

Project Deliverable C

University of Ottawa

GNG1103

Group 10

February 4, 2024

Catherine Satoh (300351169)

Fahad Husain (300361090)

Jennifer Campbell (300359940)

Manning Whitby (300118220)

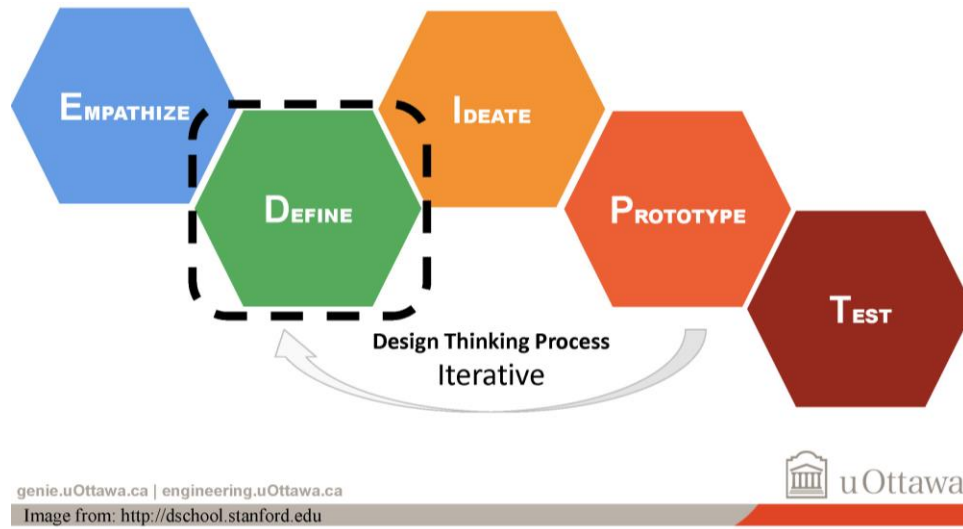
Reese Jenkins (300393859)

Table of Contents

Introduction	4
Problem Definition.....	4
Design Criteria Translated from User Needs	4
Benchmarking	5
Design Specifications (Target Specifications)	8
Conclusion.....	10
Appendix	10
References	11
Bibliography	12

Introduction

Mines Action Canada assigned our team to develop a virtual reality experience and a short video that portrays the impact of military AI robots on civilian life. Following the client meeting, we analyzed their product requirements to determine the most effective solution. To develop our prototype, we interpreted the users' needs to establish design criteria containing functional and non-functional constraints. We also conducted technical benchmarking on similar existing products, comparing three past submissions for this project. Based on the client's target specifications, we ranked the importance of each criterion and will use this to guide our benchmarking and brainstorming process. This represents the 'define' stage in the engineering design process.



Problem Definition

Mines Action Canada needs an accessible VR experience and a short video (1 min) demonstrating the dangers and ethical concerns of autonomous weapons and how civilians adapt their environment to survive.

Design Criteria Translated from User Needs

Rank	Need	Design Criteria	Functional/Non-Functional/Constraints
1	The project must provoke emotion	- Evokes concern (A sense of fear or anger)	Functional

		<ul style="list-style-type: none"> - Sense of motivation and inspiration to ban the use of Killer robots - Good use of visuals - Use of audio to enhance emotions - Fluid/ continuous simulation to immerse user 	Nonfunctional
2	The VR environment must accurately represent the ethical concerns of autonomous weapons	<ul style="list-style-type: none"> - Number & diversity of ethical dilemmas present - Complexity of ethical scenarios depicted - User engagement time with ethical scenarios 	Functional
3	Setting is severely affected by 'killer robots' (no robots though)	<ul style="list-style-type: none"> - Dark - "Scary" - Unknown/unrecognizable place (one location) - Inflicts fear - Unable to see the killer robots 	Functional
4	The project must be simple	<ul style="list-style-type: none"> - The VR does not rely on interactions - The VR displays one location - The message is clear - The VR focuses on the environment rather than the characters - The story is easy to follow 	Functional
5	Video Accessibility	<ul style="list-style-type: none"> - No flashing lights - Not very loud - Short (1 minute long) 	Constraints

Benchmarking

A weighted sum was scored to determine the product that fit the design criteria best.

Green = best (3pts),

Yellow = moderate (2pts),

Red = least (1pt)

Specification	Importance (1-5)	<u>“Rust in peace”</u>	<u>“JERMs stop killer robots”</u>	<u>“Morality Mavericks”</u>
Emotion				
Concern (Fear and anger)	5	Makes user feel scared of what the world has become after the robot invasion	Nothing much happens so don't really feel fear towards robots. Makes you wonder what outside looks like	The POV seemed not to be stressful besides the sounds, chaos could be seen so slightly concerned, but not enough
Motivation/inspiration	4	Repeating how they want to go back to their old life makes user feel uneasy. “We can't let it get to this point”	Since users can't feel anxious, motivation is lower.	Pretty good, narration was not too emotional, so message was there, visuals were good but didn't feel the need to ban robots
Visuals (objects and settings)	3	A little too dark, but adds to the creepiness. So many intricate components (a lot of visuals) Posters, Nets, blocked off regions, safety equipment, protocols, etc...	Posters are not very scary or concerning, rather too playful. Text on posters is good. Time is given to see mask, hat and poster content. No food	Good idea with the hyper focusing circle to draw attention, but it was kind of distracting. Relies on little memorial ground to make user emotional
Audio (sound effects and music)	2	Words were clear, context is given, tone fits the feeling, and music fit the mood	Lacking, only audio was radio chime, and news report. Volume was too low	Narration was funny, didn't feel very stressful but surrounding noise compensated for it. A lot of additional sound effects.

Fluid video	1	Scenes change fairly fast, not much time to digest. Gives user a lot of scenarios and immerses them.	A little shaky but adds to the POV, only one room so not much could be showcased. You do feel immersed enough.	Dark circle drew away from immersion. Lovely POV style video, not jumpcuts
Ethics				
Number & diversity of ethical scenarios depicted	4	Curfew, masks to make you unrecognizable, reflective clothing, uncertainty in targets, altered cityscape (human dignity)	Posters to describe uncertainty in targeting, boarded windows, padlocks, empty pantry, masks & hats for disguise	Robot safety store selling masks and radios, poster about threats, some civil unrest, school loudspeaker & siren
Complexity of ethical scenarios depicted	5	Some of creativity in the ways people are impacted and have adapted	Almost no creativity in the ways people are impacted and have adapted	Almost no creativity in the ways people are impacted and have adapted
User engagement time with ethical scenarios	3	Fair time given to each ethical scenario listed	More time is spent walking around room & only seconds spent engaging with altered environment	Fair time given to different scenarios, but zooming in/out perspective is distracting
Simplicity				
Non-Interactive (static)	2	Yes	yes	Yes
One location	4	Yes	yes	Yes
Easy to follow story	5	The story is easy to follow but they could have expanded on certain topics. Ex. Why the reflective gear makes it harder for the AI to track and identify (what kind of sensors are used)/.	Yes, the story is easy to follow and shared in a creative way (through radio)	No background information was given.

Focused on Environment	4	Yes, it showed how the town was affected and the realistic solutions humans came up with.	Not really. It focused on how people protect themselves, which is very informational. However, the viewer doesn't get to see how the weapons actually affect the area.	It focused on the emotional effect of the AI weapons but not the physical effects.
Clear Message	5	Yes, the message is very clear.	Yes, the message is very clear	Message is unclear.
Accessibility				
No Flashing Lights	3	yes	yes	yes
No loud noises	3	yes	yes	Hectic background noise
1 minute long	3	1 minute 30 seconds	yes	yes
Total				
-	-	150	115	108

Design Specifications (Target Specifications)

	Design specification	Relation (<, >, =)	Value	Units	Verification
Functional					
1	Concern (Fear and anger)	=	Yes	N/A	Testing/Review
2	Motivation/inspiration	=	Yes	N/A	Testing/Review
3	Visuals (objects and settings)	=	Grim lighting	N/A	Testing/Review

4	Audio (sound effects and music)	>	One song + 5 sound effects	#	Analysis
5	Non-Interactive (static)	=	yes	N/A	analyze
6	One location	=	yes	N/A	Review/analyze
7	Easy to follow story	=	yes	N/A	Review/analyze
8	Focused on Environment	=	yes	N/A	Review/analyze
9	Clear Message	=	yes	N/A	Review/analyze
10	Unknown/unrecognizable place	=	yes	N/A	Review/analyze
11	Number & diversity of ethical dilemmas present	>	5	scenarios	Measure
12	Complexity of ethical scenarios depicted	=	yes	N/A	Review/analyze
13	User engagement time with ethical scenarios	>	10	seconds	Review/analyze
Non-functional					
1	Fluidity of video	=	Yes	N/A	Testing/Review

Constraints					
1	No Flashing Lights	=	Yes	N/A	Testing/Review
2	No Loud Noises	=	Yes	N/A	Testing/Review
3	Duration	=	1	Minute	Measure

Conclusion

The meeting with our client, Mines Action Canada, gave us an opportunity to establish their needs in communicating the ethical concerns of autonomous robots. Through emphasizing with the customer needs we were able to more clearly define the form and the specifics of this communication.

Appendix

The table attached below is further benchmarking of past projects. In doing so, we can get a better sense of what contributes to an ideal solution to the task we were given.

TEAMS	Storyline	Setting
Visionary VR	<ul style="list-style-type: none"> - Grandma hurt - Girl asks robot to let her see grandma - Robot denies doesn't understand importance (ethical problem) 	<ul style="list-style-type: none"> - House when call comes - Burnt down restricted area talking to robot
Triple A	<ul style="list-style-type: none"> - Guy wants to go home - Protocols announced - Kind of funny 	<ul style="list-style-type: none"> - Safety store - Outdoors - Long street with buildings and parked cars - Police car

	<ul style="list-style-type: none"> - New safety gear sold in store: masks, guns etc. 	<ul style="list-style-type: none"> - Tiny memorial ground
Rust in Peace	<ul style="list-style-type: none"> - Great name - Great video, dark tones, night time - Reflective clothing for protection - Masks - Posters everywhere 	<ul style="list-style-type: none"> - Night time - A LOT of settings - Siren in street - Outside - Nets above - Blocked off region
AAC	<ul style="list-style-type: none"> - All videos are really shaky - Can't see the words on poster - Silence while drone is doing protocol - Lights flashing from drone through window 	<ul style="list-style-type: none"> - Classroom with windows
Innovation Nation	<ul style="list-style-type: none"> - Shows new way of making video - Not just looking at each setting but showing the video a POV of playing the simulation - News reports on table that AI went rogue (good context) - Grim lighting 	<ul style="list-style-type: none"> - Kindergarten classroom
12 th Man	<ul style="list-style-type: none"> - Heartbeat - Robotic voice announcing to be identified - More should have happened - Why a flipped over bed? 	<ul style="list-style-type: none"> - Hospital rooms - Beaming red lights

References

Oreofe Oluwatayo, Betselot Delnessahou Tadesse, Tharshaon Thirukumaran, Sohan Udayashankar (2023). *Rust in Peace*. MakerRepo. University of Ottawa. <https://makerepo.com/tharsh02/1847.g6-rust-in-peace>

Megan Bauman, Jadon Xia, Rayyan Faruquee, Ella Macneil (2023). *JERMs Stop Killer robots (P8)*. MakerRepo. University of Ottawa. <https://makerepo.com/JadonXia/1838.jerms-stop-killer-robots-p8>

Andrew Yusuf, Ava Ziegler, Daniel Barker, Gracie Bailey-Postma (2023). *Morality Mavericks*. MakerRepo. University of Ottawa. <https://makerepo.com/danielbarker/1845.morality-mavericks>

Bibliography

Linked below are sources that were used as inspiration when starting our design process and used for making this deliverable. It helped us pinpoint the most important aspects of the killer robot issue we must research.

The Guardian (2023). How killer robotics are changing modern warfare | It's Complicated [YouTube Video]. Retrieved from <https://www.youtube.com/watch?v=SZ8L5-gecho>

DUST. (2019). Sci-Fi Short Film “Slaughterbots” | DUST [YouTube Video]. Retrieved from <https://www.youtube.com/watch?v=O-2tpwW0kmU>

Al Jazeera English. (2019). Killer robots: Scientists concerned over ethics of military AI | Al Jazeera English [YouTube Video]. Retrieved from <https://www.youtube.com/watch?v=qCWRnzT1riA>

Campaign to Stop Killer Robots (2021). This is real life, not science fiction [YouTube Video]. Retrieved from <https://www.youtube.com/watch?v=vABTmRXEQLw>

TED. (2020). A swarm of mini drones makes ... magic! | Marco Tempest [YouTube Video]. Retrieved from <https://www.youtube.com/watch?v=u2bQSKvZ2qI>

LAB 360. (2023). AI Robot TERRIFIES Officials Before It Was Quickly Shut Down [YouTube Video]. Retrieved from <https://www.youtube.com/watch?v=Kza8TF8nb0k>

Global News (2023). “Will your existence destroy humans?”: Robots answer questions at AI press conference [YouTube Video]. Retrieved from <https://www.youtube.com/watch?v=T80yQHmqp6o>

Liz Mineo (2024, January 12). “Killer robots” are coming, and U.N. is worried. Retrieved February 5, 2024, from Harvard Gazette website: <https://news.harvard.edu/gazette/story/2024/01/killer-robots-are-coming-and-u-n-is-worried/>