Project Deliverable I

Video and User Manual

Submitted by

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1 Introduction

Vissiolle is a smartphone application with the purpose of helping blind and visually impaired users navigate the menus of household appliances. It is intended to be used by a user who is already familiar with the functions of their household appliances as well as the use of a smartphone, and is meant as a guide to help read menus and locate different household objects. This document will explain the purpose and functions of the application, how to install and set up the application, how to use the application and the troubleshooting and support system. It also includes documentation describing the development of the application and recommendations for future improvements.

This User and Product Manual (UPM) provides the information necessary for blind and visually imapired users to effectively use the <System Name (Acronym)> and for prototype documentation.

2 Overview

The problem this application is intended to solve is that blind and visually impaired people often have difficulty using the controls of household appliances. There is a need to provide some form of assistance in using these appliances. Vissiolle is the only of these solutions that does not rely on connecting the user to a sighted employee which gives the user more independence and can be more reliable in times when an employee may not be available.

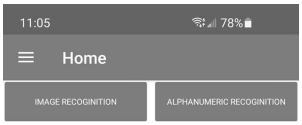

Figure 1: User interface of final prototype

Vissiolle has two features to aid the user. The first is image recognition, which allows the user to take a picture of an object, and Vissiolle will identify that object. The second feature is alphanumeric recognition, which allows the user to take a picture of printed text, and it will read

that text out to the user. This is done by tapping the relevant button on the home screen, and taking a picture through the phone camera. Vissiolle is then programmed to interpret these pictures into the requested information, and read them out loud.

2.1 Cautions & Warnings

When using the application ensure you do not touch objects to locate them for pictures, many appliances may be hot and could cause burns.

3 Getting started

3.1 Set-up Considerations

3.1.1 APK Installation:

After downloading the .apk file, open the file. If prompted, grant permission for the file to make changes to your device. The application will then be installed on your device.

3.1.2 Google Play/Apple App Store Installation:

Search “Vissiolle” on the app store relevant to your device. Select “Vissiolle”. Press Install. The application will then be installed on your device.

3.2 User Access Considerations

Application can be accessed by anyone who has access to the device it is installed on.

3.3 Accessing the System

To access the system find the application icon on your device’s application list and tap it.

3.4 System Organization & Navigation

The system menu has two buttons, image recognition and alphanumeric recognition, tap the button to open the relevant function.

3.5 Exiting the System

To exit the system press your phone's home button. Then close the application by opening your phone’s open application list and clear the application as you would any other application.

4 Features and detailed description of Vissiolle

Vissiolle features two usable functions to efficiently assist the blind or visually impaired users to gain access to major household appliances with safety and ease. The application has a clean and simplified user interface to provide convenience use experience. The home page of Vissiolle provides two options for users' preference and use conditions. The first option is image recognition and the second option is algorithmic recognition. Once the user decides which option fits their needs the most, all they need to do is click in and start the use. Users are able to access tutorials on how to use the application from the home page. The application will take users clicking as input and will output the results that have been recognized via sound and readout.

4.1 Image Recognition

Image Recognition is a feature that has been proved and tested usable and reliable for users' daily demand. This mode allows users to take a picture and the application will recognize the words or the appliance in the selected image.Users are expected to take a picture which involves the entire or majority part of the appliances in the frame. The application will take the picture as input then analyse the object in the picture. Once the analysis is done, the results will display on the screen and will be readout by sounds. Users are able to adjust the volume by using the volume adjustment buttons that originally came with the cellphone.

4.1.1 Picture taking

In order to feed input to image recognition, the user will be asked to authorize for camera use. Once the application is authorized to use the camera, the user will be guided to the photo taking interface. When the picture is taken, the results will be displayed shortly and readout.

4.2 Algorithmic Recognition

The algorithmic recognition is currently developing and updating. It is a beta version of point recognition. This mode enables the user to point the phone at the direction or the object they expect to see. This mode allows the user to have a real-time recognition of what the user is pointing at. However, due to the complexity of programming, this mode is currently under development. Therefore, users are expecting errors and possible malfunctions during use. The errors and bugs will be fixed in future updates.

5 Troubleshooting & Support

The Vissiolle is a software which has new concepts and applicable features, the complexity of codes might cause potential problems, bugs and malfunctions while use. Therefore, we encourage users to report any issues and malfunctions occurred during their use. The Vissiolle technical support team will get it checked out and get issues resolved by launching an updated version with improvements. Users might expect errors and possible malfunctions during use of algorithmic recognition mode. Remember to gain external assistance if needed and report the issues to our technical support team by calling +1 (123)-456-7890 or online reporting. By doing

this, we are able to further improve the user experience and the quality of the application in order to assist more visually impaired users.

5.1 Error Messages or Behaviors

When issues or malfunctions take place in either image recognition or algorithmic recognition, the application will say out loud “object can not be detected” or “fail to recognize” to remind the user to either adjust their framing or the system fails to recognize the object. This circumstance usually occurs when the users are in algorithmic recognition mode.

5.2 Special Considerations

Vissiolle’s use scenarios are limited due to the incompletion of the software. Therefore, the application will only function indoors. Users are only expected to gain access to their household appliances and gain situational awareness indoors. If the issue occurs with the applications while the user uses it outdoors, the Vissiolle team will take no responsibility for it.

5.3 Maintenance

The application requires no regular maintenance. However users have the options to report any malfunctions or technical issues during their use. Therefore the developers will notice the problems and can be fixed by uploading the latest version of the software update.

5.4 Support

The application support team is available receiving error reports and calls seven days a week. Users could also contact the customer support team via phone call or online reporting. Online reporting function is under development, but customers are still able to reach our support team by dialling +1 (123)-456-7890.

6 Product Documentation

The final prototype kept the same interface as the second prototype but had its changes. As Vissiolle is an application, making sure the software was sufficient was extremely important. If a phone with very little RAM or it is outdated in software, that could be a hindrance to Vissiolle picture scanning or text to speech functions and would cause many errors. Therefore, using Doxcan, an API allows you to convert a photo of a document into a scan of a document, and Visual Studio to code for both functions made the process easier.

When you open Vissiolle, it gives you a description of the interface and location of the buttons. Upon pressing the button, it will tell you what button you pressed. The top right and left of the screen contain both image recognition and alphanumeric buttons. The button on the left that says “Image Recognition” can identify objects and give the user an accurate description of the object selected. The function on the right will be “Alphanumeric Recognition” and this button will read whatever letter or number the user takes a picture of at. The process of using both functions is displayed in the final presentation ().

6.1 <Subsystem 1 of prototype>

6.1.1 BOM (Bill of Materials)

Table 1: Vissiolle's Bill of Materials

Material/Tool/Equipment	Description	Quantity	Cost per unit	Total cost
Laptop	For creating software	3	Owned	Owned
Software Design Application	Visual Studio Code and Doxcan will be the choice of software creating platform	3	Free	Free
Stove and Dishwasher	For functionality testing purpose of "image recognition" and "alphanumeric recognition"	1	Owned	Owned

6.1.2 Equipment list

Since this is an application, most of the software for this app has been quite simple. We used visual studio code to code this application with C# language. The interface is very simple, and we used Doxcan as the application programming interface to increase speed and fluidity of scanning the pictures. Stoves and Dishwashers were used to test Vissiolle on household appliances. Lastly the laptop and the phone must have been bought or the software must be at least 7 years old. Old software with bad hardware will cause the application to malfunction.

6.1.3 Instructions

This prototype started very simple, and the approach was to get the image recognition function finished as it is essential for creating the next function. This function was finished during

the second prototype and was documented in the second prototype deliverable (Deliverable F GNG2101.pdf). Furthermore, in the second prototype, it details the main loop behind both image recognition and alphanumeric recognition.

Vissiolle has two main functions containing “Image Recognition” and “Alphanumeric 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 assumes that the user’s button has processing issues and responds saying “Some Error Occurred can’t be done. Please take the picture again.” (Deliverable F GNG2101.pdf)

After creating this loop that is the main component of our application, changes to the other functions are essential. Therefore, the “Point Recognition” function was switched with “Alphanumeric Recognition”, which was more reasonable. The steps to using both functions for “Image Recognition” and “Alphanumeric Recognition” are quite similar as they both start from the home page to the camera interface, but after that these functions are different. “Image Recognition” scans applications and assumes whatever object is inside the picture. Prototype 1 and Prototype 2 have documented the creation of this “Image Recognition”. “Alphanumeric Recognition” uses text to speech functions.

6.2 Testing & Validation

The testing for Vissiolle was quite difficult. The lack of information on how those who are visually impaired use phones made not only building the interface difficult but making the right adjustments difficult too. Taking pictures of many different objects for “Image Recognition” and testing the accuracy of it was important. “Alphanumeric Recognition” was tested by taking a lot of pictures of different household appliances labels to see the accuracy of it. The process of testing is displayed in the final presentation (Final Presentation GNG2101.pdf).