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VOICE-BASED EMAIL SYSTEM FOR VISUALLY IMPAIRED PEOPLE

Rajini S [1], Dhivyaa A S [2], Jananipriya R M [3], Karthikapriyaa V S [4]

[1]Associate Professor, Department of Computer Science and Engineering, Kumaraguru College of Technology, Coimbatore, Tamilnadu, India
[2-4] Department of Computer Science and Engineering, Kumaraguru College of Technology, Coimbatore, Tamilnadu, India

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Abstract - *Nowadays, Technology usage has increased, and it offers many opportunities for present-day generations to fully embrace the Internet. Email continues to be the most common form of communication technology in the business world. People with vision loss find it very difficult to use this technology because their use requires visual and touch perception. Developing computerized practice systems has opened up numerous possibilities for the visually impaired. This system is very helpful for the blind to use Internet applications. This project introduces the structural design of a voicemail system that blind people can use for easy email access. The application uses speech-text and text-speech algorithms where visually impaired users can make effective use of the application.*

Key Words: **Voice email, Email for blind, Visually impaired, Email for partially sighted, Voice-based Email System**

1. INTRODUCTION

In today's world, the combination of technology and the Internet has made communication so easy. In 2015, the world's email user base was almost 2.6 billion. By 2025, the world's email users globally will increase to over 4 billion, using e-mail as the most frequently used type of communication. There are an estimated 285 million people with sight loss around the world with 40 million blind and 245 million visually impaired. However, using this technology is quite hard for people with visual deficiencies. For sending an email they need to tell the full content of the letter to any other person (who is not sight-impaired), and then the third person will compose the letter and send it on a blind man's behalf. However, that is not the correct solution. Existing technologies such as screen readers, automatic speech recognition, text to speech, and speech to text made things easier for the visually impaired, although partially. As a result, the need arose to create a complete voice-based application that could send or receive emails or perform messaging related operations.

2. OBJECTIVES OF THE PROJECT

The goal of voice-based email for the visually impaired people is to develop an application that will benefit the visually impaired to take advantage of every utility a regular person uses to send and receive emails effectively. The system will prompt the user with voice commands, users must use some keywords that will perform some actions. Example: Read, Send, Compose, etc. The voice mail system can be used by someone who is blind to easily access the emails. This application is based on the use of speech to text and text to speech translators, allowing everyone to control their email accounts through voice. The system will ask the user with voice commands to do certain actions and the user will reply to the same. Speech to Text, also called Automatic Speech Recognition, converts speech into text, allowing you to compose emails as an easy task. The Text to Speech module provides audio of the incoming mail, the sender, the subject, and the body of the outgoing mail. The information will be read out by the system. This makes it possible to condense the dependence of people with visual impairments on email-related activities.

3. SCOPE OF THE PROJECT

A voice email system is a fully computerized system that allows users to share and communicate messages without typing. It is primarily beneficial to the blind because all official information and documents are only transmitted via email. The primary benefit of this system is that the need of the keyboard is totally eliminated, and the user will only react through voice. This approach aims to assist partially sighted people in promoting the development of digital India through the use of the internet, as well as to make their lives simpler.

4. PROBLEM DEFINITION

Previously, blind persons had difficulty sending emails through the system. Emails were inconvenient for many people, including the blind, who were unable to send emails. They were able to use email in everyday situations due to the vast array of email kinds and capacity settings. Audio emails are favored by persons who are blind. People with visual disabilities can efficiently access their email using a voice email infrastructure. The user does not need to remember keyboard and mouse shortcuts. Audio instructions are simple for them to respond to. This is beneficial to persons who have visual problems, such as the disabled or blind. It is also suitable for ordinary people to use.

5. EXISTING SYSTEM

Most of the existing system aims at creating a voice-based email system which will make it possible for visually impaired people who are not familiar with computer systems to use email services. The entire system is based on IVR- interactive voice response. But it is based on mouse clicks events and needs to remember some keyboard shortcuts to perform specific services. The main drawback of the system is the messages are sent as a recording, So if we send a message from Visually impaired people to visually impaired people then recording is fine. But for other professional use or other users, they can read the text, no use for a recorded message. If they are in an organization or any public place, other users can easily read the text, recording is not a comfortable option for them. This system is not friendly to the blind as it does not provide any audio feedback and also not able to perform all the possible actions like composing, inbox, trash, etc.

6. PROPOSED SYSTEM

The proposed system is completely creative and quite different from existing messaging systems. The proposed application is a fully voice-based python application. The user will provide voice commands to the system which the system will follow and track. One of the main advantages of our system is that the blind user does not need to have the usage of the mouse and keyboard shortcuts as all activities will be mainly based on voice inputs.

The most important aspect that has been taken into account and noted is accessibility, i.e. user-friendliness. This whole project is mainly based on Speech to Text and Text to Speech. In this system, the application will require the blind user to carry out specific operations in order to benefit from various services and if the user wishes to access those services, he/she can carry out that operation. Every time the blind user launches the app, the home page is displayed. Once logged in, the user will be brought to a dashboard with Inbox options, Composing a new-mail, Sent-mail, and User information. Users will speak out commands such as 'Inbox', 'Sent', 'Compose', and 'User information' and corresponding actions can be performed.

- Compose - The system will ask for the Receivers email address, Subject, and Body of the mail. Once the required information is provided, the application will ask the partially sighted user to say YES to confirm and it will send the message to the receiver's email address.
- Inbox- After the user speaks out command as Inbox, the system will read out if any new emails received for the user. The user will then say the sender's name whose mail he may want to read and then the system reads the Sender's name, Subject, and Body of the mail.
- Sent messages - This section maintains a log of email sent by a specific user.
- User Information -This section contains the username and email id of the user.

The proposed system focuses on reliability and usability.

7. METHODOLOGY

7.1 Interactive-Voice-Response (IVR)

Interactive-Voice-Response (IVR) technology allows computers to communicate with human beings through voice and DTMF tones through the keyboard. In telecom, IVR lets customers interact with the organization's server through dial pad or voice recognition, then the services can be queried through IVR dialogue. The Interactive Voice Response (IVR) system can respond via prerecorded or dynamic generated audio records to provide additional guidance on procedure. IVR

systems hosted in a network are dimensioned to manage large volumes of call and are also used for outbound calls, as the IVR-based applications are much smarter than the predictive dialing based applications.

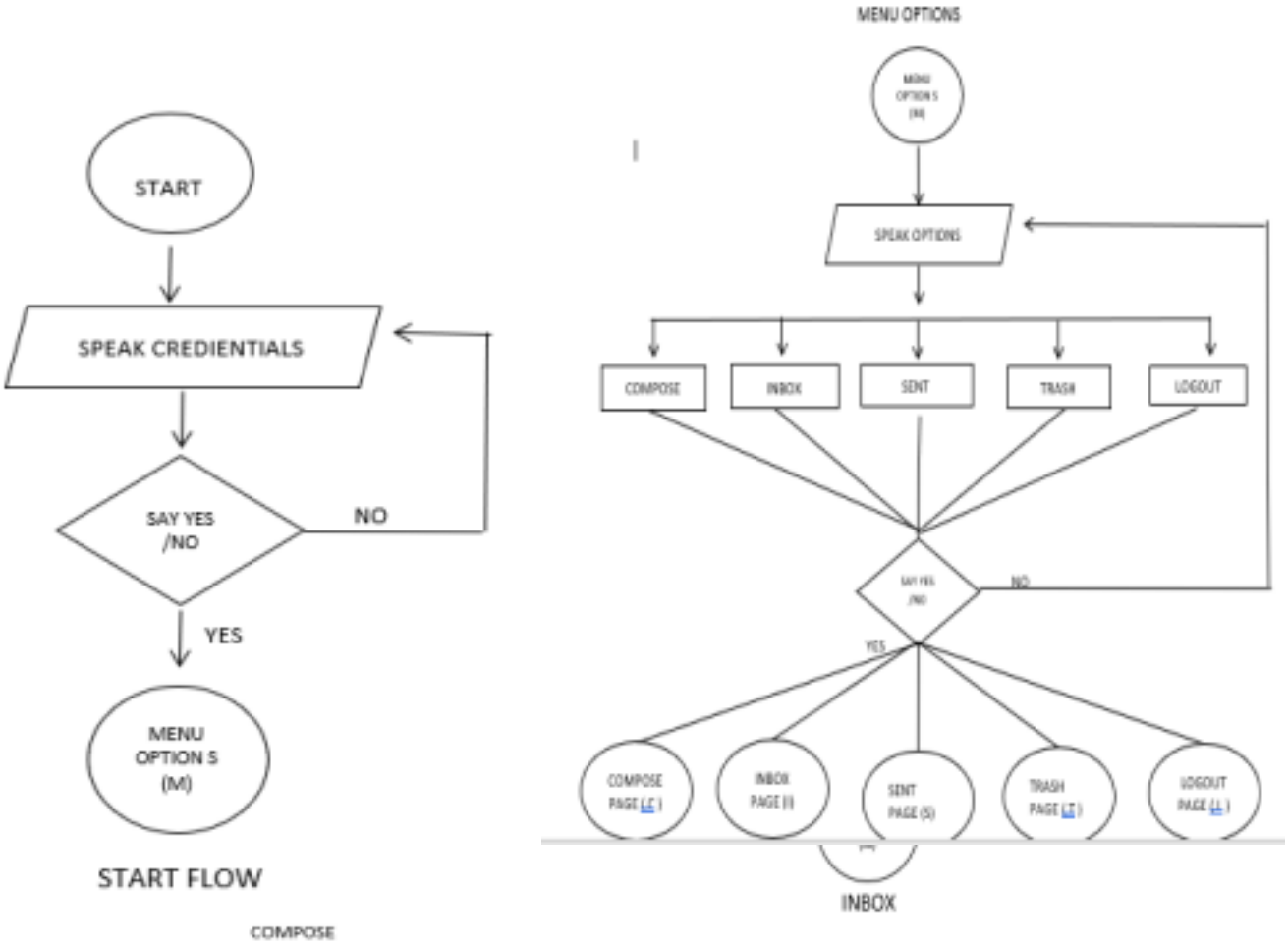
7.2 Speech-Recognition

Voice recognition is a sub-domain of computational linguistics which develops methodologies and different technologies which allow computers to identify and translate speech into text. It incorporates knowledge and research in the areas of linguistics, computer and electronic engineering. Some voice recognition systems need training where a speaker reads a separate text or vocabulary through the system. The system analyzes the specific voice of the individual and uses it to refine the voice recognition of the individual, increasing accuracy. A training-free system is called a speaker-independent system. The system which uses training is referred to as speaker dependent.

7.3 Text-to-Speech and Speech-to-Text

Several API's are available for text to speech conversion to Python. One such API is a Google Text to Speech API known as a gTTS API. gTTS is a very user-friendly tool which converts typewritten text into audio which can be recorded into mp3 files. The gTTS API supports a variety of languages, including English, Hindi, Tamil, French, German and many other languages. The voice can be transmitted using either of the two available audio speeds, quick or slow. Nevertheless, since the last update there is no ability to change the speaker's voice. Speech to Text, also referred to as Automated Speech Recognition mechanism, translates speech into text, making it easier to write emails.

8. FLOW DIAGRAM



9. SYSTEM REQUIREMENTS

- Software requirements - Jupyter Notebook, Python, gTTS API, Django
- Hardware requirements - Windows 7 & above, 2 Gb memory.

10. CONCLUSION

Our application is customer-friendly, efficient and cost-effective, making it easy for the visually impaired to interact with the Python-based application. It focuses on developing and implementing a real-time email interaction system for people with visual impairments. We developed an application which can help blind people to avail the messaging services efficiently. Our application helps to overcome the disadvantages of existing mail systems. In this system, the keyboard usage has been eliminated completely and also reduces the load of memorizing shortcuts as well as remembering the position of keys on the keyboard. The user simply has to listen to the voice command given by the system and react accordingly to carry out the required actions. This application requires the user to say the action that needs to be performed, then the system will carry out the necessary actions. Users will be prompted to provide information via voice input whenever requested and the system will provide authentication of user details.

11. FUTURE SCOPE

For further improvements to the application, attachments such as pictures, word files, and audio and video files can be embedded. The Encryption and Decryption algorithms can be utilized to ensure the credentials that are passed during connection. We can use many commands to perform diverse operations such as archive, report, reply, forward, etc. The automatic response to incoming mails can also be integrated.

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