Voice Based E-mail Application for Blind/Visually Impaired People

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ABSTRACT

In today's world communication has become really easy because of integration of communication technologies with internet. However, visually impaired individuals find it tough to utilize this technology because of the fact that using them needs perception. Despite the fact that several new advancements are enforced to assist them use systems with efficiency, no user who is visually impaired will use this technology as expeditiously as a traditional user. In contrast to traditional users they need some practice for using the offered technologies. This paper is aimed at developing an email application for Android that can facilitate even a visually impaired person to use the services for communication through email. The system can work solely on voice commands spoken by the user via speech to text. This application may be also be utilized by any traditional person without any impairment. The system is supported by interactive voice response which is able to make it user friendly and easy to use.

Keywords: - *speech recognition, email, visually impaired, user friendly*

1. INTRODUCTION

There are 285 million people who are estimated to be visually challenged worldwide: thirty-eight million are blind and 247 million have low vision [1]. Thus, it turned out to be the ethical responsibility to give one thing back to society and develop an application for the visually impaired. The existing systems don't offer an entire voice based application for a visually impaired person. [2] So, there emerged a necessity to make a voice based application for such individuals so that they can send or receive the emails with ease by providing proper services. Email has turned out to be a crucial a part of formal communication in skilled world. For folks that can see, emailing isn't a giant deal, except for folks that are not blessed with ability of vision it poses a key concern as a result of its intersection with several vocational responsibilities. Therefore we've attempted to develop a voice based email system which is able to aid the visually impaired individuals who are naive to such systems to use email facilities in a trouble free manner. The users of this application do not have to possess knowledge regarding keyboard shortcuts or where the keys are located. All functions are primarily based on voice commands, thus making it very straightforward for any type of user to use this system.

2. LITERATURE REVIEW

It is estimated that there are a total of 4.92 billion email accounts existing in 2017 and there will be approximately 5.59 billion accounts by the end of 2019[4]. It is also estimated that there are a total of 340.2 million smartphone users in India in the year 2017 [5]. This makes emails the most used kind of communication. The prevailing email systems don't give any means of feedback or Talkback service.

The most common mail services that we tend to use in our day to day life cannot be used by visually challenged people. This is as a result of they do not offer any facility in order that the person in front will listen the content of the screen. As they cannot visualize what is already present on screen they cannot build out where to click in order to perform the required operations. [3] For a visually impaired person employing a computer or smart phone system for the first time isn't that convenient as it is for a standard user even though it is user friendly. Though there are several screen readers offered then also these individuals face some minor difficulties. Screen readers speak out whatever content is there on the screen and to perform the particular actions the person will have to use keyboard shortcuts because mouse location cannot be detected by the screen readers. This means 2 things; one that the user cannot make use of mouse pointer as it is fully inconvenient if the pointer location cannot be derived and second that user should be versed with the keyboard on wherever each and every key is placed. A user who is new to computer will therefore not use this service as they're not conscious of the key locations. Also there are some difficulties faced by visually impaired people when using smartphone systems. All these are some drawbacks of the present system that we are going to overcome within the application we are developing.

3. PROPOSED SYSTEM

The proposed system relies on voice command based system unlike the existing mail systems. The most important thing that has been kept in mind while developing the proposed system is accessibility. A system is accessible solely if it may be used expeditiously by all varieties of individuals whether or not disabled. The current systems do not offer this accessibility. Therefore the system we are developing is completely different from the current system. Unlike current system that emphasizes a lot on user friendliness of traditional users, our system focuses a lot on user friendliness of all varieties of individuals as well as normal people visually impaired individuals.

The complete system is primarily based on speech to text commands. Once using this system the application will be prompting the user to speak specific commands to avail respective services and if the user wants to access the respective services then he/she needs to speak that command.
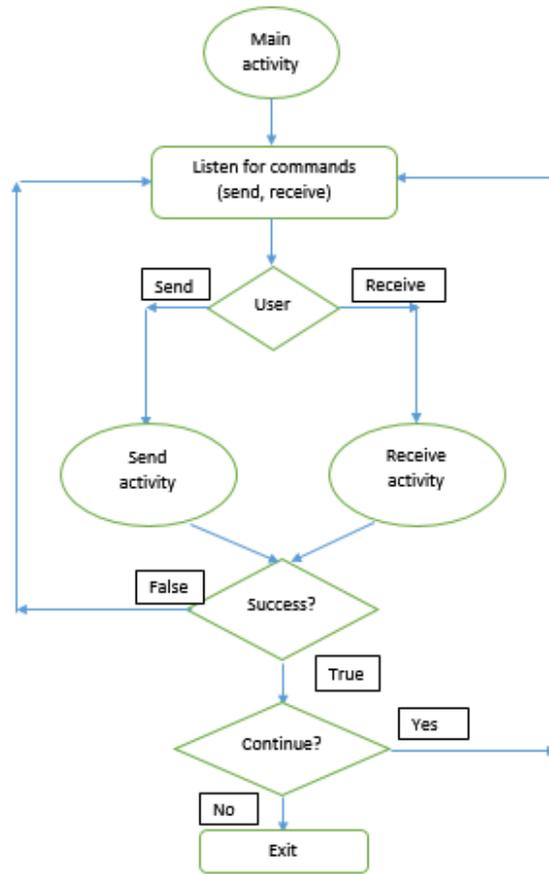
Chart -1: Flow of the system

3.1 IMAP protocol

The application makes use of IMAP for accessing the email data from the mail server. IMAP (Internet Message Access Protocol) is an Internet standard protocol used by e-mail clients to retrieve e-mail messages from a mail server over a TCP/IP connection. IMAP is defined by RFC 3501. [6]

Fig -1: Simultaneous access

IMAP has several advantages over POP (Post Office Protocol) such as follows:

- When using POP, clients typically connect to the e-mail server briefly, only as long as it takes to download new messages. When using IMAP4, clients often stay connected as long as the user interface is active and download message content on demand. For users with many or large messages, this IMAP4 usage pattern can result in faster response times.

- The POP protocol requires the currently connected client to be the only client connected to the mailbox. In contrast, the IMAP protocol specifically allows simultaneous access by multiple clients and provides mechanisms for clients to detect changes made to the mailbox by other, concurrently connected, clients. See for example RFC3501 section 5.2 which specifically cites "simultaneous access to the same mailbox by multiple agents" as an example.

- Usually all Internet e-mail is transmitted in MIME format, allowing messages to have a tree structure where the leaf nodes are any of a variety of single part content types and the non-leaf nodes are any of a variety of multipart types. The IMAP4 protocol allows clients to retrieve any of the individual MIME parts separately and also to retrieve portions of either individual parts or the entire message. These mechanisms allow clients to retrieve the text portion of a message without retrieving attached files or to stream content as it is being fetched.

- IMAP4 clients can create, rename, and/or delete mailboxes (usually presented to the user as folders) on the server, and copy messages between mailboxes. Multiple mailbox support also allows servers to provide access to shared and public folders.

- IMAP4 provides a mechanism for a client to ask the server to search for messages meeting a variety of criteria. This mechanism avoids requiring clients to download every message in the mailbox in order to perform these searches.

3.2 Main Activity Screen

The main activity screen will be the first screen to be displayed on startup of the application. This screen waits for the user to press the button so that the system will start accepting voice commands from the user.

The screen contains a full-sized button so that there is no doubt about the location of the button for visually impaired users. They can press anywhere on the screen to give commands.
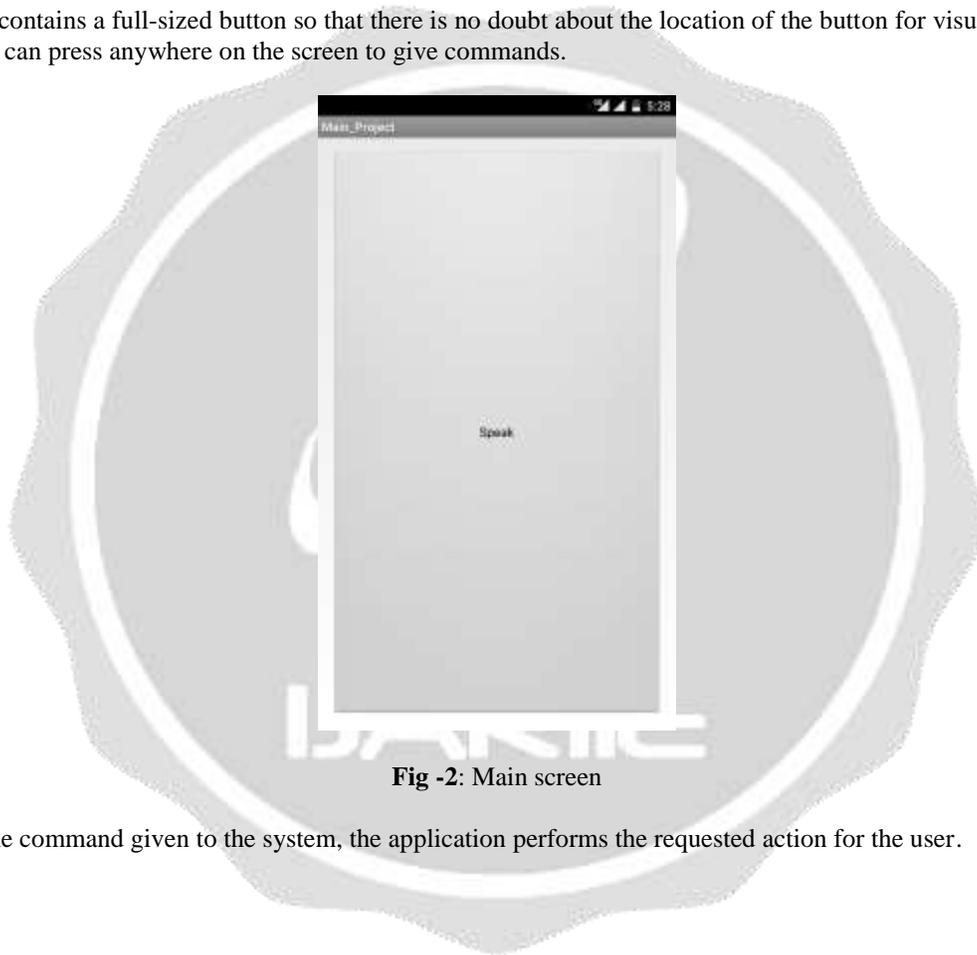
Fig -2: Main screen

Based on the command given to the system, the application performs the requested action for the user.

3.3 Send Activity Screen
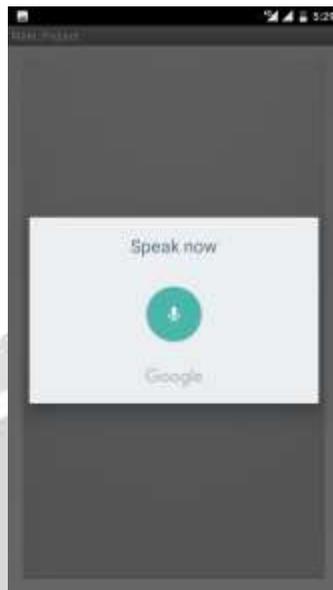
Fig -3: Accepting voice commands

If the user says "send", the system considers it as a command to compose an email. He/she is then prompted to speak the email address of the recipient either in speech. The user can also opt to input the email address character by character. Next comes the subject of the email. Finally, the body of the message is entered. All of these are accepted by the system in speech format. Necessary validation from the user is required by the application at each step.

3.4 Reading a message
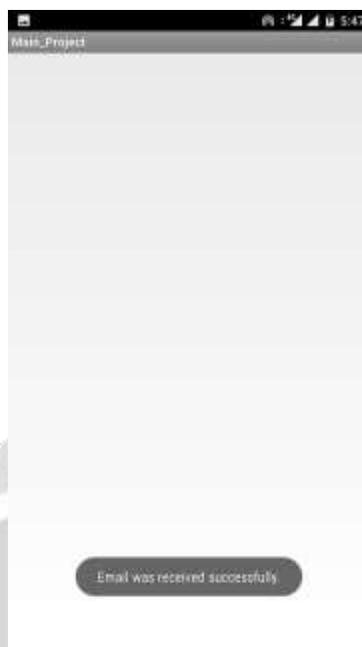
Fig -4: Receiving/reading a message

The system asks for voice command at the main screen. If the user says "read" or "receive", the system begins reading the email information regarding sender address, subject of message and body of the message which is in text.

4. CONCLUSION

In this paper we have planned a system which can facilitate the visually impaired individuals to access email services efficiently. This system can help in overcoming some drawbacks that were earlier faced by the blind individuals in accessing emails. We've eliminated the thought of using keyboard altogether with screen readers which can help reducing the cognitive load of remembering keyboard operations. Conjointly any user who will not grasp the location of keys on the keyboard would like not worry as keyboard usage is eliminated. The user solely has to follow the directions given by the system and use voice commands consequently to get the several services offered. Other than this the user may have to be requested to feed info through voice inputs whenever required.

5. ACKNOWLEDGEMENT

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