developed well into the 21st Century with applications in military systems and intelligence collection. The research results have been prudent in facial recognition software embedded in closed circuit surveillance and speech recognition despite the numerous languages and sound patterns in the world.

United States, China, Russia, and India are all nations that have advanced artificial intelligence systems and are currently incorporating them into their respective militaries. AI systems have been embedded in warfare platforms across the land, water, space, and air. They have enhanced performance with less human input maintaining their autonomous nature while carrying out coordinated attacks (Coyne & Hall, 2018). Cybersecurity has also been improved with the use of artificial intelligence in military systems. Leakage and loss of classified information have been prevented using artificial intelligence systems that learn previous attack patterns and develop countermeasures. Logistics and transportation of essential military goods, arms, and troops have been eased by incorporating artificial intelligence and robotics in the military. They help the military

detect anomalies and malfunctions and further reduce operational costs.

AI systems have been used to calibrate and enhance the accuracy of military hardware by analyzing reports and data on the position of targets. AI systems further deduce the probability of enemy behavior, vulnerabilities, weather conditions and further devise approaches and mitigation measures. Robotic surgical systems (RSS) have been developed to provide healthcare for the wounded on battlefields (Bhatt, 2018). These systems analyze medical records of soldiers and provide diagnoses and critical levels of injuries sustained. AI systems and robotics have been developed for conducting combat training and battlefield simulations. The AI systems render models of war scenarios that help soldiers get acquainted with possible procedures on the battlefield to train and get prepared for them. These systems are also used for warfare analysis to determine possible outcomes.

In the war against terrorism, artificial intelligence and robotics have been used to gather intelligence to monitor threats and increase situational awareness. Unmanned aerial vehicles, also referred to as drones, are used extensively in this area to identify and track potential threats and carry out necessary measures such as targeted strikes (Bhatt, 2018). The use of robotics also increases the efficiency of military personnel and reduces the chances of losing lives. AI systems can process large data sets from numerous sources simultaneously, which is not humanly possible (Zhang & Dafoe, 2019). Therefore, they are essential in the fight against terrorism as they enable military personnel to recognize patterns of attacks

and derive correlations, thereby preventing future occurrences of terror attacks.

Extremist terrorists in India carried out an attack on hotels using Blackberry phones. This attack prompted government officials and military personnel to adopt artificial intelligence in their counter-terrorism operations. Terrorism in the present age has become highly digital with the rise of new threats such as cyber-crime networks. Military officials in India adopted the use of Artificial Neural Networks together with Social Network Analysis for purposes of facial recognition (Fawkes, 2017). These tools analyze terrorist networks for deceptive behavioral patterns in social media sites and also the dark web. India also established advanced AI-based data collection stools such as the National Intelligence Grid (NATGRID), the Crime and Criminal Tracking Network and Systems (CCTNS), and the Lawful Intercept and Monitoring (LIM) system. These systems enable the Indian Defense Force to have a database that tracks and geotags terrorist activities and develops countermeasures through predictive algorithms embedded in the AI systems (Zhang & Dafoe, 2019). The government of India also set up a research and development agency for AI and robotics known as the Center for Artificial Intelligence and Robotics (CAIR) to reduce the risks to its soldiers during counter-terrorism operations (Fawkes, 2017). The government has also begun an initiative to enhance the problem-solving prowess of the defense forces before and during terror calamities. AI is expected to help avert future occurrences such as the Mumbai attack in 2008.

Challenges

Artificial intelligence and robotics, although effective in the war against terrorism, still have some shortcomings. Artificial intelligence systems might be susceptible to dangerous errors such as the inability to distinguish friendlies and combatants, thus proving to be less accurate than human operators (Reid, 2016). They might also develop malware and anomalies due to external hacks. It is also predicted that the AI systems may adapt and develop emergent behaviors which may cause them to react dangerously. Due to the rapid development and increased demand for artificial intelligence technology, there may be a global arms race and escalation. Many nations across the world have realized that robotics and artificial intelligence are the future warfare fronts (Reid, 2016). Considering that AI and robotics reduce human casualties, it might encourage military personnel to undertake greater risks against differing countries, thereby resulting in an escalation. Military officials might rely heavily on these AI systems neglecting the need for human input and common sense, forgetting that sometimes the systems can be erroneous. This scenario is known as the automation bias.

Ethical considerations have also been realized regarding the use of artificial intelligence and robotics. Critics against AI systems and robotics argue that weaponized artificial intelligence is incapable of differentiating a fearful civilian and an enemy combatant and may cause unnecessary loss of lives. The critics further state that these systems lack proportionality, which can lead to them causing massive collateral damage. AI and robotic systems may cause an accountability gap, leading to a loss of moral value. The systems can make their own decisions, leading to liability claims with no perpetrator being blamed on. They also can lead to numerous false alarms due to miscalculations.

The autonomous nature of AI systems and robotics makes them possess human characteristics but no human values such as emotions. They might then end up committing extrajudicial killings while utilized in the fight against terrorism. The use of these systems has thereby presented a threat to human dignity. AI systems further pose a threat to personal privacy, among other human rights. Malicious government officials can use them to surveil their citizens or censor information under the pretense of national security. AI systems have been used to spread fake news, start radical revolutions, discriminate against minority groups using biased algorithms, and undermine democratic social stability to achieve undesirable effects.

Recommendations

Benefits achieved by using artificial intelligence and robotics in the war against terror may be undermined by the challenges that arise. As a means to prevent this from happening, some recommendations can be considered. Necessary precautions need to be taken in order to avoid adverse outcomes from the use of AI and robotics in the military. One essential precaution is ensuring the presence of a human to mitigate operational errors and ethical risks that the systems may cause. A human is necessary to ensure that the machines stick to the rules of engagement, protect the dignity, and act in a humanitarian manner. The human complements the effectiveness of the AI system for better results and can also provide deployment assistance for the machines (Dobrescu, 2018). Human involvement also ensures meaningful

judgment and accountability during operations. Human involvement in the operation of AI systems should be ensured at all phases, target-selection, and engagement, and the system's life-cycle beginning from system design to help it acquire and learn some human attributes.

AI systems should be restricted to specific tasks, should have constraints on active time, and parameters limiting their movement should be developed. These are all measures to ensure that these systems would cause minimal damage if they turned rogue or developed divergent behaviors causing them to act dangerously. Measures to guarantee reliability and predictability should also be put in place to ensure that consequential systems work as they are designed and perform only their specified duties. The systems should also be designed to guarantee transparency in the ways they operate to ensure they comply with legal requirements. Artificial Intelligence systems and robotics will also have to be in line with the international regulations for such systems and withstand political commitments and treaties that concern verifiability and reciprocation in the event of escalation.

How the research is going to help the United States

Research in artificial intelligence is bound to be beneficial to the United States Department of Defense (DOD), specifically the Defense Advanced Research Projects Agency (DARPA). Using AI, the US military can identify malfunctions and anomalies in their combat vehicles using a specific AI system designed by IBM, called Watson. DARPA uses an AI system known as Target Recognition and Adaptation in Contested

Environments (TRACE) to identify dangerous targets who are threats to national security (Gulhane, 2018). The US Army and Navy have used AI and robotics by companies such as Orbital ATK to perform simulations of battlefields and war scenarios. In collaboration with the US Veterans Administration, IBM has designed an AI system to assess soldiers' health issues known as the Electronic Medical Record Analyzer (EMRA). Robotics have been further used as prosthetics for soldiers who sustained battlefield injuries. DARPA is developing a robotic submarine system that incorporates artificial intelligence in its operations to perform functions such as detection of underwater mines and sea warfare, reducing human casualties (Dobrescu, 2018). UAVs in the fight against terrorism are set to be more efficient in targeting terrorist targets without actually having boots on the ground. Military defensive and offensive strategies will also be more efficient and calculated using algorithms in the AI systems to maximize the effect.

Conclusion

AI and robotics systems are bound to intensify the war against terrorism, but the risks associated with further advancements in this area have to be appropriately studied and mitigated. Ethical issues on the use of these systems also have to be considered and safeguards enforced to ensure control. It has to be noted that even with the effectiveness of this kind of technology, it has to be guarded appropriately to ensure it doesn't fall into the wrong hands and thereby cause more damage than good. Given the various applications of AI and robotics, it would be prudent to find other uses in

multiple fields such as education and medicine and not only focus on military operations and warfare.

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