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Email System Based on Voice and Biometric Authentication

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Abstract: In the today's world, as the advancement in the technology communication over long distance becomes very important for all the peoples, for visually impaired peoples also. But the hardware such as keyboard, mouse etc, are not user friendly with the visually impaired peoples, so they are not able to access the basic things of technology such as email. Our aim is to make a email system which will help the blind people to communicate through voice, and to improve the security by using biometric authentication. The normal people can also use the system while driving or while they want to use it hands-free. The blind people need not to remember and. As the user will give the commands to the system, it will interact with the user accordingly.
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I.   INTRODUCTION:

With the appearance of the new technologies, the term accessibility is extended to computer accessibility. The majority of the operative systems include new and innovative solutions for people with disabilities [3]. Normally people use mouse and keyboard to handle the computer and access the information. Normal people can see what is present on the screen and then they can choose whatever they want to do, but for blind people it is impossible to read what is on the screen without eyesight. If anyone want to check weather forecast of their city from the internet then they have to first open the browser and then open the particular weather forecasting website and choose their city. This can easily be done by normal people and who has the basic knowledge of how to use the computer and the internet, but the blind people needs some help to use the internet.

Thus for blinds it is a tedious job to use the internet and retrieve the information without any reference. A system is required which will be user friendly for the blind people, the system will interact with the blinds with the help of voice. The users will enter the email, voice password and a unique identification i.e. their fingerprints for accessing the emails, and the users are logged-in the system will automatically read out the received email for the blind people.

II.   EXISTING SYSTEMS

Bulk of information is available on technological advances for visually impaired people. This includes development of text to Braille systems, screen magnifiers and screen readers. Recently, attempts have been made in order to develop tools and technologies to help blind people to access internet technologies. Among the early attempts, voice input for surfing was adopted for the Blind people. A sight-blessed person can interact with the computer with the help of different input/output devices, while a visually impaired person is somehow forced to use specially designed devices or programs to interact with computers. The visually impaired person uses different types of equipments and programs that enable him/her to enter data into computers or control them.

In [2], Their aim was to develop search engine which will support the Man- Machine interaction purely in the form of voice. A search engine purely based on voice is introduced, in which the user can give the commands and can control the web browsers through their voice. The existing Search Engines get request from the user in the form of text respond by retrieving the relevant documents from the server and displays in the form of text. Even though the existing web browsers are capable of playing audios and videos, the user has to request by typing some text in the search text box and then the user can play the interested audio/video with the help of Graphical User Interfaces (GUI). The proposed Voice based Search Engine aspires to serve the users especially the blind in browsing the Internet. The user can speak with the computer and the computer will respond to the user in the form of voice. The computer will assist the user in reading the documents as well.

In [4], their work aims at developing an email system that will help even a naïve visually impaired person to use the services for communication without previous

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training. The system will not let the user make use of keyboard instead will work only on mouse operation and 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. The system is completely based on interactive voice response which will make it user friendly and efficient to use.

III. PROPOSED SYSTEM

Flowchart of Proposed System:

The figure above gives the working of the proposed system in the form of flowchart. The user first needs to provide the user name and the password through his voice by using the android mobile and also by authenticating himself by placing its finger on the finger print scanner. It is then checked with the database and if the user is found registered then he is allowed to access his account. If the user is not registered then he is registered. For registering also the user needs to give its finger print by placing the finger on the scanner. Once the user gets registered he can login into his account by providing the required details. Once the user gets logged in the system starts reading all the

new mails the user has received along with the information of the sender as well as the information regarding the mail like date, time etc. Once the system has finished reading all the new mails, the user needs to give the further command to the system like send to send a new mail again through his voice.
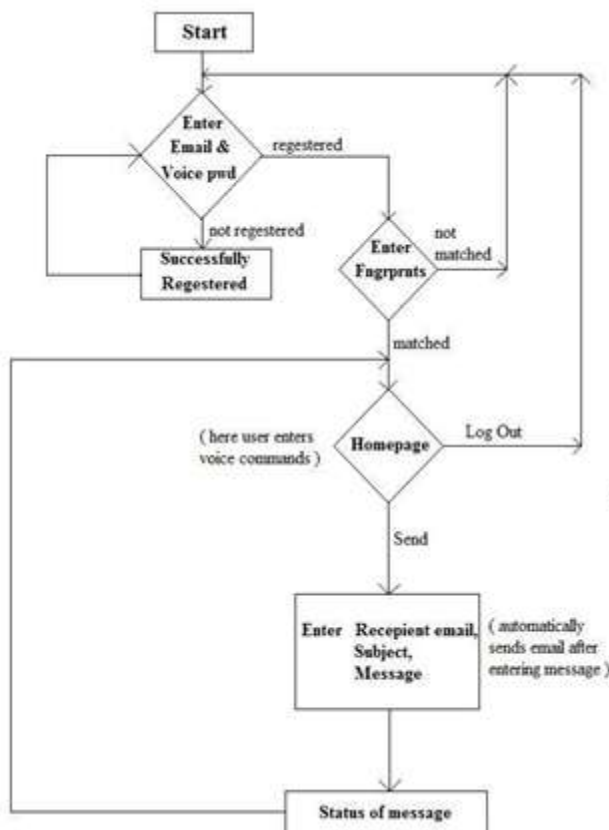

Figure : Flowchart of Proposed System

Once the user gives the command of send for sending any mail, the system will ask the user different details regarding the mail like the recipients email address the subject of the mail and also the body of the message. After giving all the necessary information the user needs to give command of send for sending the mail. Once sender says send the system will take a time duration of some seconds and then would inform the user about the status of the of the mail i.e. sent or not sent.

Working of The Finger Print Scanner:

The finger print scanner used in our system is an optical type of the finger print sensor. Optical fingerprint scanners are the oldest method of capturing and comparing fingerprints. As the name suggests, this technique relies on capturing an optical image, essentially a photograph , and using algorithms to detect unique patterns on the surface, such as ridges or unique marks, by analysing the lightest and darkest areas of the image. Just like smart phone cameras, these sensors can have a finite resolution, and the higher the resolution, the finer details the sensor can discern about your finger, increasing the level of security. However, these sensors capture much higher contrast images than a regular camera. These scanners typically have a very high number of diodes per inch to capture these details up close. Of course, it's very dark when your finger is placed over the scanner, so optical scanners also incorporate arrays of LEDs as a flash to light up the picture come scan time. Such a design is a bit bulky for a Smartphone though, where slim form factors are important.

IV. SYSTEM DESIGN

Voice based email system is system in which information is exchanged in speech format. The systems require use of keyboard which is very difficult for blind people to recognize and remember characters of keyboard. Also, a trainer is required to access mails each time. We are developing an e-mail system for blinds and handicapped people for efficient and independent use. The blind people cannot read the information and cannot view the mouse cursor to give command to the computer, thus our system makes this task easier to access mails only by providing voice commands to it. It manages voice and e-mail messages from your PC via messaging and also accesses all critical communications from a single screen.

1. **Working System:** We are going to develop an information retrieval toolkit for the blind and then transform the information into a voice so that they can hear the message and access the mail easily. We are searching for without a browser and how we are going to access the mail without the use of keyboard or mouse.

2. **Easiness in Modification of Data:** The proposed system provides managing of huge data effectively and efficiently for efficient results, storing the information of the users etc. in such a way that the database can be modified.

3. **User Friendly:** The proposed system is user friendly because the retrieval and storing of data is fast and data is maintained efficiently. Moreover the graphical user interface is provided in the proposed system, which provides user to deal with the system very easily.

4. **Mails are Easily Sent:** Mails can be easily sent in a proposed system. So any type of sent can be generated in a proposed system, which helps the users in a fast access.

This system is developed by us. The working of each developed module is as follows.

Registration:

This is the first module of the system. Any user who wishes to use the system should first register to obtain username and password. This module will collect complete information of the user by prompting the user as to what details needs to be entered. The user will need to speak up the details to which the system will again confirm by prompting alphabetically. The user also needs to give its biometric authentication by placing his finger on the finger print sensor. If the informatio-
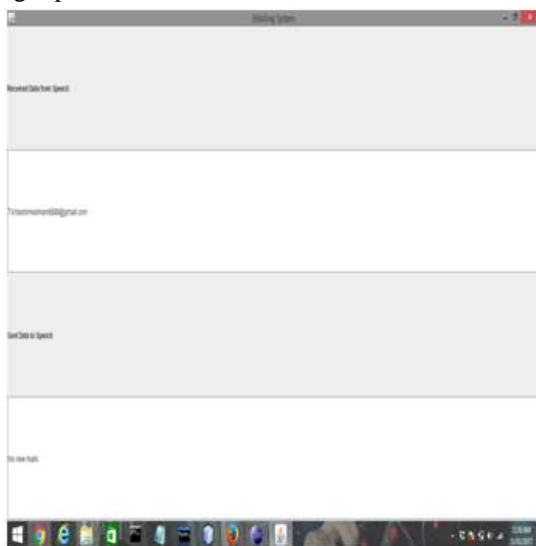

Fig . Registration page

-n is not correct user can re-enter else the prompt will specify the operation to be performed to confirm. After the successful registration of the user the system will acknowledge the user about the status.

Login:

Once the registration is done the user can login to the system. As the system first checks that the user is registered or not, user can login from the same page. This module will

ask the user to provide the username and password. This will be accepted in speech. Speech conversion will be done to text and user will be told to validate whether the details are entered correctly or not. The user also need to place his finger on the finger print sensor to give its authentication. Once the entry is done correctly database will be checked for entry. The system will also check for the proper finger print authentication. If the user is authorized it will be directed to homepage.

Inbox:

This option helps the user view all the mails that has been received to their account. The user can listen to mails they wants to by performing the click operation specified by the prompt. In order to navigate through different mails prompt will specify which operations to perform. Each time the mail is selected the user will be prompted as whom the sender is and what is the subject of that particular mail. The system will read the complete mail along with email id
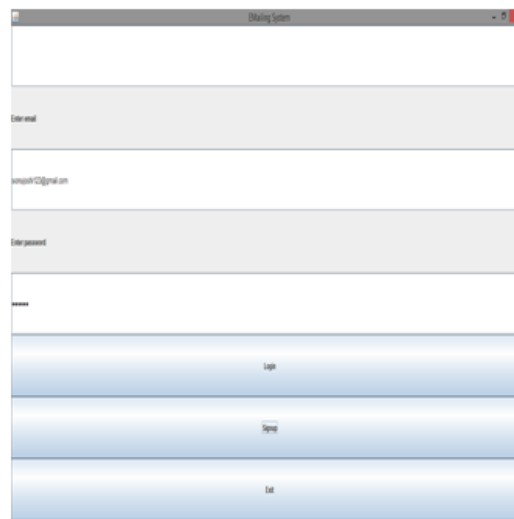

Fig . Inbox

if sender and also the information about the mail i.e. time, date etc of the mail.

Voice Input Through Mobile Device:

While giving input to the system Android mobile phones are used. If user gives the voice input directly to the system the accuracy level is too low so here mobile phones are used. For giving voice input through mobile first we need to create APK file of the system and that file is installed in mobile phone. After installing that file user can use the application for giving voice inputs to the system. The application is shown in figure below.
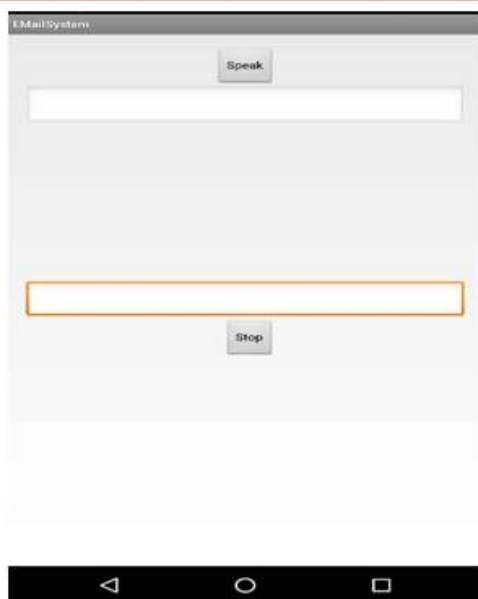
Figure: Mobile Application

Whenever the system asks for any input from the user, the user just needs to click on the speak button shown in the above screenshot. When the user clicks on the speak button a Google speech to text service gets opened as shown in the screen shot below and the user gives the required details and the user gives the input in the form of voice then the speech to text conversion takes place. As shown in above figure user have to speak through android mobile phone using the application. When the user clicks on the speak button the Google speech to text popup gets displayed and then the user
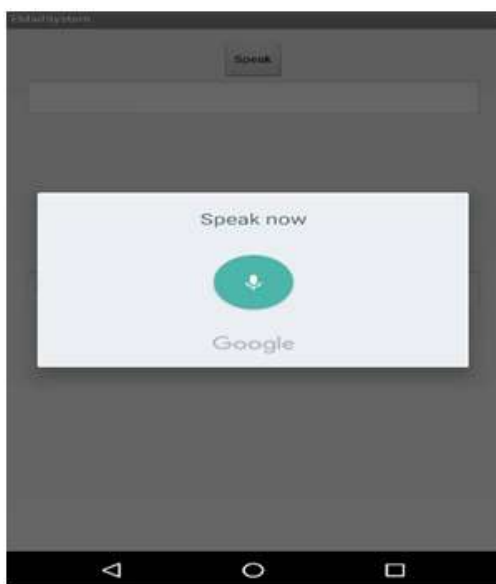

Figure : Mobile Application

can start speaking i.e. giving the details to the system in the form of voice .When user speaks it get converted into text and entered in the required field in the system as the system. The android mobile is connected to the system by using wifi connection.

The parameters used for the comparison between the Normal Email Application and
the Email Application based on Voice are:

- Users: The type of the people that can use the system.
- Security: The security system used in the application.
- Interface: The type of the interface used in the system for giving inputs to the system.

Parameter	Normal Email Application	Email Application based on voice
USERS	Existing Systems cannot be used by Blind people.	Proposed system allows blind people to use Email system easily.
SECURITY	This system is less Secure than proposed system as only single security is provided i.e. password.	Here in this system as Finger Print Scanner is used along with password, this system is more secure.
INTERFACE	For giving input here keyboard and mouse are used so user should have knowledge about the keys present on keyboard.	For input no use of keyboard and mouse so user can easily give input by speaking the message.

Table : Comparison between Normal Email Application and Email Application based on Voice

The accuracy of optical finger print sensor depends upon the different factors such
as resolution and the size of the sensing area. The more the size of the sensing area
and the resolution of the scanned area the more is the accuracy of the finger print sensor. Also the accuracy of the finger print sensor depend on the neatness, contrast and geometric distortion. The protection of the data and the images exchanged between the sensor and the computer also affects the accuracy of the finger print sensor.

V. CONCLUSION

The given proposed system helps the visually impaired people to access email services efficiently as compared to

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the previous system. This system also helps in overcoming some drawbacks that were earlier faced by the blind people in accessing emails. The system also eliminates the concept of using keyboard shortcuts along with screen readers which will help reducing the cognitive load of remembering keyboard shortcuts. Also any naive user who does not know the location of keys on the keyboard need not worry as keyboard usage is eliminated. The use of the mouse is also eliminated. The user only needs to follow the instructions given by the system accordingly to get the respective services offered. Other than this the user might need to feed in information through voice inputs using the android mobile application when specified. A system also guarantee's the proper delivery of the Email from the sender to receiver and also read out the new mails whenever the user gets logged in.

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