

Voice based Email System Application for Blind and Visually Impaired Peoples

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ABSTRACT

Internet has become one of the basic amenities for day-to-day living. Every human being is widely accessing the knowledge and information through internet. However, blind people face difficulties in accessing these text materials, also in using any service provided through 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 environment like, the screen readers have 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 the Blind people to send and receive voice based e-Mail messages with the help of a computer.

Keywords: Speech to text and Text to Speech converter, Interactive Voice Response (IVR), Screen Reader, MFCC

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I. INTRODUCTION

Existing System: Simple e-mail systems are available in which only voice recognition & text-to-speech systems are accessible. The visually challenged people find it very difficult to utilize this technology because of the fact that using them requires visual perception. 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.

II. PROPOSED SYSTEM

In this system mainly three types of technologies are used namely:

1. STT (Speech-to-text) : here whatever we speak is converted to text. Their will a small icon of mic on whose clicking the user had to speak and his/her speech will be converted to text format, which the naked people would see and read also.
2. TTS (Text to Speech) : This method is full opposite of STT. In this method, this converts the text format of the emails to synthesized speech.
3. IVR (Interactive voice response): IVR is an advanced technology describes the interaction between the user and the system in the way of responding by using keyboard for the respective voice message. IVR allows user to interact with an email host system via a system keyboard, after that users can easily service their own enquiries by listening to the IVR dialogue. IVR systems generally respond with pre-recorded Audio voice to further assist users on how to proceed. Audio that would be pre-recorded and the system need to have large volumes.
4. MFCC (Mel Frequency Cepstral Coefficients) Is a feature widely used in automatic speech and speaker recognition.
5. Screen Reader: Screen readers are software programs that allow blind or visually impaired users to read the text that is displayed on the

computer screen with a speech synthesizer or braille display. A screen reader is the interface between the computer's operating system, its applications, and the user.

System architecture:

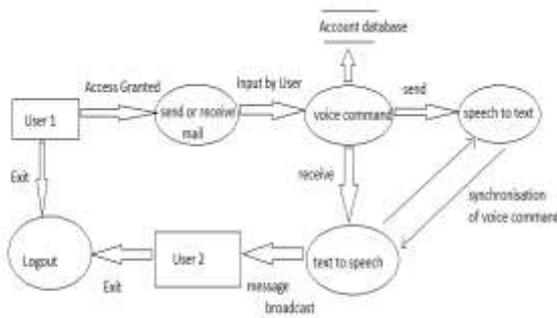


Fig.1 System architecture

The system is currently developed by us. When user will visit our site he would first have to register in our website through registration form. User will be very well guided with the help of voice commands, while registrating all the necessary fields to be filled will be read by site, by clicking on that box he would have to fill in them. While filling up the necessary fields, speech would be recorded in database. Very frequently used words will be present i.e., when user would speak it would get typed automatically. Also the voice would be recorded in the database. Because after registration, user has to go to login page and type user id & password which would get recognized through database enabling the correct user to get access to his/her account. After successful login the user would read the received mails present in inbox and also can send the mails.

III. DESIGN

3.1. User Interface Design

The complete website focuses more on efficiency in understanding the IVR rather than the look and feel of the system as the system is primarily developed for the blind people to whom the look and feel won't be of that primary importance as the efficiency of understanding the prompting would be.

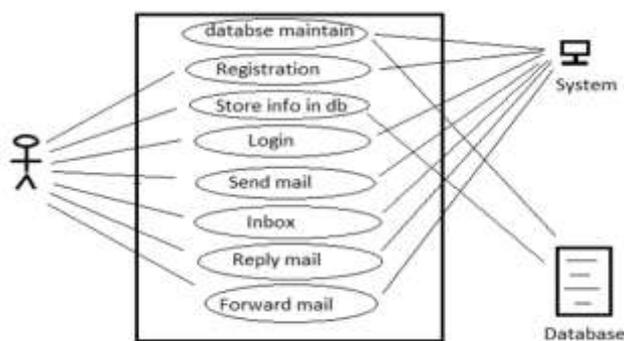


Fig. 2. Use Case Diagram

3.2. Database Design

System maintains a database for user validation and storing mails of the user. There are a total of five tables. The Inbox, Sent-Mail schemas will store all mails of the respective service that belongs to that particular user.

3.3. System Design

System is voice oriented. When user is over every legal space in website, it will receive voice messages where user is right now. If normal people don't want this feature they can turn it off. The system work flow is defined in DFD diagrams.

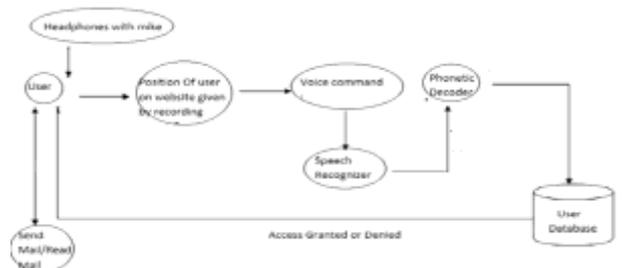


Fig 3. Level 0 DFD

IV. IMPLEMENTATION

Registration:

This is the first module of system. Any of the users who want to use the system should first register himself to obtain his/her own username and password. Registration module will obtain all the details about user by voice commands given by the system that where to fill which information. The user should speak the details as the system requires. If the information is incorrect then the system will be telling about re-enter the information again.

Login:

This is the second module of system. Once the registration is done the user can login to the system. Login module will ask user to provide username and password. Here the process goes in speech to text conversation of user. User is told to validate whether he/she entered details are correct or not. If the details are correct then the user is authorized and will enter to the main page.

Compose mail:

These are not only the most used mail function but also a very important feature of mailing systems. Without compose, one cannot mail. Since the system is for visually challenged people and keyboard operations are completely avoided composing mail is totally done on voice input and mouse operations. No typed input will be required, as the system totally focuses on simple mouse click operations.. User can record the messages by clicking on the small mic option present in front of every box. Here, the STT technology gets used, that means speech gets converted to text.

Inbox :

This option helps the user view all the mails that has been received to his/her account. The user can listen to

mails Which he/she wants to listen? By clicking on authorize button the user can access to his/her inbox account.

Scope:

For people who can see, e-mailing is not a big deal, but for people who are not blessed with gift of vision it postures a key concern because of its intersection with many vocational responsibilities. This voice based email system has great application as it is used by blind people as they can understand where they are. E.g. whenever cursor moves to any icon on the website say Register it will sound like "Register Button". There are many screen readers available. But people had to remember mouse clicks. Rather, this project will reduce this problem as mouse pointer would read out where he/she lies. This system focuses more on user friendliness of all types of persons including regular persons, visually compromised people as well as illiterate.

Advantages:

1. It gives appropriate detail to the user
2. It reads whole screen easily
3. Low cost
4. It helps blind people to listen the detail they required
5. One of the major advantages of this system is that user won't require to use the keyboard.

Disadvantage:

1. Internet connection is required
2. Available only for Desktop User

V. CONCLUSION

It has feature of speech to text as well as text to speech with speech reader which makes designed system to be handled by visually impaired person as well as blind person. We have eliminated the concept of using keyboard shortcuts along with screen readers which will help reducing the cognitive load of remembering keyboard shortcuts. The user only needs to follow the instructions given by the IVR and use mouse clicks accordingly to get the respective services offered. Other than this the user might need to feed in information through voice inputs when specified

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