Designing with Conscience:
Engineering Against Autonomous Weapons Systems

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Abstract

This report examines ethical concerns surrounding the implementation of autonomous weapon systems in war. It highlights the risks these systems pose to global stability, safety, and human rights. Mines Action Canada, CRAiEDL, and University of Ottawa students have collaborated to aid in educating people on this topic.

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1. Introduction

What happens when soldiers are replaced with autonomous weapon systems (AWS)? The stakes in artificial intelligence are high when coupled with AWS. As many start to seriously consider the possibility of using these weapons, the risks become more urgent. Canadian Robotics and Artificial Intelligence Ethical Design Lab (CRAiEDL) and Mines Action Canada has teamed up with University of Ottawa students to educate people on the dangers of autonomous weapon systems. Key concerns this report covers include lowering the threshold to war, lack of use in human judgement and understanding, and loss of meaningful human control.

2. Client Needs

2.1 Lowering the Threshold to War

Autonomous weapons have lots of implications and concerns, but one that particularly stands out is the lowering of the threshold to war. The use of autonomous weapons brings the ability to start wars with a decreased cost, in terms of human lives. The introduction of these weapons could mean wars not fought by man, but by machine. This shift inherently reduces the risk for any side using these weapons, and with this, war would seem much more appealing to those who wage it. (*Stop Killer Robots: Research and Monitoring*, n.d.)

This problem brings more than just war fought by machines, as it also dehumanizes the idea of war itself. With fewer to no human stakes on the line, decision-makers might view war as more of a technical exercise rather than a moral or political one, further pushing the decision to engage in hostilities ever further.

2.2 Lack of Human Judgment and Understanding

Another important concern expressed by the client was the lack of human judgement and understanding associated with AWS. The functionality of autonomous weapons is determined solely by programmed algorithms supplemented by sensor data, without the need for human input. Therefore, by design, these autonomous systems do not possess the necessary human qualities such as empathy, moral reasoning, or contextual awareness, to make correct decisions on the battlefield. The lack of human judgement and understanding increases the risk of unpredictable behaviour and mistakes in target identification, which directly undermines humanitarian laws and ethics. Furthermore, the rise of artificial intelligence and machine learning worsens this issue, as the decision-making processes of autonomous systems are increasingly complex and opaque. This makes it more difficult to understand the choices an autonomous system makes, since the algorithms they operate on differ fundamentally from human reasoning.

Thus, there is a need to explore applications of autonomous robots that remain human-centered. This should also emphasize decision-making that is ethical as well as transparent.

2.3 Loss of Meaningful Human Control

The rise of a very substantial loss of meaningful human control in autonomous weapon systems raises burning ethical and practical questions, which we must not ignore. These machines without significant human intervention operate on algorithms and raw sensor data. At critical junctures of decision making, such as target selection and engagement, these high-tech weapons do not require human assistance. It is this very absence of supervision that can allow grievous mistakes for example, wrongly identifying one's adversary or contravening international humanitarian law. Machines lack the ability to feel, to judge morally, and to contextualize and work through perplexing ethical dilemmas in warfare. With the cascading evolution of artificial intelligence algorithms and machine learning, decision making could become even more complex than it already is, making accountability difficult to clench. This shift to an automated battlefield threatens to subvert the civilized ideals that have dictated our conduct thus far and render conflict investigation more likely, with greater instabilities for the world. Human oversight must be retained, the systems workings need to be made transparent, and a tight ethical framework must be in place to deal with their deployment.

3. The Problem Statement

Mines Action Canada and CRAiEDL seek to reconceptualize a machine originally designed as a model for autonomous weapons to prevent the training of students to program autonomous weapons. This solution is needed to spread awareness of the associated ethical dilemmas in using AWS in war, involving students in creating problematic products and to mitigate the misuse of robotics and AI research regarding the risks to human lives and global stability.

4. User Benchmarking

Ethical concerns about AWS have been a focus in both the public eye and international debates, however a firm stance has yet to be taken, and progress has been slow. The "Stop Killer Robots" campaign started by NGO in 2013 has been working against the dehumanization of people and the rise of AWS through AI, aiming to convince governments and the United Nations to outlaw the development of lethal AWS, although many countries are not on board with this, claiming existing international law is enough to consider ethical implications. (McVeigh, 2013) In December 2023, the UN General Assembly requested the Secretary-General to address the ethical challenged posed by AWS. (Blanchard, 2024) While this demonstrates political direction against AWS, forum changes alone are not enough to stop the destructive path AI in war is headed.

5. Conclusions

In conclusion, the rise of autonomous weapons is a danger to all, especially civilians. While these technologies may promise no soldier fatality, they make it easier to start a war, they lack judgement as they base decisions off algorithms, and these systems don't have human intervention as they are artificially intelligent. It is essential that people are highly educated on these risks and that the use of autonomous weapons in avoided as much as possible for war purposes.

6. Bibliography

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