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AI-Driven Blind Signature Classification for IoT Connectivity: A Deep Learning Approach

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ABSTRACT: Communication is a fundamental aspect of human life, and in recent times, numerous internet-based technologies have been developed to make communication more reliable and efficient. However, these advancements often overlook individuals with visual impairments, as most computer activities rely heavily on visual perception. Among various applications, email remains one of the most widely used and reliable methods of communication. While regular users find email systems intuitive and accessible, visually impaired individuals face significant challenges due to the lack of inclusive design. Current email systems are predominantly visual-centric, making them difficult to navigate for users with visual disabilities. To address this gap, our proposed system introduces a voice-based email platform tailored specifically for the visually impaired. Leveraging Python scripting, the system enables users to send, receive, and manage emails entirely through voice commands. By integrating speech recognition and text-to-speech technologies, the system provides an auditory interface, allowing users to compose emails, check inboxes, and navigate folders without the need for visual input. This approach not only enhances accessibility but also promotes independence and confidence among visually impaired individuals in their digital communications. The implementation utilizes several Python libraries to facilitate speech recognition and synthesis, ensuring seamless interaction. For instance, the system employs the Whisper model for accurate voice-to-text conversion, enabling precise transcription of spoken commands. Additionally, the GTTS (Google Text-to-Speech) library is utilized to convert text responses into speech, providing auditory feedback to users. Furthermore, libraries like smtplib and imaplib are employed to handle email sending and retrieval functionalities, ensuring compatibility with standard email protocols. By focusing on voice-driven interactions, the proposed system eliminates the need for traditional input devices like keyboards and mice, which can be challenging for visually impaired users. Through continuous development and refinement, such systems have the potential to empower visually impaired individuals, enabling them to participate more fully in the digital age.

KEYWORDS: Deep learning, Blind signature classification, recurrent neural network, automatic feature Extraction.

I. INTRODUCTION

Email is most widely used communication media among all the methods, especially in the business world. With the boom in internet technologies, the communication has become a lot easier. Internet is considered as the vault of innovation, technologies and information. Numerous networking and social media sites. The most conventional way of online communication is e-mail. It is estimated that there are more than 4.5 billion email accounts. It provides a VOICE BASED MAILING SERVICE where the visually impaired person could read and send and receive mail by their own without the help of others. By the end of 2020, this figure is estimated to rise up to 5.9 billion, which is an improvement of over 29.5 %. There are 2.586 B email clients overall along with both business and purchaser clients as per. along these lines, email remains as the accepted standard for delivering noteworthy communication. For utilizing these offices of Internet each individual requires visual ability. Since on visual discernment to comprehend what substance are available onscreen. Henceforth this type of frameworks is of no utilization for visually impaired people. For making these frameworks helpful for these visually challenged individuals. There are different advances given to them such as Automatic speech recognizer, screen reader, TEXT TO SPEECH, SPEECH TO TEXT, braille console and so on. Internet is considered as a major storehouse of information in today's world. No single work can be done without the help of it. It has even become one of the de facto methods used in communication. And out of all methods available email is one of the most common forms of communication especially in the business world. However not all people can use the internet. This is because in order to access the internet you would need to know what is written on the screen. If that is not visible it is of no use. This makes internet a completely useless technology for the visually impaired and

illiterate people. As nearly 285 million people worldwide are estimated visually impaired it become necessary to make internet facilities for communication usable for them also.

A typical misguided judgment alludes to a robotized attendant as an IVR. The terms are particular and mean various things to conventional broadcast communications experts. The reason for an IVR is to take input, process it, and return an outcome, while that of a mechanized specialist is to course calls. The term voice response unit (VRU) is sometimes utilized too. In order to achieve the goal, we have designed an open source, light weight VOICE E-MAILING SYSTEM that can be used by a Blind person to send e-mail through voice recordings. The system allows a Blind person to record her voice and instead of converting the SPEECH TO TEXT, the system directly sends the recorded voice message to the recipient's mail address as an attachment.

II. EXISTING SYSTEM

The pre dominant mail service can be used by only a normal person. HTML formatted emails are not created with accessibility in mind. For the visually challenged password is not secured in the email system. The visually challenged people cannot view the screen to read out the content, since all the web applications has been designed till date depends on the use of normal people. The existing mail service does not provide flexible access to the visually challenged people. Because they are in written format and there is no read out option to hear the mail that is received to their mail address. Despite we have screen readers to access the desktop application for the people who have that disability since they do not have application to access the web application. The main use of using the internet is to communicate with others and to interchange their information which is provided by email service. Still the existing system of mail service fails in providing the flexibility to the people in need. Due to these demerits in the current system, we can overcome that in the application we are going to develop and implement.

DISADVANTAGE

The disables cannot use the normal mail system.

- At present, visually challenged people only use the desktop applications.
- They may not be able to interact with the web-based applications.

III. PROPOSED SYSTEM

This paper aims at developing an email system that will help even a naive visually impaired person to use the services for communication without previous training. The system will not let the user make use of keyboard and mouse operation for speech conversion to text. Also, this system can be used by any normal person also for example the one who is not able to read. To know the received (unseen) message to read the subject and body of the message and compose a mail with user mail-id and password finally logout the system. The complete system is based on Text-to-speech and Speech-to- text. This voice email not just made for blind people; anyone can access it.

ADVANTAGES:

- Visually challenged person can able to send our own mail without anyone helps.

IV. SYSTEM ARCHITECTURE

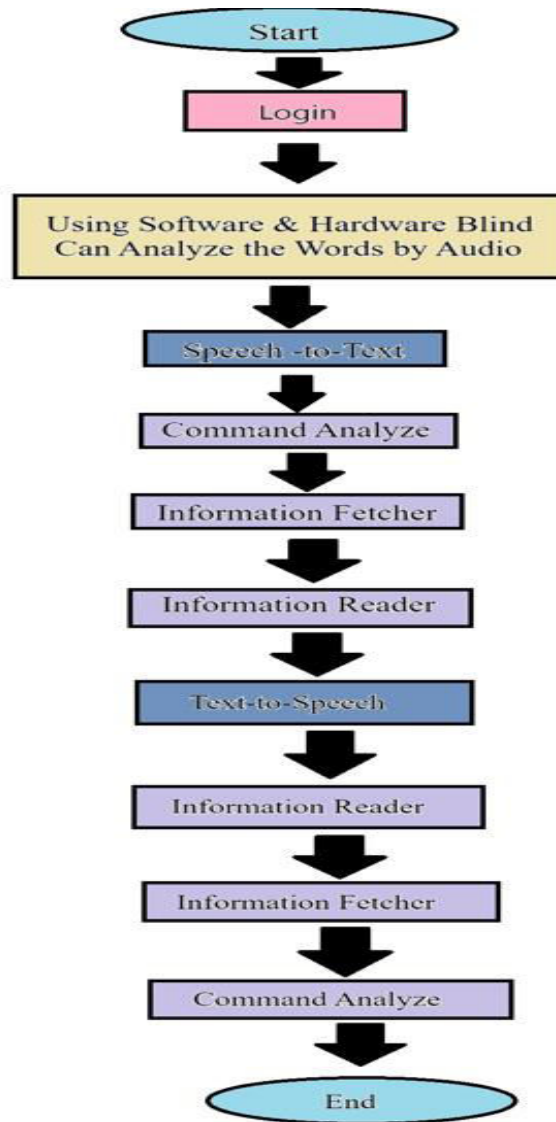


Fig 4.1 System Architecture

V. METHODOLOGY

- Speech-to-Text
- Command Analyzer
- Text-to-Speech
- Compose
- Read Received Mails

SPEECH-TO-TEXT

The systems obtain speech at run time through a microphone and with the help of speech-to-text converter the speech gets converted into text. Speech-to-text converter recognizes the speech analyzed the sounds you make by filtering what you say then it digitized it to a format it can read. Python platforms are used here to develop this. Our speech to-text system directly obtains and converts speech to text. It can add-on other larger systems, giving users a different choice for data entry.

Analog speech signal must first be sampled at time and amplitude axes, or digitized. Samples of the speech signal are analyzed in even intervals. Speech feature extraction involves the formation of equally spaced discrete vectors of speech characteristics. Feature vectors from training database are used to estimate the parameters of acoustic models.

COMMAND ANALYZER

Command analyzer will analyzes the corresponding module through the text input. Execute that module and generate a result to the main module.

TEXT-TO-SPEECH

Using speech synthesis techniques, it converts text to voice output. It used by the blind to listen to written material. Text-to-speech is also used on devices such as portable GPS units to announce street names when giving directions. Our Text-to-Speech Converter accepts a string of 50 characters of text (alphabets and/or numbers) as input.

COMPOSE MAIL

In this module get a voice input from the blind. connect to the mail server with help of IMAP protocol Login with correct user id password. Send the mail with recipient mail id.

READ RECEIVER MAIL

Read the received mail with sender mail id, subject and body to the Blind.

VI. RESULTS

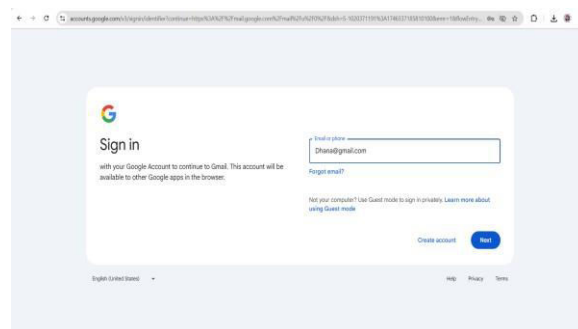


Fig 6.1 Login Screen

```
=====
Malware Dataset
Process - Malware Attack Detection
=====
Data Selection
Samples of our input data
id      dur      proto  service  ... ct_srv_dst  is_sm_ips_ports  attack_cat  label
0 1 0.121478 tcp - ... 1 0 Normal 0
1 2 0.649902 tcp - ... 6 0 Normal 0
2 3 1.623129 tcp - ... 6 0 Normal 0
3 4 1.681642 tcp ftp ... 1 0 Normal 0
4 5 0.449454 tcp - ... 39 0 Normal 0
5 6 0.380537 tcp - ... 39 0 Normal 0
6 7 0.637109 tcp - ... 39 0 Normal 0
7 8 0.521584 tcp - ... 39 0 Normal 0
8 9 0.542905 tcp - ... 39 0 Normal 0
9 10 0.258687 tcp - ... 39 0 Normal 0
```

Fig 6.2 Process Screen

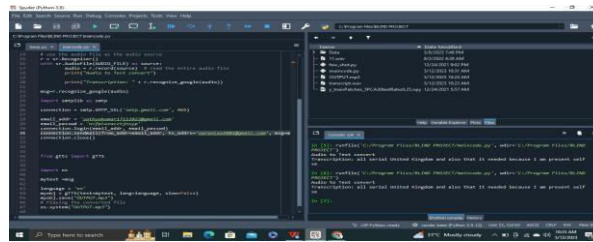


Fig 6.3 Coding Screen

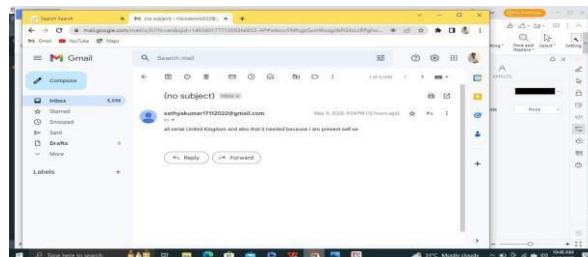


Fig 6.4 Output Screen

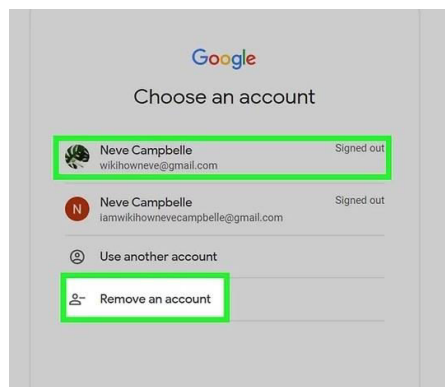


Fig 6.5 Logout Screen

VI. CONCLUSION

The Voice Email is a System which helps the blind and handicapped people to access mails easily and efficiently. It provides a voice-based mailing service where the visually impaired person could read and send and receive mail by their own without the help of others. We have eliminated all these concepts and overcome all difficulties faced by blinds. It uses speech recognition application which provides an efficient voice input method for mailing devices for blind. It is also useful for handicapped and illiterate people.

VII. FUTURE ENHANCEMENT

There are screen readers available but, they impose some or the other kind of difficulty to them. Screen readers basically read out the content on the screen for them and in order to respond to it, they need to provide input through a keyboard. So, in order to accomplish this, the user needs to be aware of the positions of the keys on the keyboard. Hence, a person who has never made use of a computer will never be able to use such kind of a system. Also, the screen- readers that are available, read the contents sequentially and hence, only if the content is in the basic HTML format, then only the blind is able to make out clearly what actually the content is. Also, the advance WebPages" of email system which proves to be user friendly to a person with normal eyesight turns out to be complicated to them.

Hence, in order to avoid the drawbacks of the current available systems, we are developing an email system that will help these blind people to attach the file using voice recognition.

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