Project Deliverable E: **Project Plan and Cost Estimate**

GNG 1103 – Engineering Design

Group: 7

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Abstract

The objective of this deliverable is to outline the key aspects of the first prototype, the testing methods that will be used to test the prototype, and the feedback from the client from the second client meeting. Two main features of the final design were implemented in the first prototype: the main page and the AR camera view. These two features act as the foundation of the app, and everything else will be built on top of them. Many testing protocols that will be used to test the functionality of the prototype were also described. In addition, the client feedback was analyzed and utilised in the creation of the prototype; the client's feedback can be summarized as: the final design must focus on simplicity and ease of use, and any design features that might hinder these qualities should be removed.

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1. Introduction

Previously, the project schedule and cost estimates were completed to help organize what remains to be done in the project. With the schedule in place, the development in the Unity engine of the chosen conceptual design commenced. In this deliverable, a description of all aspects of the first prototype of the design will be outlined, as well as a testing plan which will test the functionality of the implemented features of the prototype. Additionally, the client feedback received in the second client meeting and its impact on the chosen design will be explained. The development of the first prototype and sharing it with the client will be an essential factor in creating the best possible product that will fulfill all the client's needs.

2. Prototyping Test Plan

Testing is a very important step in developing Prototypes. It demonstrates which aspects might not be functioning as they should be and what improvements still need to be done to develop a prototype. The tests that were used during the development of Prototype I are listed in Table 1 as well as their results.

Table 1. Prototyping Test Plan

Test ID	**Test Objective (Why?)**	**Description of Prototype used and of Basic Test Method (What?)**	**Description of Results to be Recorded and how these results will be used (How?)**	**Estimated Test duration and planned start date (When?)**
1	Test the camera option for the app. This is to ensure the camera option of the application is reliable when scanning objects.	The purpose of this was to test our concept and provide further evidence on the overall structure.	These results will be used to help further the structure of our AR app.	Estimated rest duration will be before the deliverable is completed and submitted
2	Test the map option of this app. Having an accurate and reliable map will help improve the application.	The purpose of this is to test the map feature of the application.	These results will make us know that the map on the application is reliable and efficient to use.	Estimated rest duration will be before the submission of the deliverable.

3. Prototype I

The main focus of the Prototype I was to create all of the spaces for each of the components that were demonstrated in the final concept design. Client's feedback was noted and some of the adjustments were made to the initial design in order to improve the application. Prototype I has a layout of all of the features and working transitions between the scenes. It includes the added scene which the client suggested to include. More on the client feedback will be discussed in further sections.

3.1. Main Page

The main page will be the first thing the users see on the screen when they open the app. The goal was to make it simple and easy to navigate and have an aesthetically pleasing design to it. As demonstrated in Figure 1, the main page includes 4 buttons that allow the users to choose whether they want to use the camera to identify their object or they already know what object it is and they simply want to access the maps to find out where they can recycle it. Users can also access the search page if they want to manually type in their object to find out information. Those three main features are located at the bottom of the screen. Finally, users can access their account page, which is located in the top right corner of the screen.

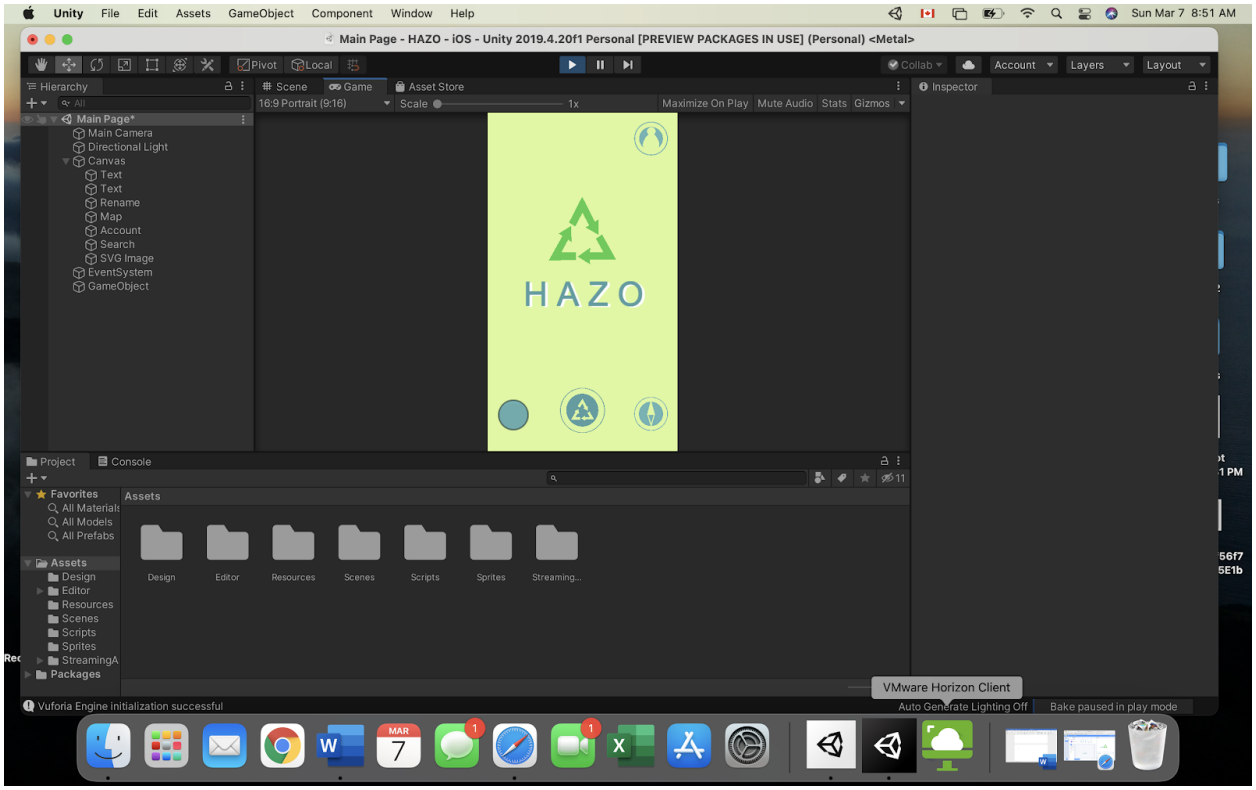

Figure 1. Main Page

3.2. AR

If the user decides to scan their object to find out how they can recycle it, they can access the camera by clicking on the middle circle on the main page. Figure 2 demonstrates the camera view. Two buttons are located at the corner of that page, which allow the user to access the search page or the maps. In the top left corner, the users can click on the button which will take them back to the main menu.

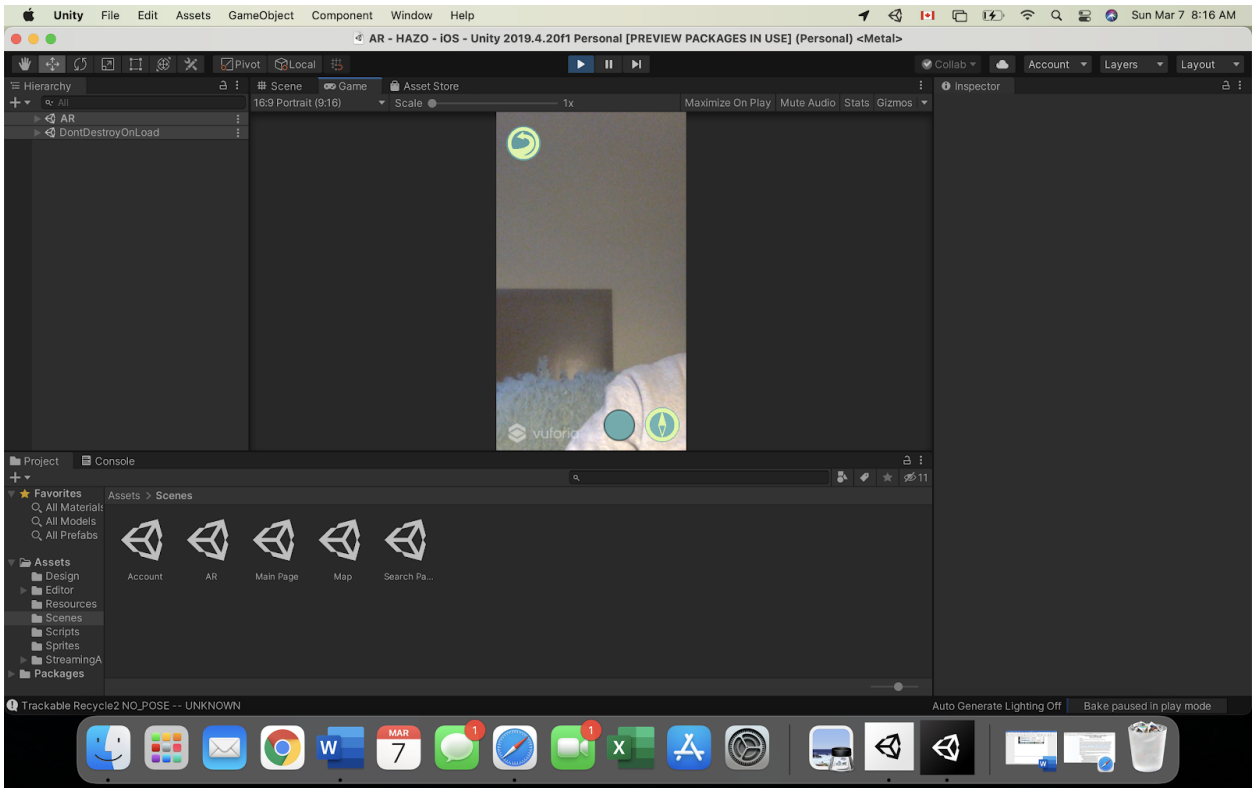

Figure 2. Camera View

The idea behind the camera view is to scan the recycling symbol and identify the type of plastic. Since not all of the plastic can be recycled it is important to identify which plastic items can go into the recycling bin and which should go to the trash can. Figure 3 demonstrates the image recognition feature. At the moment, it provides the name of the plastic as well as if it can be picked up by the most curbside recycling programs. For the objects that do not have recycling symbols, the search page can be accessed either through the main page or through the AR page.

Figure 3. Functioning AR image recognition

For the next deliverables the plan is to add recognition of all of the recycling symbols as well as create a search bar with the database of the main household objects and how those can be recycled. In regards to the main page, all of the button icons will need to be finished and some overall improvements to the UI can be added.

4. Customer's Feedback

During the second client meeting, a conceptual design was shared and feedback from the client was received. This section outlines individual feedback from the client regarding the concept design as well as client's overall feedback to all of the teams. Client's feedback to the conceptual design was very important since it provided improvement suggestions and things that the client wanted the team to avoid in further developments. All of the client's points were considered and implemented when developing Prototype I.

4.1. Client Feedback for Concept Design

Overall, the client's feedback was positive. The client liked the aesthetics of the design and its attractiveness to the users. However, some notable comments were made. First of all, the client preferred if the app scanned all kinds of objects and did not solely rely on objects with the recycling symbol. The team chose to focus on scanning only the objects that have recycling symbols because it would be easier to implement considering the time and skills limit; however, it will also increase the success rate of the scanned object. The client offered to include a search bar which will include all objects but also keep the high rate of success. The search bar will allow the users to search any object that they like to recycle and it will give them the information regarding that object. Moreover, if the object is not recognized through the AR or it is recognized wrong, the user will be able to access the search page with one click and enter their object manually. Another feedback that was provided by the client is to exclude the map if it doesn't provide the entire list of the recycling facilities, and if it is not convenient to use. The team decided to focus first on making the other features of the app perfect and then focus on perfecting the map. Furthermore, if the map does not correspond to the client's needs at the end, it will be removed from the application. Lastly, the client mentioned that if we wanted to implement the account section into the app where the user would have to log in, it can be a great feature as long as it doesn't require the user to log in every time they use the app and overall does not make the app more difficult to use.

4.2. Feedback to Other Teams' Designs

After the second client meeting, some main points were also provided for all of the teams. Those points are as important to consider as the individual feedback. First of all, the client wanted to be presented with the ongoing maintenance costs. The team identified those costs in the previous deliverable. So far there has been no cost to the development and the team is not looking into purchasing anything from the asset store; however, based on the client's feedback on Prototype I, the team might change their decision. The team set out a limit of about $20 to spend on the assets. The client also mentioned that the team should focus on creating a simple application that allows users to do two simple things: scan or search their object and find out how that object can be recycled. The client suggested that teams should focus on their strength and find out if there

are any features to the app that are unnecessary and can be removed for a more user friendly application. As described in the previous sub-section, the team is considering removing the map feature. Another possible aspect the team can remove is the personal account feature; however, this will also remove the entertaining aspect of the app and may play a disadvantage at the end.

5. Conclusion

While utilising the feedback provided by the client, the first prototype was established. The skeleton of the AR application was completed and consisted of the main page that will be seen every time a user opens the application and a page dedicated to the camera view that will be later used for the AR portion of the design. In conjunction with the prototype, a prototype testing plan was created. Multiple tests and their respective durations and results were developed to provide insight on the functionality of the application. With the first prototype completed, the team will share it with the client to receive further feedback which will then be used in the creation of future prototypes.