VOICE BASED EMAIL ASSISTANCE FOR VISUALLY IMPAIRED – A COMPREHENSIVE REVIEW

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ABSTRACT

The advancements made in technology worldwide, email is widely utilised nowadays. Email can significantly improve the efficiency and effectiveness of how messages and all sorts of data are transmitted. However, accessing text-based information might be challenging for those who are visually impaired. The emergence of computer-based practical solutions has given the blind worldwide many new options. This project introduces the structural architecture of the voicemail system, which enables a blind person to effortlessly access emails. The text-to-voice and voice-to-text methods are employed. Additionally, any typical individual, such as someone who is illiterate, may utilise this method. This system will be effective since it is entirely based on interactive voiceresponse.

KEYWORDS: *Voice based, Text-to-speech, Speech-to-text.*

I. INTRODUCTION

People who are blind are not able to utilise the postal services that used on basics. There are a number of technologies available to these visually impaired users to make these systems more user-friendly for them. Those mechanism couldn't provide the right reaction like a typical system, therefore they were not particularly helpful to those folks.The only way visually challenged may address an mail is by speaking entire message to a third party, who will then write the message and send it on the blind person's behalf. But this is not the proper course of action in this situation. It is quite improbable that someone who is blind will always be able to locate assistance. Therefore, our Voice Based Email Assistance helps visually impaired people access emails easily and efficiently and provide them convey emails using voice commands in the absence of keyboard or other input

device, improving society and giving such people with visual impairments an equal status. With the help of this programme, anybody may manage their email accounts using only their voice while still being able to read, transmit, and do all other important operations. It is built on the usage of STT and TTS converters. The user will reply to voice orders from the system asking them to carry out specific actions. The technologies of Speech-to-Text and Text-to-Speech are thus used here.

Automatic voice recognition, often known as STT, turns speech to text, making it simple while sending emails. The system reads the sender, subject, and body of the email sent to you using the Text-to-Speech module. Through the use of speech and DTMF tones entered via a keypad, IVR technology set up a computer to involved with others. To better orient users on what to do, interactive voice response can answer with previous recorded or dynamically produced audio.

II. LITERATURE SURVEY

Pranjal Ingle et.al [1], Summarizes this paper uses 3 technologies are STT, TTS, IVR. When a client accesses the site, they must enroll using voice commands. After that process, their voice will be captured and saved. And the user will be assigned an unique Identification and a password. The client may use the mail after a log in using the ID and password which is provided. This paper, Adobe Dreamweaver CS3 required creating the UI. Entire website was mostly concerned with comprehension efficiency. It provide a contact us page, here the client may make suggestions or get assistance if necessary.

Milan Badigar et.al [2], says that this paper based on voice commands, system was builton STT commands. Utilizing that, the program will demand the client to speak specific command to use their services. IMAP is used by this application which uses Internet Message Access Protocol that email users use to receive messages from a mail using a Transfer control protocol or Internet Protocol connection.

Amritha Suresh et.al [3], Voice Recognition, IVR, and Mouse click are used. For security verification speech recognition is used. Initial module is Registration. That will gather all of the client's information by requesting the user to provide data that is needed. Login module is next where the client should give ID and password that is accomplished through of voice commands. A next phase is where the user is taken to the inbox page. Users can do typical mailing system activities after logging in.

Saurabh Sawant et.al [4], this paper provides a way to improve the interaction of visually impaired and illiterate persons with the email system. There, conversions from speech to text and text to speech were used. Use a PHP mailer to implement the functionality that allows sending email. Email

address and password were used for registration. The Knuth- Morris-Pratt Algorithm is utilized for finding inbox. The drawback of this method is it requires host server which is Gmail and it will not allow other email engine to access.

Bishal Kalita et.al [5], This Article offered an email system that blind persons could simply use. The methods of STT, TTS, and the Viterbi Algorithm are used. The user must register when the use the website for the first time. The disadvantage of this method is the effectiveness of the Viterbi algorithm declines as the mistakes grows, does the amount of space required.

Dudhbale P et.al [6],Summarizes the main components are the Email, which reads messages in the recipient's mailbox, For news Real Simple Syndication is used, Song- listening music, and The red book reader system to search drives and folders, use the drive browser. Blind users utilise the design to readily access the operating system's email and multimedia services.

The GUI design may be accessed without using a keyboard by utilising voice commands and mouse clicks. Along with email, RSS was created as a mechanism to transmit a list of headlines and update alerts. Other programmes, in addition to Email, may be accessed by voice commands

Akif Khan et.al [7], The issues associated with the accessibility of email activities on a smartphone, authors presented Tetra Mail, which is blind-friendly email client. Based on HCI concept, they created Tetra Mail framework for visually impaired. Tetra Mail's interface is created for visually impaired which does not require prior knowledge of touching screen. This prototype implementation shows an enhanced user experience, and greater control on touch screen interfaces when executing fundamental email management tasks.

Rijwan Khan Et.al [8], The authors of the article have suggested an email system that is simple for persons who are blind to use. Three modules make up the system design: TTS, STT and Mail Programming Module. This technology uses artificial intelligence (AI) to convert speech to text using an API that uses neural network models. Additionally, it uses different hashing algorithms (MD5, SHA), which result in stronger security than standard systems, to convert passwords or other credentials into hash functions and store them in databases.

Prajakta Chavan Et.al [9] the idea proposes to use a smart watch to develop a voice-based email system that will make it simpler for blind people to access email. Instead than enabling the user to type, the system will concentrate on speech recognition. Nowadays, the internet is utilised for a variety of purposes. Our voice-based email system utilising the smart watch project to allow those with visual impairments to access the internet. They will find the wristwatch useful since it will recognise voice and convert it to text and then connected through internet in order to send the necessary email to the address. The use of an Arduino smart-watch processor allows access to

Bluetooth, Wi-Fi, and battery status.

Table 1 Techniques used for Voice Based Email Assistance

PAPER NO	TITLE	AUTHOR	METHODOLOGY	DISADVANTAGES
1.	Voice Based email Systemfor Blinds	Pranjal Ingle, Harshada Kanadeand Arti Lanke,	Speech-to-text, Text –to- Speech, Interactive voice response, Adobe, Dreamweavercs3	The entire website isfocused mostly on understanding efficiency.
2.	Voice BasedEmail ApplicationFor Visually Impaired	Milan Badigar, Nikita Dias, Jemima Dias andMario Pinto	Internet Messageaccess protocol(IMAP), To start voice command,buttonsare used	Buttons are used toinitiate an application.
3.	Voice Based Email for Blind	Amritha Suresh, BinnyPaulose, Reshma Jaganand Joby George	Speech Recognition, Interactive voice response, Mouse click events	Mouse click eventsare used
4.	Speech BasedE-mail Systemfor Blind and Illiterate People	Saurabh Sawant, Amankumar Wani, Sangharsh Sagar, Rucha Vanjari and M R Dhage	PHP Mailer, IMAP Server, Knuth-Morris-Prattalgorithm	It requires Gmail as ahost server and cannot utilise other email providers such as Yahoo, etc.
5.	Voice Based Email for Blind People	Bishal Kalitaand Santosh Kumar Mahto	Viterbi Algorithm, Speech-to- text, Text-to-speech	The number of errors in the ViterbiAlgorithm decreases, as does the quantity of space required.
6.	Voice Based System in Desktop and Mobile Devices for Blind People	Dudhbale, P., Wankhede, J.S., Ghyar, C.J., and Narawade, P.S.	G-mail system, Realsimple syndication, Red book reader system	Mouse click eventsare used

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7.	Tetra Mail: A usable email client for blind people	Akif Khan, Shah Khusro, Badam Niazi, Jamil Ahmad, Iftikhar Alam and InayatKhan	Human-Computer Interface.	Requires user to learn complex commands
8.	Voice Based E-Mail System usingArtificial Intelligence	Rijwan Khan, Pawan Kumar Sharma, Sumit Raj, Sushil Kr. Verma, Sparsh Katiyar	API use neutral Network, Hashing algorithm for security	Utilization is costly.
9.	Voice Based Email System	Prajakta Chavan, Devesh Jain, Pradnya Savant, ZebaShaikh	To convert TTS,STT, the Arduino Smart Watchis connected to the Internet by Bluetooth, wifi, and other means.	Battery life may be limited and expensive.

III. PROPOSED SYSTEM:

Here, the visually impaired uses an email application which is created. Instead of Google Gmail they offer their own email services. In light of that, this application uses Gmail which is another advantage. NLP (Natural Language Processing) is employed in our application to increase user interaction.

Natural Language Processing

Computer uses NLP to communicate people with their own language with the addition of processing other languages. Natural language processing encompasses a wide range of techniques for analysing human use. It require a diverse set of techniques since text- and voice-based data, as well as actual applications, vary greatly. Basic activities of NLP are lemmatization or stemming, language recognition, part-of-speech tagging, etc..,
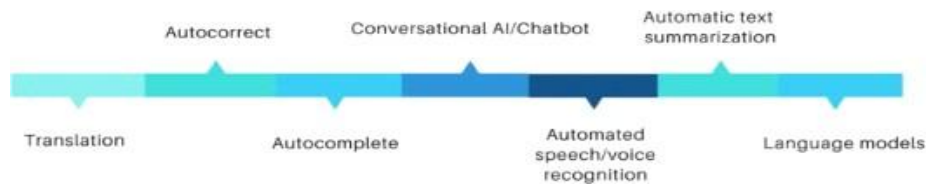
Figure 1 Applications of NLP

The benefit of using NLP as software is less expensive than hiring a human. Faster response times, when NLP is used, Chabot or phone response times are extremely fast. Call centres often have a restricted workforce, which limits the number of calls that can be addressed. Using NLP, a larger call volume may be managed, resulting in shorter customer wait times. Itis simple to locate pre-trained machine learning models that facilitate various NLP applications.

System Architecture

- Client should register by setting up account.
- The user should provide Username and password for authentication
- If the user enters valid credentials, the registration procedure will be successful.
- The user may access their email accounts; check Mails, and how to write them.
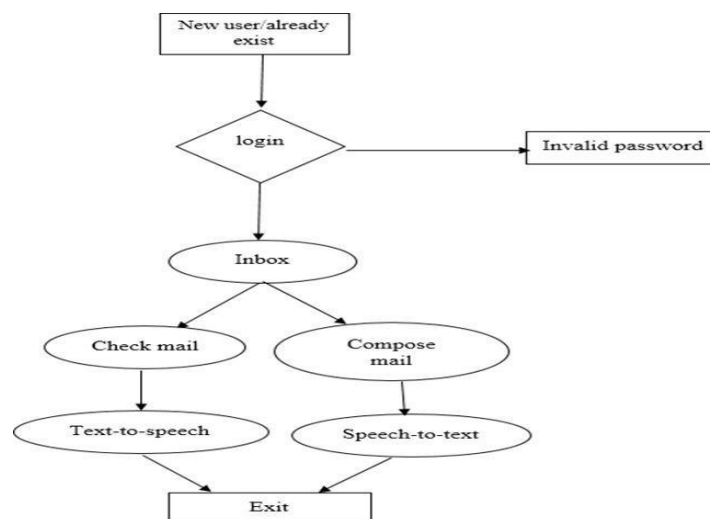- STT and TTS modules are shown here.

Figure 2 Voice Based Email Architecture

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Module Description

In the proposed system, it has three modules to use

• Speech-To-Text

• Text-to-speech

• Interactive Voice response

• Voice based mail application

1. Speech-to-Text Converter

It can identify your voice, analysed by filtering and digitize your speech into a format that can be read by a computer. It is possible to store the recognized text in a file. C# and Net. Here, something was developed using internet platforms. Our voice to-text solution immediately gathers and transforms speech-to-text. The many components of voice recognition systems include feature extraction, acoustic models derived, dictionaries, language models, and speech recognition algorithms.
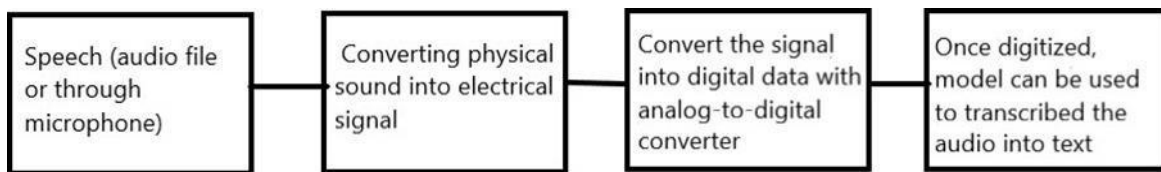

Figure 3 General Diagram of STT

2. Text to Speech Converter

Using speech synthesis techniques, it converts text to vocal output. It is used to send bank information, emails, and other information for everyone, and the blind use it for text-based material. On devices like handheld GPS units, text-to-speech is also used to announce street names when giving instructions.
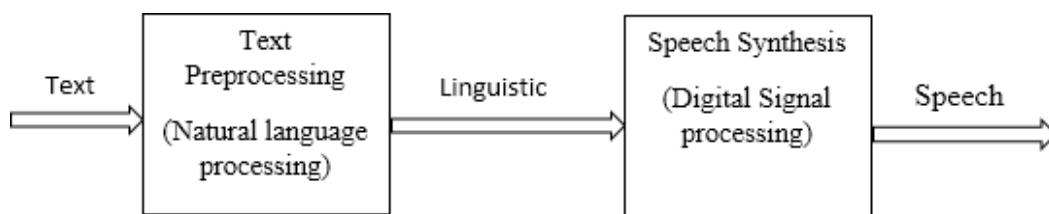

Figure 4 TTS Workflow

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3. Interactive Voice Response

IVR (Interactive Voice Response) is a technology that depicts the interaction between the user and the system, which answers to voice messages by utilising a keyboard.

4. Voice based Email Application

Client may use voice instructions to send emails and receive emails. The SMTP and POP3 protocols are used by Email for sending and receiving emails, respectively. The SMTP (Simple Mail Transfer System) server swiftly transmits the email messages, making it a dependable protocol for sending emails. POP3 (Post Office Protocol) is used in order to receive emails is utilised. Emails are stored on the POP3 server and made available for viewing.

IV. CONCLUSION

This article outlines a voice-based email system for persons who are blind or visually impaired. It was created as a tool to make it easier and more effective for them to retrieve emails. It offers a voice-based postal service so that people who are blind may read and send letters on their own, without assistance. By creating an Android app exclusively for persons with vision impairments, offered. They can read and send mail using the voice-based service on their own, with no assistance. Here, visitors must utilise certain keywords that will carry out certain task. A blind person may access emails quickly and simply with this EMAIL system.

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