Be My Eyes : Android App for visually impaired people

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Be My Eyes: Android Voice Application for Visually Impaired People

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Abstract **-This paper proposes Be My Eyes, a universal voice control solution for non-visual access to the Android operating system.[1]It has been observed that nearly about 60% of total blind population across the world is present in INDIA.[4]As our society farther expands, there have been many supports for second-class citizens, disabled. One of many supports that are urgent is the guarantee of mobility for blind people. There have been many efforts but even now, it is not easy for blind people to independently move.[2] With the rapid growth of wireless communications, the need for voice recognition techniques has increased greatly. Voice applications based on voice interfaces, voice recognition, and voice dialogue management can help users to be focused on their current work without extra effort for hands or eyes.[3]The application listens to your commands and then responds with voice commands by talking. The application converts your voice into text.[5]**

Keywords-**Text-To-Speech, Visually Impaired Peoples, Mobile Devices, Voice Based Interfaces, Speech-To-Text.**

I. INTRODUCTION

With advances in new technologies, mobile devices have grown in popularity to become one of the most common consumer devices.[3]Cell phones are very important part of modern life. Many of us need to make a call or send a message at anytime from anywhere.[5]For blind and motion-impaired people this issue is more obvious, but other people also often face this problem, e.g., when driving or using a smart-phone under bright sunshine. Sighted users often find them inevitably placed under situations where non-visual interaction is required.[1]

"Be My Eyes" is an android application which supports voice commands. The application is developed for visually impaired people. After unlocking the mobile phone the application will be launched without any voice command. The systems accept voice command and perform the operations according to it. For performing the further task it first translate the voice into text and then produces output in the form of voice.

It performs basic functions such as calling, messaging and operations of contact (such as add, show, delete). Previously visually impaired people

need to operate the phone keys manually by remembering the position of keys. But in case of this application they just have to operate the phone by voice command.

The blind people face challenges daily in communicating with the world around them. They have to depend on their sighted colleagues for making a phone call and accessing other mobile functionalities. This system is a voice recognizing application for mobile phones that allow access to most of the functionalities of the phone and will make it possible for visually impaired people to connect with the society. The sighted user's people with limited reading ability can also use this application if they are involved in activities that prevent reading (e.g.: driving or other eyes-occupied situations).

II. LITERATURE REVIEW

There is bulk of information available on technological advances for visually impaired people. This includes development of text to Braille systems, screen magnifiers and screen readers. Other developers have proposed an application converts your voice message in to text format while sending message and text message into the voice format when it receives message.

Among the early attempts, voice input and input for surfing was adopted for the Blind people. IBM's Application has an easy-to-use interface and converts the text-to-speech having different gender voices for reading texts and links. However, the disadvantage of this is that the developer has to design a complex new interface for the complex graphical application to be browsed and for the screen reader to recognize.

Considering Indian scenario, Shruti-Drishti and Web-Application for Blind are the two web applications that are used by Blind people to access the internet including the emails. Both the systems are integrated with Indian language ASR and TTS systems. But the available systems are not portable for small devices like mobile phones.[4]

1.JustSpeak: Enabling Universal Voice Control on Android

In this paper authors have, designed and implemented voice user interfaces in the form of voice navigation, commands and launching other applications using C and C++ programs. The voice application was written in C++ supported by CodeWarrior 9.1 and designed in common Palm Operating System applications.

The important feature of JustSpeak was implementation of multiple commands in single speech. It was more time to combine multiple commands into one sentence than repeating the whole dialog. The interaction to launch applications via voice commands is simple and fully accessible for non-visual use. It has been released on Google Play Store for free downloads**.**

This paper provided information about universal voice control on android operating system. This application was helpful in providing enhancement to all application running on mobile system.[1]

2.Design and Implementation of a Voice Based Navigation for Visually Impaired Persons

In this paper authors have used Android

Software Development Kit (SDK) for development. The application was based on navigation system which used TTS(Text-to-Speech) for visually impaired people in order to provide a navigation service through voice command. Also, Google Map API was used to apply map information.. Smart Phone recognized the voices, search for destination, routes, and provide the route to the user through voice command. The primary function was to search destination through voice recognition and Google TTS (Text-to-Speech) service.

The application was designed in such a way that if the voice command is unclear then, a message 'speak once more' will pop up and users have to say the destination once more clearly. It was a navigation system for blind people in order to provide exact location information. It was cheap and easy to install in Smart phone which allowed blind people to easy excess the program.

This paper gave knowledge about the navigation system which uses TTS (Text-To-Speech) for blind people.[2]

3.The Design and development of user Interfaces for voice application in mobile devices

In this paper authors have, designed and implemented voice user interfaces in the form of voice navigation, commands and launching other applications using C and C++ programs. The voice application was written in C++ supported by CodeWarrior 9.1 and designed in common Palm Operating System applications.

This paper gave information about a prototype of voice application which uses voice recognition, and for developing the prototype they have used the voice engine from Conversay to meet the new requirements of voice applications. The maximum significant variance was only 2%; the point of "Digit Dial" is 98.8% and96.6% in office noise and car noise respectively. This paper provided the prototype of voice application integrated with voice recognition. With the help of this we can design and implement voice user interface such as voice commands.[3]

4.Voice Based System in Desktop and Mobile Devices for Blind People

The paper specified the use of ASR (automatic speech recognizer) and TTS (Text-to-Speech) get used for converting speech to text and vice versa. This included development of text Braille systems, screen magnifiers and screen readers. Web browser for blind were the two web browser framework that were used by blind people to access the internet including email G-mail- System read messages on recipient mailbox. RSS- Real simple syndication for news Song- listen songs Book reader-system read book Drive browser- To search drives and folders.

Voice mail architecture helped blind people to access email and other multimedia function of operating system.

This paper, described the voice mail architecture used by blind people to access email and multimedia function of operating system easily and efficiently. This paper majorly focused on mailing and desktop applications. By using this functions we have enhance functionality of our application.[4]

III. Proposed System:

a) SYSTEM ARCHITECTURE:

From literature review, it has been found that the commonly used features are:

1. Call
2. Message
3. Contact(Add ,Show ,Delete)
4. Date
5. Battery Status

The proposed system "Be My Eyes" has functionality as shown in the architecture

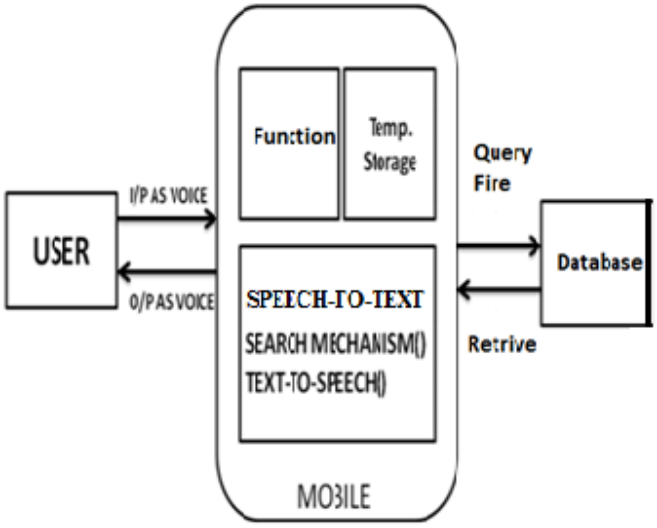

Fig.1. Block Diagram of Be My Eyes Architecture

b)Function Description:

Table.1: Voice Action supported by Be My Eyes

Operations	Keywords
To make Call	Call
To send Message	Send Message
To show Contact	Show Contact
To delete Contact	Delete Contact
To add Contact	Add Contact
To check Battery	Battery
To set Alarm	Alarm
To check Bluetooth Connectivity	Bluetooth
To check Network Signal	Signal
To send E-mail	E-mail
To check Date and Time	Date
To know all Keywords	Instructions

IV. System Implementation:

a) Android:

Android is a software stack and mobile operating system that includes the operating system for portable devices, middleware, user interface, and a standard application (Web Browser, Email Client, SMS), multimedia message service (MMS). It provides the required application through the Android Software Development Kit (SDK) to develop a variety of tools and APIs. Android works on the Linux kernel and the Android system uses C / C + + libraries.Android has emerged as a new mobile development platform, building on past successes and avoiding past failures of other platforms The platform is open source, with no up-front fees, and developers enjoy many benefits over other competing platforms.

Complete: The designers took a comprehensive approach when they developed the Android platform. They began with a secure operating system and built a robust software framework on top that allows for rich application development opportunities.

Open: The Android platform is provided through open source licensing. Developers have unprecedented access to the handset features when developing applications.

Free: Android applications are free to develop. There are no licensing or royalty fees to develop on the platform. No required membership fees. No required testing fees. No required signing or certification fees. Android applications can be distributed and commercialized in a variety of ways.

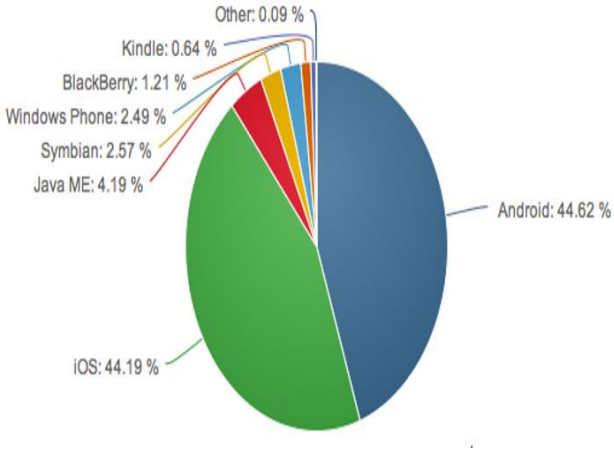

Fig.2: Pie Chart showing usage different OS.(groovesontheradio.com)

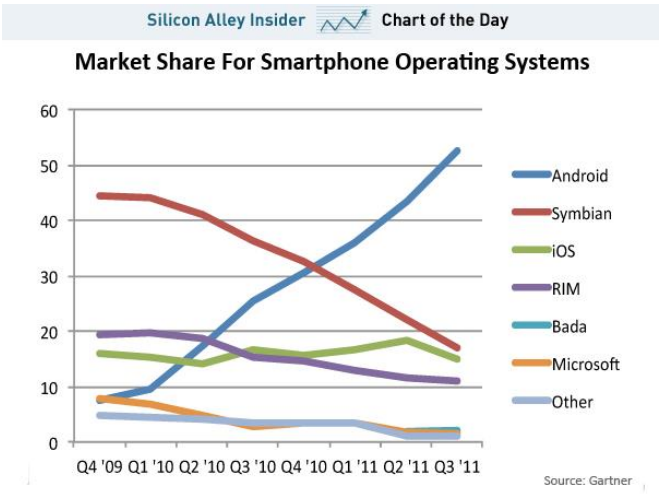

Fig.3: Market Share for Smartphone OS

b) Methods Used:

i. Text to Speech (TTS):-

TTS is a method that converts speech from text. TTS is important for voice output for voice feedback for user. TTS is implemented in software where audio capability is required. When user enters voice command, TTS will convert that voice into text format and performs specific action.

ii. Speech to Text(STT):-

Android has a inbuilt feature that is speech-to-text through which user can provide speech input to the

software. In the background speech input will be converted to text and perform action in the form of TTS.

The system proposes following applications:

1. Splash Screen and speech-to-Text:After unlocking the phone the system will launch Splash Screen application. In Speech-to-text user will enter keywords such as “call”, “message” ,”battery”, ”date”, ”Bluetooth” for launching specific application.

2. Call: The user will enter number through voice to make call. When user will get an incoming call the system will identify the number and inform it to user through voice.

3. Contact: With this Application user can add, delete contact. The user will enter contact number and name through voice.

4. Message: User will enter number and message through voice and when user will get an incoming message the system will identify the number and message and inform it to user through voice.

5. Date and Battery: Application will identify current date & time and for battery the application will check status of remaining battery an inform it to user through voice.

6. Bluetooth and Internet Connectivity: User has to click on the screen to know Bluetooth and internet connectivity status.

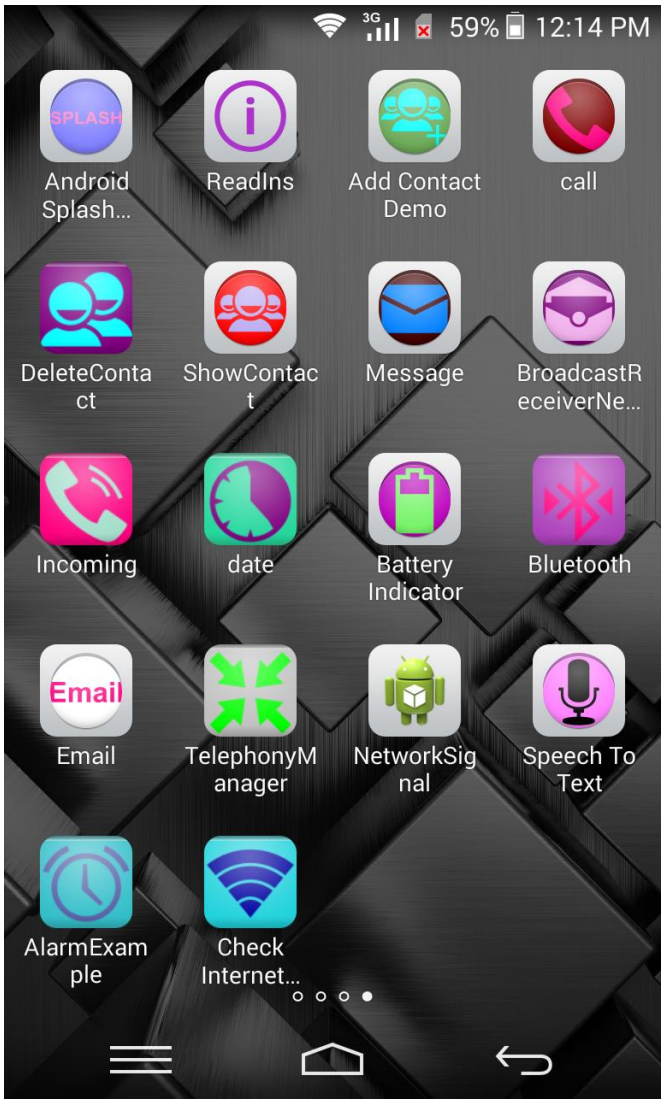

Fig.4: Screenshot of Implemented Application

V. System Analysis:

Table.2: Response Time for Applications

Sr.no	Application	Response Time(sec)
1.	Splash Screen	2
2.	Speech to text	3
3.	Call	20
4.	Incoming Call	2
5.	Message	28
6.	Read Message	8
7.	Read Instructions	4
8.	Date	6

9.	Battery	5
10.	Add Contact	16
11.	Delete Contact	17
12.	Show Contact	3
13.	Bluetooth	2
14.	Internet	4
15.	Alarm	10

VI. Conclusion:

This project demonstrates the idea of messaging and calling system for visually impaired people.It allows environmental barriers to be removed for people with a wide range of disabilities. In this project we have presented the system designs and use cases of the application "BE MY EYES". It is a universal voice control assistant on Android operating system. The application provides enhancements to all applications running on mobile system. BE MY EYES can benefit large number of users with universal eyes-free and hands-free voice control of their mobile devices.

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