

SMART EYE FOR BLIND

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Abstract - Our project is an innovative system for visually impaired people and can act as a voice aid for them. Our system has a custom messaging feature, with inbox and sent items, and also call log and dialer. All actions performed by the user, the system speaks out and assists the user to know his current position on phone screen. This system also includes an Object Detection and Emergency alert system. This system will allow the visually impaired to detect images which are in front of them so that they can get a sense of their surroundings and also allow users to alert their emergency contact when they feel the need to. The system in all is a smart assistant for whatever action the user has performed through a custom application. With the rapid development of artificial intelligence and mobile computing, modern technology has brought more convenience to the blind and visually impaired people. The group of visually impaired persons are undergoing an inconvenient daily life without the assistance from their family or friends. They need an approach to get to know about the life outside their home and they desire to have access to internet and mobile services as a normal one. The objective of our System is to make their lives easier and much more independent so that they don't always have to depend on others and create some normalcy in their lives.

Keywords - Voice Assistant, Object Detection, Emergency System.

I. INTRODUCTION

Nowadays our lives revolve around our mobile phones. It's become a necessity; we are so engrossed in our phones 24x7. We spend most of our time sending messages or calling someone on the phone.

So communication is not an issue for us. But on the other hand the visually impaired have no way of using a mobile phone. They have to be completely dependent on someone to make calls for them or to do any activities. There are Braille systems which are available online but it is very costly and the availability of these products is very less and there are only a few people who can interpret braille. So what we wanted to do was create a system which will allow the Visually impaired users to access the basic components of a mobile, which includes Messaging, Calling, Alarm Clock, etc. The System also includes the Object Detection and the Emergency alert, which will allow users to identify the objects which are present around their surroundings and also allow users to contact their emergency contacts when in need. With the help of this system the users can make calls messages and communicate with others without the assistance of any family members.

OBJECTIVES:

The Objectives of our Project are:

- To create a system which will allow the visually impaired to access the basic components or services of the phone

- To allow them to communicate with others and have an idea about their surroundings without any assistance from any family member.
- To create some independence in their lives so that they don't feel like a burden to others.

II. LITERATURE SURVEY

There is a bulk of information available on technological advances for visually impaired people. This comprises development of text to Braille systems, screen magnifiers and screen readers. Other developers have proposed an application converts your voice message into text format while sending message and text message into the voice format when it receives messages. We collected articles most relevant to our proposed system.

- Sonal R. Pampattiwar^[1] has proposed "Smartphone accessibility application for visually impaired" The purpose of this research project is to create an application that would enable the visually challenged to use some basic features of mobile phones thus making their life a bit easier. To use the feature of calling and messaging the user has to enter the calling/messaging module by drawing the '>' gesture on the main screen, Subsequently he/she has to draw pattern(left, right arrow key-) on his smart phone touch screen. The application then recognizes this number, asks the user if he wants to make a call or send a message. To make a Call the user has to draw '>' on his

phone screen. The application would ask the user for confirmation by asking him.

- Dr. Hari Om^[2] has proposed “Offline voice assistant application for android based devices” The proposed app has three modules: like Speech to text conversion module, Text processing module and Response module. Introduces a universal voice control application for accessing different apps on Android operating system. A voice control app has several important applications. It can support an efficient and natural interaction with a user through different voice commands. It can store a set of available voice commands based on the application context. Here, we present the system design of a voice assistant application along with its utility. It includes the generation, recognition, and analysis of the voice commands, and then provides corresponding intelligent responses automatically. It improves the experience of the graphic interface interaction for differently abled persons, especially blind and motion impaired users.
- Prof. Sangeetha K N^[3] has proposed “Blinds Personal Assistant Application for Android” The aim of this project is to assist the blind people to deal independently some of their daily activities such as object detection and reading hard copy documents. And also it focuses on cost effective manner to deal with this problem. Hence in this they have chosen android smartphone to implement this project, because they have been proliferated to every common man. This system contains three main modules those are object detection, OCR and voice interaction. The object detection and OCR modules works with acceptable latency and they are pretty good in accuracy. Strong internet connection is required for voice interaction model.

III. METHODOLOGY

The Proposed System works as follows; the visually impaired initially opens the smart eye application. After opening the application, it is introduced with the user-friendly GUI, This GUI consists of all the modules which are present in the Application. The Modules are: 1) Basic module which contains Messaging, Calling, Clock and battery applications 2) Object Detection 3) OCR 4) Emergency Alert 5) Barcode Scanner. The user can access these modules with the help of the interactive GUI. The entire GUI has the talk back feature with the help of this the user can navigate around the application. On clicking on any module on the GUI the interactive GUI will inform the user which module the User has clicked on. If the user wants to open that certain module then the User can simply double click on the icon, whereas if the user wants some other module the user can click on some other icon with the help of the GUI.

1. Messaging, Custom dialer and Clock:

These are our basic functionalities of our system which will help the user to read the contents of messages. System allows users to listen to the battery level and alert them battery is low. Also user can call from this app using custom dialer and call logs. On the first click the voice assisted system will give the description of the module following that it will say that if you want any other module click somewhere else. Now if you want to select the messaging module the user can simply double click on it and it will open. Now the messaging module once it is opened will consist of the inbox where all the messages are placed. On clicking on it our system gives the description of the message which includes the subject and who sent it. On double clicking on the message the message is opened and the system reads the message to the user. Now if the user wants to send a message then he/she can simply speak the message and then double click on the send button to send the message respectively to certain contacts. The Custom Dialer can be accessed in the same way the messaging module was accessed. Now if you want to make a call to a specific contact then that contact can be selected by simply speaking his/her name or you can also manually type in the number which will be guided by the voice assistant and double click on the call button to make the call. The user can monitor the time and set alarm by simply accessing the clock in the application system. The voice assistant will assist the user to set the Alarm and monitor the time on the System.

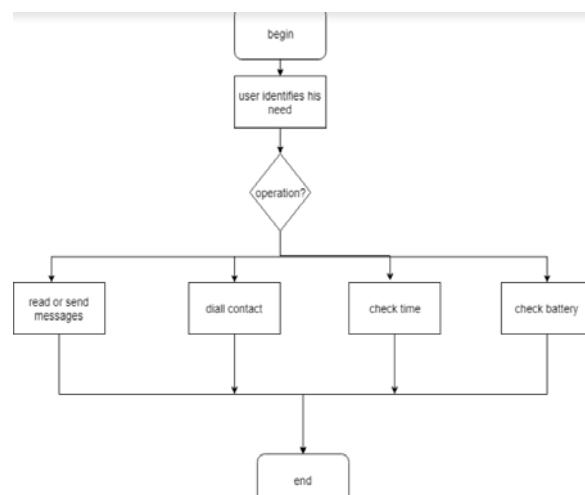


Fig 1.1 : Basic Module

2. Object Detection:

It allows user to recognize the object kept in front of him.

It detects and identifies the object and will prompt about the object identified. We are identifying Stationery Objects. The user will open the GUI and by single clicking on the Object Identification icon the user will get the description of the module, if it is not the module the user wanted the user can click somewhere else. And if the user wants to open the

Object Identification module he/she can simply double-click on the icon. The Module will firstly open the camera of the device. Now the user can simply take the image of the object which is in front of them and the voice assistant will detect the image and then identify the image which is in front of them and let the

user know what is in front of them. If the object isn't detected it will let the user know that no object is detected and re-adjust the camera to detect the object. The Object Detection Module is based on Masked Convolution Neural Network.

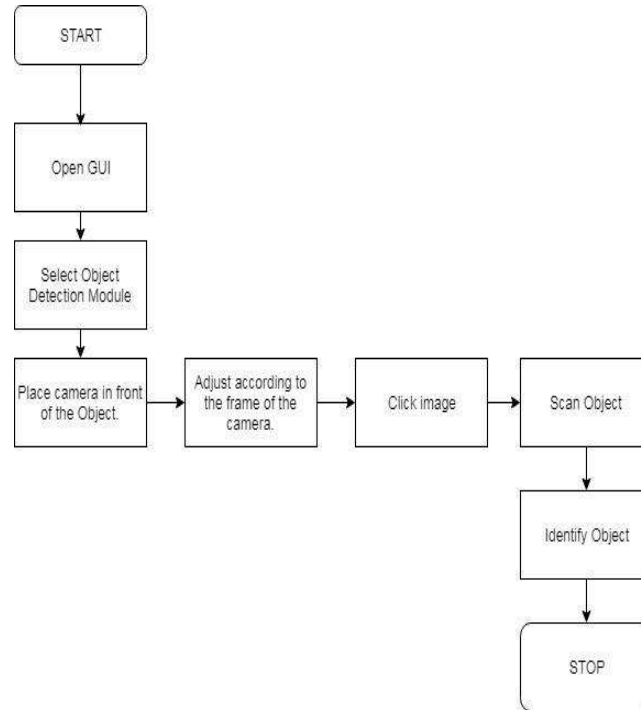


Fig 1.2: Object Detection

3. OCR with Text to Speech:

In this, users can take a snapshot of the document or magazine which he wants to read and then the system will read the contents of the document. It gives a voice over support to identify the edges of the paper to be photographed and prompt when all edge of the document is within the camera. The user firstly opens the GUI and by single clicking on the OCR icon the user will get the description of the module, if it is not

the module the user wanted the user can click somewhere else. Now if you want to open the OCR module he/she can simply double-click on the icon. Once it opens it will open the mobile device camera, the user can place the camera on top of the material and take a snap and it will then convert the text to speech. It gives a voice over support to identify the edges of the paper to be photographed and prompt when all edge of the document is within the camera.

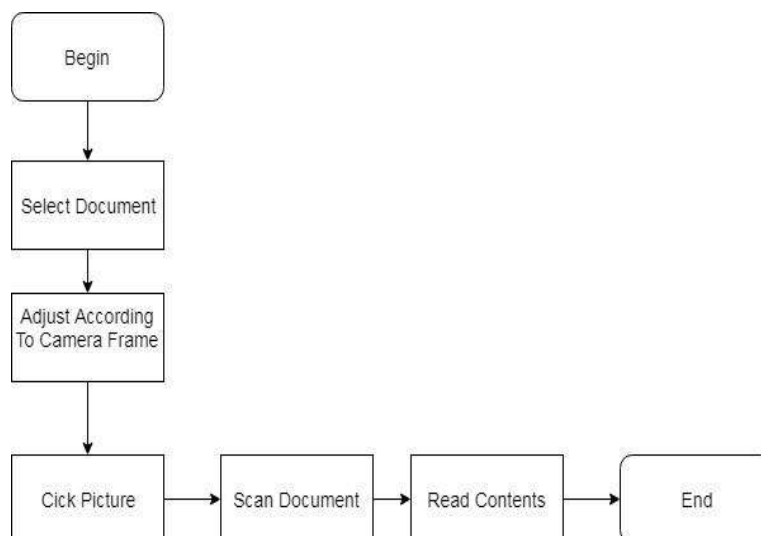


Fig 1.3: OCR Text to Speech.

4. Emergency Alert:

Our system will send emergency alert messages to the assigned emergency contact. When the visually impaired is in trouble or in any emergency and wants help and they want to contact their family or emergency contact, at that time this module is used. This module is opened by the user by simply double-clicking on the SOS icon. On opening it, a call is directly made to the emergency contact the user has listed.

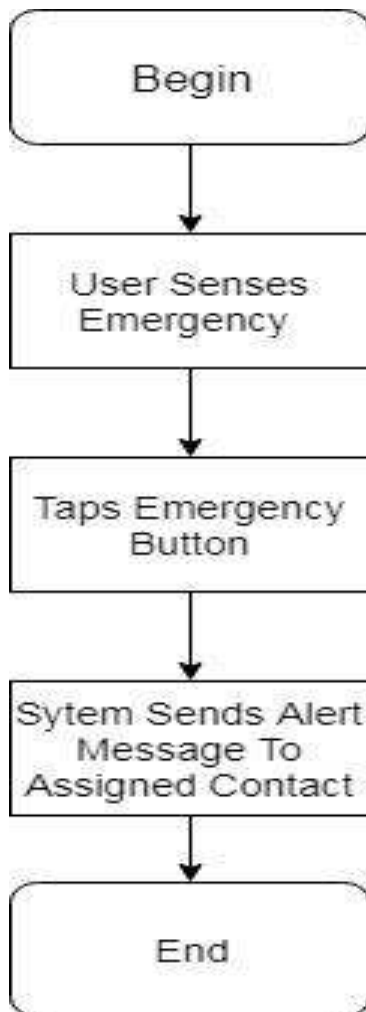


Fig 1.4 Emergency Module

5. Barcode scanner with product description:

The system provides a barcode scanner that uses the camera to help locate the barcode printed on most product labels, and then read out available product description.. On clicking on the icon the camera will open and the user must simply scan the barcode of the product, if the barcode isn't detected the voice assistant will let the user know and then the user can simply rotate the product for the scanning of the. It gives a voice over support to identify the edges of the barcode to be scanned and will prompt the user when all edge of the barcode is within the camera. When the barcode is scanned the voice assistant will give a description of what the product is.

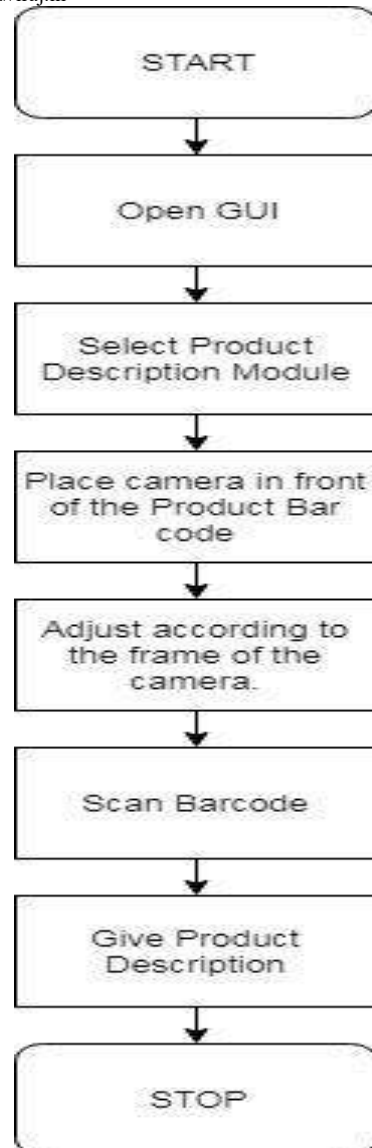


Fig 1.5: Barcode scanner with product description.

IV. CONCLUSION

Smart eye for blind is an android application developed in order to aid the visually impaired people in their everyday life. It eliminates environmental barriers for people with a wide range of disabilities. It is a voice control assistant on Android operating system for whatever action the user has performed on the custom app. It provides enhancement to some general applications running on smartphones. The main aim of this project is to assist the blind to deal independently with some of their daily activities. The system in all is a smart assistant for whatever action the user has performed through a custom application.

V. FUTURE SCOPE

This can be a good application for those people who are currently not able to use their phone due to lack of vision or those who have blur vision. It can act as a voice assistant to them. In the OCR module of

application further multiple languages can be added, currently only english language is implemented. Also, in emergency module along with call location of the person can be sent.

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