
Voice Based Email System for Blind People using Speech Recognition Technology

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Abstract

This paper presents the Internet is considering as an important information repository now. Without it no single work is possible. It is even regarded as one of the de facto techniques that are used in transmission. In the enterprise world, including all the forms of communication particularly the Email is most common form. But all people can not use the internet. Because you need to know what's on the screen to access the internet. It doesn't matter if you don't see it. That leads to making the internet as not useful technology for blind and uneducated people. The currently available structure, such as TTS and ASR screen readers, do not allow visually impaired people to use the Internet efficiently enough. With around 285 million people with visual impairments worldwide, they need access to the Internet to communicate.

Keywords

Voice Based Email, Speech Recognition, Blind People, TTS, ASR, Visually Impaired

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1. Introduction

The Internet is considering as an important information repository now. Without it no single work is possible. It is even regarded as one of the de facto techniques that are used in transmission. In the enterprise world, including all the forms of communication particularly the Email is most common form. But all people can not use the internet^[1].

Because you need to know what's on the screen to access the internet. It doesn't matter if you don't see it. That leads to making the internet as not useful technology for blind and uneducated people. The currently available structure, such as TTS and ASR screen readers, do not allow visually impaired people to use the Internet efficiently enough^[2]. With around 285 million people with visual impairments worldwide, they need access to the Internet to communicate. So I came up with a project to develop a voicemail system that would make email easier to use for people who are not familiar with computer systems and are visually impaired. We don't require to know the fundamental knowledge about key combinations or locations^[3]. The process is based on mouse click operation, creating it easy for all kinds of people. Users also don't have to remember which mouse click action they need to perform to get a particular service, as the system dictates which click will lead to which action.

1.1 Motivation

Email has completely replaced texting and has become a common way of communicating with each other. Even after social media and other technologies are available today but the internet is still the common style in communication. One of its main drawbacks is that you must have visual ability to receive and access e-mail, or any page on the Internet in general^[4].

The technology is useless because blind people cannot in any way take advantage of the benefits the Internet has to offer.

1.2 Problem Definition

The Internet has created the life of individuals comfortable by providing information entry, contact with others, expand a business. To communicate over the internet E-mail is supposed to be the most good way to send and receive sensitive data. There are certain standards for people to access the Internet, and those standards have to be visible^[5]. However, there are people who are blind or blind, unable to use technology because they cannot see anything. So we came up with this project idea to improve society and give equal status to those with such special abilities^[6].

1.3 Objective of Project

This project aims to create an email system that allows naive and visually impaired people to utilize the facilities of communicating and no need of prior teaching. There is no need of typing. It functions only with mouse manipulation and voice to text.

1.4 Limitation of Project

It become tough for blind individualsto access E-Mail since the screen reader is having a loud audio interface. The automatic Speech recognizer routine degrades if it includes a loud environment.

1.5 Existing System

Usually, email is sent by seeing the screen and typing the message and other necessary details or by entering details in smartphone, audio devices, making them unsuitable for the visually impaired. In addition, there are various existing search engines that accept requests in text form from users, retrieve relevant documents from the server for a response, and display them as text, which is almost impossible for the visually impaired.

1.6 Disadvantages of Existing System

- Mainly designed normal people with vision.
- Cannot be used by differently abled people with bad vision.
- Cannot be used by differently abled people with physical issues.

1.7 Proposed System

To develop a system which can listen and understand the voice of user which will enable him/her to send emails just through his voice. An interactive Website will be made with Voice Assistant Accessibility which will enable a visually impaired person to send and read emails.

1.8 Advantages of Proposed System

- Designed to enable differently able people for sending mail.
- Can be used by differently abled people with bad vision.
- Can be used by differently abled people with physical issues.
- Use of ML Technology for betterment of society.

1.9 System Configuration

Software Requirement

- OS: Windows 10
- Language: Python 3.6 or Above
- IDE: VS Code

Hardware Requirement

- Processor: i3 or above
- Storage: 120 GB or Above
- RAM: 8GB or Above

Literature Survey

Efficient Email System for Visionless People using Automated Speech Recognition

<https://www.irjet.net/archives/V7/i4/IRJET-V7I4711.pdf>

The Internet has evolved into a widely used benefit in today's day-to-day life. Every individual can access the internet for various needs like gaining knowledge, information, or for communication goals. The major quality of the internet in communication is the Email Method. It's more comfortable for us

to use the emailing system, but it is very tough for Blind people to do the identical. There are many other screen readers which allow them to read or compose their emails. This application allows them to achieve the main functions efficiently utilizing voice commands. The message comprises a voice recording attachment, and then it has been sent to the identified user. Through this, the sending and accepting of emails can be accomplished in any born language. This process will also assist in avoiding any in-between text adaptation problems.

Voice based e-mail System for Blinds

<https://www.arcjournals.org/pdfs/ijrscse/v3-i1/5.pdf>

The Internet has become one of the basic conveniences of everyday life. Everyone has access to a wide range of understanding by the technology. Visually impaired individuals, however, have difficulty retrieving the textual stuff. Advances between the computerized accessibility systems have needed up numerous opportunities for blind individuals around world.

Audio feedback-based virtual environments like screen reader have assisted Blind people to access internet applications immensely. Describes a voicemail system architecture, is utilized by the visually impaired people to send E-mail simple and efficiently. This research offering enabled a visually impaired person to use a computer to send voice-based e-mail messages in their born language with the aid of a computer.

Voice Based Email for Blind People

<https://www.ijariit.com/manuscripts/v3i3/V3I3-1462.pdf>

The improvement in computer-based accessible systems has opened up many routes for the visually impaired across a wide majority of the world. Audio feedback-based virtual domains like screen readers have enabled blind people to access internet applications significantly. However, a big selection of visually impaired individuals in other countries, in certain, the Indian subcontinent could not help much from such systems. This was mainly due to the disparity in the technology needed for Indian languages reached to those corresponding to other famous languages of the world. In this paper, we define the voicemail system architecture that can be used by a blind individual to access e-mails easily and efficiently. The donation made by this study has helped blind people to send and receive voice-based e-mail messages in their born language with the help of a mobile device. Our offered system GUI has been assessed against the GUI of a traditional mail server. We discovered that our proposed architecture performs much finer than that of the current GUIs. In this project, we use voice-to-text and text-to-voice techniques for entry for blind individuals.

Design

3.1 Architecture Diagram

3.1 Algorithms And Modules

Speech recognition

Voice popular library with support for multiple engines and APIs online and offline. Speech Engine/Help API:

- CMU Sphinx (works offline) • Google Speech Recognition • Google Cloud Speech API
- hit the snow • Popularity of Microsoft Bing Speech
- Houndify API

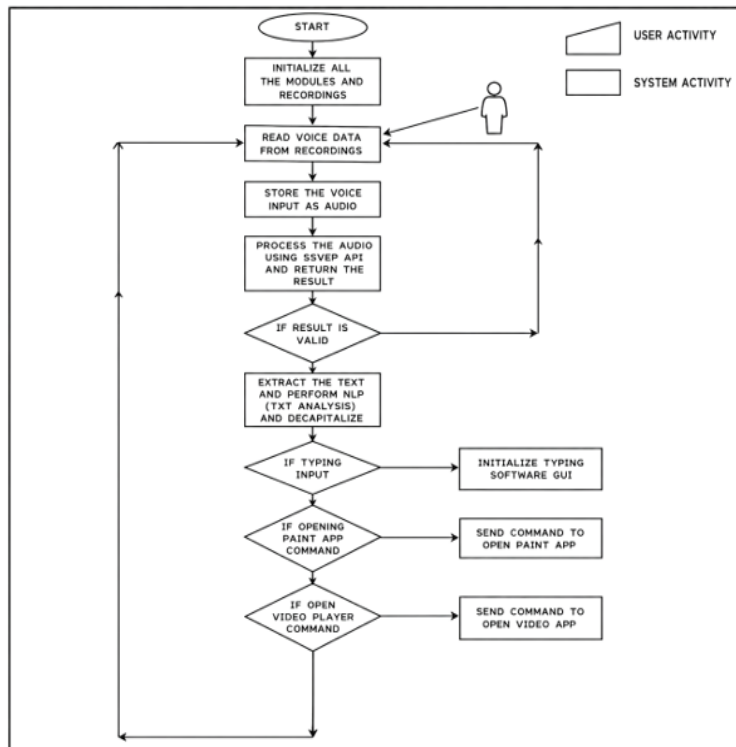


Figure 1. Flow Chart Of Use Login And Accessing system

- Convert IBM Speech to text content
- Snowboy hotword detection

Implementation

The design as currently being developed by us. Below are already developed modules. Their work is as follows.

A. Login:

This module asking us to enter a user name and password. It is taking orally. Your voice is converting into text and you are being asked to confirm that these information you gave is correct. If the entry is created correctly, it checks that the database exists. After verification, the user is redirected to the main page.

B. Main Page:

Users will be redirected to this page upon successful login. On this page, users can now do whatever they want. The following options are available:

1. Inbox

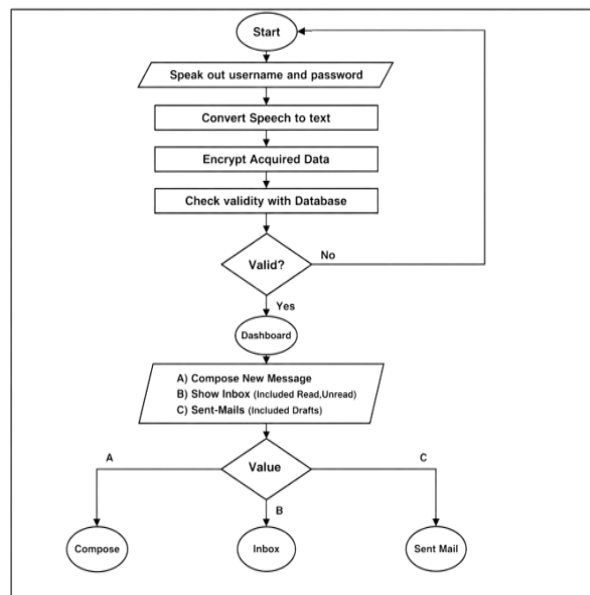


Figure 2. Architecture diagram

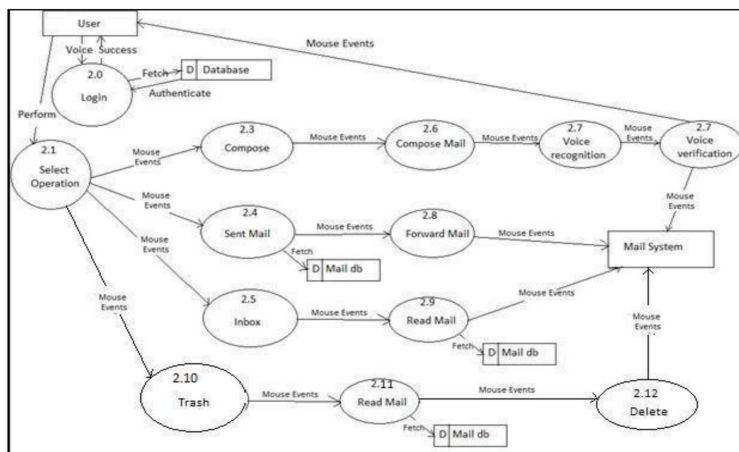


Figure 3. Flow diagram

2. Write
3. Transmitted
4. Garbage

Tooltips provide click-to-action actions to perform the following needed services. The event of clicking double right click is clearly reserved for log out whenever the user wants to. This is the first prompt you see after logging in. All of these features are being carried out. As a part of the delivered system, the below modules are comprised and carried out in the system. Here is a full description of this system.

C. Write a letter:

Here it is considered as one of the numerous significant possibilities supplied by mail assistance. The process of the mail generation parameters doesn't similar to the already delivered system. It completely eliminates the use of the keyboard, allowing you to compose emails only with the sound input and operation of mouse. The input in the form of typing is not necessary. You can directly record and send messages for distribution. This voice message is done in the form of stroking. Recipients can listen to the recording and receive messages they want to send. Users do not need to attach files. Recording options are provided in the message compose window itself. After the recording, make sure the recording is complete for you to listen and when you make sure it, it is accordingly get attached to an email.

D. Inbox:

Emails received to their account. Users can listen to the mail they want through the click operation specified in the tooltip. It tells you what to do to navigate to different mail prompts. Whenever a message is selected, the user is prompted to indicate who the subject of a particular email is. So the user can decide whether to read the letter or not. Deleted emails are stored in the Recycle Bin.

E. Sent Mail:

This option tracks all emails sent through the employer. If your users want to admittance these emails, this alternative suits your needs. To contact sent emails, users must follow the steps on condition through the prompts to traverse in the emails. When the control reaches a specific user, it asks who the recipient is and what the subject of the email is. This helps users to efficiently understand and extract the mail they need.

F. Garbage:

This option will track all emails deleted by the user. Deleted emails can be found in your inbox or Sent Mail. If users need to recover the deleted emails, this option is the way to go.

1.1 Python

Python is a universally useful decipherable, intuitive, object-oriented, high-level programming language. Python contains thousands of library files to help develop any application in a fast development way. Many companies use python as their main programming language because of its flexibility and ease of code, and there is plenty of help and community to make the app better day by day.

1.2 DJANGO

Django is a higher level Python that is mainly used in web application development, this framework has a lot of features and helps in developing clean code writing and many features of the python programming language can be used here.

D-jango provides the following architecture

Installation work

The installation work of python 3.6 and with it the installation of Pycharm IDE is shown in the following set of steps which needs to be followed to get the final execution environments.

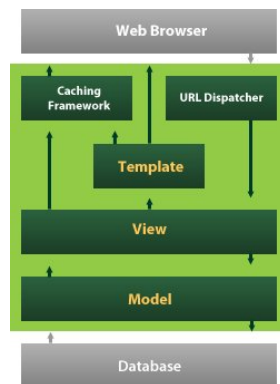


Figure 4. Django architecture layers

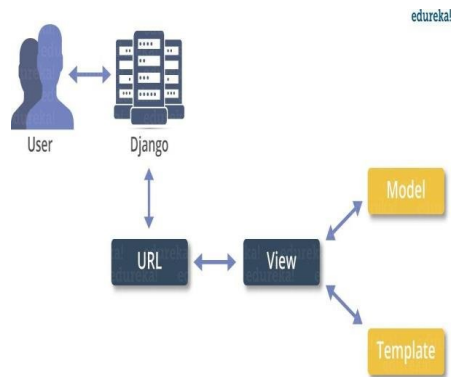


Figure 5. Django_Framework

Installing Python

Step 1) Need to download the python software from online provided by the concerned website and correct version downloading must be done.

Step 2) Then the installation process needs to be started by selecting the following option.

Step 3) Python installation process is started now.

Step 4) Needs to wait till the installation process is done and then cancel button needs to be pressed.

Installing Pycharm

Step 1) Next Pycharm IDE installation needs to be done, depending on the version needed for your computer correct ide must be downloaded.

Step 2) After downloading the IDE installation process needs to be started as shown in the following diagram.

Step 3) click the next to proceed further



Figure 6. Python_Links_Download

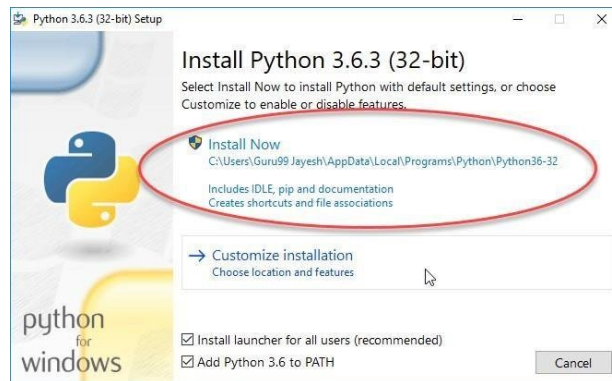


Figure 7. Installing_Python

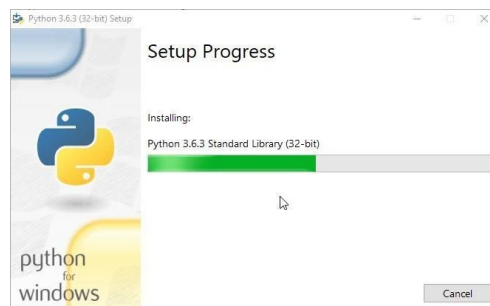


Figure 8. Installation_Process



Figure 9. Successfully installed

Download PyCharm

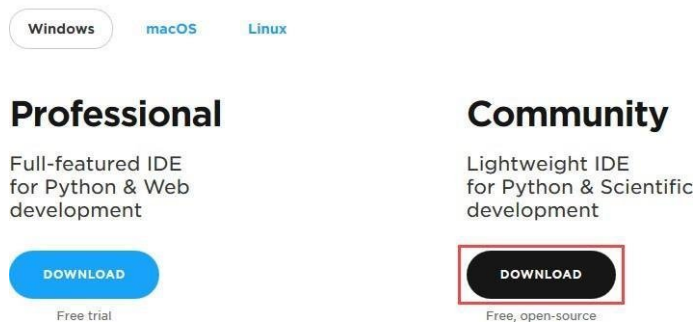


Figure 10. Pycharm.Download.screen

Step 4) Select the option depending on the requirements, as for our requirements we keep everything default.

Step 5) Choose the JetBrains option for the list of option given

Step 6) Installation is started and we must wait till the installation is completed

Step 7) After the installation process, there will be a screen showing that PyCharm is installed.

Step 8) Then after clicking the finish button Pycharm IDE is started.

1.1 HTML5

Html is a most useful computer language of today's world because in this digital world everything is happening in online mode, therefore everyone should know about html5 language.

Html is a markup language, called as Hyper text markup language. It is designed for making web pages and websites. It is useful for designing a website and text, images and videos and hyperlinks in web pages.

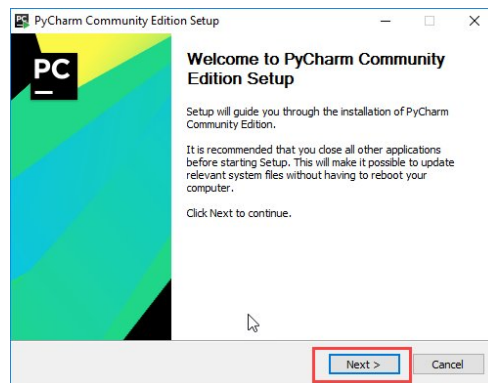


Figure 11. Starting_Pycharm_Installation

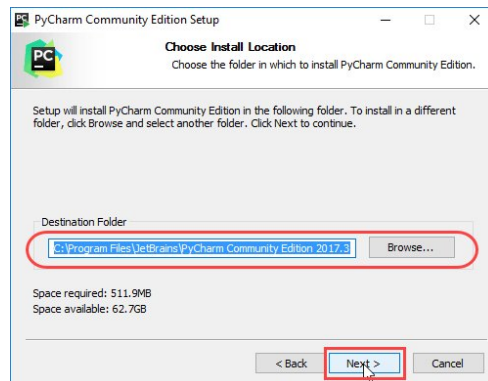


Figure 12. Choosing_Location

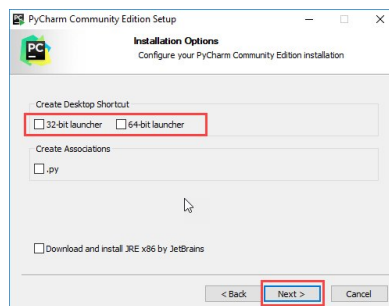


Figure 13. Choosing the bit of operating_system

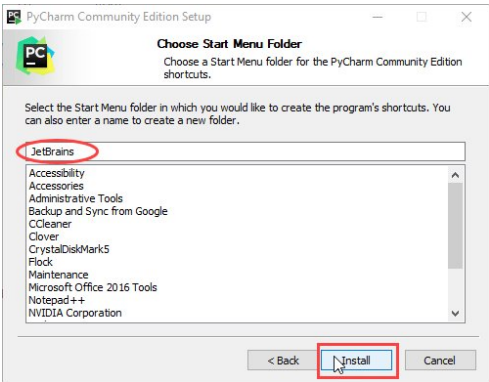


Figure 14. Version_choosing

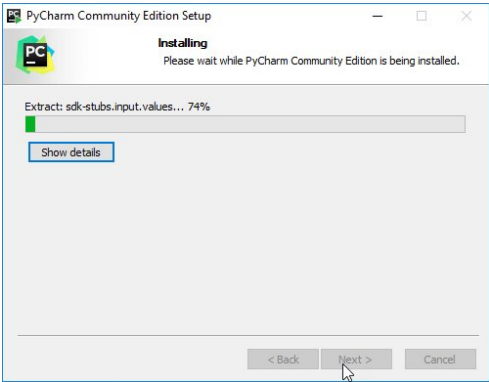


Figure 15. Installation_Process

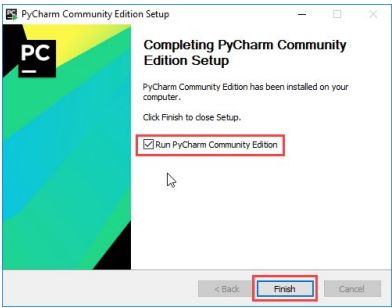


Figure 16. Installation_Done

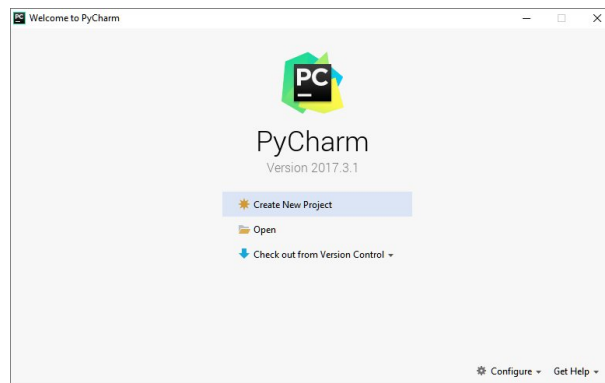


Figure 17. PyCharm Welcome screen

With the use of html language we try to make understand the web browsers of devices that how it should be look our web page informations to the users.

Html is made up of two words that is Hyper text and Markup language.



Figure 18. HTML5 logo

Hyper text joints the 2 web pages into a single text as when the user click on that text then it will take the user to the next page.

Markup language is used to make the structure of any web page, there are many tags present in this because of which the web pages are designed. And all the html tags are predefined.

Other than html there are many other languages are also markup languages like XHTML, XML but html is most useful language. And it is not case sensitive language.

Html is introduced by Tim Berners Lee(1980) in Geeneva. We use CSS(Cascading Style Sheet) for style and colors in web pages.

Html5 is the latest version and having more features and advanced teags than html. The tags and attributes in html can eassily add the audio,video,graphics in a web page.

Results and Analysis

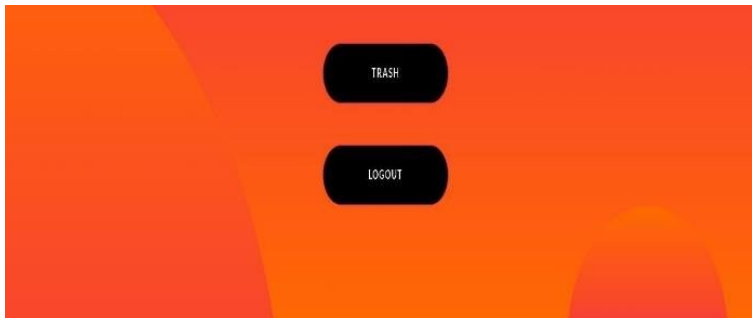


Figure 19. Snapshot of login credentials

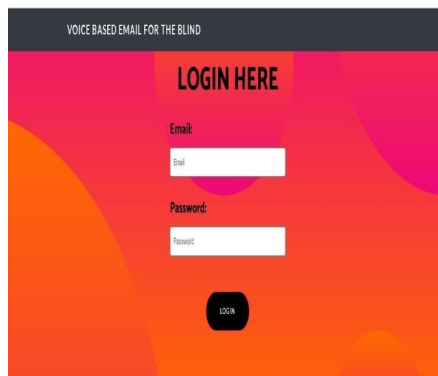


Figure 20. Snapshot of Menu Page (compose,inbox,sent)

Conclusion

To develop a system which can listen and understand the voice of user which will enable him/her to send emails just through his voice. An interactive Website will be made with Voice Assistant Accessibility which will enable a visually impaired person or even physically impaired person to send and read emails.

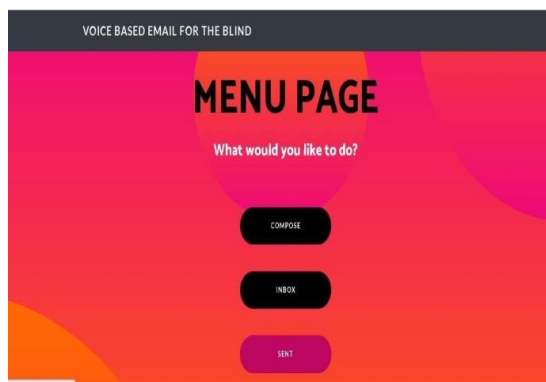


Figure 21. Snapshot of Menu Page (Trash,Logout)

Future Scope

There may be extensive possibilities of this machine many improvements may be completed within design inclusive of which include specific languages which includes capability of accessing the deleted mails and junk mail also this gadget can be more desirable such that it could additionally send attachments that are extra favourable for blind individuals this machine may be made available to all regional people who aren't knowledgeable enough. Furthermore, sign language systems can also be integrated with the system to create the system more scalable and powerful.

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