



The Third Eye

Harshit Gupta¹, Anubha Garg², Veer Bhadra Pratap Singh³

^{1,2}Student, IMS Engineering College, Ghaziabad, Uttar Pradesh

³Assistant Professor, IMS Engineering College, Ghaziabad, Uttar Pradesh

ABSTRACT

As technology is increasing day by day, technology for visually impaired people is also increasing at a fast pace, but having some things that make their life easier and things that they use daily to complete tasks are the absolute best. Here we have presented an application for a blind person or visually impaired people so that he/she can access the basic functionality of a smartphone. WHO (World Health Organization) report states that approximately 285 million are visually impaired in the world. They face challenges like communicating with the world in their day-to-day life. It creates difficulty in their life even to make a phone call and access other functionalities of a smartphone. After so much advancement still, some people are not able to use a smartphone. With the expeditious growth of wireless communications, voice recognition technique has increasingly needed. A gesture-based application helps a wide range of users to operate a smartphone. This application listens to gestures, speech and performs relevant action.

Keywords— Android, iOS, Flutter, Text-to-Speech, Speech-to-Text, Image Recognition, Gesture-based interface, Mobile devices, Visually impaired people, Smartphone

1. INTRODUCTION

In this modern era of technology, smartphone devices have become one of the most common consumer devices. A smartphone plays a very important role in human life. Smartphones make life easier with its various functionality like – communicating with others through voice calls, emails, messages, browsing the internet, taking photos, etc. With the help of smartphones, these all have become a matter of seconds. For example, you just have to dial the person's contact number from your phone and wait till he/she responds. But this pleasure is only for those people who don't have any disability.

Most of the people misunderstood blindness, there are many preconceived beliefs had been owned by many people about blind people, they just believe it to be true without even getting in touch with a blind person. Most people think that blind or visually impaired people are not able to live a normal life like them only because of their visual disability. Blind people can live a normal life and do things according to their lifestyle. But, they face a lot of difficulties due to inaccessible infrastructure and social environment. One of the biggest problems for a visually impaired person, especially the one who is completely visually impaired or blind, is to operate a mobile phone.

The graphical user interface of most smartphone apps are designed for sighted people, there is no additional feature or apps which gave access to the phone to a visually impaired person. So, considering this problem 'THE THIRD EYE' launcher creates an accessible interface on any smartphone device for a visually impaired person that delivers independence to them and helps them to use the basic functionalities of smartphones like voice calls, messaging, location fetching, image recognition, some operation in case of any emergency, etc. It's unique, simple to understand, easy to use and the vision-free interface makes ease for a blind or visually impaired person to operate a smartphone. Simple gestures, voice recognition, and image recognition combine to THE THIRD EYE replace conventional smartphone inputs.

2. RELATED WORK

- **Eyemate for blind and blind tracker:** In this system, a blind person can move independently without taking any help from others and can make an emergency call and their guardians can also find out him/her easily if he/she is lost somewhere. The user has to wear the device on his body and there is an interaction between the hardware module and Eyemate application. The application will tell the obstacle position respected to the blind person and it also tells the current location which is measured by the GPS in every 4 minutes [2]. Present latitude, longitude and time are also sent to the server. As a result, the traversed path of that person is saved to the server. Now the guardians can easily find out their current location. So guardians need not worry about the blind person as they can easily find out their location from the server. It helps the visually impaired people to reach their destination by defending all the obstacles coming, but it does not protect themselves from all types of obstacles.

- **JustSpeak:** JustSpeak is an Android accessibility service designed for use with many existing applications and other accessibility services (e.g. Talkback) on smartphones and tablets running Android 4.2 and up. The interaction to launch applications and activate on-screen control via spoken commands is simple and spontaneous and fully accessible for non-visual use.[1] This application is available on Google Play Store for free downloads. For now, JustSpeak only supports English. As discussed earlier, this application uses Google’s ASR service in JustSpeak to recognize user input speech. Along with reliable performance, Google ASR also gives developers great flexibility by offering both online and offline recognition, therefore, JustSpeak can be used without an internet connection. Of course, there are advantages of connecting to the Google servers. One more important benefit for JustSpeak users is that online recognition returns multiple scored results as opposed to a single result when using offline recognition.
- **Object detection:** Application for detecting an object using the mobile video camera and giving voice instructions about the current location of the blind user by using GPS and to give the location of an object to the blind person. Firstly, according to object information users need to train the system. The system extracts the features to search objects in the camera view so that it will be able to know the direction of the object where it is placed using an angle extraction feature.[3] This Android application gives warning of the obstacles that come in the way of the user. This project comes up with the use of object detection for blind people and provides them many features such as audio/ vocal information of an object and the current location of a blind user.

3. PROBLEM STATEMENT

Smartphones are one of the best examples of the advancement of technology, but till now it is not easy for a visually impaired person to use a smartphone effectively. The main reason for this is the presence of the touchscreen. Touchscreen made all the functions virtual and requires sight or vision to perform any operation, a visually impaired person cannot recognize what function is running on the screen. As a result of which they find themselves different from others.

4. THE PROPOSED WORK

In this system, we are developing an application for smartphones i.e. a gesture-based user interface, in other words, a launcher application. This application is easily controlled by a visually impaired person by using different gestures, speech recognition and various other techniques that don’t require sight. When a blind person touches the screen launcher it will detect the touch and start speaking the basic options which are present on the screen through text to speech. Text to speech is the method that speaks the text. The blind person will hear whatever is open on the screen, which is the easiest way of recognizing options on that screen for a blind person. The person can now operate and can perform some basic functionality of phone like call (from contact, dial number), Text-messaging, date, time, current location, detect an object in front of them and much more basic functionality. He/she can also do some emergency operations like emergency call, send their location to someone when they get into some trouble or lost, etc. These all are done only with gestures and voice commands as narrated.

5. SYSTEM ARCHITECTURE

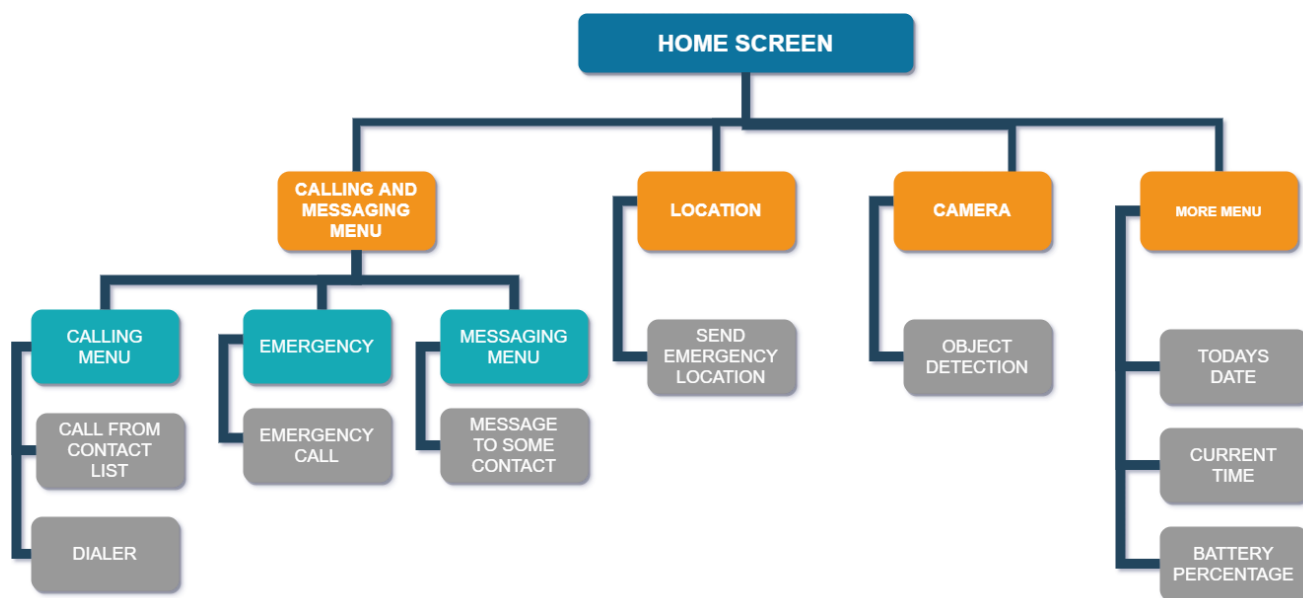


Fig. 1: Architectural Diagram of mobile app

5.1 Home Screen Menu

In home screen there are four options:

- (a) Calling and Messaging menu
- (b) Location Menu
- (c) Object-Detection
- (d) More Menu

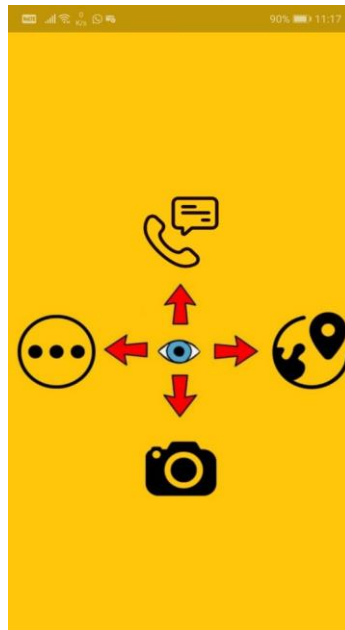


Fig. 2: Home Screen

5.1.1 Calling and Messaging menu (Swipe-Up): The user can communicate with their family, friend or any other person. He/she can make a call or send a message to them. Here is also an option of an emergency call in case of an emergency.

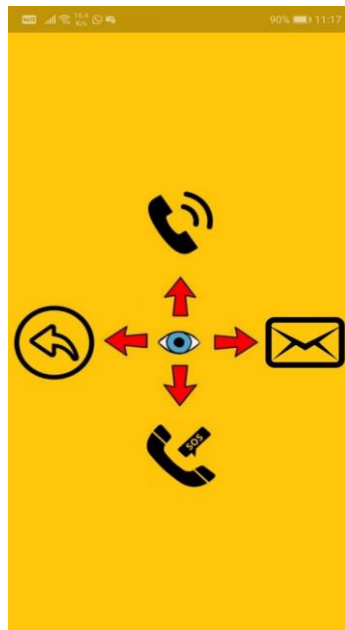


Fig. 3: Calling and Messaging Screen

(a) Calling Menu: (Swipe-Up):

- **Contacts:** The user can call from their contact. The user first swipes right and speaks the name of the person to whom he/she wants to call. The speak-recognition system will listen to his/her speech. After speaking, the user can also listen to his input by just swiping up with the help of text-to-speech. After confirming, user just swipe down to make a call. The spoken input will be searched from his contact list and call will be made. To disconnect the call, user has to press the power key.
- **Dialer:** User can also dial a number. The user first swipes right and speak the phone number. The speak-recognition system will listen to his/her speech. After speaking, the user can also listen to his input by just swiping up with the help of text-to-speech. After confirming, the user just swipe down to make a call, a call will get connected to the spoken phone number. To disconnect the call, user has to press the power key.

(b) Messaging Menu (Swipe-Right): The user can send a message to a person from their contact list. He/she first swipe right and speaks the message, the speech recognition system will listen to his/her speech and convert it into text. After speaking, the user can also listen to his/her message by just swiping up with the help of text-to-speech. After confirming, the user just swipe down and select the contact to whom he/she wants to send a message by speaking his/her name. On again swiping down user can send his message.

(c) Emergency Call (Swipe-Down): When a user is in some emergency he can just swipe down on the screen and call. The call will get connected to a person, which has been previously set by the user.

5.2 Location Menu: (Swipe-Right)

It is the tracking system with which the user can listen to its current location and He/she can also send its current location. This would help a blind person in case of any emergency or he/she lost its track. By just swiping right the user can send its location as a text message, the location is in the form of latitude and longitude. His/her location is sent in the form of a google map link. The link will look like-“I need help Please track me, I am here: - https://www.google.com/maps/place/28.65****,77.44****” It is a very important part of our application. As a result with the help of this link user’s guardian can easily find and reach him.



Fig. 4: Location Screen

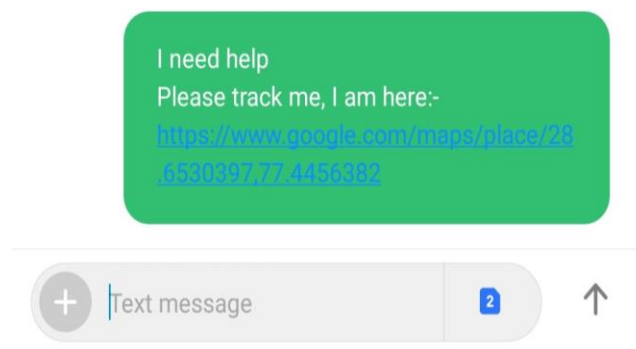


Fig. 5: Location message received by the guardian

5.3 Object-Detection: (Swipe-Down)

In our application with the help of this feature, the user can identify the object in front of him. The user can do this with just swiping down, the camera will be open and it will detect the objects and speaks their name. It acts as an eye for him.

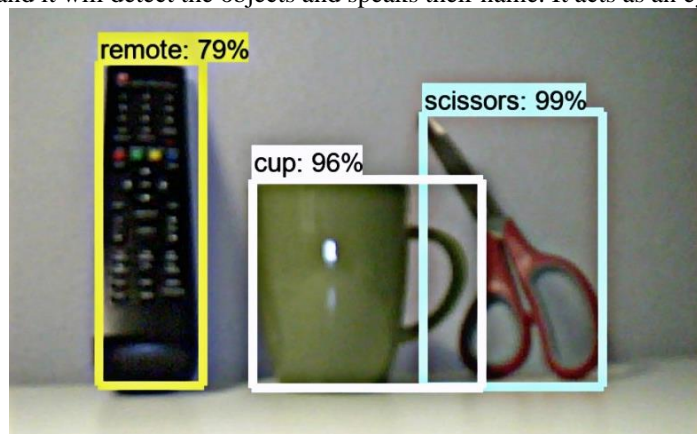


Fig. 6: Object-detection

5.4 More Menu: (Swipe-Left)

There are many more basic functionalities that are needed by the user, so in the more menu, there are three options.

5.4.1 Today's Date: (Swipe-Up): The application will identify today's date and inform it to the user through voice using Text-to-speech.

5.4.2 Battery Status: (Swipe-Right): The application will identify the current battery status/percentage of the device he/she is using and inform it to the user through voice using Text-to-speech.

5.4.3 Current Time: (Swipe-Down): The application will identify the current time and inform it to the user through voice using Text-to-speech.

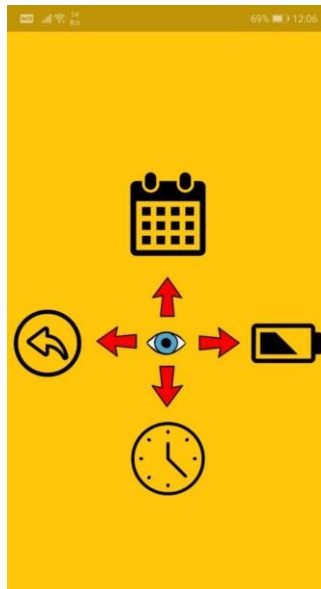


Fig. 7: More Menu

6. CONCLUSION

This application demonstrates the idea of messaging, calling, emergency and many more other features of smartphones for visually impaired people. This application will be very efficient for a visually impaired person. It allows environmental barriers to be removed for people who feel different from others. It acts as a virtual eye that makes the world equal i.e. people with vision and people without vision This application is based on flutter.

7. FUTURE WORK

Based on feedback received from our users, we will update our application and add new features to it. We will also resolve issues. We will continuously take reviews from our users and try to improve them accordingly. The development of this application is very important for future use. In the future, we plan to introduce dynamic gestures, a navigation system, text recognition, we will also be converting this application into a launcher application.

8. REFERENCES

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