



Voice Based E-mail System For The Visually Challenged

Chaitali Patil, Shifa Shaikh, Ashutosh Shahane, Tushar Jadhav, Prof. Abhay Gaidhani

Department of Computer Engineering, Sandip Institute of Technology and Research Center, Nashik (422213), India

Abstract:

As the technology is enhancing, people are coming more closer to digital life and digital communication. There are many ways to communicate with others through internet in this new advanced era. Most of them are choosing the easiest way of communication i.e., Electronic mail (E-mail). E-mail is the technology that enables user to contact with others by sending mails and also helps in business world communication. There are people who cannot use these technologies because either they are illiterate or do not have ability to see the screen. So, to make this technology closer to visually challenged people, authors proposed a Voice Based E-mail System. This system provides them the facility of communication and make them much stronger and independent. This architecture will help blind people to access e-mail and other multimedia functions. Leaving behind the old techniques, this voice-based email system will be containing new technologies that will be easily acceptable by visually challenged people.

I. INTRODUCTION

Internet is the most essential part in today's world of communication. Emails are further important way of communication that widely used in the business world. This technology has been useless for the incapacitated and oblivious people. There are around 260 million visually challenged people around the globe according to a survey. That also means these people are unaware of how to use internet or e-mail and about new advanced technologies. The solution to this problem has been in a way that either there should be third person which is not visually challenged to help them in reading and sending mails or to use screen-readers, keywords etc. Braille keyboards proved to be useful but not sufficient enough to perform high level operations. These ways are not correct to deal with this problem and also had drawbacks. This application uses text to speech (TTS) and speech to text (STT) converters so that visually challenged people can operate the system easily. This system reduces the complexity to remember the characters or information regarding keyboard shortcuts.

Every function will be based on simple voice commands so that those people could easily make use of the technology. The model will also help blind people to become independent and strong as they will be able to communicate without the help of third person. Emails have become a norm of communicating with each other replacing letters completely. Even after other technologies such as social networking and others are also taking hold over the internet world, emails remains the most ubiquitous form of business communication. One of the major drawbacks that sets in is that accessing emails or on a whole any page on the internet requires a person to have visual capabilities. This means that a visually challenged person can in no way take the benefits of the facilities provided by the internet thus rendering the technology useless.

II. LITERATURE REVIEW:

Several contributions have been made for visually challenged people so as to give them accessibility in the field of communication via E-mails. Following are the technologies of each paper:

1) Recently in 2020, Voice based email system was proposed to overcome drawbacks of traditional ASR and screen reading systems. The system consists of advanced features so that blind people can operate easily. It consists of Login module as first module and validating the login credentials. The client then moves to home module after signing in and following choices are available there: Inbox, Create, Sent mail and Junk. IVR technology is used in PC Program design and STT(Speech-to-message) and TTS(Text-to discourse) is also used. The proposed system also makes use of mouse click events .

2) In paper , the authors proposed Voice based email system by linking the application with Google's Gmail. Traditional systems provided their own user developed email services. The system consists of:

- (a) Speech-to-text Converter
- (b) Text-to-speech Converter.

The application makes use of SMTP protocol for sending emails and POP3 protocol for receiving emails. Accuracy of speech to-text is low as there is a need to train it. It is a desktop application that can be used by illiterate and handicapped people also. The proposed system not only ensures the user's data security but also give users a sense of secure mailing.

3) In paper , the authors have proposed the email system that can be used by visually impaired people easily. System design consist of three modules: TTS(Text-to speech) module, STT(Speech-to-text) module and Mail Programming Module (Compose, Inbox and Sent Mail)module. In this system Speech-to-text is done using Artificial Intelligence (AI) through API involving neural network models provided to developers by Google Cloud Speech-to-text. Also, it uses various Hashing Algorithms(MD5, SHA) to store passwords or other credentials in database by converting them into hash functions which results in higher security than traditional systems. The process of using hashing algorithm[3].

Four main technologies are used in proposed Voice based email system:

- STT
- TTS
- IVR
- Speech Recognition

The user solely follows directions given by the system and uses voice commands. The proposed architecture provides more features than existing GUI. Java programming language is used in the system. Also, fingerprint scanning technique is proposed in the system.

III. PROBLEM STATEMENT:

The mail services that are available today are of no use to the people who are visually impaired. This is because these systems are not helpful to them in any way as it cannot provide any audio feedback to readout the contents for them which is not efficient for searching of files. Although, there are screen readers available but, they impose some or the other kind of difficulty to them.

IV. Objectives:

- 1) To develop a voice-based email system will be containing new technologies that will be easily acceptable by visually challenged people.
- 2) To help to communicate blind users with others through internet in this new advanced era.
- 3) To recognize words and phrases that are in spoken language.

V. RESEARCH METHODOLOGY

- Voice Input.
- MFCC.
- Speech to text.
- SMTP Protocol.
- Text to Speech

VI. OUTCOME

To make this technology closer to visually challenged people, authors proposed a Voice Based E-mail System. This system provides them the facility of communication and makes them much stronger and independent. This architecture will help blind people to access e-mail and other multimedia functions. Leaving behind the old techniques, this voice-based email system will be containing new technologies that will be easily acceptable by visually challenged people.

VII. APPLICATIONS

- Blind School
- Blind Users
- Semi Blind Users

VIII. DESIGN OF PROPOSED SYSTEM

This project is designed by dividing it into the following three phases:

1. UI design:

In this phase, the UI or the user interface of the project is developed. That is the designing of the webpages in which the user will use to interact. The user interface is designed using HTML5 and CSS3.

2. Database design:

Database is important in every project since it is responsible for storing of data and user credentials. That is, database mainly aims User authentication and storing all the user mails. The database design will include various tables' creation for storing emails.

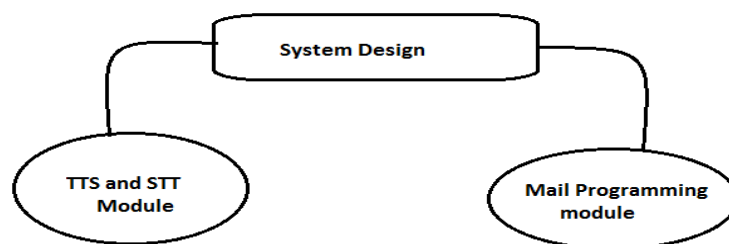
3. System design:

The system will consist all the modules such as: TTS (Text to Speech) and STT (Speech to Text) module, Mail programming module (Compose, Inbox, and Sent Mail).

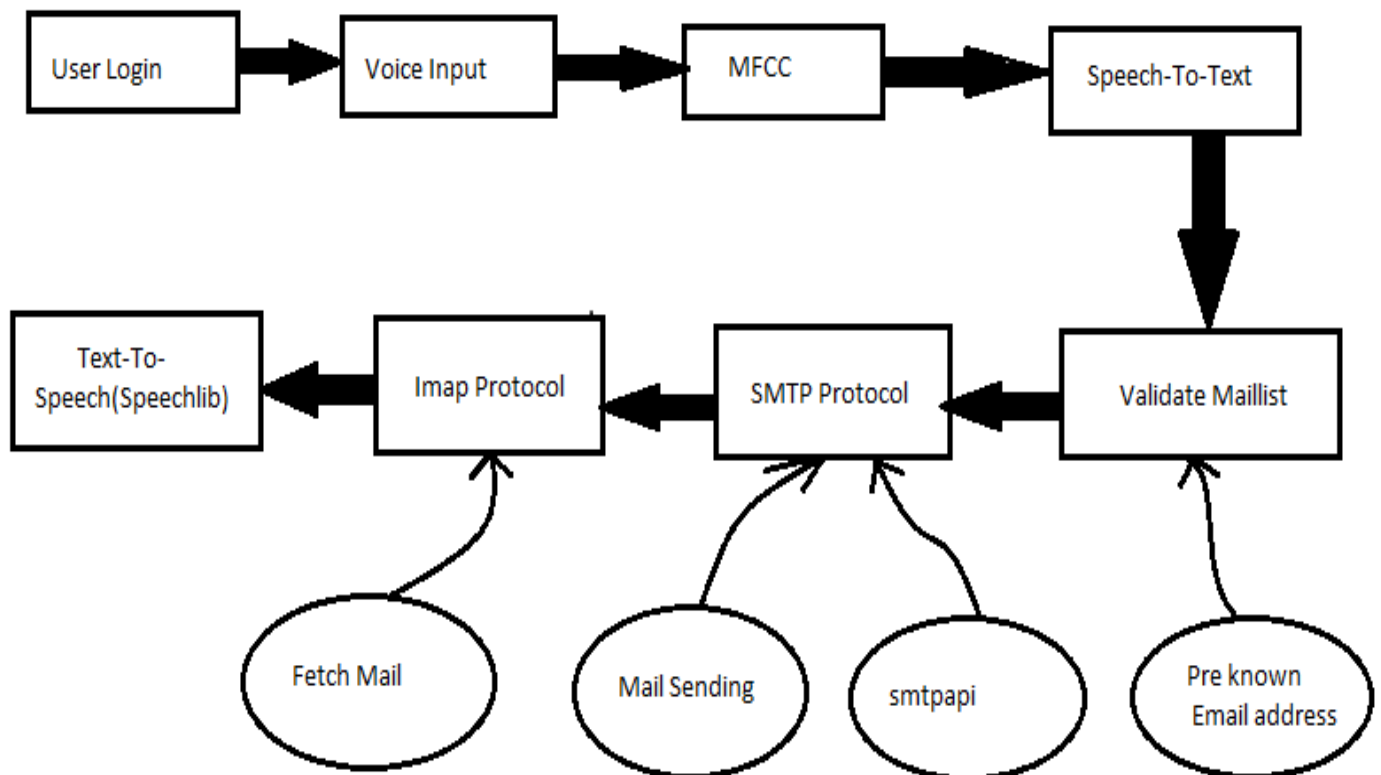
A. Mail Programming Module:

Email is appearing as one of the most valuable services on the internet today. Many of the internet systems use SMTP as a method to transfer mail from one user to another. SMTP is a sending protocol and is used to send the mail while POP (post office protocol) or IMAP (internet message access protocol) are used to retrieve those emails at the receiver's side.

B. Sending Email: When an email is distributed across, it will contain certain things like header and its own body sequence of responses requested message is line up between shopper and server in sending an email.



IX. ARCHITECTURAL DESIGN



a) Speech-to-text Converter:

Speech-to-text converter helps as to obtain input for the system. When a person speaks through microphone and is recognised by the system, the speech is then converted to text. Our speech-to-text system directly obtains and converts speech to text. It helps the visually impaired people so that they can control the whole system by giving input as speech and no need to worry about keyboard shortcuts or screen readers. In Voice Based email system, the users speak the username, passwords for logging into the system and also when users choose actions to be performed like displaying inbox, sent mails, compose mail etc. Speech recognition systems can be divided into several blocks: feature extraction, acoustic models' database which is created based on the Training data, dictionary, language model and the speech recognition algorithm.

b) Text-to-speech Converter:

Text-to-speech converter helps in obtaining output from the system. When any operation occurs in the system the resulting output is in text format but it is useless for visually impaired people. So, the text is then converted to speech and is heard by them. It is very useful as it does not require pressing keyboard shortcuts or anything Else for outputs displaying. In Voice based email system, when the user gives instructions to read the inbox mails or sent mails then the text-to-speech converter converts the text in mails into the speech and is understood by user. Text-to-speech is also used on devices such as portable GPS units to announce street names when giving directions.

X. CONCLUSION:

This paper is the proposed Voice based Email system for visually impaired people, which helps blinds and handicapped people to access mails easily. It provides a voice-based mailing service where the visually impaired person could read and send mail on their own. It builds confidence and the user gets independent as they do not need help of others. System has eliminated all the concepts and overcome all difficulties that were in traditional methods that were faced by the visually impaired people. These voice-based e-mail systems can also be used by illiterate and handicapped people as the TTS & STT technologies benefit them.

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