Voice Based Message System Visually Impaired People

S. Shanmuga Priya
sshanmugap@newhorizonindia.edu
New Horizon College of Engineering, Bangalore, Karnataka

Latha K.
lekhanaram99@gmail.com
New Horizon College of Engineering, Bangalore, Karnataka

Nagesh S.
nageshsp143bagli@gmail.com
New Horizon College of Engineering, Bangalore, Karnataka

S. Sathish Kumar
1nh17cs114.sathishkumars@gmail.com
New Horizon College of Engineering, Bangalore, Karnataka

ABSTRACT

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 environment like, the screen readers have helped visually impaired people to access internet applications immensely. However, a large section of visually impaired people in different countries, in particular, the Indian sub-continent 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 voice message system architecture that can be used by a visually impaired person to access messages easily and efficiently. The contribution made by this research has enabled the visually impaired people to send and receive voice-based messages in their native language with the help of a mobile device. Our proposed system GUI has been evaluated against the GUI of a traditional message server. We found that our proposed architecture performs much better than that of the existing GUIS. In this project, we use voice to text and text to voice technique access for visually impaired people. This project introduces the Voice based message system structural design that can be used by a visually impaired person to access messaging easily. The involvement of research is helping visually impaired individual to send and receive voice-based messages in their inhabitant language with the help of a computer.

Keywords— Voice Based, Visually Impaired, Message System, Speech to Text, Text to Speech, Interactive Voice Response and Speech Recognition

1. INTRODUCTION

In today's world communication has become so easy due to integration of communication technologies with internet. However, the visually challenged people find it very difficult to utilize this technology because of the fact that using them requires visual perception.

Even though many new advancements have been implemented to help them use the computers efficiently no naïve user who is visually challenged can use this technology as efficiently as a normal naïve user can do that is unlike normal users, they require some practice for using the available technologies.

This paper aims at developing a message system that will help even a naïve visually impaired person to use the services for communication without previous 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.

This architecture will also reduce cognitive load taken by the visually impaired people to remember and type characters using the keyboard. It also helps handicapped and illiterate people.

2. PROBLEM DEFINITION

A visually impaired people person can access messages easily and efficiently, it is a computer-based system that allows users to exchange messages through voice recognition, the application will be a python-based application for visually challenged persons using IVR- Interactive voice response.

The main advantage of this system is that use of keyboard is completely eliminated, the user will have to respond through voice only.

1. Authentication

It is an optional package (standard extension) for reading, composing, and sending electronic messages. Simple Message Transfer Protocol (SMTP) is used when   message   is delivered from a message client to a message server or when message is delivered from one message server to another. Post

Office Protocol (POP) allows a client to download a message from server. Internet Message Access Protocol (IMAP) is an Internet standard protocol used by message clients to retrieve messages from a message server over a TCP/IP connection.

2. Navigation

Here, the user will have to use certain keywords which will perform certain actions. The keywords like: Compose, Received Message, Sent Message, and Go Back.

3. Speech to text (STT)

Here whatever we speak is converted to text. Their will a small icon of microphone on who's clicking the user had to speak and the speech will be converted to text format.

4. Text to speech (TTS):

Here the method is full opposite of STT. This method, converts the text format of the messages to synthesized speech.

3. OBJECTIVES

This project aims at developing a message system that will help even a naïve, visually impaired person to use the services for communication without previous training.

The voice-based message for visually impaired people system can be used by a visually impaired people person to access messages easily and efficiently. Thus, reliance of visually impaired on other people for their activities related to messages can be reduced.

The main advantage of this system is that use of keyboard is completely eliminated, the user will have to respond through voice only.

This application provides a voice-based messaging service where they could read and send messages on their own, without any guidance.

The system does not require the use of keyboard. Instead, it will work only on mouse procedures and speech alteration to text.

Here, the users have to use certain keywords which will perform certain actions for e.g., Read, Send, New message, etc.

This application proposes an android application, designed specifically for visually impaired people.

4. EXISTING SYSTEM

In previous work, visually impaired people do not send message using the system. The multitude of message types along with the ability setting enables their use in nomadic daily contexts. But these messages are not useful in all types of people such as visually impaired people they can't send the message. Audio based message are only preferable for visually impaired peoples. They can easily respond to the audio instructions. In this system is very rare. So there is less chance to available this audio based message to the visually impaired people.

Disadvantages:

1. People facing some minor difficulties. Screen readers read out whatever content is there on the screen and to perform those actions the person will have to use keyboard shortcuts as mouse location cannot be traced by the screen readers
2. Screen readers read out the content in sequential manner and therefore user can make out the contents of the screen only if they are in basic HTML format.
3. Thus, the new advanced web pages which do not follow this paradigm in order to make the website more user-friendly only create extra hassles for these people.
4. All these are some drawbacks of the current system which we will overcome in the system we are developing.

5. PROPOSED SYSTEM

We describe the voice message system architecture that can be used by a visually impaired person to access messages easily and efficiently. Our proposed system GUI has been evaluated against the GUI of a traditional message server. We found that our proposed architecture performs much better than that of the existing GUIS.

The entire structure is based on IVR- interactive voice response. When using this system, the computer will prompt the client to perform precise operations to gain relevant services and if the client needs to way in the relevant services, then they need to perform that particular operation.

Advantages:

1. In contrast to present system which emphasize more on user easiness of naive users, this system focus more on user easiness of visually disabled people as well as uneducated people.
2. This system is that user will not need to use the keyboard. All operations will be based on voice proceedings.
3. This system will be perfectly accessible to all types of users as it is just based on simple mouse clicks and speech inputs and there is no need to remember keyboard shortcuts.
4. The visually impaired people can advance from Desktop application to the web-based application.

In this system, the pc is going to be prompting the user to perform specific operations to avail various services and if the user has to access the various services, then he/she has to perform that operation. Firstly, the user will have to register in application system through the registration form. The user goes to be assisted through voice commands whereas registering all the mandatory fields to be stuffed are going to be scan by website; once the user would speak it would get written automatically. After successfully registering, the user can log in by speaking the Username and Password when prompted by the system, this username and password will then be converted from speech to text and then the user will be authenticated by verifying the credentials with the database. Users can access various sections like Compose, Inbox, and Sent Messages after successful login.
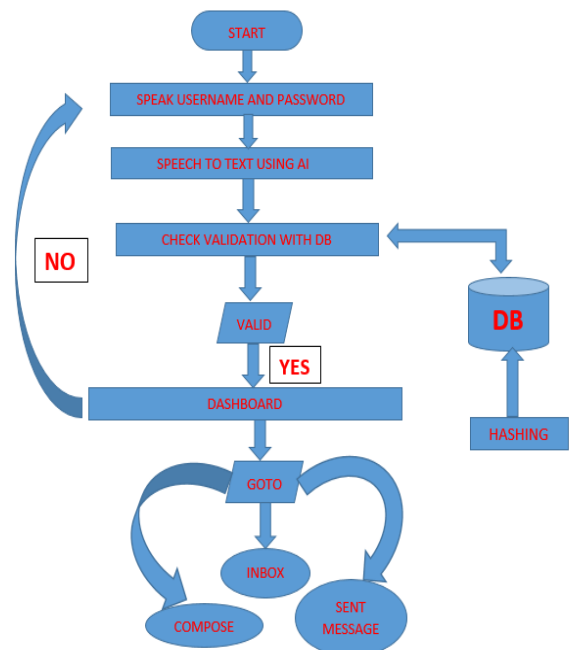
Fig. 1: Flow chart of User login and accessing system

6. SOFTWARE AND HARDWARE REQUIREMENTS

Hardware Requirements

1. Processor : Any Processor above 500 MHz

2. RAM   : 512Mb
3. Hard Disk   : 10 GB
4. Input device : Mouse and mic
5. Output device : Monitor and speaker

Software Requirements
Operating system   : Windows 10
1. Front End   : Python IDE
2. Data Base   : SQL Server Management Studio
3. Database Connectivity   : ODBC Sources

Tools Used
1. Python IDLE.
2. Interpreters for scripts.
3. Selenium Web driver in python.
4. Google Speech-to-text and text-to-speech Converters.
5. Pyttsx text to speech API in python

7. METHODOLOGY
In this system mainly four 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 user 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. Speech recognition: Speech recognition is the ability of a machine or program to identify words and phrases in spoken language and convert them to a machine-readable format. Rudimentary speech recognition software has a limited vocabulary of words and phrases, and it may only identify these if they are spoken very clearly. This project is designed by dividing it into the following three phases:
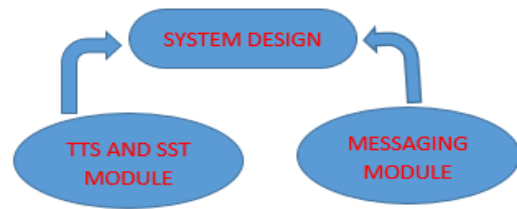
UI design
In this phase, the UI or the user interface of the project is developed. That is the designing of the web pages in which the user will use to interact. The user interface is designed using HTML5 and CSS3.

Database design
 Database is important in every project since it is responsible for storing of data and user credentials. That is, database mainly aims User authentication and storing all the user messages. The database design will include various tables' creation for storing messages.

System design
The system will consist all the modules such as: TTS (Text to Speech) and STT (Speech to Text) module, messaging programming module (Compose, Inbox, and Sent Message).

Fig. 2: System Design Modules

Message Programming Module
Message is appearing as one of the most valuable services on the internet today. Many of the internet systems use SMTP as a method to transfer mail from one user to another. SMTP is a sending protocol and is used to send the mail while POP (post office protocol) or IMAP (internet message access protocol) are used to retrieve those messages at the receiver's side**.**
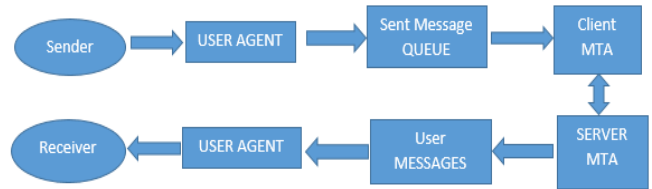
Fig. 3: Model of SMTP system

Sending Messages
When a message is distributed across, it will contain certain things like header and its own body. A sequence of responses requested message is line up between shopper and server in sending a message. How header and body are differing from each other, header will terminate when a null line is in it. The message body contain the particular data browse by receipt. In body every data is taken after null line. Receiving Message: In a specific time, interval user agent at server aspect checks message boxes. If in this time during any data receive it alert the user immediately.

8. ACKNOWLEGDEMENT

9. FUTURE WORK
For people who can see, messaging 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 message system has great application as it is used by visually impaired 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.

The major drawbacks of the application can be used as the future enhancements for this project. There are two major drawbacks in this application i.e.., the exact voice recognition and the image or document attachment. So in the future enhancement, we can add the image or document attachment for the sender.

10. CONCLUSION

This message system can be used by any user of any age group with ease of access. It has the feature of speech to text as well as text to speech with speech reader which makes designed a system to be handled by a visually impaired person as well as visually impaired people.

This system will help in overcoming some drawbacks that were earlier faced by the visually impaired people in accessing message system.

We have eliminated 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.

11. REFERENCES

[1] Jagtap Nilesh, Pawan Alai, Chavhan Swapnil and Bendre "voice-based system in desktop and mobile devices for visually impaired people". In international journal of emerging technology and advanced engineering (IJETAE), 2014

[2] Ummuhanysifa U., Nizar Banu P K, "voice-based search engine and web page reader". In international journal of computational engineering research (ijcer).

[3] T.shabana, A.Anam, a.rafiya3, K.Aisha, "voice based email system for visually impaired".

[4] Arjunaj, "voice-based email for visually impaired", http://www.slideshare.net/123arjun1/voicebased-email-for-visually impaired.

[5] c. Kang, h. Jo and b. Kim, "a machine-to-machine based intelligent walking assistance system for visually impaired person", the journal of Kics, vol. 36, no. 3, (2011).

[6] Voice Based System in Desktop and Mobile Devices for visually impaired People". In International Journal of Emerging Technology and Advanced Engineering (IJETAE), 2014.

[7] Voice Based Search Engine and Web page Reader". In International Journal of Computational Engineering Research.