

Project Deliverable H: Prototype III and Customer Feedback

University of Ottawa

GNG 1103: Engineering Design

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1.0 Past Prototypes and Reasons for Prototype III

The previous prototypes of our project are what laid the foundation for us to create the third prototype. In the initial prototype the goal was to create the environment and lay out the foundation of our game and story. This first prototype was very important because it is what allowed us to narrow in on what we were going to do with this project going forward. It is also what we had to show to our client to get feedback on, so it was important we had a good prototype to get feedback on. After the first prototype the feedback we received was to try and make the environment look more like it's going through a wartime, and to add some more assets to the environment so it is not as plain. Using this feedback we continued on to our second prototype.

For our second prototype our goal was to implement a movement system into the game so we could test the scale of it to make sure that the user could get to where they needed to be in the allotted amount of time. Also the movement system implemented was meant to help us fully implement the VR for this prototype. This involved creating a player model and moving it around the environment to check if all the buildings have colliders, and the player could not walk through any walls or buildings that they weren't supposed to go through. Additionally for this prototype we added more things to the environment, such as more buildings and started working on some of the buildings you could walk into, such as the robot safety store. This prototype continued on laying the foundation and groundwork for prototype 3, and making sure once we implement the VR system into the game it runs smoothly.

For this prototype our goal was to implement the virtual reality system with the game, which included being able to move around the environment with the VR headset on, and having some interaction with the virtual reality. Another goal we set with this prototype was adding audio to the game, and getting different audio clips to play at certain points. We also wanted this prototype to be a fully functional solution, so the story and message which we wanted to convey from our design was kept in mind heavily as we went on with the development of our third prototype and incorporating it within the virtual reality experience.

2.0 Prototype III

The third prototype that we have created will be the final prototype that we put out before our final presentation on design day. We have taken into account the questions and comments out of every client meeting and presentation. We applied the feedback to our past prototypes to create this version of our reality. We have also tested things like timing in our first prototype, and movements into our second prototype. In this prototype we started to test out audios and the type of movements we want to use (teleportation versus standard movement). Below we have outlined the test plans for each of these tests we wanted to run. We also included the analysis for each other's plans in order to see the results to improve our prototype.

Submit with assignment:

https://drive.google.com/file/d/1_vBp3tbsg8CsMbBE0n_InXk6HazTtXkv/view?usp=drive_link

3.0 Prototype Test Plan and Analysis

3.1 Test Plan:

For this prototype, our objectives were to choose what kind of movement we want to use for our VR controller, as well as set up the audio aspects of the game. We firstly tested the VR headset in the sample scene that comes with the library. The purpose of this test was to figure out which movement type we should go with in our game. We Each tried both teleportation and the standard form of movement, then voted on which one would be more applicable to our game. We voted based on the ease of use of the movement, as well as the quality of experience (any motion sickness/ level of immersiveness). We ended up deciding to use standard joystick movement, as we deemed it to be more immersive and easier to implement. It was also much easier to use, which is crucial since the people who are playing our game may not know how to use the VR headset, so we decided we should make it as simple as possible.

Once we decided which form of movement we should use, we tested the movement inside of our game. To do this, we had to install the required libraries, then set up the headset to work with unity. We then had one person wear the headset, enter the game, note anything that felt off (height being too short/tall, environment being too big, movement too slow, etc.). We then had another group member adjust the values inside unity to fix what felt wrong. We continued this cycle until we felt that we had a realistic depiction of movement inside of our game.

For the second test, we wanted to figure out a way to have an audio clip play when the user entered a certain area. To achieve this goal, we had a plan to try different methods (scripts, timeline), test them, and if it didn't work move on to the next method or try to fix the errors of the current method. We repeated these tests until we had the final product that we were looking for, which was to have a narrator comment on different aspects of the game. We also decided to add protestors, as well as a protesting audio to our scene. We felt that this added another layer to the experience and made it feel more realistic.

3.2 Analysis and Results

As previously mentioned, we analyzed the realism and feel of the VR headset and movement through a series of trials. We marked down some of the comments for each trial, in which we improved until we achieved our final result:

Trial	Comment	How we Fixed the Issue
1	The player seems very short	Increased the Y offset of the camera
2	The player is moving very slowly	Increased the movement speed of the locomotion system
3	The player seems like a giant	Changed the scale of different objects in the environment, and changed the height of the player accordingly

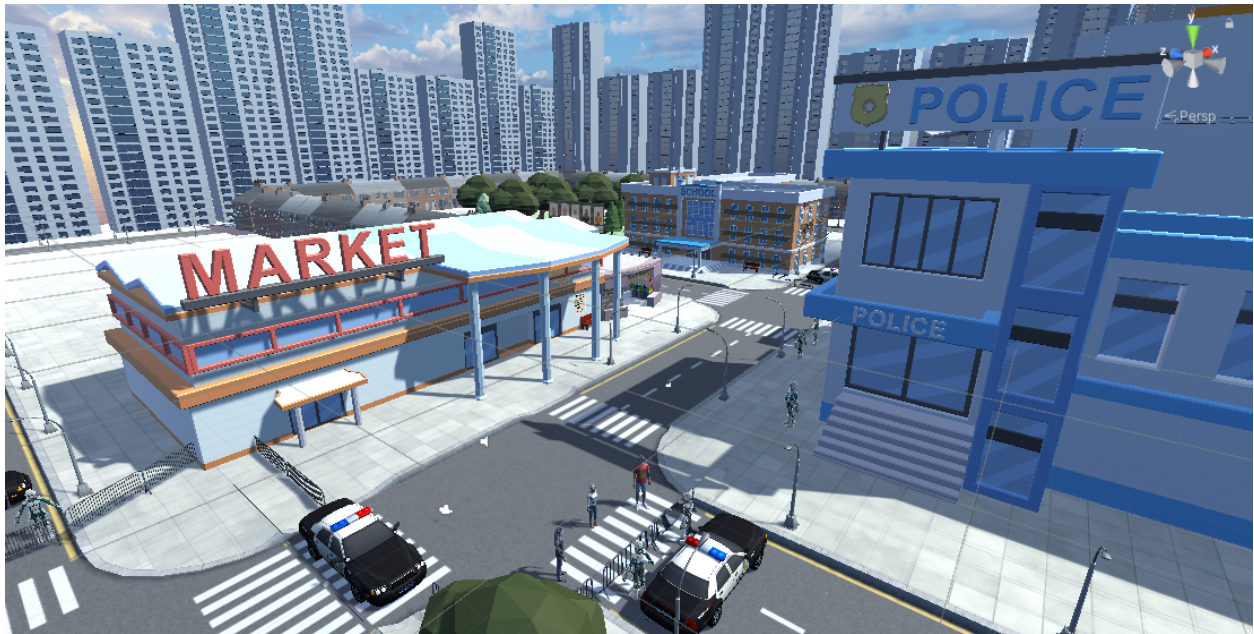
Once we implemented the VR, we moved on to the test and analysis of the audio. We had different ideas regarding how we should implement the audio. The first of which was a simple timeline that would play each audio clip after a certain amount of time passed. After testing this, we felt that it felt a bit too robotic, and the audio didn't really line up with where the player was in the environment. We then decided that we could instead have each specific audio clip trigger when the player gets close to where the audio relates to. After repeatedly testing the scripts that we came up with, we found a solution that worked for our needs. A video clip of this is included within the submission of this deliverable. We then finally added some audio for the protestors, which fades away as the player leaves the area.

3.2 Additional updates to the environment:

As a part of this prototype, we also added some more details to the environment to make it feel like a more complete game. Here are some photos:







4.0 Client Feedback

As both client meetings and presentations have been completed, the only way to receive feedback was by asking friends and family members their thoughts and ideas on our prototypes. The feedback we received from one of the group's family members was that the posters were the main eye catching factor of the project. They stated it was their favourite part of the simulation as they enjoyed the colours and the designs incorporated on the posters. They also mentioned that the storyline was very effective as it made them think about what the potential problems autonomous robots could cause which was something they have never really thought about before. One of their concerns was what would happen if facial coverings such as masks got banned and a legislation against them. This comment was something that could be taken into consideration if we had more time to demonstrate the cause and effects of the counter measures against the robots but as we were told to simply focus on the environment, we will just keep the assumption that masks will be allowed in this society.

5.0 Updated BOM, User Specifications, and Detailed Design

For this prototype we did not purchase any additional assets, so our user bill of materials is still the same. Our current bill of materials looks like this:

Asset #	Asset Name	Link to Asset	Cost
1	Modular Low Poly Streets	https://assetstore.unity.com/packages/3d/environments/urban/modular-lowpoly-streets-free-192094	\$0
2	Low Poly City Buildings	https://assetstore.unity.com/packages/3d/environments/urban/low-poly-city-buildings-256801	\$20.45
4	Simple Generic Buildings - Cartoon Buildings	https://assetstore.unity.com/packages/3d/environments/simple-generic-buildings-cartoon-buildings-266743	\$0
5	Church Model	https://assetstore.unity.com/packages/3d/environments/historic/church-model-110307	\$0

6	Simple Drone	https://assetstore.unity.com/packages/3d/vehicles/air/simple-drone-190684	\$0
7	Military camo bag	https://assetstore.unity.com/packages/3d/props/clothing/accessories/military-camo-bag-62496	\$0
8	Character Pack-Lowpoly	https://assetstore.unity.com/packages/3d/characters/humanoids/character-pack-lowpoly-free-221766	\$0
9	Walkie Talkie Radios	https://assetstore.unity.com/packages/3d/props/electronics/walkie-talkie-radios-245895	\$0
10	Navigation Radar Console	https://assetstore.unity.com/packages/3d/props/electronics/walkie-talkie-radios-245895	\$8.86
11	Low Poly Pack-Environment Lite	https://assetstore.unity.com/packages/3d/props/exterior/low-poly-pack-environment-lite-102039	\$0
	Total		\$29.31

For the user specifications, it requires the user to know how to use the virtual reality controllers and headset. We will have to include a user manual for users that are not familiar with virtual reality, so they know how to maneuver around the environment.

Our design for the game is in the above prototype 3 section. The main plot of the game includes the user finishing work, and spawning outside of their work building. The user then moves down the environment through a path which is narrowed down so they can't choose where to go so they can see all the things they are meant to see. They walk past the robot safety store and see different posters about autonomous robots, so they can see how the robots affected the world going forward. Then the user walks past a school with a robot safety alarm drill going off, then a tribute to all the people wrongfully killed by autonomous weapons before arriving at their home where the experience then ends.

Wrike Link

[Calendar](#)

[Snapshot of Deliverables](#)

[Snapshot of Presentations](#)

[Snapshot of Client Meetings](#)