Needs Identification and Problem Statement

GNG 1103- Engineering Design

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Group 8

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1. Introduction

Mines Action Canada is a humanitarian disarmament organization that works to “end suffering caused by landmines, cluster munitions, autonomous weapons, explosive weapons and nuclear weapons”. Research and development of these kinds of weapons can lead to international divisions and an arms race in development and deployment of this technology (hacking, stealing, reverse engineering technology from other countries, etc.). Autonomous weaponry will ultimately lead to civilian distrust and casualties because of any possible biases or failures in the machine's algorithms and sensor data.

Mines Action Canada has recruited our team to create a curated VR experience that shows how people would adapt to a world in which autonomous “killer robots” are commonplace in civilian areas. This project aims to persuade decision makers in parliaments around the world and in the UN general assembly to act now and preemptively ban killer robots before weapons manufacturers begin developing them.

Autonomous weapons use sensor data inputs to form and eliminate targets without confirmation or intervention from a human being. These kinds of weapons raise several questions about ethical concerns for the safety of civilians and people in combat. For instance, how will an autonomous weapon abide by international humanitarian law? Who is responsible for the consequences of the weapons decisions? Is it the engineers? The person who turned it on? How can we prevent catastrophes if an autonomous weapon’s technology were to fail or be hacked? How are people turned into sensor data, and are there any biases towards certain demographics?

Our goal for the project is to produce a carefully curated VR experience that shows how civilians in present day times would evolve and adapt to their sensor data being monitored by autonomous weapons. We would like our project to provoke concern in the user but also give them hope that their decision can prevent this world from developing in the first place.

2. User Needs

User Needs	Priority*
1. Presentation is memorable to the user and provokes deep concern, with a desire to avoid such a reality.	5
2. Presentation is interactive.	4
3. Environment is adequately immersive while maintaining a reasonable cost.	3
4. Presentation is in a landscape that is familiar and relatable to the users.	4
5. Project presents a scenario that is fictional, yet resemblant of a realistically possible future	5

6. Presentation accounts for users with disabilities such as motion sickness, epilepsy, physical immobility.	3
7. Presentation is simple and not reliant on extensive graphic imagery, characters or plotlines.	5
8. Presentation is easy to understand and follow for the user.	4
9. Presentation should be around one minute.	3

*High priority number indicates high priority

3. User/Technical Benchmarking

User benchmarking for this project will come from three categories: Previous MakerRepo submissions, the documentary “Immoral Code” and other media campaigns used for the purposes of banning other indiscriminate weapons. The advantage of the previous MakerRepo is that these have already received commentary from the client in previous years, allowing for direct comparisons of progress. The documentary “Immoral Code”, produced by a group with a similar advocacy goal against killer robots, provides access to direct commentary from a curated civilian response, as well as unfiltered commentators. In relation to media campaigns from other ban goals, such as blinding lasers, such campaigns were successful to the point of becoming international conventions. In regards to these, these provide concrete evidence as to the current success of the project when compared against.

4. Problem Statement

Encourage decision-makers in legislatures to preemptively ban autonomous killer robots by designing an immersive and memorable VR simulation that provokes concern while balancing realism and simplicity.