Voice-based Email System for Blinds

Jain (Deemed-to-be University), Bangalore,Karnataka, Jain Deemed-to-be University),

Bangalore,Karnataka, INDIA

Abstract - With the advent of computer technologies, many technological solutions have been implemented for the visually impaired so that they can utilize them and benefit from them. Considering it a key idea we have built a desktop application that will help blind people to send and read emails as ordinary people do. In this research paper, we describe the VMAIL system architecture for the Python platform that can be used by a Blind Person to access e-mails easily. The application uses a text-to-speech, voice recognizer to facilitate sending and reading, and emails using a computer. The Internet has become one of the basic amenities for day-to-day living. Every human being is widely accessing knowledge and information through the internet. However, blind people face difficulties in accessing these text materials, also in 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 Blind people access internet applications immensely. We describe the Voicemail system architecture that can be used by a Blind person to access e-Mails easily and efficiently.

I. Introduction

The most common mail services that are used in our day-to-day life cannot be used by visually challenged people. To make these systems convenient for these people who are visually challenged there are various technologies provided to them like a screen reader, automatic speech recognizer, speech-to-text and text-to-speech, braille keyboard, etc. However, these technologies are not that useful for those people as they could not give the proper response like a normal system. The objective of Voice Based Email for the Visually Impaired is to help challenge one's access to emails easily and efficiently. This application is based on using speech-to-text and text-to-speech converters, thus enabling everyone to control their mail accounts using their voice only and be able to read, send, and perform all the other useful tasks. The system will prompt the user with voice commands to perform a certain action and the user will respond to the same. So here put to use are the Speech-to-Text and Text-to-Speech technologies using the .net framework. Speech-to-Text also known as Automatic Speech Recognition converts spoken speech into text, which helps compose emails as an easy task. The Text-to-Speech module gives an audio output of the mail received, the sender, the subject, and the body of the mail are read out by the system. Along with it, the aim is to provide assistance to use fundamental applications like My Computer, Word, Notepad, etc.

II. Related Work

During the survey, we found many different approaches taken for this application

Feon Jaison

Assistant Professor

Aditya S Avalakki

[1] Tetra Mail: a usable email client for blind people

Akif Khan, Shah Khusro, Badam Niazi, Jamil Ahmad, Iftikhar Alam, Inayat Khan: Electronic Mail has become an essential tool of communication and collaboration for sighted, visually impaired, and blind people. However, due to inconsistent interface design, lack of logical order of navigational items, the diverse set of screen sizes and orientations, complicated text-entry layouts, and inadequate mapping of haptic feedback, the existing email-related activities on smartphones contribute to several issues. In addition, blind people also confront problems in precisely accessing non-visual items on touchscreen interfaces to perform common email-related activities like sending, receiving, organizing, deleting, filtering, searching, and managing spam emails. Due to these problems, blind people are facing difficulties not only in operating a smartphone but also in performing several email-related activities. Furthermore, spam and junk emails cause frustration and contribute to cognitive overload. We proposed Tetra Mail, a usable blind-friendly email client to overcome the challenges of the accessibility and usability of email-related activities on a smartphone. The proposed email client is evaluated through an empirical study of 38 blind participants by performing 14 email activities. The results of this prototype implementation show an improved user experience, accuracy in task completion, and better control over touchscreen interfaces in performing basic activities of managing emails. The results demonstrate that Tetra Mail is an accessibility-inclusive email client enabling blind people to have a better user interaction experience and minimal cognitive overload in managing emails.

[2] Human-computer interaction based Smart Voice Email (Vmail)Application - Assistant for Visually Impaired Users

Sherly Noel: Communication development is creating a revolution in the current digital era. Formal or casual communication is now sent through email. The growth in digital technology has given immense opportunities to visually impaired people. This application is developed to ease the process of email writing not only for visually impaired people but for everyone. Now human voices can also be given as input instead of typing on the keyboard. So, the additional skills required for typewriting will not be necessary anymore. This application recognizes the user's voice and performs comparisons with pre-sample voice stored in the database and executes the voice command. Common day-to-day spoken words are used as a command language. It focuses on reducing the load incurred in human memory. The proposed work aims to develop a mechanism that converts Speech to Text (S TT) for email composing and also converts Text to Speech (TTS) for reading emails. Google web kit API (Application Programming Interface) is used in this application for speech recognition. Investigations made on the application prove its effectiveness by delivering a better performance when compared with the various parameters like audible distance, accent, pace, words per minute (WPM), accuracy, and homophone words. The graphical analysis depicts the accuracy in terms of word recognition.

[3] Voice-Based Email for Visually Challenged People

Dr. S. Brindha, Ms. D. Priya, Mr. S. Mukesh, Mr. C. Dinesh Kumar, and Mr. R. K. Naveen: The advancement in computer-based accessible systems has opened up many avenues for the visually impaired across a wide majority of the globe. Audio feedback-based virtual environments like screen readers have helped Blind people access internet applications immensely. However, a large section of visually impaired people in different countries, in particular, the Indian subcontinent could not benefit much from such systems. This was primarily due to the difference in the technology required for Indian languages compared to those corresponding to other popular languages of the world. In this paper, we describe the Voicemail system architecture that can be used by a Blind person to access E-Mails easily and efficiently. The contribution made by this research has enabled Blind people to send and receive voice-based emails. We found that our proposed architecture performs much better than that of the existing GUIs.

[4] Voice-Based E-Mail System using Artificial Intelligence

Rijwan Khan, Pawan Kumar Sharma, Sumit Raj, Sushil Kr. Verma, Sparsh Katiyar: One of the most used forms of communication among people is Email. A lot of confidential and urgent information is exchanged over emails in today's time. There are about 253 million visually impaired people worldwide. These visually impaired people are facing a problem with communication. Since technology is growing day by day these types of visually challenged people feel that they are more challenged. So, the authors proposed a Voice-based Email System using AI that will make the email system very easily accessible to visually challenged people and also help society. Accessibility is the most important feature that is considered while developing this system. Any system is called accessible only if both able and disabled people can use it easily.

[5] Voice-based e-mail System for Blinds

Pranjal Ingle, Harshada, Kanad, Arti Lanke: The Internet has become one of the basic amenities for day-to-day living. Every human being is widely accessing knowledge and information through the internet. However, blind people face difficulties in accessing these text materials, also in 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. An audio feedback-based virtual environment like the screen readers has helped Blind people to access internet applications immensely. We describe the Voicemail system architecture that can be used by a Blind person to access e-Mails easily and efficiently. The contribution made by this research has enabled Blind people to send and receive voice-based e-Mail messages in their native language with the help of a computer.

[6] A Review of Voice-based E-Mail System for Blind

Paulus A. Tiwari, Pratiksha Zodawan, Harsha P. Nimkar, Trishna Rotke, Priya G. Wanjari, Umesh Samarth: Due to its simplicity and accessibility, the Internet is widely used in almost all communication applications. In recent times, several applications based on the internet have been developed to make communication more reliable and efficient in nature. Out of these numerous applications, E-mail is the most widely used and reliable way to communicate with each other. The usage of e-mail is quite easy and lucid for regular users but when it comes to the user with visual defects, the system is yet very difficult to use. The current system is not useful for people with visual defects as the available system are based on visual perceptions. There is huge upgradation in technologies nowadays, especially for visually challenged people. Still the current emailing system is yet not to upgrade for the use of the visually impaired. This arises a significant need to upgrade the existing system to make it more useful for the visually impaired. Thus, in this study, we present an email system working on the voice-controlling principle for people with visual impairment to deliver simple and easy access to the email system. This framework will also be helpful for individuals with other weaknesses alongside visually impaired individuals.

[7] Real-Time Face Recognition using Effective Supervised Machine Learning Algorithms

P. Nagaraj, Rajesh Bangla, and A.V. Krishna Prasad: In security authentication systems, face recognition has become an emerging new trend. Modern FR processes can detect whether the individual is real (life) or not through face recognition, thus preventing the systems from being compromised by displaying an actual person's image. These new systems of face recognition are the result of recent advances in the field of computer vision and efficient algorithms for machine learning. This thesis describes in depth how the identification of a real-time face can be to create a safety alert framework for the workplace, the machine learning algorithm Haar cascade classifier was used to build four distinct classes for identification of security equipment and eventually identify the faces in both images and video using python open CV. Initially, a face detection technique is performed to scan the face identity marks through.

[8] Face detection techniques: a review

Ashu Kumar, Amandeep Kaur, Munish Kumar: With the marvelous increase in video and image databases there is an incredible need for automatic understanding and examination of information by intelligent systems as manually it is getting too distant. Face plays a major role in social intercourse for conveying the identity and feelings of a person. Human beings do have not a tremendous ability to identify different faces than machines. So, an automatic face detection system plays an important role in face recognition, facial expression recognition, head-pose estimation, human-computer interaction, etc. Face detection is a computer technology that determines the location and size of a human face in a digital image. Face detection has been a standout among topics in

computer vision literature. This paper presents a comprehensive survey of various techniques explored for face detection in digital images. Different challenges and applications of face detection are also presented in this paper. In the end, different standard databases for face detection are also given with their features. Furthermore, we organize special discussions on the practical aspects of the development of a robust face detection system and conclude this paper with several promising directions for future research.

[9] Voice-based Email System for Blinds

Ruchi Khedekar, Sonu Gupta: In today's time communication has become so easy due to the internet and technologies. But visually challenged people find it very problematic to utilize this technology because of the fact using them requires visual perception. Although, many new advancements have been implemented to help them use the computer efficiently so no novice user who is visually challenged can use this technology as efficiently as any naive user can which is unlike normal users this requires some practice for using the available technologies.

This paper aims at developing an email system that will help even a novice visually impaired person to utilize the services for communication without previous training. The system will not let the user make use of the keyboard instead will work only on mouse operation and speech conversion to text. It can be used by a non-impaired person who has difficulty reading. The system is fully based on interactive voice response which will make it user-friendly to use.
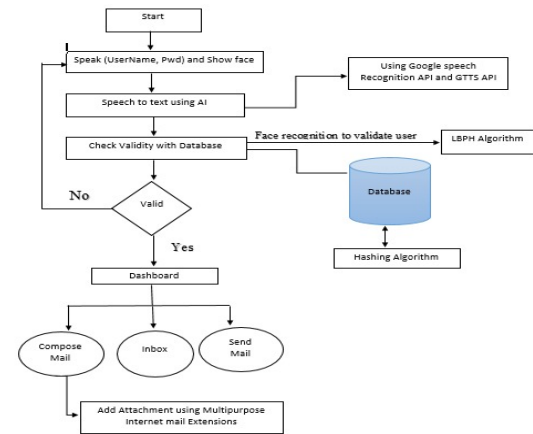
[10] Voice-Based Email System

Harivans Pratap Singh, Aman Pratap Kushwaha, Aayushmaa, and Harendra Singh: Email is one of the most prevalent ways for people to communicate with one another. In today's environment, email is used to send a substantial amount of confidential and urgent information. As technology is enhancing, people are coming additional nearer to digital life and digital communication. There square measure many ways to speak with others through the web during this new advanced era. Most of them square measure selecting the best manner of communication, i.e., email correspondence (Email). Email is the technology that allows users to contact others by sending emails and additionally helps in business world communication. However, their square measure cannot use these technologies because they're illiterate or can't examine the screen. So, to form this technology closer to purblind individuals, the authors projected a Voice-based mostly Email System. This method provides them the facility of communication and creates a lot of stronger and freelance. Moreover, this design can facilitate blind individuals to access email and alternative transmission functions. Leaving behind the previous techniques, this voice-based email system will be containing new technologies that are simply acceptable to purblind individuals.

III. Methodology

The system interprets a given vice command using natural language processing and processes it. The system checks if the command is valid or not and accordingly executes the next command after processing it.

A successful execution gives a voice-based confirmation, if the system is not able to run then it asks to run the voice input again.

IV. Usage

This voicemail can be used by

- Adults
- Children
- Elderly people
- People with disabilities
- **Adults**: The findings show that people refer to technology in a variety of ways and a modest level of sociability.
- **Children**: Studies show that children use these voice mails to easily access their email.
- **Elderly people**: Active users with basic computer abilities were described as participants. The authors also emphasize the necessity for more research on how elderly individuals utilize voicemail.
- **People with disabilities**: A little research looked into how voice interfaces can help people with cognitive disabilities or vision problems in their daily lives, as well as how easy it is for them to use voicemail.

V. Conclusion

This project is the proposed Voice based Email system for visually impaired people, which is developed as an application that helps blind and handicapped people to access emails easily and efficiently. It provides a voice-based mailing service where the visually impaired person could read and send mail on their own without the help of others. It requires basic information about keyboard shortcuts. The system has eliminated all these concepts and overcome all difficulties faced by the visually impaired. It uses a speech recognition application that provides an efficient voice input method for mailing devices for the blind. It is also useful for handicapped and illiterate people.

VI. References

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