Project Deliverable F: Prototype 1 and Customer Feedback

University of Ottawa

GNG 1103: Engineering Design

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1.0 Introduction

In this document the first prototype we developed for the stop killer robots campaign for Mines Action Canada was reviewed. Also feedback from the client from our first meeting, and feedback from an outside source for our first prototype was gone over as well, as well as how we could use the feedback to develop our project further. An outline for what we wish to accomplish for the second prototype concludes this document.

2.0 Client Feedback

During our last client meeting we were able to gather a variety of the clients opinions on our design ideas which have helped us shape our first prototype. To begin, the client shared what they liked the most about all of our ideas, then stated what they did not enjoy as much, followed by suggestions and concerns.

Firstly, they enjoyed the idea of having a school where the user will be able to see first hand how the robots would affect children. They enjoyed this concept as they thought incorporating children into the simulation was a smart idea that could be very effective in showing the consequences of these robots. Secondly, they enjoyed having an anti robot/robot safety supply store where the user could see the products being sold in the store's window.

Thirdly, they also enjoyed the idea of having a graveyard/memorial in our simulation as the user will be able to experience something very emotional which will help with the atmosphere and environment we are trying to achieve in this project.

Lastly they admired a few of our ideas of small details to include such as warning posters around the street, bordered up windows and doors and having some graffiti and vandalism on the sides of buildings.

Some of the ideas the clients did not enjoy as much was having a television playing the news at the beginning of the simulation as it would take too much time to program and to not show the decision makers as murderers.

To conclude the presentation, the clients were willing to provide us with suggestions and concerns for our specific ideas and for the overall project. There was a big emphasis on keeping the simulation simple in order to be able to finish the project on time rather than having so many ideas we are unable to meet deadlines. In order to keep the design simple, they suggested keeping all of our ideas in one environment (i.e. having the school, store and memorial all on one street) rather than having the user move around too much trying to find the key ideas of our simulation. In addition to keeping the design simple, it is also important to keep the simulation/video between 30-60 seconds making sure not to drown ourselves with too much work. They also suggested having the news playing on a radio instead of the television if we wanted to keep the news feature in our design. They also mentioned that they do not necessarily want physical drones and/or robots in the simulation as it could end up being too much work but to focus more on what could go wrong with the animatronics and then to do further research about specific failures to make the simulation more realistic. Although more realistic animated designs are more convincing, the clients would rather us not sacrifice our ideas and for realism as

they mentioned having a design that is less realistic is better than having a more realistic design but is incomplete.

Having all these ideas and suggestions in mind, our design will consist of a simple environment making sure to avoid too much complexity to make sure our design is complete and done on time and incorporate some user interaction if capable.

3.0 Prototype 1

For the first prototype we focused on starting to develop the environment where the user would be in. This is the foundation of building the virtual reality experience, so we started with a low fidelity version of the environment, where we could start increasing the fidelity of it as we get more assets.

Below are pictures of the 3D environment which was developed for the first prototype.
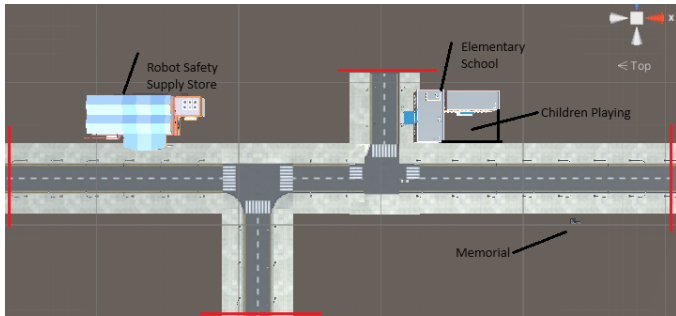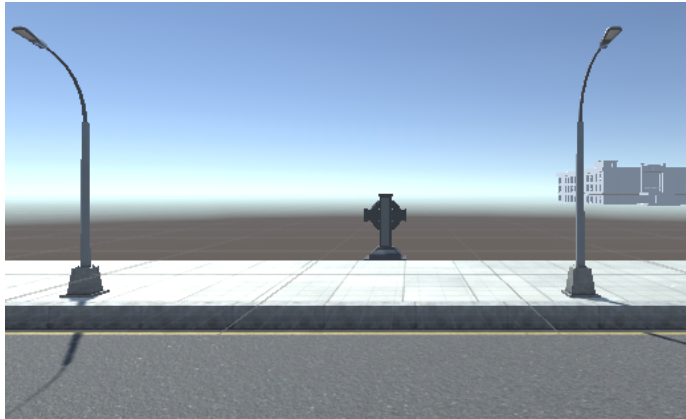
4.0 Critical Components/Systems

Environment:

The environment will be a regular city neighbourhood, the user will have the ability to walk around this street and experience what life with killer robots would be like. The environment will be dull and gloomy to bring in the feeling of uneasiness and sadness. The environment will be recognisable but with slight changes that make the user slightly uncomfortable with the potential of the future.

Storyline:

The user will be on the street to begin. They will have the opportunity to walk around the street to experience the environment. The user will be able to see how windows and doors to homes and businesses are boarded up and locked to protect against this threat. There will be posters around the streets depicting anti-autonomous weapon messages. The user will pass by a school

as they are in one of their robot safety drills. This will include the children running into the school. The user will also come across a Robot Safety Supply store that sells products that can help the citizens protect and hide against the robots. Finally at the end of the street the player will come across a grave/memorial to remember all those who have been wrongly killed by these robots.

User Interface:
The system of the environment will be designed in a way that makes the user feel uneasy/uncomfortable. Dull and dark colours, characteristics of an apocalyptic society, and a sad storyline. This is going to force the user to think about the possibility of this reality. The user will be able to experience and see the entire street, which will allow them to move towards the main ideas of our storyline. They will be looking at the posters, the store, the school, and the memorial.

Music/Audio:
The music and audio of this will be very quiet and eerie to again bring in that uncomfortable feeling. The player will be able to hear the robot safety drill announcement as they are approaching the school. It will also include sounds like cars and people talking to create the familiar feeling. The user will be able to hear over the radio messages warning against killer robots and the dangers of them.

5.0 Test Plan/Analysis/Results

Test Plan	Analysis	Results
- Create a low fidelity version of our reality. - This allows us to see things such as timing, layout of the buildings, the materials and assets needed	- Evaluate the usability and compatibility of our environment to the ideas of our project, and how well it will translate over to developing the virtual reality experience	- The environment will be able to convey the desired outcomes that we wish it to, it just needs to be developed a bit further.

5.1 Test Plan:
We updated our test plan from the last deliverable, as we realised that it was flawed. The objective of our first test was to determine the scale of our environment, meaning how far apart the main portions of the experience should be. We did this by measuring the distance between the main points of interest, then taking the total distance that will need to be travelled and dividing it by a 2 m/s, which is a standard movement speed. We then compared the calculated time with the target time of 30-60 seconds for our experience.

The objective of our second test was to quantify the realism of our environment, as well as the quality of our storyline and the strength of the portrayal of our desired message. We did this through our own ranking, as well as feedback from others, including our project manager. We then used these ratings to adjust our environment.

5.2 Analysis:
We used our prototype to analyse the compatibility of our chosen assets, as well as several other elements of the environment. We first loaded the basic assets into unity, which were a school, market, roads, and a headstone, which will act as a memorial. We then used an assumed walking speed of 2 m/s for our character, then calculated the minimum time it would take to visit each point of interest. Initially, the scale was much too large, as the time it would take to visit each spot was calculated to be 50 seconds just to walk to each spot. Considering that the experience needs to last between 30 and 60 seconds, this amount of time is too high. Based on this analysis, we reduced the scale and brought that time down to ~30 seconds.
The second test that was executed was simply a ranking of different criteria, based on our own opinions, as well as our design specifications and feedback from others. These criteria were the realism of the environment, the link between our environment and the message that we want to portray, as well as the story itself. The average response for the realism of the environment was a 5, which told us that there had to be some adjustments made. A main component of the lack of realism is the fact that we do not have background city buildings in place yet, which makes the environment look very empty. Another aspect of realism that we added was dirt and graffiti decals to the buildings.

5.3 Results:
As a result of our first test (time required to reach each point of interest), we determined that the initial idea of the environment had to be greatly scaled down to reach our time goal. As previously stated, we reduced the scale to bring the time down to about 30 seconds.
For the second test, the average rankings for the different criteria were 5 for the realism, a 4 for the link between the environment and the message that we are trying to portray, and a 7 for the storyline. Due to these rankings, we added the aforementioned decals, which increased the rating to a 6.5. This rating still isn't' very high, as the prototype is missing many of the components that will add to the realism. We didn't have time to add anything to increase the strength of the link between the environment and our message, and we also didn't change the storyline at all. In our future prototypes, we now know that we should add more drone-related posters, propaganda, items, etc, as well as more buildings and real life links to increase the realism.

6.0 Outside Source Feedback
Our group presented our first prototype to our project manager to get feedback from our first prototype. From the meeting the feedback we received from our first prototype was to make the environment seem more warlike and not as clean, which would give it more of a grimy aesthetic.

For example we were told to make some of the windows in stores broken up, and make the effect the drones had on the world to be more prevalent. Some more feedback we also received was to fill up the environment some more, and put more buildings in than the ones that we had so the land is not as barren.

7.0 Prototype 2 Outline
For our second prototype we hope to start implementing some user interface into the environment where we can get a user to actually be in the environment and move around. Also in the next prototype we will incorporate some of the things we were suggested to from the feedback from the project manager, such as putting more buildings in and making the environment more like a wartime. We also hope to start adding sound into the game as well.

7.1 Test Objective:
We will start by testing movement scripts. The objective of the test will be to create or find a movement script that can be used effectively within our game, and determine how we will use that to allow the player to interact with the world.

7.2 Description of Prototype and Basic Test Method:
The prototype to be tested will consist of a simple player model in our environment, which will have a camera and a script attached to it. We will test our scripts by creating or finding an initial script, apply it to the model, and try to move around the environment. If we do not meet our requirements, we will make adjustments and retry the test. The aforementioned requirements are as follows:

Design Specification	Relation	Value	Units	Verification Method	Test Duration
Time to reach each location	<	30	Seconds	Test (Start with the initial script and make adjustments until the time threshold is reached.)	This test may take up to four days to complete, as it will be a fairly complex script to create.
Player Camera is attached to the player's head	=	True	boolean	Test (until we find a way to connect the camera to the player's head, allowing it to move with the player's movement. If we have time, we can also allow the camera to	This should be a fairly simple task to complete. It will be a required task to complete before we test the script, but it

				be controlled by the player.)	should be able to be completed in less than a day.
Number of movement options	=>	5	Options	Test (An optimal script will allow the player to move in all four directions, and jump. We will test our script until we can perform these movement options.)	This will be tested alongside the creation of our script, so it will also be several days before this test can be performed.

7.3 Uncertainties:
The biggest uncertainty of this test plan is the implementation of the camera movement. After we create the movement script, we may not have enough time to complete the control of the camera. As long as we are able to attach the camera to the player's head, which should not be too difficult of a task, we will be able to test our movement script, so it will not be an issue if we do not implement this aspect in the prototype.

7.4 Dependencies:
The entire test will be dependent on obtaining a player model that can be properly rigged so that we can control it with a script. After we find a player model, we will then be able to attach the camera to its head. After this, we can then start to work on our movement script.

7.5 Milestones:
The major milestones of this project will be attaching the camera to the player's head, the first successful player controlled movement, and finally player controlled camera movement.

7.5 Responsibilities:
Ava will be responsible for finding a suitable player model, Daniel and Grace will be responsible for testing and tweaking the movement script(s) and Andrew will be responsible for creating the camera movement script.