GNG 1103

Project Deliverable G
Prototype II and Customer Feedback

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Introduction

This deliverable describes the test plan and the development of the second prototype. The main objective of this prototype is to introduce functionality to the application's subsystems. In the last prototype, only the basic app layout and maneuverability throughout the application were developed to demonstrate a proof of concept. The next steps were to develop the functionality of the app's features, which created the critical parts prototype (prototype II).

Prototype Test Plan

Why are we doing this test?

What are the test objectives

The test objectives for the second prototype primarily revolve around the functionality of the waste identification features, including the scanning and search subsystems. Some examples of these objectives include incorporating AR camera recognition and being able to manually search for waste items alternatively.

What is being learned or communicated with the prototype

This prototype will help us learn whether our critical subsystems can function accordingly once we implement the additional parts of our initial concept. Furthermore, we are learning new and creative ways to go about programming these critical parts of the system. We have also learned about implementing AR camera recognition into Unity, as well as methods of manually searching for waste items.

What are the possible types of results

Similarly to the results of the previous prototype, the results of this prototype's tests will be binary and qualitative. The binary results refer to either "working" or "not working" while the qualitative results refer to "how well is it working" on a basic scale of 1-5 (5 being the best and 1 being the worst). For example, if we are able to implement a scanning method but it is limited to only recognizing specific items, then the results will be "working" and rated "2" for functionality.

How will these results affect the decisions

These results will guide us towards a workable solution that functions sufficiently as well. Subsystems that do not work yet will need to be adjusted until they work. Then, subsystems that do not function properly yet will need to be modified and improved. The decisions will be centred around accomplishing our goal of 3 working subsystems that function exceptionally well and can be rated a 5/5.

What are the criteria for test success or failure

The aforementioned possible types of results included binary and qualitative results. The criteria for test success of the binary results would be “working” while a test failure would be “not working.” On the other hand, the criteria for test success of the qualitative results would be a high rating for functionality (like a 4/5 or a 5/5) while a failure would be a lower rating, such as 3/5 and below.

What is going on and how is it being done?

Results of the Previous Prototype

The previous prototype was an overall success, having created a basic layout for the application, as well as proving the basic concept. Not only did the prototype include a basic layout and maneuverability throughout the subsystems, but we also went a step further by implementing a fully functional game feature, as well as incorporating the camera to the scan subsystem.

Prototype Description

This prototype introduces functionality of the application’s subsystems. We have implemented AR camera recognition software into the scan feature. Furthermore, the alternative search method for item identification has been incorporated, allowing access to the Ottawa Garbage and Recycling web page, where a user can search for a specific item’s corresponding disposal method.

Description of the testing process

The AR camera recognition and search features have been incorporated into the app through Unity. The functionality of these additions will be tested by running the Unity project and examining its performance through the Game View window. Each subsystem will return a binary result of either “working” or “not working,” followed by a qualitative result on the scale of 1-5. Then, the updated software will be uploaded to the IOS Unity Remote 5 application to be examined again. This test will also return binary results of either “working” or “not working,” as well as a rated level of performance from 1-5.

What information is being measured

The information that is being measured includes the accuracy and consistency of the item identification method via camera and search. The overall performance of these subsystems will dictate the qualitative results, which are measured on a scale of 1-5 as previously described.

What is being observed and how it is being recorded

The performance of the added subsystems in both Unity’s Game View window and the IOS Unity Remote 5 application will be observed. These observations will be recorded in the form of binary and qualitative data, which will be added to the document created for the previous prototype or shared with the team via email or WhatsApp.

What materials are required and their approximate costs

Similarly to the previous deliverable, F, there are no costs associated with this prototype. The only materials that are needed are the Unity software, Unity Remote 5, a smart phone that runs IOS, and a computer.

What work needs to be done

After this round of testing the team is now done with the second prototype and is now ready to move onto the final prototype, prototype III. Moving forward the team will integrate the scanning subsystem into the main screen of the app to have one fully functional app. Throughout this process we will still be adding more items to the database to have a range of items that users may need help sorting. After the scanning page has been added then the team will fine tune the layout and aesthetics of the app so the different screens are consistent.

When is it happening?

How long will the test take and what are the testing prerequisites

Testing length will depend on the system or subsystem that is being tested. Accessory systems like the game and search will only take a few hours over the span of one to two days. However, the scan system will take a few hours a day over the span of three to four days. Before testing can occur, the team needs to finish inserting images into the game, write the code so the search button works, integrate the search and game subsystems into the home screen, and make the scanning page able to identify some different objects.

When are the required results

The results from testing for this prototype are due by March 19, 2021 so that the team will have time to finish implementing the final subsystems for our last prototype and to finish the final design of the app before Design Day on April 8, 2021.

Prototype II

Figure 1. Home Page

The home page currently has three buttons at the bottom working. The buttons boxed in red are both clickable and take the user to different scenes depending on which they select.

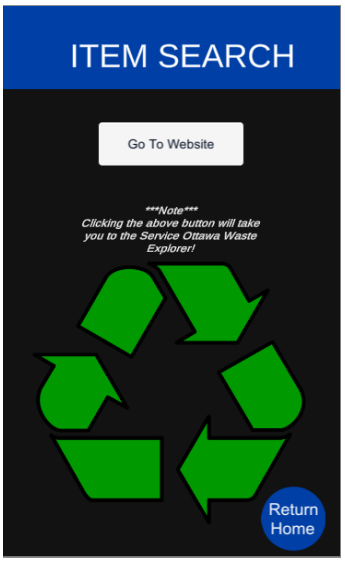

Figure 2. Search Page

The search page has two functional buttons. The first button is the 'Go to Website' button that opens the Ottawa Waste Management website on their phone so they can search where they should sort their items. The second is the 'Return Home' button that when clicked takes the user back to the home page.

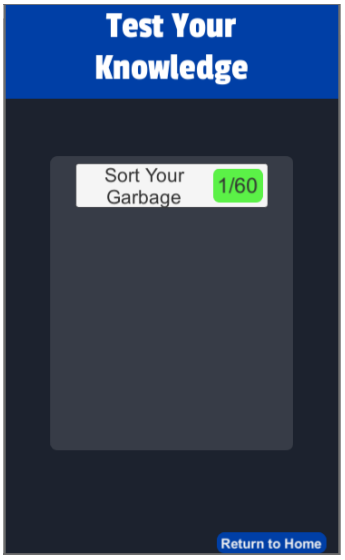

Figure 3.1. Game Homepage

This page has two functional buttons: 'Sort Your Garbage' when clicked will begin the sorting game and 'Return to Home' will take the user back to the home page.

Figure 3.2.1. In Game

In the game there are four clickable buttons with different options, when the correct button is clicked it flashes green when the wrong one is clicked it flashes red. There is a timer in the top right corner that starts to count down when the game is started.

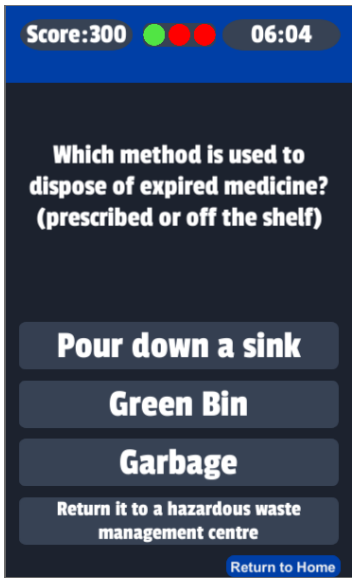

Figure 3.2.2. In Game

When questions are answered correctly the score in the top left corner will increase, when answered incorrectly the user will lose a life. There are only three lives given, they can be seen in the center at the top of the screen. When a life is lost the colour will turn from green to red.

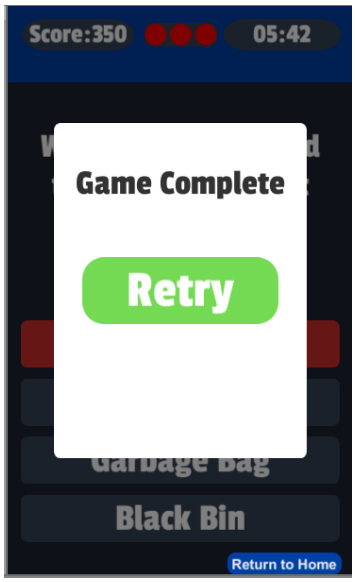

Figure 3.3. End of Game

Once the game has been completed or the user has run out of lives a pop up will appear telling the user that they have completed the game. The user can then choose to restart the game or return to the home screen.

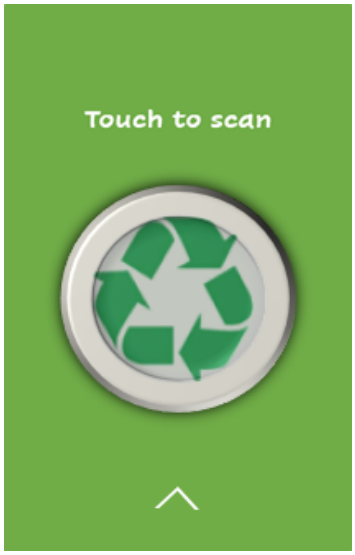

Figure 4.1 Scan Homepage

This is the main page for scanning, and it has two buttons. The circle button in the middle can start scanning, and the arrow below can return to the main page.

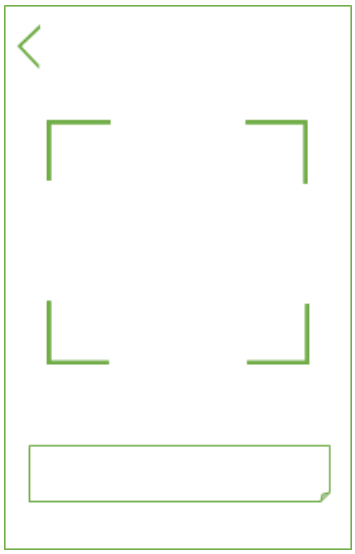

Figure 4.2 Scan Page

When this page is opened, the camera will be turned on to start scanning, and the object to be scanned should be placed in the middle box to begin recognition, and the result will be shown in the box below. The arrow in the top left corner of the page takes you back to the main scan screen.

Feedback

Currently, testers have given back mostly positive feedback regarding the home page of the app, the game, and the search options. They currently have no issues with the functionality of the systems itself, but have expressed that there should be more uniformity throughout the subsystems of the app to make it look more professional. Tester said the scanning subsystem was good but needs to have more items in its database.

Conclusion

Overall in this deliverable, the team was able to improve upon our first prototype and has now been able to complete our second prototype. With this deliverable, the team is now finished prototype III for our sorting app, and have outlined a testing plan to ensure the project stays on the right track to fulfill the clients needs. Following this deliverable, the team will be taking the feedback from the client and other observations gathered to now move onto the third prototype, where we will be installing the last subsystem and finalizing its design.