SYNTHETIC SOLUTIONS INC.

Project Deliverable G: **Prototype II and Customer Feedback**

GNG 1103 – Engineering Design

Faculty of Engineering – University of Ottawa

Team C01-1

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Abstract

Our mobile application prototype was presented in the previous deliverable, as well as an analysis and discussion of the client feedback received during the second meeting. This deliverable aims to highlight the implementation of feedback on our second prototype and discuss the testing process of our features. Additionally, the client's feedback will be addressed for further development and improvement of our mobile application.

Introduction

In the previous deliverable, prototype I was designed and underwent thorough testing and received client feedback. The purpose of this deliverable is to continue developing and crafting the prototype to fit the client's needs. This deliverable will be divided into three parts: Presenting Prototype II, discussing customer feedback, and setting forth objectives for the final prototype.

Feedback

Client Feedback

The client was very impressed with the current prototype of the app and scanner. He had no criticism on the product and is excited to see the finalized version on Design Day.

Other Feedback

The UI was given to others to test and give feedback on their opinions. Overall, they found the product to function as expected but may use some aesthetic changes. The colours can be more vivid and iridescent and the buttons could have better textures applied to them. The app also did not scale properly to all screens and that caused some aesthetic issues.

Prototype II

The purpose of prototype was to complete as much of the application as possible in Unity, as well as finalize the item scanner so it could be hosted in a constant state. The UI was formulated in such a way that it could be adapted to more screen resolutions and appear more appealing to the user's eyes. A True/False trivia game was also created and added to the Game Screen.

Prototype — Unity

The UI has mostly seen changes in terms of adding more functionality to buttons that previously did not work, as well as better resolution scaling with various aspect ratios. Besides that, no major changes have been made to the Unity UI; however, some aesthetic adjustments will still be required before Prototype III.

- Home Screen

Most of the Unity UI has been unchanged since the previous deliverable. The Home Screen is facing a similar layout and colour theme but has now been adjusted to be more compatible with other screen resolutions beyond the standard 9:16 aspect ratio. This will allow the app to be more usable on various other devices that do not use that aspect ratio. The item scanner button on the Home Screen is set up to now link to the scanner. This way, one button click will be all it takes for the scanner to open and allow users to scan their item to find if it is recyclable or not and, in turn, which bin it goes into.

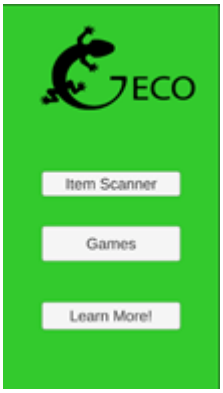

Figure 1. Home Screen

- Game Screen

The Game Screen also has gone largely unchanged since the last deliverable. It did however undergo similar resolution scaling changes like the home screen. The main change made to the Game Screen was the *Trash Trivia!* button that now links to a True/False trivia game for users to play. Similarly, the *Recycling Madness* button now links to a sorting game.

Figure 2. Game Screen

- Learn-More Screen

No significant changes have been made to the Learn More screen yet. It will merely require proper resolution scaling over the next few weeks to ensure that it functions on a wide range of devices. The only new addition made to this section is the linking to external websites. The *Local Regulations* button will now take users to the City of Ottawa recycling and garbage policies. This way, users can familiarize themselves with local regulations.

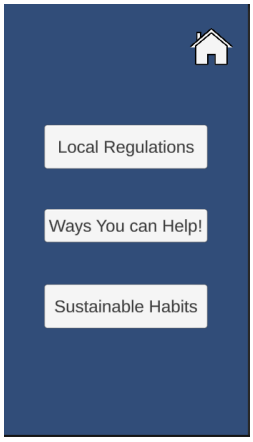

Figure 3. Learn-more Screen

In the final prototype, prototype III, this page will have infographic images linked to the *Sustainable Habits* button, as well as a *Ways You Can Help* button. These images will give users more information in one place on what they can do to make the Earth a better place.

Prototype — Teachable Machine

For the teachable machine component, progress was made on the accuracy of the item scanner and user-friendliness. A more extensive database of photos that included peoples' faces and different visuals was added so that the scanner would not mistake something for another. Additionally, a textbox was added around the instructions of the item scanner so that it is easier to read them after the scanner has identified the item. The current prototype for the item scanner can be seen in figure 4.

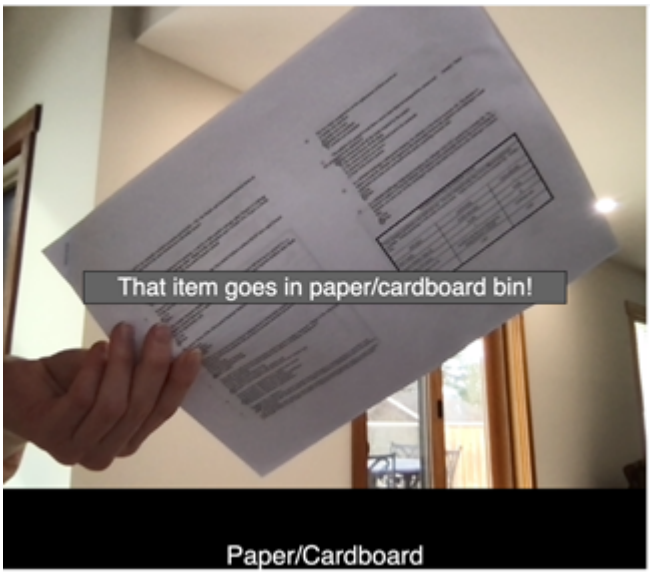

Figure 4. Item Scanner in Browser

For the future, the item scanner needs to be connected to a server so that the whole team can access the scanner. Once this is done, the scanner can be linked to the button in the app and would then open in the user's browser.

The hope is also still to have the incentivization system that is linked to the scanner, but the group decided that the incentivization would be one of the last priorities because the app would still be complete without it. This would likely be done in unity and would be linked to the number of times the user opened the scanner in their browser (clicks of the scanner button).

Prototype — Games

- Trash Trivia!

Trash Trivia is a new selection to this prototype. It is a True/False trivia game where users can answer various questions and statements on recycling related facts, including if certain items can be recycled and how they are recycled. When a user selects an answer, an animation happens to move the non-selected answer to reveal if it was correct or not.

In addition, a second option for Trash Trivia was developed. This option is very similar to the True/False game, with only a minor alteration of introducing a multiple-choice format. This option has color-coded built-in functions that show the user whether they selected the correct (or wrong) answer. For Prototype III, we aim to combine both Trash Trivia 'versions' into one complete option. Some extra improvements include the addition of sound effects for option selection plus more questions so to add diversity and creativity within the game.

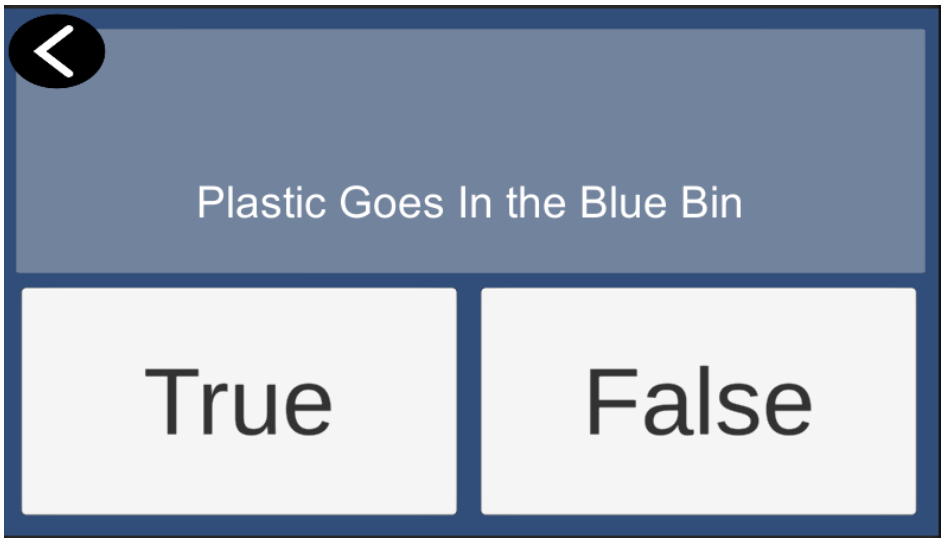

Figure 5. True/False Section

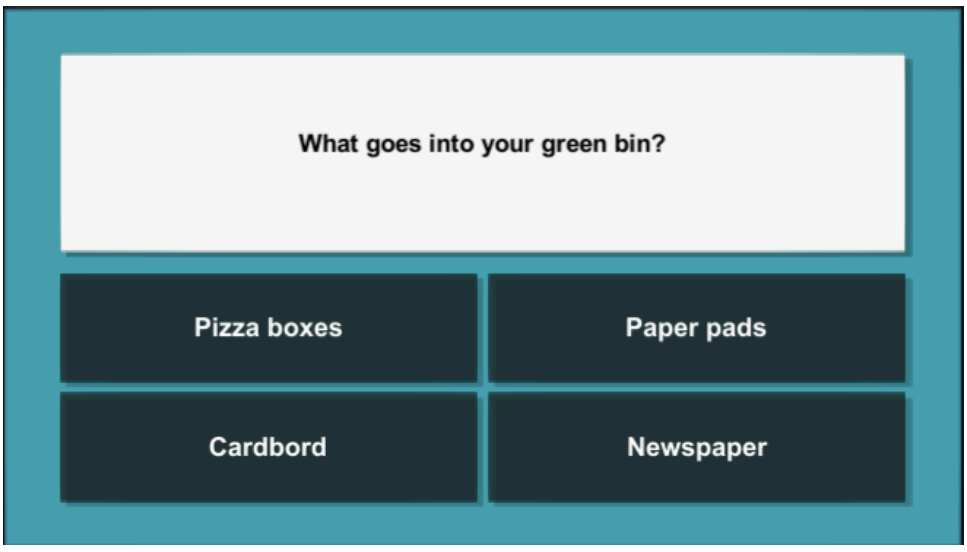

Figure 6. Multiple Choice Section

- Recycling Madness!

Our second game available to the user is Recycling Madness! This option will take the user into a scene where they will have to sort various items into their corresponding trash bins. Currently, the game has only one scene: a kitchen! The set has six different items for the user to drag into the trash, compost, or recycling bins. The game has built-in sound effects for both wrong and correct bin selections.

Figure 7. Recycling Madness!

Further improvements for prototype III will include creating more scenarios for the user to choose from (e.g., a bedroom, bathroom, study area, etc). Also, more items will be added to the bundle to have approximately ten items to sort for each scenario. It will have to undergo proper resolution and scaling to work on different devices.

Testing

Unity UI

Testing the Unity UI was done by making sure that every button worked on ‘play mode’ and the user could swap between scenes and that buttons would work correctly. After that was done, the app was exported in Unity to a Google Pixel 4 smart phone. On the smart phone, all features worked although there were issues for correct resolution scaling. Scenes did not render to look exactly how they were intended too originally. The screenshots taken are presented below. After making modifications in Unity, the scenes should scale properly to different screen sizes. Testing will continue on other phone models to guarantee compatibility.

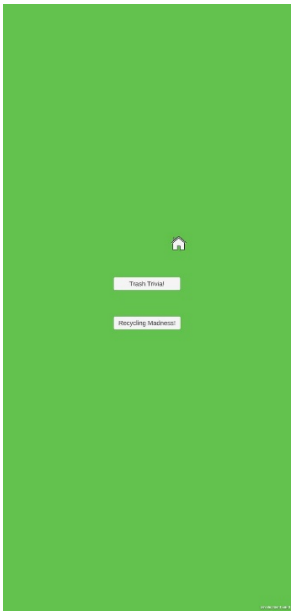

Figure 8. Testing UI-Part 1

Figure 9. Testing UI- Part 2

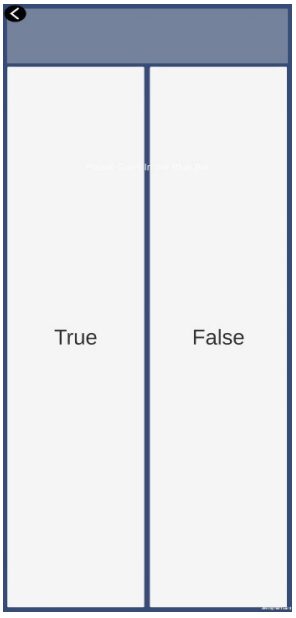

Figure 10. Testing UI- Part 3

Item Scanner

The item scanner's accuracy has been tested by placing different objects in front of it and having it identify them. Prototype II for the item scanner includes a comprehensive image database of over 2500 items that the item scanner should be able to correctly recognize and give instructions for the corresponding proper disposal method. With that being said, the scanner still needs to be tested to ensure it is as accurate as possible. The next thing on the list is to get the item scanner running from a server, as previously stated, to allow other team members to test the scanner out and check the compatibility with different cellphones. Further testing on iOS compatibility will be presented in the next and final prototype.

Conclusion

This prototype is a presentation of how the team deployed most of the features discussed in the previous deliverable, as well as an incorporation of the abundant feedback received. This feedback from general users and experts will be further utilized to produce the final prototype, prototype III.