

Speech Based E-mail System for Blind and Illiterate People

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Abstract - Internet is a rich source of knowledge and information without which very few works can be done. It is most important mode of communication and connection. E-mail overall is most common mode of communication in business world. Internet is quite useless technology for visually impaired and illiterate people. Proposed system not only helps visually impaired but also illiterate people and hence will be an important approach towards connecting people which earlier was not possible and tedious for visually impaired people to operate all functionality of E-mail system. Proposed System overcomes shortcomings of existing systems. Idea focuses on providing basic functionalities like compose, send, receive E-mail along with advance feature like Voice based operation, Search Mail, provision for voice as well as text based mail.

which curbs all the above drawbacks and turn into a simple system. Idea focuses on providing basic functionalities like compose, send, receive E-mail along with advance features like voice based operation, search mail, provision for voice as well as text based email with added ease and simplicity.

3. Related Work

Interaction of the users to the system earlier was based on Screen reader based technology also the systems given in [2][3] are based on mouse click based operations were in for every operation there is associated mouse click for example to compose email let say to left clicks. Therefore interaction with the system is tough also there is need to keep events in mind.

Key Words: Speech-to-text, Text to speech, PhpMailer, Voice Command, KMP

This paper focuses on developing an email system which helps blind people to use communication services. The system based in IVR is used, major idea is to discard keyboard and use of mouse operation [1].

1. Introduction

Speech based E-mail system is the crux of this project. Entire idea revolves around making the use of speech based operations to enable the usage of emails. In earlier attempts system were made for use of blind people. The major focus of those systems was using screen-readers to read the text. Later came the Braille keyboards. Braille keyboards proved to be useful but not sufficient enough to perform high level operations. One of the major drawbacks of previous system was their scope was quite limited only to blind people. We have put our sincere efforts to increase scope of system to both visually impaired and illiterate people. E-mail above all is most common mode of communication in business world. Internet is quite useless technology for visually impaired and illiterate people. It is estimated that nearly 285 million people in world are visually impaired and idea is to facilitate to provide suitable communication system for them [1].

Internet is rich source of knowledge and information, blind people face difficulties in accessing text based material. The idea is to develop audio feedback based virtual environment like screen reader, text to speech, etc [2].

Voice mail architecture helps blind people to access info. in form of audio, text, self read system. Idea focuses on helping visually impaired and illiterate people to access technology by reducing cognitive load. Decision making depends on eyesight and everything that happens or appears [3].

2. Motivation

It is estimated that nearly 285 million people in the world are visually impaired and idea is to facilitate suitable communication system for them [1]. This reason was driving force behind developing given system. One of the major disadvantage of existing system is that all operations are based on mouse click events. Operations depend completely on types of clicks specified by idea [2][3]. Also sometimes remembering keyboard shortcut is difficult. The extent of existing system is limited for blind and visually impaired people. There is high need of developing a proper system

4. Proposed System

Proposed System overcomes the shortcomings of existing system. Ideas focuses on providing basic functionalities like compose, reading emails, sending emails, receiving mails along with voice based interaction to facilitate working with each of the facilities provided along with provision for sending text as well as voice based email.

The system is generally created for visually impaired and blind people for improving their interaction with system.

Earlier the system was used by visually impaired people was totally based on IVR that used screen readers and braille keyboards which will use for interacting with the system. All though this made system much more complicated to use.

The system is made optimized allowing to user with exact content that is needed to interact with system. Instead of

using screen readers and braille keyboards system uses speech-to-text conversion and text-to-speech conversion with which working of E-mail system is greatly simplified. Also for operations that we will do will employ the feature of voice command which would reduce need to find a particular button on a screen as commands would be voice based.

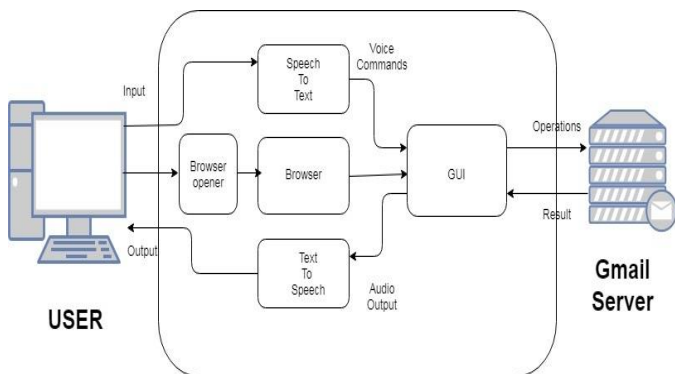
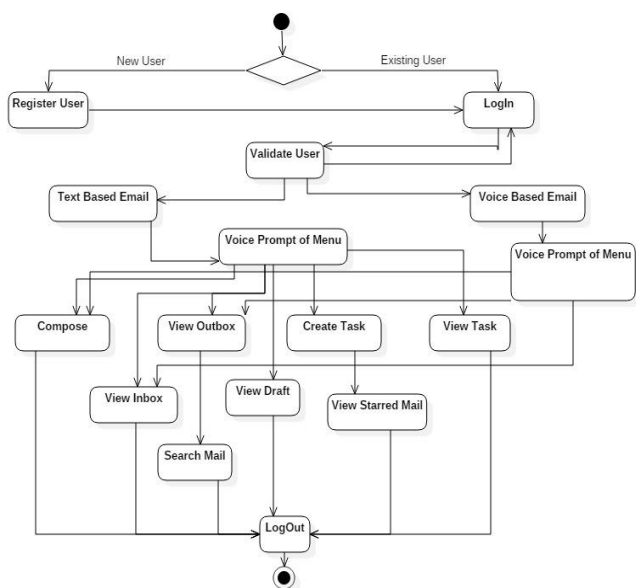


Fig -1: System Overview Diagram

4.1. Flow of Working



In order to begin interacting with proposed system user need to have a G-mail account prior to usage. Firstly to reach a website normal screen readers can be used. The usage will move first to login screen wherein he will voice prompted for selection of options first will be to register itself and next would be to login.

The registration process begins by entering the E-mail account id that should only be of g-mail. For fetching and sending of emails we are using g-mail system as our host system. We use the functionality that is provided by php in the form of PHP-mailer to support the functionality of sending and receiving mails. Next other required details and password of the user must be taken.

As we use PHP-mailer which provide the functionality of sending and receiving mails it requires both e-mail id as well as password of users, hence it is taken as in input.

The user account provides two options for mailing

1.Text-based E-mail

2.Voice-based E-mail

1 Text-based E-mail allows sending of an text based email.

2 Voice based email allows sending of an email which is voice based, prior to which message of the user will be accepted in the form of voice and its recording would be sent to other user. After selection of any of these methods through voice commands user moves to a page which allow options for operations. From the list of operations any operation could be selected by user.

5. Implementation

5.1 Speech-To-Text:

Input to the System is provided by the means of speech-to-text. Speech-to-Text API is used for conversion of speech-to-text.HTML5's Built in Speech Recognition API is used for this purpose hence using this input is provided to different modules of the system as intended user cannot manually enter the data required.

5.2 Text-To-Speech

Text-to-Speech is used for conversion from text to speech. It is used to Speak menu to the user which can be used to provide list of available options a particular user can do on a given module or page. It is also used to read message that is been received by the intended user. As intended user cannot directly read. ResponsiveVocic.js is API that is used for conversion of Text to speech.

5.3 PhpMailer and PHP-IMAP

PHP Mailer is a library which is provided by PHP which can be used to send e-mail. PHP Mailer is used in proposed system which is used to send emails. In order to extract the mails from the system PhpImap is used to fetch the user's mail from the IMAP server.

5.4 Knuth-Morris-Pratt Algorithm

Pattern Matching is very key component when it comes to searching mail in inboxes. System provides three ways to search by keyword, date and today's date out of search by keyword requires KMP for pattern matching.

Given a string 'S', the problem of string matching deals with finding whether a pattern 'p' occurs in 'S' and if 'p' does occur then returning position in 'S' where 'p' occurs.

Knuth, Morris and Pratt proposed a linear time algorithm for the string matching problem as compared to other approaches.

A matching time of $O(n)$ is achieved by avoiding comparisons with elements of 'S' that have previously been involved in comparison with some element of the pattern 'p' to be matched. i.e., backtracking on the string 'S' never occurs

The prefix function, Π : The prefix function, Π for a pattern encapsulates knowledge about how the pattern matches against shifts of itself. This information can be used to avoid useless shifts of the pattern 'p'. In other words, this enables avoiding backtracking on the string 'S'.

The KMP Matcher: With string 'S', pattern 'p' and prefix function ' Π ' as inputs, finds the occurrence of 'p' in 'S' and returns the number of shifts of 'p' after which occurrence is found.

6. Results

The interaction with the system is greatly simplified with help of speech-to-text and text-to-speech. Every operation within the system takes place with the help of voice commands the environment is entirely voice command driven with proper feedback from the system at every stage of interaction mouse click based interaction is completely avoided and whole interaction with the system is made voice based. In addition to text based email system Voice based Email has been also provided for added mailing options.

7. Conclusion

The method described in the proposed uses speech-to-text and text-to-speech for interaction with system it also greatly increases the security as compared to other approaches. The whole process of speech-to-text and text-to speech makes it more interactive and easy for the user to keep track of its activities which is not possible in other approaches.

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