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Artificial Intelligence in the United States Military: Exploring Lethal Autonomous Weapons

Introduction

The days of waging and winning war by simply having the largest military are over. A military must be trained, highly skilled, and possess weapons that will undeniably overpower any adversary. Nations, especially China and the United States (US), have accordingly begun producing weapons that will ensure military readiness in response to this changing landscape. An asymmetric investment in artificial intelligence (AI) has generated an unprecedented rush to master the technology, creating the potential for a widespread integration of autonomous machines to assist with the execution of military missions. The following analysis will explore lethal autonomous weapons (LAWs) within the context of the US military, as well as the potential benefits and detriments associated with them. Although LAWs are presently quite controversial, it will be argued that completely banning them is premature and would likely be disadvantageous to the US and its military.

Defining LAWs

Currently, there is no universally accepted definition of a lethal autonomous weapon; this stems, in part, from the lack of consensus about what constitutes weapon autonomy. Some scholars argue that autonomy is the ability of a machine to make a lethal decision independently, while others believe it is when a system is able to perform any part of the decision-making

process, without assistance, to engage and destroy a target.[1] The United Kingdom's Ministry of Defence defines an autonomous weapon as a system that is capable of understanding higher level intent and direction; from this understanding and perception of its environment, such a system is able to take appropriate action to bring about a desired outcome; it is capable of deciding a course of action from a number of alternatives without relying on human oversight and control; while the overall activity of the system will be predictable, individual actions may not be.[2]

Autonomy can further be divided into three categories: human-in-the loop, human-on-the-loop, and human-out-of-the-loop. The first include military weapons that can select targets and deliver force only with human command, such as a drone; the second include those that perform similar actions, but under the oversight of a human who can override its actions if necessary. An example of this would be the robot employed on the Korean Demilitarized Zone, which uses a camera and pattern-recognition to determine if an intruder is present; it first issues a verbal warning directing the individual to surrender, after which the robot can fire automatically or remotely by a soldier the robot has notified. The US military currently employs the first two categories in combat situations, and it is estimated that upwards of thirty other nations have developed such human-supervised systems.[3,4]

The third variety, human-out-of-the-loop weapons, are capable of identifying a target and delivering force without any human interaction or direction.[4] This category is the most worrisome to military strategists, policymakers, and ethicists alike, each of whom is concerned about the consequences of giving machines so much power. With developments in AI quickly advancing, however, it is quite likely that considering autonomy will be critical in globally deciding the level of authority to grant to machines.

Implications of LAWs

Much uncertainty exists about the future of AI - many are optimistic that it will advance mankind in an unprecedented way, while others believe it will devastate the economy and leave many unemployed. A concept that is critical to incorporate into discussions about AI is understanding that there are positive and negative outcomes to everything, and AI is no exception. As such, it is important to explore both the potential advantages and disadvantages of autonomous weapons.

LAWs could prove to be significantly valuable to the US military. The Department of Defense, in its *Unmanned Systems Roadmap: 2007-2032*, has advocated for increasing the use of military robots and autonomous weapons for multiple reasons.[5] Its primary justification for employing them would be because of the tactical advantages that they would have. Militaries have long used robots to fight alongside people, but the caliber of an autonomous weapon is such that it would categorically outperform any human soldier. Firstly, humans require many things that robots do not; soldiers need sleep, food, and shelter, while a machine can easily continue to execute its mission without such necessities. Further, human soldiers are often placed in dangerous physical environments that threaten their safety and security, which again emphasizes their inferiority compared to machines. Unlike humans, robots are not as sensitive to such conditions, and would be able to navigate hazardous landscapes more effectively. By removing humans from these missions, and instead using LAWs, it would undoubtedly reduce the number of human injuries and casualties.

Similarly, amplifying the use of LAWs and allocating soldiers towards other military duties requiring human attention could be quite cost-effective. There are many areas in which

these financial benefits would be realized, namely the costs of deployment, healthcare, and maintenance expenses like salaries, housing allowances, and other benefits & entitlements. According to the Center for Strategic and Budgetary Assessments, the cost per service member deployed to Afghanistan was $2.1 million in FY 2014.[6] Although the upfront cost of a military weapon like a drone or autonomous robot might be higher, it is more economically justifiable long-term; for example, the General Atomics MQ-1 Predator, which is a remote piloted aircraft previously operated by the US Air Force, cost roughly $4 million per unit; however, it was also used and maintained for more than 24 years, while human deployments typically average about 8 months.[7,8] On top of this, many soldiers return from war experiencing unsettling side effects of combat, and require considerable support both financially and medically.

Lastly, although it is one of the most controversial points about LAWs, some military personnel believe that they are actually more ethically justifiable compared to using human soldiers. As discussed earlier, humans are impacted by high-stress environments, and have many mental and physical shortcomings that robots do not. In cases of extreme stress, human actions can be unpredictable; to that end, Roboticist Ronald Arkin has suggested that autonomous robots are able to act more “humanely” because they do not have the self-preservation behavior that humans do, nor are their decisions directly impacted by emotion or instinct.[9] Autonomous robots will be able to process more incoming information, and do so more effectively than any human could. In the case of offensive arterial weaponry, for example, autonomous weapons would be able to fire with a genuinely random pattern that might confuse the enemy, whereas humans follow personal judgment that is likely clouded by subjectivity and implicit biases.

The case against LAWs is strong, however. Detaching humans from the process of making lethal decisions appears morally reprehensible, not just because of the literal dehumanizing aspect of allowing a machine to have power over someone else's life, but also because of the potential consequences that might arise if an autonomous weapon does not function properly. Because of this, a myriad of leading AI and robotics researchers have penned an open letter denouncing their participation in assisting the US military, or any other military for that matter, with developing what they view as a weapon that will carry out genocide and perpetual warfare. The letter, signed by figures from Google, Tesla, and Harvard, also calls for a worldwide ban on autonomous weapons, advocating strictly for AI research that will benefit humanity.[10]

Allowing autonomous weapons to decide which lives to take and which to spare could be catastrophic to global stability and security. The primary concern raised by those opposed to developing autonomous weapons is that they will be required to distinguish between civilians and enemies, which is known as the Principle of Distinction outlined in International Humanitarian Law.[11] The inability of a machine to differentiate between these two categories could result in unintended casualties and other unexpected damage. Providing lethal authority to a machine could expose vulnerable populations to extreme violence on an unprecedented scale. This problem creates two other significant challenges, specifically that such violence could fuel perpetual warfare and that assigning culpability would be incredibly difficult. It is important to note, however, that humans also make these mistakes, and the purpose of implementing LAWs would be to decrease the prevalence of that to ensure that enemy targets are identified with a greater degree of certainty that humans could possess.

With advancements in AI technologies that are now able to make their own decisions, new challenges have arisen that highlight the damage those systems can inflict. In the case of self-driving cars, for example, the question is often posed about who would be responsible should the car have an accident while in automatic mode; when lethal authority is delegated to a machine, individuals want to know who would be accountable should a LAW make the wrong decision. As it stands, accountability is clear; the soldier who makes the decision is directly responsible, while those superior to them might be culpable as well if they were involved in that decision-making process. Given how smart AI machines are supposed to be, but also their lack of common sense and subjective understanding, mapping accountability would prove to be considerably more challenging with an autonomous weapon.

Moving Forward

With scientists, military personnel, and international leaders swearing off autonomous weapons, and even the research and development of them, the global narrative surrounding the technology is contentious. In the face of such drastic moral objections, the likelihood that nations will collectively reach a consensus about LAWs is low, meaning that nations will continue to develop this type of technology in isolation from international input. As such, it would be premature and dangerous to US national security to impose a ban limiting the research behind and development of autonomous weapons before their utility and capabilities are fully understood. Most importantly, this is because foreign militaries are already developing this technology, and a ban on LAWs would put the US military at a strategic disadvantage, weakening its readiness for combat.

The most problematic aspect of placing a ban on autonomous weapons is that it severely limits the possibility of proactively considering the ethical and moral concerns posed by the very people who have the ability and resources to solve them. If anything, AI and military researchers who have such objections to this technology are the best people to be involved in its research, development, and production. It would not be in the best interest of the US or its military to implement a technology it does not fully understand, and without the solutions that might come from such prominent university and industry officials, autonomous weapons will continue to suffer from these weaknesses.

Further, in advocating for the use of autonomous weapons in the US military, it is important to mention that they should be developed in accordance with international regulations governing human rights, war, and armed conflict. Any LAW that is employed by the US military is required to comply with International Humanitarian Law, of which the basis are the Geneva Conventions that outline acceptable weapons, the protection of civilians, and respect for humanity. Until LAWs can be developed to fully comply with these conventions, they should not be allowed in combat. The primary guideline of concern related to autonomous weapon implementation is that parties of conflict must be able to distinguish between the civilian population and enemy combatants at all times, and must take adequate precautionary steps to ensure compliance.[12] Because of the importance of following these conventions, the unwillingness of scientists and researchers to be involved in at least attempting to ethically research and develop autonomous weapons is unfounded. The US military *needs* these figures to help pinpoint weaknesses before they ever come to fruition on the battlefield, and their hesitation only fuels adversarial advancement and US military uncertainty.

Conclusion

From a military perspective, the interest in weaponizing AI is not surprising. Its potential advantages for improving the speed, stealth, and effectiveness of military operations are unparalleled; in the face of rising defense costs, employing AI as a weapon would significantly decrease spending and allow existing personnel to dedicate their time to tasks that currently require human attention alone; with nations like China and Russia also racing to perfect autonomous weapons, the US must do so as well, while also incorporating moral concerns about developing the technology along with other important tactical and strategic considerations. Hopefully, discussions about LAWs and the impact they might have on the globe will continue to develop in a way that placates militaries, industries, and the public alike.

*The contents of this paper reflect the author's views and are not officially endorsed by the United States government, Department of Defense, or Department of the Air Force.

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