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An Android Based Voice-Mail Application for Visually Impaired

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ABSTRACT: Every human being is widely accessing knowledge and information through internet. However, blind people face difficulties in accessing these text materials, also with using any service provided through the internet. The advancement in computer-based accessible systems has opened up many avenues for the visually impaired across the globe in a wide way. Audio feedback-based virtual environments like, screen readers have helped visually impaired people to access internet applications immensely. The proposed Voicemail system architecture will help the visually-impaired person to access e- Mails easily and efficiently.

KEYWORDS - Internet, Voice mail, Text-to-Speech, Speech-to-Text

I. INTRODUCTION

Internet plays a vital role in today's world of communication. Today the world is running on the basis of internet. No work can be done without use of internet. Electronic mail i.e. email is the most important part in day to day life. But some people in today's world don't know how to make use of internet, some are blind or some are illiterate. So it goes very difficult to them when to live in this world of internet. This aims at developing an email system that will help even a visually impaired person to use the services for communication without previous training. This system's users would not need to know any basic information about keyboard shortcuts or where the keys are placed. This technology intends to provide an email system that will allow even visually challenged people to communication services. The system is entirely based on interactive voice response, making it extremely user-friendly and productive. The main advantage of this program is that it eliminates the need for a keyboard; instead, the user will have to rely solely on voice and touchpad to react. As a result, we developed a voice- based email system for blind individuals, which will greatly assist visually impaired and illiterate people in sending emails.

II. PROBLEM STATEMENT

Globally, there are about 3.9 billion email users. This year, the number of email users surpassed 3.9 billion [3], indicating that email is now used by more than half of the world's population. The number of email users is expected to reach 4 billion by 2020. As a result, emails are the most often used mode of communication. Visually impaired people are unable to use the most common postal services that we use on a daily basis. This is due to the fact that they do not provide any means for a person in front of the screen to hear the content. They can't tell where to click to complete the essential procedures because they can't see what's already on the screen Speech recognition & converting into text. Even if it is user friendly, using a computer for the first time is not as convenient for a visually impaired person as it is for a typical user. [10] indicates despite the fact that there are numerous screen readers available, these individuals nonetheless experience some minor challenges. Screen readers read whatever is on the screen, and to conduct certain activities, the user must use keyboard shortcuts because the screen reader cannot track the location. As a result, there is a need to develop a voice-based email Android app that enables blind people to compose, read, and manage their emails through voice commands. [11] The app should incorporate advanced voice recognition and text-to-speech and speech-to-text technology to enhance the email experience for blind users, ultimately improving their quality of life.

III. OBJECTIVES

- To alert the user when he/she receives new mail through voice commands.
- To allow the user to enter input by tapping anywhere on the screen instead of clicking on the target point.
- To compose the mail through voice commands.



- To convert voice commands to text.

IV. EXISTING SYSTEM

The conventional mail service is useful only to the people who can see and type as well. HTML and CSS designed web-based. emails are not created while keeping accessibility for all, in mind. The existing mail services do not provide easy access to the visually challenged people because they are in written format or any type of attached information and there is no read out option to hear the mail that is received to their mail addresses. Although we have screen readers that enable these people to access the desktop applications, we do not have any technology or system that can help these people to access the android applications. The only purpose of using the emails is to communication. But the existing system of mail service fails in providing the user-friendliness to the people. This suggests that there are lots of disadvantages of using these types of systems.

Hence, the limitations are listed below:

- The visually challenged cannot use the normal mail system.
- Due to the unavailability of completely voice-based applications, such people are unable to interact with the web-based applications.

IV. PROPOSED SYSTEM

Any technology can be considered beneficial if it can be accessed by all types of people. The existing mail systems do not provide any such facilities by which a visually impaired person can have access to them. Thus, the system that is being developed here is entirely different from the existing ones. Unlike other systems which focus only on a particular set of people, this system completely focuses on visually challenged people. This will be an Android application that will be completely based on "voice" or "speech". The user will be able to give commands to the system, which, the system will follow. Moreover, the system will prompt the user to perform specific actions to avail respective services. The application will be accessible on all Android-based devices and will be voice controlled.

V. LITERATURE SURVEY

In the system proposed by Rohit Rastogi [1] mainly concentrates on four different types of technologies Speech-to-Text (STT) this module collects the speech given by the user and converts to Text, Text-to-Speech (TTS) this converts the response give to system to Speech, Chatbot for making the conversation more sense and for giving responses more like a human and finally, mail communication module for sending and receiving emails.

In the system proposed by Pranjal Ingle [2] mainly three types of technologies are used namely: STT (Speech-to-text), : here whatever we speak is converted to text. The small icon of mic on whose clicking the user had to speak and his/her speech will be converted to text format and TTS (text-to-speech) this, method is full opposite of STT. In this method, it converts the text format of the emails to synthesized speech? IVR (Interactive voice response): IVR is an advanced technology describes the interaction between the user and the system in the way of responding by using keyboard for the respective voice message. IVR allows user to interact with an email host system via a system keyboard, after that users can easily service their own enquiries by listening to the IVR dialogue. IVR systems generally respond with pre-recorded Audio voice to further assist users on how to proceed. The audio that would be pre-recorded and the system need to have large volumes.

VI. SYSTEM DESGIN

6.1. SYSTEM ARCHITECTURE

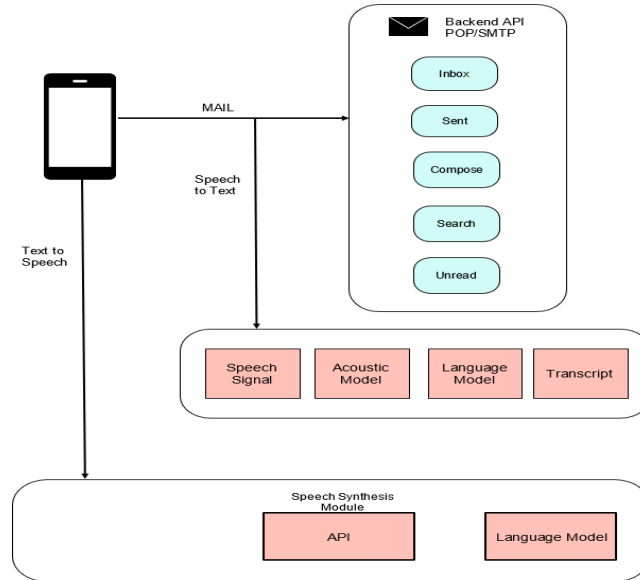


Figure 1: System Architecture

A speech signal is the sound wave that is produced by a person when they speak. It is a continuous signal that is captured by a microphone and then converted into digital form for processing by a computer.

An acoustic model is a statistical model that is used in speech recognition systems to match the speech signal to phonemes or units of sound. The acoustic model is trained on a large dataset of speech recordings and their corresponding transcriptions, and it learns to associate the speech signal with the phonemes that it represents.

A language model is a statistical model that is used in natural language processing to predict the probability of a sequence of words occurring in a given language. It is trained on a large corpus of text and learns to associate the words in a sentence with the probability of their occurrence in a specific order.

A transcript is a written or typed record of spoken language. In the context of speech recognition, a transcript refers to the output of the speech recognition system, which is a written representation of the words that were spoken in the speech signal. The transcript is generated by combining the output of the acoustic model and the language model to produce the most likely sequence of words that match the speech signal.

A speech synthesis module, also known as text-to-speech (TTS) module, is a computer program that generates spoken language from written text. It takes written text as input and produces a spoken version of that text as output, using a variety of algorithms and techniques.

Speech synthesis modules typically use a combination of linguistic rules, natural language processing, and machine learning to generate speech that sounds natural and expressive. They can be used in a variety of applications, such as voice assistants, audiobooks, navigation systems, and accessibility tools for people with visual impairments.

Speech synthesis modules can produce spoken language in different voices, accents, and languages, depending on the configuration and settings of the module. Some speech synthesis modules even allow users to customize the voice parameters to achieve a more personalized output. Overall, speech synthesis modules play an important role in making text-based content accessible and convenient for people who prefer to consume information through spoken language.

POP is a protocol used by email clients to retrieve email messages from a mail server. It allows the user to download and read email messages on their local device, and then delete them from the server.

SMTP, on the other hand, is a protocol used by email clients to send outgoing email messages to a mail server. It is responsible for delivering email messages to the recipient's email server, where they can then be retrieved by the recipient using POP or other email protocols.

6.2 DATA FLOW DIAGRAM

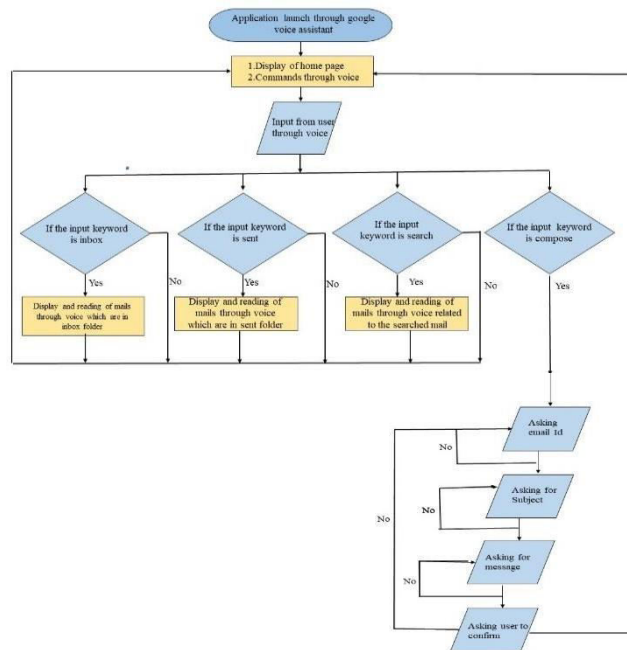


Figure 2: Data Flow Diagram

Flow chart of system design:

- When the user launches the application through Google voice assistant the home screen is displayed and the application will start giving voice commands.
- After the application will wait for the user to provide input through his voice.
- If the input keyword provided by the user is “sent” or “inbox” the corresponding mails will be displayed and read one by one respectively.
- Whenever the user gives search as an input command the application will ask for the user to provide mail-id which the user wants to search and display the desired results.

VII. RESULTS AND DESCRIPTION

1. HOMEPAGE

After voice command the user will be directed to the homepage containing options for: Inbox, Compose and sent mail. The user will speak out "inbox", "sent mails", "compose", and the respective action will be performed.

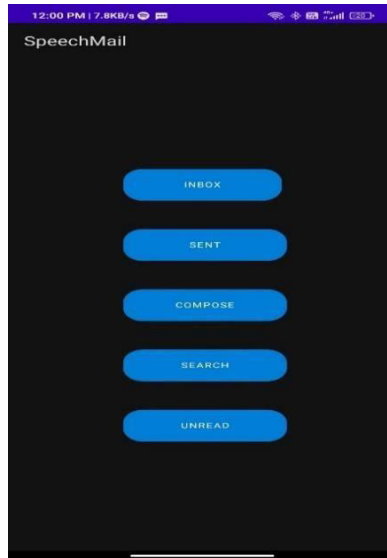


Figure 3: Home page

2. INBOX

When the user speaks "Inbox", this screen will be displayed. The system will prompt the user about all the new mails received and read out the sender's name one by one. The application will then speak out the new mails first. The system will then read out the sender's name, subject and content of that mail.

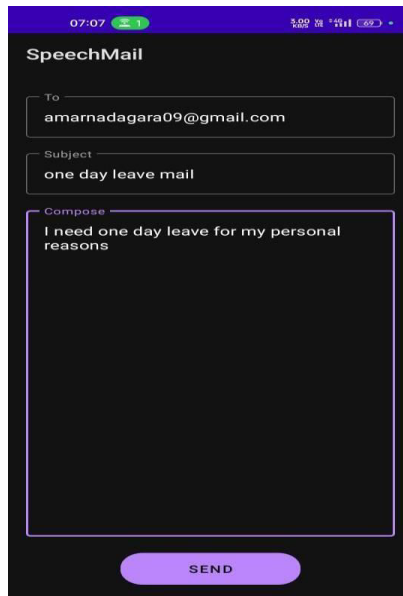


Figure 4: Compose page

3. COMPOSE MAIL

This option is used to compose new email. This option will not work same as that of the existing systems. Rather it will take voice input. The user will just have to give the input through his voice. No keyboard shortcuts or typed input will be required. The user will be prompted by the system to tap anywhere on the screen and speak out the recipient's mail



address, subject and body of the mail. After entering all the content, the system will read out the content so that the user can check whether it is correct or not. In case of any correction, the user can re- enter the content. After taking all the required inputs, the system will prompt the user to speak "yes" to confirm and send the mail.



Figure 5: Inbox page

4. SENT MAIL

This section maintains a record of the emails sent by a particular user. In case the user wants to access the emails that he has sent so far, he will be able to do so by choosing the “Sent Mails” option available on the dashboard.

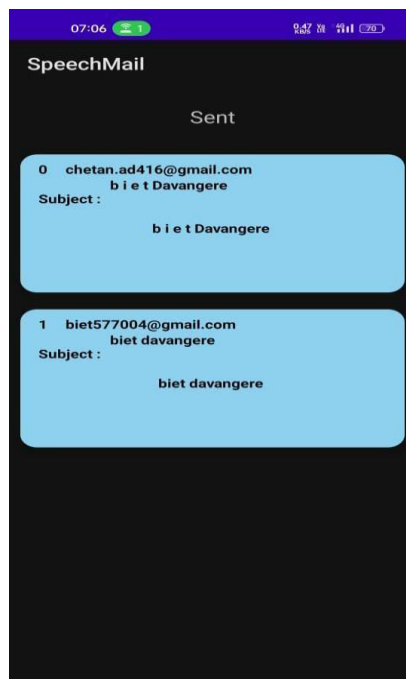


Figure 6: Sent page



5. SEARCH MAIL

This section maintains displaying the searched message to the user. Here user can speak out the mail that he wants to search, then system will recognize and display the mail.

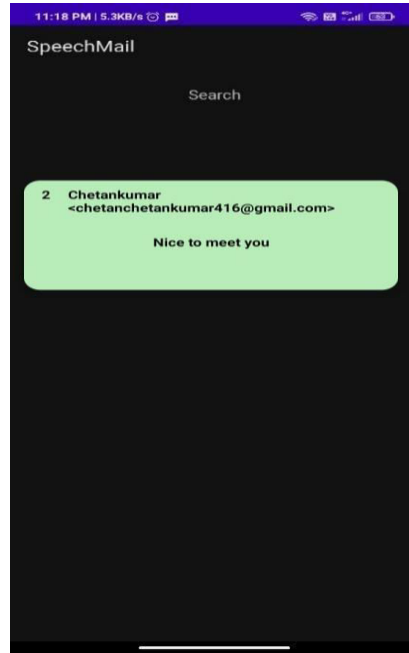


Figure 7: Search page

6. UNREAD MESSAGES

This section maintains a record of unread messages, here user can get all the unread messages just by speaking the command "Unread".

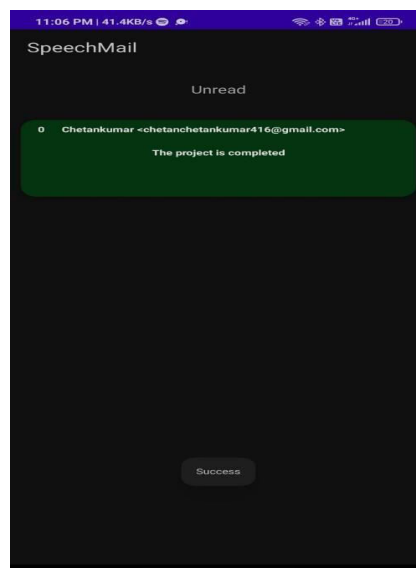


Figure 8: Unread page

VIII. ADVANTAGES AND DISADVANTAGES

1. ADVANTAGES

- This system makes the disabled people feel like a normal user.
- The Gmail app is compatible with screen reader software, such as Talk Back for Android , making it accessible for blind individuals.
- The visually impaired people can advance from Desktop application to the android application.
- They can touch anywhere on the screen to activate the voice command.

2. DISADVANTAGES

- This system will not work if the user is unable to speak out the content.
- The application will work only for Google accounts.
- File attachments is not available.

IX. CONCLUSION

Our application is user friendly, efficient and an economical system, which allows a visually challenged individual to interact with an Android application easily. It involves the development and implementation of a real-time email interaction system for visually impaired. We have planned to develop a system that could facilitate the visually challenged individuals to access email services in an efficient way. Our application can help in overcoming some of the drawbacks of the existing email systems. In this system, the use of keyboard has been eliminated completely and thus reduces the cognitive load of remembering keyboard shortcuts as well as the position of the keys on a keyboard. The user only requires listening to the voice commands given by the system and respond accordingly in order to get the desired operations performed. This requires user to speak the operation in the email application and then the system will perform the required operations. The user would be requested to feed info through voice inputs whenever required and system will ensure the authentication of the user details.

X. FUTURE SCOPE

For people who can see, e-mailing is not a big deal, but for people who are not blessed with gift of vision it postures a key concern because of its intersection with many vocational responsibilities. As a future scope voice could be extended to image attachments and other options such as indentation, fonts etc., that are available with normal E-Mail.

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