Project Deliverable F

Prototype 2

Submitted by

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1.0 INTRODUCTION

On November 1, 2021 Vissiolle's team had a third client meeting which confirmed the functionalities and details of the second prototype. The second prototype focused on developing our application Vissiolle more towards the final type. During the client meeting, the topics were concentrated on its core functionalities and how the application works under different conditions. It is a beta version with usable functions so that we could test out the core functionality of the application such as point recognition, user interface, etc. Besides, we are still maintaining the course to make the Vissiolle a user-friendly and minimum training required application for the client.

2.0 CLIENT FEEDBACK

During our third client meeting we received a variety of useful feedback. The feedback was directed at functionality rather than focusing on Vissiolle's interface. The client had questions about how the application is progressing forward and the details of the current prototype. The client expressed questions about the different circumstances of taking pictures as steady pictures could be difficult for visually impaired users. Furthermore, the client had great recommendations on how the tutorial could be used efficiently by the user and if each button should not only read out its name, but also its function. The client clarified Vissiolle's issues on potential missing symbols that can hinder the scanning process of the application and had a positive reaction to the current prototype and progress of Vissiolle.

3.0 PROTOTYPE

3.1 Prototype Goals

The goal for this prototype was to familiarize Vissiolle with the use of "Application Programming Interfaces" which can make scanning objects, letters, and numbers easier. It is important to also focus on the code that can accomplish what the application needs rather than focus on aesthetics as that can be changed later. The function "Image Recognition" has been completed and point recognition is what needs to be done.

3.2 Prototype Discussion

Figure 1 contains the current home screen. The top right and left of the screen contains both image recognition and point recognition buttons. The image recognition application has

been completed. The button on the left that says “Image Recognition” can identify objects and give the user an accurate description of the object selected. This is meant to help the user use objects that work with that household appliance. The function on the right will be “Point Recognition” and this button will be read whatever the user points at. This button requires the user to hold it while pointing it and it is meant for the user to effectively use their household appliances.

Figure 1: Home Screen for Vissiolle

Figure 3 is the transition from image recognition button to taking the picture. It is essential for the application to allow the user to use the full camera range to take a picture as that allows for errors and makes up for the lack of vision. Vissiolle will then read out the picture.

Figure 2: Image Recognition in Use

Vissiolle will then read out what the image in the picture is. The Image Recognition function in vissiolle has been completed and will allow the user to recognize the appliance in the picture.

Figure 3: Image Recognition on home screen

The three straights on the top right of the screen on figure 4 lead the user to the audio tutorial in “About”. The user can click on the top left of the screen to reach the tutorial.

Figure 4: Home Screen Options

The home screen option leads the user to figure 5 tutorial page. This page will give an explanation of the application and its function to the user. The top right of the screen will need to contain the full tutorial, but the point recognition button is still being worked on so the tutorial will be done when the application is finished.

Figure 5: Tutorial page

Vissiolle requires an excessive amount of coding and C-sharp is an excellent language for building applications. The home screen seen on figure 1 has the top left of the screen containing the button “Image Recognition” and the top right of the screen containing the button “Point Recognition”. Figure 6 contains the code for the home page. Line 13 contains the code for “Image Recognition” and the main function is “Clicked= “GetImage/”” and this function uses the input “GetImage” which transitions from the home page on figure 1 to the portrait screen in figure 2. Line 14 contains the code for “Point Recognition” and the main function is “Clicked= “TakeImage/”” and this function uses the input “TakeImage” to take the image and scan it using an Application programming interface to look for letters, and numbers.

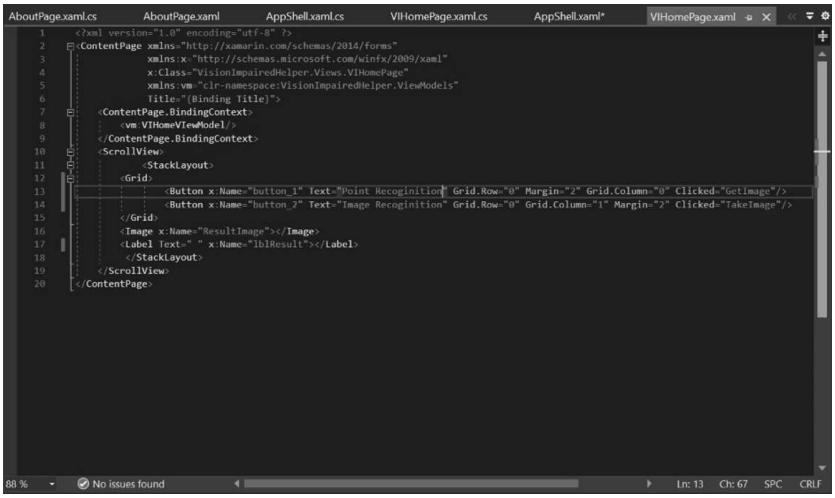

Figure 6: Code for the Home Page

Vissiolle's two main functions contain "Image Recognition" and "Point Recognition" and to give the user the best experience using the application, all situations must be considered to ensure success. Figure 7 and figure 8 contains a loop code for both functions that has an answer for every different situation that could happen when the user takes a picture. From line 76-98 the first if statement assumes that the picture is steady and the application can scan the object. If the application cannot scan the image due to the user taking a bad picture or the buttons on the appliance are unclear , the application will respond with "Image processing can't be done. Please take the picture again." From line 104-108 on figure 8 makes the assumption that the user's button has processing issues and responds saying "Some Error Occured can't be done. Please take the picture again."

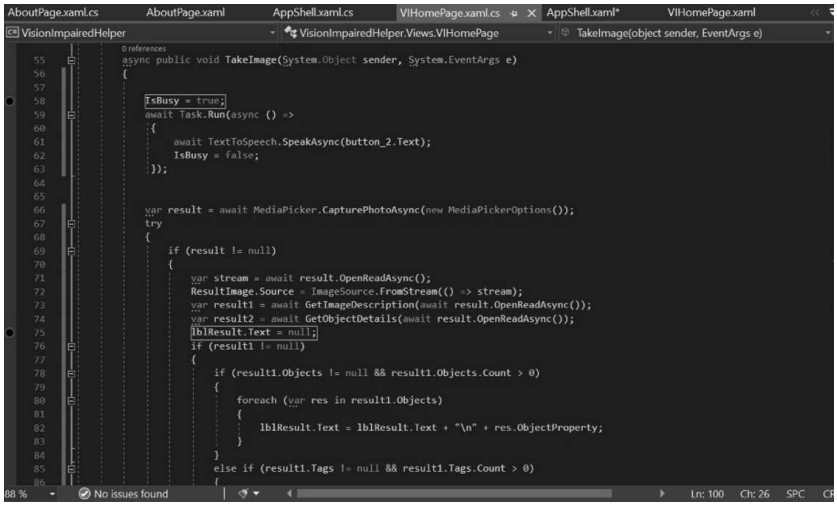

Figure 7: Loop Code for "Image Recognition" and "Point Recognition"

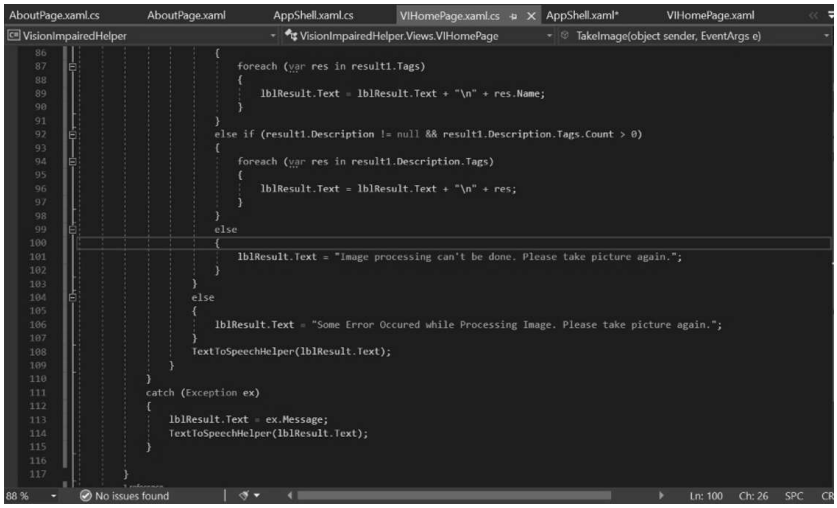

Figure 8: Continuation of Loop Code from Figure 7

4.0 TESTING

4.1 Testing Plan

This functional prototype contained features such as Image Recognition, voice readout, user tutorials and simplified user interface. The goal of the prototype testing will be based on the usability of the core features of the Vissille application and to see how each individual feature functions under different circumstances.

The testing plan for the user interface obtains the responsiveness test, simplicity test and usability test. The UI is created based on the programming language therefore the testing will reflect the stability of the code. Our group will click on each option in the UI menu in order to test whether each button is responsive and usable. The UI is already simplified with the must-need functions only.

The testing plan for the image recognition obtains the usability test, responsiveness test and reliability test. For the purpose of testing the usability of the image recognition, we will take pictures of the most common household appliances then to see whether it can recognize the appliance with the correct name to read out. We will see what is the chance that the system will result in correct results by image recognition. The accuracy of the results could give us clues about if the modifications should be involved for the code.

The testing plan for the point recognition obtains usability test, responsiveness test and reliability test. This technology is one of the core functionality that will make a difference for the users in real-life scenarios. For the purpose of testing, we will use the camera of the phone to point to common household appliances such as the stove, fridge and washing machine and so on to verify whether the appliance can be recognized at the moment of being in the frame of the camera. This might have recognition failure when the object is not fully appearing in the frame. Since the appearance of appliances can be different, therefore issues and failures might take place. We will collect the failure situations and analyze them.

The testing plan for the user tutorial obtains the accessibility test. We will test the tutorial page by clicking on the icon to see whether the tutorial is accessible or not.

Table 1 - Target Specifications for Vissiolle

Customer Need	Metric	Units
The application allows the user to effectively use household appliances without the use of braille	Not braille reliant	yes/no

stickers.		
The application is equipped with buttons and sounds rather than fully relying on a touch screen.	Not touch screen reliant	yes/no
The application can be applied to a variety of household appliances.	Number of appliances compatible	Numeric
The application allows the user to be self-sufficient.	Can be operated by a single visually impaired person	yes/no
The application will be usable on different phone operating systems	Multi Platform	yes/no
The application features a simple user tutorial	Ease of understanding	easy/hard

4.2 Testing Results

The testing plan includes the UI test, image recognition test, point recognition test and the user tutorial test. After we test each function step by step according to the testing plan, each function could work in the manner as designed to. The point recognition should be further developed since this technology simply requires more testing and stability tests on next stage prototype development. It showed several failures during the testing stage. The point recognition could not recognize some types of the stoves and washing machine because of the different appearance. Despite that the content of the tutorial should be further filled and the readout function should be added in the later iteration of the prototype, the second prototype is successful so far by testing the existing functionality.

5.0 CONCLUSION

In this project deliverable, we developed the second prototype by further working on the first prototype. We worked our way through the programming and user interface design in order to make the prototype functional and reliable. Our team also received positive results from a series of testing. The results and the achievements have shown that we are on the course with correct methods and strategies. These are the fundamentals to make sure we could eventually make the prototype shine and make a difference to those who might need it.