Undergraduate Thesis Prospectus

Interfaces and Web Applications for Military Systems

(Technical Research Project in Computer Science)

The Controversy over Lethal Autonomous Weapons

(Sociotechnical Research Project)

by

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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General Research Problem

How can weapons systems' efficacy be improved without exacerbating risks to noncombatants?

By improving weapons systems' efficacy and selectivity, digital systems can make warfare less destructive and less hazardous to noncombatants (Umbrello et al. 2020). Yet such systems can also lower the threshold to war, inviting more military action and thereby negating such benefits (Drennan, 2017). By reducing enemies and noncombatants to remote, digitized abstractions, they can also reduce combatants' reluctance to resort to violence (Korac, 2018). Highly automated systems, such as lethal autonomous weapons (LAWs), also introduce controversial problems of human responsibility for weapons that operate without direct human supervision and control (Sparrow, 2007; Swoboda, 2018).

Interfaces and Web Applications for Military Systems

How can user interfaces and web applications be improved for military usage?

I am taking CS 4991 and will review the completed computing learning experience of my internship where I did user interface work for the United States Marine Corps. During this internship, my task was to research possible ways to improve the radio software that was currently being used and make a marine-friendly web application that had the same capabilities of this software.

In fast-paced battle, having to use inefficient or complicated technology can cause severe problems. In situations where seconds can cost someone their life, there should be great emphasis on creating technology that is easy to use. If the system is complicated, it will most likely also be time-consuming or take months of training for the soldier to become skilled

enough to use it. By making systems like these easy to use, the military can save time, both in training and in battle, and possibly even lives.

The Controversy over Lethal Autonomous Weapons

How, since 2010, have the advocates and the critics of proposals to ban lethal autonomous weapons advanced their respective agendas?

Autonomous weapons systems are controversial. Some weapons systems now apply artificial intelligence (AI) to "replicate the human decisionmaking process …, outside the confines of a script" (Bills, 2015). With this change, how have advocates and critics of autonomous weapons advanced their respective agendas?

Critics of LAWs typically favor banning them on legal or ethical grounds (Akimoto, 2019). Defenders note LAWs' advantages, and argue that they should be regulated, not banned (Akimoto, 2019). Both LAWs and human soldiers may kill noncombatants, but to many critics of LAWs, the robotic killing of noncombatants is more problematic because the chain of responsibility is less clear. The Women's International League for Peace and Freedom (WILPF) contends that "a national policy has become necessary to effectively regulate the proliferation of killer robots which threatens national peace and security" (ADR Daily, 2019). Warning of LAWs' hazards, WILPF has publicized demands to ban them.

Some contend that because LAWs can violate international law, they must be regulated (Klare, 2019). The Heritage Foundation, however, argues that regulation would be ineffective; instead, LAWs should be programmed to comply with laws of armed conflict (Callender, 2017). Groves (2016) has proposed a LAWs manual. The UN Convention on Certain Conventional Weapons (UN, 2001) establishes international standards that can apply to LAWs.

According to Verdriesen et al. (2020), a weapons system that is under "meaningful human control" can "respond to ... the relevant moral reasons of the humans designing and deploying the system and the relevant facts in the environment in which the system operates," and its decisions are "traceable to a proper technical and moral understanding." Can LAWs meet this standard?

The Campaign to Stop Killer Robots demands "national policies that embrace and explore the concept of meaningful human control and reject the development of autonomous weapons" (Lawry, 2015). Egeland (2016) argues that for now at least, human control is necessary because the "technology available today is by all accounts far away from a scenario in which robots would be capable of engaging legitimate targets and not civilians."

Critics of LAWs warn that if the weapon chooses the target, human accountability is diminished. The Campaign to Stop Killer Robots objects on moral grounds to weapons systems that kill but that humans do not operate, thereby depersonalizing warfare (Lawry, 2015). They push for international law to ensure meaningful human control.

Because LAWs are less accessible to smaller or poorer countries, they can increase the international technology gap. To limit war casualties, the Observer Research Foundation (ORF) favors regulation of the conduct of war, including restriction of LAWs to mitigate the technology gap (Mohanty, 2016).

Others criticize LAWs on practical grounds, arguing for example that LAWs' programming and data requirements are inconsistent with the pace of combat (Roff, 2014; Kallenborn, 2021).

Defenders of LAWs note their practical utility. Umbrello (2019) argues that because war degrades the human psyche, LAWs are preferable. Under the stress of combat, soldiers may commit atrocities; LAWs do not.

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