

Project Deliverable D

Team 1

February 11, 2024

Abstract

The document makes use of the design criteria and user's need outlined in the previous deliverables. We are now in the ideate stage of the design thinking process and this deliverable is intended to generate several concepts which are then analysed and evaluated to have a global concept, chosen after careful calculations and considerations as a precursor of prototyping.

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1 Introduction

This document will showcase our various ideas for this project. We will present all of them in section two and elaborate on three combined group ideas in section three. That will be followed by an analysis to determine the advantages and disadvantages of each of the three ideas and to finally pivot towards a global concept.

1.1 Related Work

On Thursday, February 8, 2024, the Teaching Assistants for GNG 1103 presented us with a project [1] from a previous year that focused on autonomous weapons.

We utilized VR equipment to explore their project, which will serve as a reference for our own project for this semester.

The project we reviewed consisted of multiple scenes and complex components, including key elements such as people and blood. However, these aspects conflicted with the specific requirements outlined by our client for this year's project.

2 Concept generation (sub-systems)

A) Andreas's "Light Switch Interaction" Concept:

Description	Advantages	Disadvantages
The virtual reality video starts in a room or living area that is simulated. The user is encouraged to turn on a virtual light switch, creating an immersive experience.	Practically advantageous, hence, making the message more relatable.	
The user is alerted to the possibility of being detected by autonomous weapons through an auditory or visual cue that appears after interacting with the light switch.	Puts the risks associated with autonomous weapons in a relatable context. Expresses the seriousness of the situation while appealing to the user's emotions.	Possible incoherence in the virtual environment if other lights such as the TV or streetlights are on and could attract robots, but ceiling lights are not okay to be turned on
By making analogies to actual events that occurred during World Wars I and II, the VR scenario seeks to evoke emotions.	Emotional engagement: By associating the act of turning on a light switch with historical occurrences, the concept plays on the user's emotions and makes the experience more memorable and captivating.	The concept's focus on appealing to emotions might overshadow the core message about the dangers of autonomous weapons, risking a loss of clarity.

B) Grisha's "Dog Warning System" Concept:

Description	Advantages	Disadvantages
The VR scenario shows a dog in a virtual setting that could be a house or neighborhood.	Shows how animals can adapt to threats from autonomous weapons.	Possible difficulties in interacting and portraying a virtual dog realistically.

When the dog senses danger, it will show signs of it by barking and whining	By accommodating various forms of user engagement, the warning system's overall effectiveness is improved by incorporating both visual (the dog's behavior) and auditory (barking) cues.	Possible difficulties in interacting and portraying a virtual dog realistically.
The VR video combines sound and visuals to replicate the dog's anxiety and warnings.	Highlights how important it is for users to heed warning signals.	The need to carefully weigh user experience against realism.
It is possible to add bells or warning signs to highlight how urgent the situation is.	A more thorough warning system is aided by the inclusion of bells or warning signs in the virtual environment, which emphasize the message about potential hazards and add an additional layer of urgency.	The warning system's ability to effectively communicate the seriousness of the situation may be compromised if the user is unable to form an emotional bond with the virtual dog or believes it to be unrealistic.

C) Moise's "Reflect Warn System like waving Red Flags " Concept:

Description	Advantages	Disadvantages
The VR experience begins with a virtual landscape where users encounter a reflective signaling system.	The virtual environment demonstrates how this red flag serves as a clear warning in critical situations.	Despite the system's simple and intuitive design, there are a few issues that need to be addressed, like its reliance on visibility conditions and its vulnerability to manipulation.
The scenario focuses on the simplicity and intuitiveness of raising or waving a red flag to communicate immediate danger.	The red flag's function in maintaining clarity is highlighted when users observe it being raised to indicate danger. -Simple and intuitive design. -Low-cost implementation. -Language barrier-free communication.	Communication range limitations. Challenges in maintaining visibility conditions. Vulnerable to manipulation as anyone with bad faith can wave a red flag or remove it.

D) Ashley's "Secure Alert System" Concept:

Description	Advantages	Disadvantages
The VR experience opens in a setting where audio speakers are heavily featured.	Enhances user immersion through auditive and visual cues.	Mixed User Reaction: Some users may react favorably to the combination of militarization and fear induction, while others may find it frightening or uncomfortable.
Through these speakers, users are submerged in an environment	1. Adequate and clear communication	Potential fear and anxiety due to the loudness of the speakers.

where shelter reminders are urgently communicated.	2. High range, the message can reach out to the whole community	
By implying military participation, the alerts are taken more seriously and a stronger air of authority	The alerts sent out on time and with authority.	Perception of militarization may affect user reception.

E) Mireille's "Safe haven room" concept:

Description	Advantages	Disadvantages
The virtual reality video begins with a straightforward room surrounded by sandbags, providing a clear image of a safe area	User Engagement: The concept of sandbag for protection and looking for safety in the room that is shown is easily understood by users	Because the limited virtual environment lacks the larger context of the outside world, users might become inquisitive about the state of the outside world.
Building a small room with four walls. Users enter this space, experiencing the simplicity and protection it provides against autonomous weapons.	1. Simple and clear communication of a safe space 2. Minimalistic design for easy understanding	Possibility of Monotony: Over time, the user's overall engagement and interest may decline due to boredom in the small area.

F) Andreas's Concept: "Noise Reminder with Plastic Bag"

Description	Advantages	Disadvantages
The virtual reality video plays out a scene in which the user walks over a virtual plastic bag or other noisy object.	draws attention to the real-world difficulties users might have when trying to avoid detection	The challenge of balancing realism with the limitations of VR technology.
Upon triggering the noise, the VR experience plays a soundtrack mimicking the sound. After that, the user is reminded of how crucial it is to reduce noise if they want to evade being discovered by autonomous weapons.	Appeals to user emotions by showcasing the impact of noise on detection.	Like concept with the light switch, potential incoherence. Other noises such as the TV are tolerated, even though they are louder than a plastic bag.
This idea seeks to evoke feelings while highlighting the difficulties presented by autonomous weapons.	Puts the risks associated with autonomous weapons in a relatable context. Expresses the seriousness of the situation while appealing to the user's emotions.	The concept's focus on appealing to emotions might overshadow the core message about the dangers of autonomous weapons, risking a loss of clarity.

G) Tobi's "Underground Tunnel Experience" concept:

Description	Advantages	Disadvantages
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The VR experience starts with the user in an underground tunnel with dimly lit walls covered in posters from the government.	By immersing users in an underground tunnel, you can make them feel more confined and acutely aware of the urgency of the situation.	Intense experience of ground shaking.
These posters serve as reminders, instructing civilians to remain in the safety of the tunnels and to stay vigilant.	Government posters are incorporated into the VR environment to create a social context and add realism.	The ground shaking can induce a risk of sensory discomfort for VR users.
The immersive environment, with government messaging and a flashback narrative, aims for heightened urgency and emotional connection to the consequences of autonomous weapon deployment.	The flashback sequence gives the story more depth and helps readers comprehend the history and consequences of the misuse of autonomous weapons.	Because of the concept's emphasis on telling a story, user interaction might be limited.

H) Girisha's "School of emotions" Concept:

Description	Advantages	Disadvantages
The VR experience directly brings the user to a school in derelict condition.	Exposure to the threat of autonomous weapons to people with background knowledge. Universal approach, everyone will feel concerned due to the presence of a school.	The creation of a school in derelict condition may be difficult to execute.
Clicking on the school triggers an audio of a conversation between a child and a parent.	Provoke feelings of fear and sadness, dissuading the use of autonomous weapons.	Language barrier since there are many languages worldwide and the video will be in one language only.
There are features in the school such as trophies and photos of happy children that can also be seen.	Provoke feelings, idea caters on a wholesome level to the storytelling aspect of the project.	Complexity may undermine the importance of the intended message.

3 Concept generation (full solution)

This section describes three possible full solutions for our product. These solutions take subsystems previously described in section two and combine them into full ideas. Following this section these solutions will be evaluated and analyzed.

3.1 Design idea 1 (4 wall room ideas)

- Simple room, 4 walls// **This idea is related to our client's need of having one single scene.**
- The room is surrounded by sandbag as way of protection against an attack.
- Room has windows covers in blinds, but behind the window we have a screen displaying a town (at night) with one or two streetlights. // **Sandbags and blinds are two deceiving**

methods, as the client has requested implementation of techniques showcasing how individuals have adapted to and safeguarded themselves against AW.

- In the room there is a dog, the dog senses stress/danger and starts barking (Making noise) // The clients have expressed a preference to avoid incorporating human figures, robots, and blood. Therefore, introducing a dog into the scene serves as a means of conveying the level of danger more effectively, as animals can perceive it far better than humans. However, including a scene with a dog could be sensitive for many viewers, as it might evoke unwanted feelings at the sight of animals experiencing stress. - When the dog starts barking.
- Implement the ideas of the light switch or rustling bag. // This concept will effectively portray the sensitivity of the situation during an AW attack, where individuals avoid emitting spontaneous signals such as light or noise that could potentially provoke danger.
- On the TV plays a sequence of videos showing the reality of life outside the home (News about AW/showing the dangers of autonomous weapons). // This concept will help presenting a 60-second video showcasing the reality of AW and the severity of the situation. This brief segment will assist viewers in understanding the topic without requiring any prior knowledge or background information, precisely meeting the clients' requirements.
- The house is shaking. // To serve in transferring the danger level of AW attack in real life. However, this could be a sensitive scene to some people, and it might not be inclusive to everyone provoke.
- Posters all around the room to warn against: noise, light...; ways of protection against AW attack. // In this section, the objective is to illustrate how people remind themselves to take care and exercise caution, as one mistake could make them the next target, leading to tangible losses. Hence autonomous weapons lack specific targets or biases and do not distinguish whether the individual is a doctor or a lawyer, wealthy or poor.

3.2 Design idea 2 (Tunnel Idea)

- A linear tunnel// It's a great idea since it shows one scene as the clients asked for as well as a way of underground protection against AW. It answers the requirements of simplicity and the adaptability of civilians.
- Shaking tunnels and a sign saying to go inside. // The shaking tunnel might resemble a scene from a horror movie, which is not our intention and could evoke unintended emotions, despite accurately portraying the seriousness of AW.
- Posters on the wall encouraging citizens to stay in the tunnels and be careful not to let the autonomous weapons find them. The inclusion of signs in the scene serves as a means of depicting cautious techniques and methods for minimizing loud communication.
- An old TV broadcast or discarded newspaper showing the start of the autonomous weapons uprising. // This concept will serve as an introduction to the 60-second video, summarizing what viewers can expect to see without the need for any prior background information on autonomous weapons.
- A room with chairs and someone in the background says how did it get this bad. // Including a room as a second scene will increase the complexity of the project which contradicts the client's requirements. Consequently, it may diminish the simplicity of the intended goal, which is to portray the danger of AW, not the level of technology skills of adding multiple scenes.

3.3 Design idea 3 (School Idea)

- School in derelict condition, deserted and gloomy, atrociously impacted by autonomous weapons. // This scene brings the user to experience the repercussion of autonomous weapons, it plunges right into it, and the choice of a school caters for the universal approach, that is anyone can know the features of a school irrespective of gender, age, and nationality. This also exposes someone with zero background knowledge of autonomous weapons of the threat they pose.
- On clicking the school: A child’s innocent voice is heard asking: “What is this building?”, insinuating that she has never been to school before since AW has forced everyone to stay hidden. // This further accentuates how autonomous weapons are a threat since the situation has become so horrific that a child has never been to school. The audio of the child’s voice has been used to trigger the empathy of the user as the client has requested. Moreover, this can make the user feel sad for the child, and will encourage the individual to, ultimately be against autonomous weapons.
- An adult replies: “This was where we learnt and grew until our rights were snatched by the robots”, depicting how AW has affected the day to day lives of civilians. // A simple conversation between a parent and her child, the parent has seen what a school was and the child inexperience in what a school is altogether will provoke feelings in the user. On the other hand, the use of audio will not be as inclusive as the client’s requirement since there are different dialects around the world. Hence the intended message may not be understood by everyone. There may be options of subtitles, but this may complicate the project further.
- Inside the school, photos of the happy days, trophies and children’s artworks can be seen all over the place, with nostalgic music accompanying the visit. // Again, this scene will appeal to the user emotionally, the photos, trophies and artworks will not be unknown to users, they are characteristics that are omnipresent in schools, their aim is to highlight the comparison before and after the use of AW. The use of nostalgic music is also to promote feelings of longing, sadness, and bitterness. Yet the addition of additional scenes and structures has several drawbacks such as firstly compromising the simplicity the client has asked for and secondly, a complex environment can cause the project to diverge from its main goal that is passing on a message. The storytelling aspect in this idea can be wholesome but there is a risk, the message intended for the user may be overwhelmed by this.

4 Analysis and evaluation

In this section the three ideas will be analyzed according to our design criteria and the client’s needs. The weight scale in the table assigns a weight from 1-5 to the ideas and criterions, with five being the most desirable and one being undesirable. In the table the ideas will also get rated from 1 to 5 based on how well they meet the criteria, zero being “not met” and five being “fully met”. The weight will then be multiplied by the individual rating and those points will form a final sum for every idea, based on which it will be easier to tell which idea is more viable and fitting for our client.

Following is an analysis of the ideas according to the criteria. The numerical analysis will be in the table below, followed by an evaluation of the results.

Idea 1: simple four wall room

The simplicity of this solution is very valuable, as it has been identified by the client as a top priority. Elements within this idea, like the dog or the light switch, appeal to the empathy of the users and provoke slightly unsettling feelings, but not rage, which is in accordance with the identified needs. At the same time this is balanced with the goal of informing the user of potential threats that could arise from autonomous weapons. This idea also showcases the desired key elements of how civilians can adapt, what the downfalls/threats and consequences of autonomous weapons are, without showing the robots or people themselves. The message conveyed by this idea will be simple and clearly understandable. This idea does not fully showcase ethical and moral concerns, but it shows how bias is an important element for AW, as the weapons will potentially target everyone that they detect. Users can watch the video/experience the environment and understand the message to a great extent without background knowledge.

The environment itself is generic and simple and involves only one location, as specified by the client, and it is being made sure that there will be as little triggers as possible. The shaking of the house, the rustling of the bag, or the sensitivity of the situation with the dog and the news flash on the TV might impede the accessibility and trigger some stronger reactions in a few individuals.

Idea 2: tunnels

The tunnel idea is not as simple in its setup and not as rich in features. An appeal to empathy is not fully present, but it provokes some feelings of uneasiness and stress for the viewer of the video. The idea does inform the user well, but it is not as balanced with the emotions. It shows a solution how civilians adapt to the AW and what the threats of the weapons are. A feature to showcase the ethical and moral concerns is not in the idea, the user can only infer it.

The idea can be almost fully understood by the user without background knowledge, as the conveyed message in this idea is also clear and simple. The setup and environment are not as simple as we are talking about two different scenes, while the client advised us to stick with less than two scenes. The environment is still generic and the only concerns for triggers and inclusivity might be a low light setting (solvable with technical solutions), but also the shaking of the tunnels for people that get motion sick easily, as well as the eerie environment of the tunnels that might be triggering for some individuals.

Idea 3: schools

The school idea/scene is more complex and involved than the tunnels and the four-wall room, but it has more space to expand on certain features. However, our client identified a simple and clear setup and message as the most important part. The school has a good appeal to the users' empathy and will provoke feelings of compassion and possibly sadness, as it is something that is relatable to a great share of people. In this idea there is less information presented, but it appeals very strongly to emotions, this creates an imbalance contrary to the identified needs.

Further, this idea does not showcase how civilians possibly adapt to AW, it shows a bit what the threats and consequences of AW are, but it does not show ethical and moral concerns of them. Users would be able to watch this video easily without background

knowledge, since the story is told in a bigger accompanied storyline. However, the message might not be fully simple and clearly about AW.

The setup is also not as simple, as it is harder to design a demolished school compared to a tunnel or a room with elements inside. Such a technically challenging solution would require more effort that could be invested in making a clear and understandable message, as the client specified. The environment will still be greatly generic, and the location is a single one.

On the point of triggers, the very emotional message and setup in front of a demolished school might be unsettling for certain individuals, as they could remind of war footage that can be seen on public media.

		Idea 1	Idea 2	Idea 3
Criteria	Weight	4 wall room	Tunnels	School
Appeal to empathy	5	4 -> 20	1 -> 5	5 -> 20
Provoke feelings	4	4 -> 16	3 -> 12	5 -> 20
Balance information and emotion	4	5 -> 20	2 -> 8	1 -> 4
Showcase how civilians adapt to AW	3	5 -> 15	5 -> 15	0 -> 0
Showcase downfalls/threats of AW	5	4 -> 20	3 -> 15	4 -> 20
Address ethical and moral concerns	5	3 -> 15	0 -> 0	4 -> 20
Assume 0 user background knowledge	5	4 -> 20	4 -> 20	5 -> 25
Convey a clear and simple message	5	5 -> 25	4 -> 20	3 -> 15
Simple environment/setup	4	5 -> 20	3 -> 12	1 -> 4
Generic environment	5	5 -> 25	5 -> 25	3 -> 15
Less than 2 locations	4	5 -> 20	0 -> 0	5 -> 20
No triggers/inclusivity	5	4 -> 20	2 -> 10	2 -> 10
SUM		236	134	173

The Table above demonstrates a clear preference for idea #1 (the 4-wall room concept), which gathers the highest score among the three ideas. This idea strikes a perfect balance, eliciting emotions from potential users of the VR game while effectively presenting the relevant information about AW, aligning closely with the client’s requirements. Furthermore, idea number one stands out for its simplicity, making it easy to understand for a diverse audience, regardless of age. Comparatively, idea #2 presents a similar amount of information but lacks emotional appeal and fails to address the ethical and moral considerations effectively. On the other hand, Idea #3 prioritizes empathy to mush, overshadowing the delivery of crucial information, thus complicating the message transmission. Moreover, both idea #2 and idea #3 involve settings that are overly complicated for our project’s timeframe. In the analysis showcased on the table above it is clear that idea #1 stands out as the optimal choice for our team. Thus, we will be pursuing this idea over the upcoming weeks. Unless guided elsewhere following our clients meeting.

5 Conclusion

Through a detailed examination of the three ideas for the virtual reality project centered on autonomous weapons, we have determined that the "underground tunnels," "school of emotions," and the "simple four-wall room" concept are the most viable and appropriate options.

This conclusion is based on a thorough analysis of a number of factors, such as the ability to elicit emotions, the capacity to appeal to empathy, the ability to balance information and emotion, the presentation of the threats posed by autonomous weapons, the demonstration of civilian adaptation, the consideration of ethical and moral issues, the assumption that the user has no prior knowledge, the delivery of a straightforward message, the maintenance of a basic environment or setup, the assurance of a generic environment, the requirement of fewer than two locations, the avoidance of triggers, and the assurance of inclusivity.

The Simple Four-Wall Room idea does a great job of balancing the transmission of important information about autonomous weapons with emotional engagement. It satisfies the client's needs for a single scene, simplicity, and clear messaging. Users get a relatable and immersive experience when features like a dog, light switch interaction, and news on the TV are included. This idea effectively conveys the dangers of autonomous weapons while avoiding explicit depictions of robots, people, or blood, as per the client's preferences.

The "School" and "Tunnels" concepts, the other two ideas, have shortcomings that include potential emotional overload, complexity, and a divergence from the client's emphasis on simplicity. Although the School concept is emotionally powerful, its intricate narrative runs the risk of overshadowing the main message, whereas the Tunnel concept introduces multiple scenes and a complex environment.

In summary, the Simple Four-Wall Room idea most closely satisfies the requirements and design standards of the client. The choice to move forward with this idea is predicated on its capacity to emotionally connect users, effectively communicate the message regarding autonomous weapons, and satisfy project specifications. Unless our client suggests any changes or refocus in their conversations, this conclusion will direct our team's attention in the coming weeks.

6 References

1. GNG1103 design project from 2023 winter semester, seen on 2024-02-08.

7 Appendix:

7.1 List of ideas of team members

This is some more ideas from the team members that we might refer to in case of a re-focus or if we deem an idea not fitting anymore.

Name	Ideas	User's Needs	Pros	Cons
Tobi	1) Shaking underground tunnels 2) People talking about how dire the situation has gotten 3) A news report showing how the autonomous weapons first acting up	It shows how humans have adapted to autonomous weapons and shows the repercussions	It shows how humans have adapted and shows how autonomous weapons could oppress people	It has more than 1 scene and may be difficult to produce and the changing of scenes may be disorienting for the viewer.
Andy	1) Turning light on but reminder regarding AW 2) Walking over plastic bag creates noise -> reminder AW	Both showcase how humans have to adapt to live with AW	Both simple events, not part of a big story line	
Girisha	1) Distressed dog or another animal whining because of AW. 2) School in derelict condition due to AW. 3) Bells as a warning sign of AW.	1) and 2) highlights the repercussions of AW and the moral concerns associated. 3) Demonstrates civilians' adaptability and as a means of protection.	-Depicts the devastating consequences of AW. -Answers to the storytelling requirement. -Provoke feelings.	-Can be complicated to implement. -Story requires more than once scene.
Mireille	1) Simple room (4 walls). 2) sandbags.	1) Simplicity 2) Protection against AW	Simple and clear to understand.	
Ashley	1) Audio speakers telling people that their need to take shelter soon	1) Simplicity 2) Researched story telling	1) Allows users interactions with the product.	1) Not accessible for

	2) Showcasing the dangerous that the military personnel are being faced with AW.		2) Adding research element and making links with our benchmarking	those with audio impairment 2) Would be hard to keep general and not target a specific area of the world.
Moise	1. Reflective signage system like raising or waving a red flag to communicate immediate danger.	Timely warnings about potential threats.	1. simple and intuitive 2. low cost implementation. 3. No language barrier	1. Dependency on visibility condition. 2. subject to manipulation 3. limited communication range.

7.2 Sketch of Global Concept

Sketch of idea number 1 since it has been chosen to be the best fitting idea.

