RAMAPURAM
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INSTITUTE OF SCIENCE & TECHNOLOGY
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Voice Based Email For Visually Challenged

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ABSTRACT

- Today, communication has become so easy due to integration of communication technologies with internet.
- Even with many advancements the visually challenged people find it very difficult to utilize this technology because of the fact that using them requires visual perception.
- The increased use of technology and it's limitless opportunities have made it inevitable for the present generations to apply the Internet technology to the fullest.
- Email being one of the most widely used features of the Internet, we aims to develop an email system that will help even a visually impaired person to use the services without previous training.
- The system will work based on speech and text conversion along with an interactive voice responsive system.
- 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.

EXISTING SYSTEM

- Email being most used form of communication - Estimated email users around 6 billion by the end of 2022.
- Visually Challenged people can not use the generic email system.
- The generic method email communication requires the visual sense to navigate through the UI.
- They do not provide any facility so that the person in front can hear out the content of the screen.
- External & Additional tools like Screen Readers are required which may question communication security at times.
- These screen readers also just read out all the things that is in the screen, and in order to navigate through them the person has to use keyboard & mouse or touch, this is would mean that a visually challenged person should be well versed with the keyboard layout, positions, shortcut and be able to track the mouse pointer, which realistically a visually impaired person might find it difficult and challenging to do so.
- No naïve visually challenge person would be confident enough to try and use the generic email system on their own.

DRAWBACKS OF EXISTING SYSTEM

- There is no voice command or sound system,
- Still the visually impaired person has to use the keyboard,
- It needs a lot of practice for them to use,
- Third person is sending mails behalf of them,
- There is no STT (speech to text), TTS (text to speech), or IVR (Interactive Voice Response).

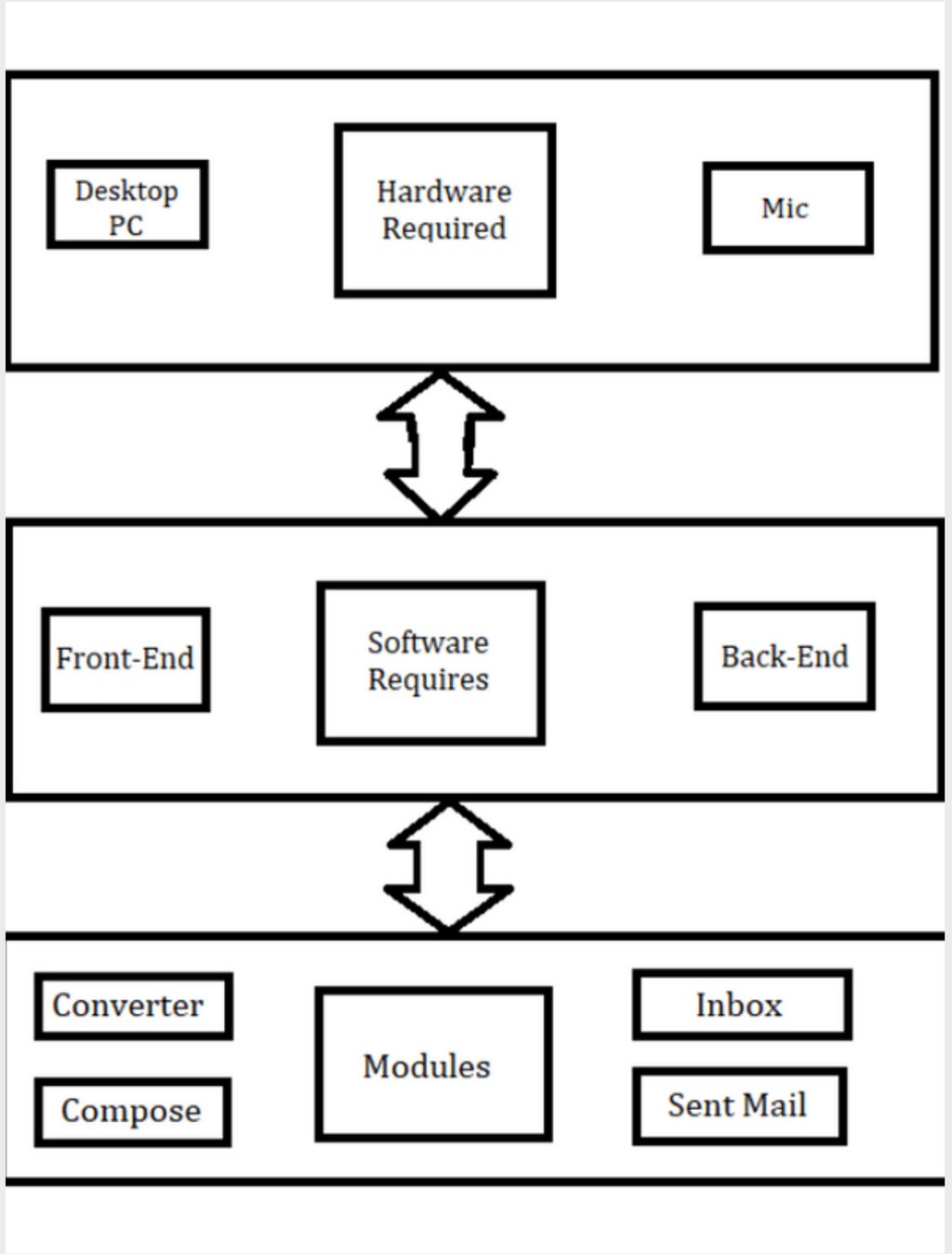
PROPOSED SYSTEM

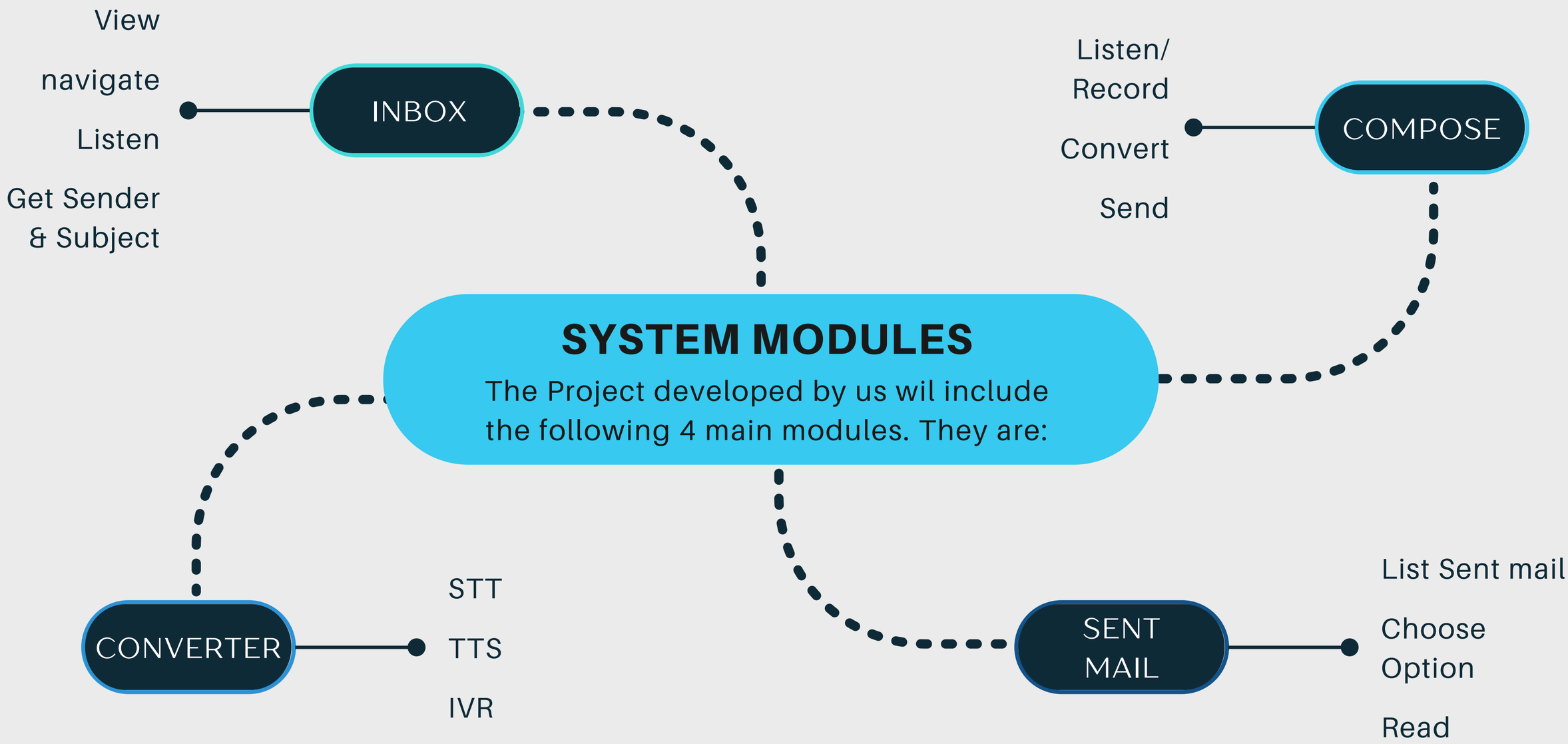
- Voice-based email system can be used by a visually challenged person to access e-mails easily and efficiently.
- This project will enabled the visually challenged people to send and receive voice-based e-mail messages at ease.
- In this system mainly three types of technologies are used namely:
- **STT (Speech-to-text):** here whatever we speak is converted to text.
- **TTS (text-to-speech):** this, method is full opposite of STT. In this method, which converts the text format of the emails to synthesized speech.
- **IVR (Interactive voice response):** IVR is an advanced technology that allows user to interact with an email system via certain commands, IVR systems generally respond with pre-recorded audio voice to further assist users on how to proceed.
- The system will prompt the user to perform respective operations through prompting.
- This system will be perfect for most the user as its based on voice, and in addition to that with the prompting, one need not remember the process every time and follow through the guide.

BENEFITS OF THE PROPOSED SYSTEM

- The disabilities of visually impaired and overcome. Makes them feel like normal user.
- IVR & prompting, provide no hassle guidance.
- They don't "necessarily" require any help.
- Can be implemented in different forms and places in the future.
- Eliminates keyboard- most complicated for Visually impaired
- Can be nearly used by every one.
- Even people who can not read and write can benefit from using this.
- Very useful for people with poor eyesight too.

OVERVIEW OF PROPOSED SYSTEM




View
navigate
Listen
Get Sender & Subject
INBOX
Listen/ Record
Convert
Send
COMPOSE
SYSTEM MODULES
The Project developed by us wil include the following 4 main modules. They are:
CONVERTER
STT
TTS
IVR
SENT MAIL
List Sent mail
Choose Option
Read

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 certain commands for the respective voice message.
- IVR allows user to interact with an email host system via a system certain commands, after that the 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. The audio that would be pre-recorded and the system need to have large volumes.

- TTS is a computer generated synthesised speech recognition that will help to covert the text to the speech by a system for a user
- STT is a process of converting the user's input (speech) to a text format for the system

SPEECH RECOGNITION

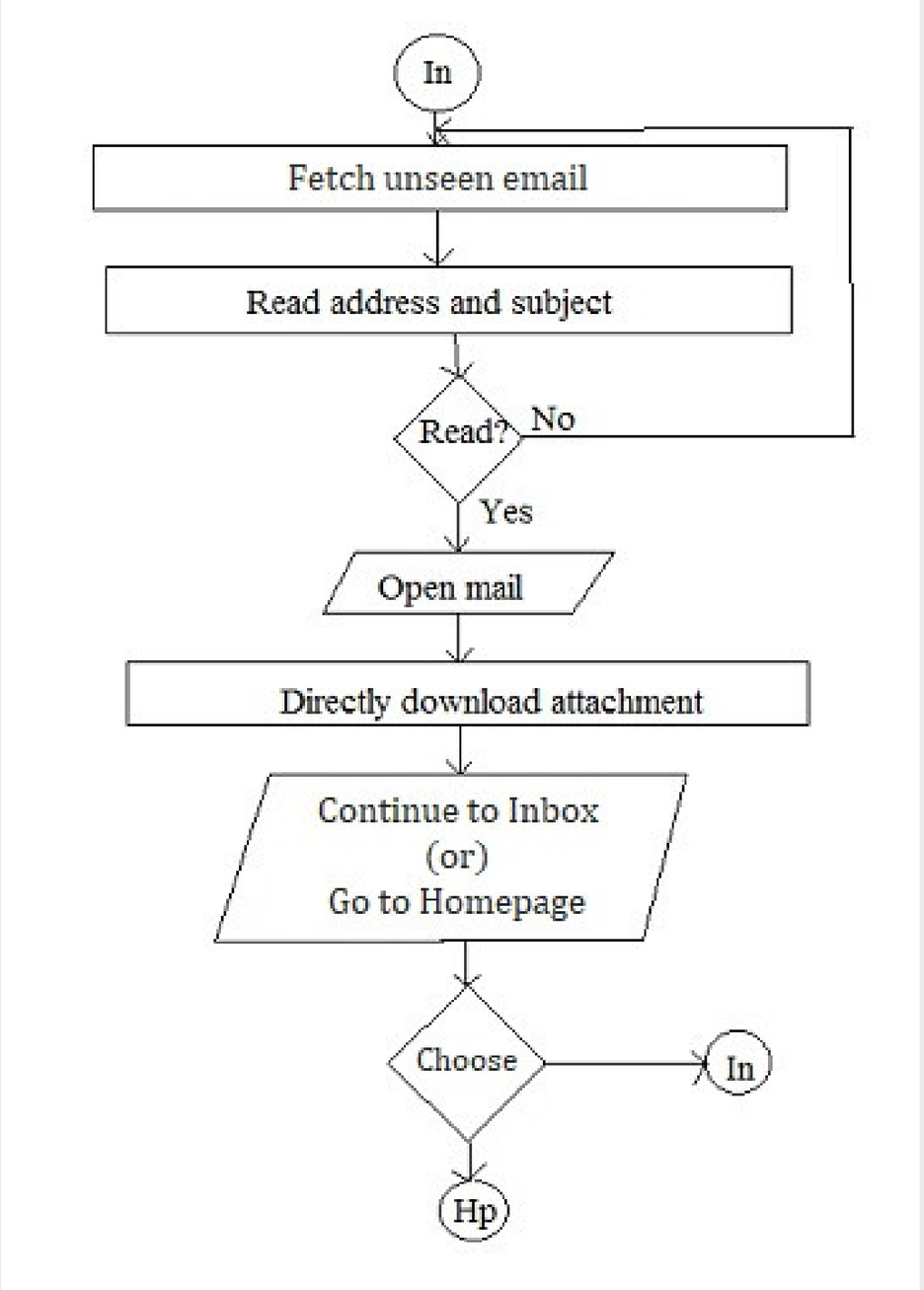
- SpeechRecognition is a library that acts as a wrapper for many popular speech APIs and is thus very flexible to use. One of these is the Google Web Speech API which supports a default API key that is hard coded into the SpeechRecognition library.

- It is also known as automatic speech recognition (ASR), computer speech recognition or speech to text (STT). It incorporates knowledge and research in the computer science, linguistics and computer engineering fields. The reverse process is speech synthesis. Some speech recognition systems require "training" (also called "enrollment") where an individual speaker reads text or isolated vocabulary into the system.

- A handful of packages for speech recognition exist on PyPI. A few of them include: Google-cloud-speech, Watson-developer-cloud, Pocketsphinx, Wit, Apiai, SpeechRecognition.

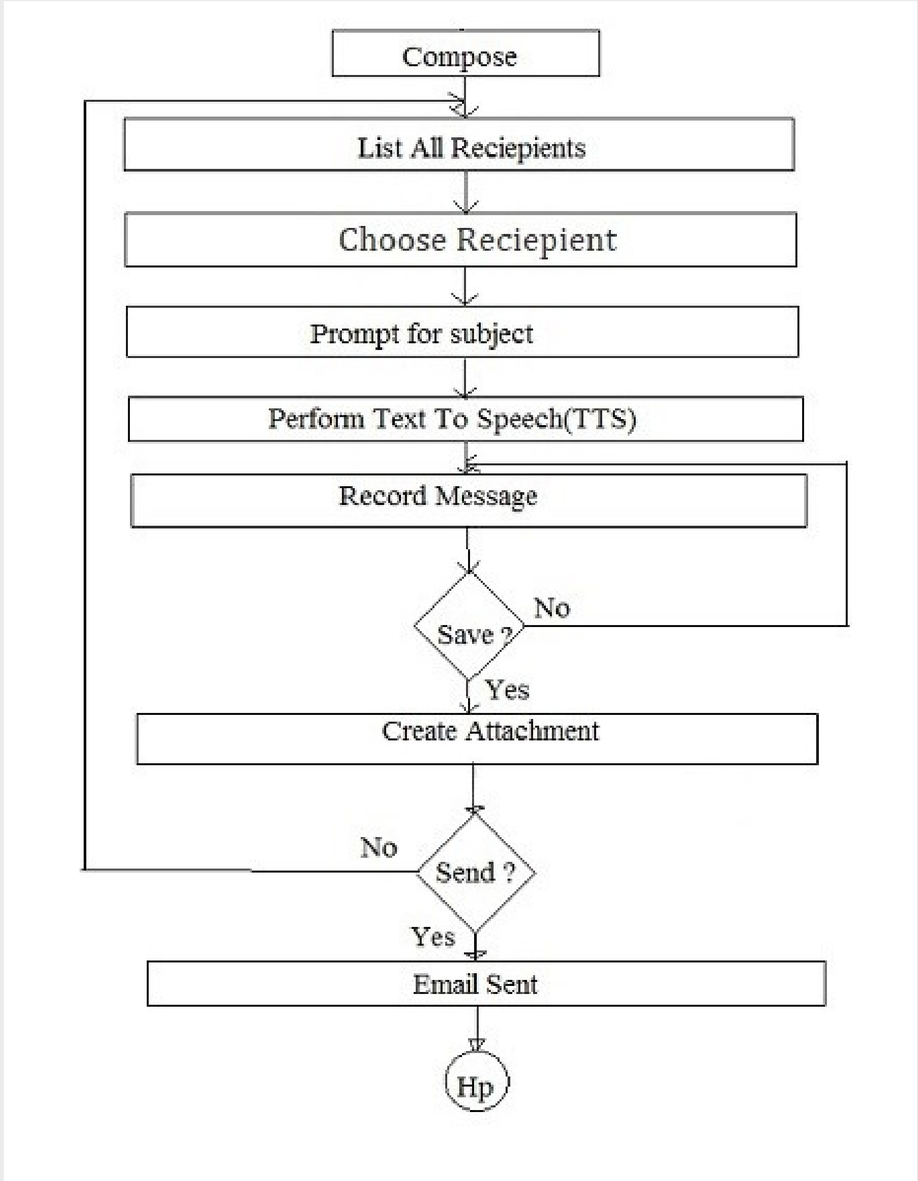
INBOX

- This option helps the user view all the mails that has been received to his/her account.
- The user can listen to mails he/she wants to by performing certain commands.
- 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.
- Accordingly user can decide whether the mail needs to be read or not.



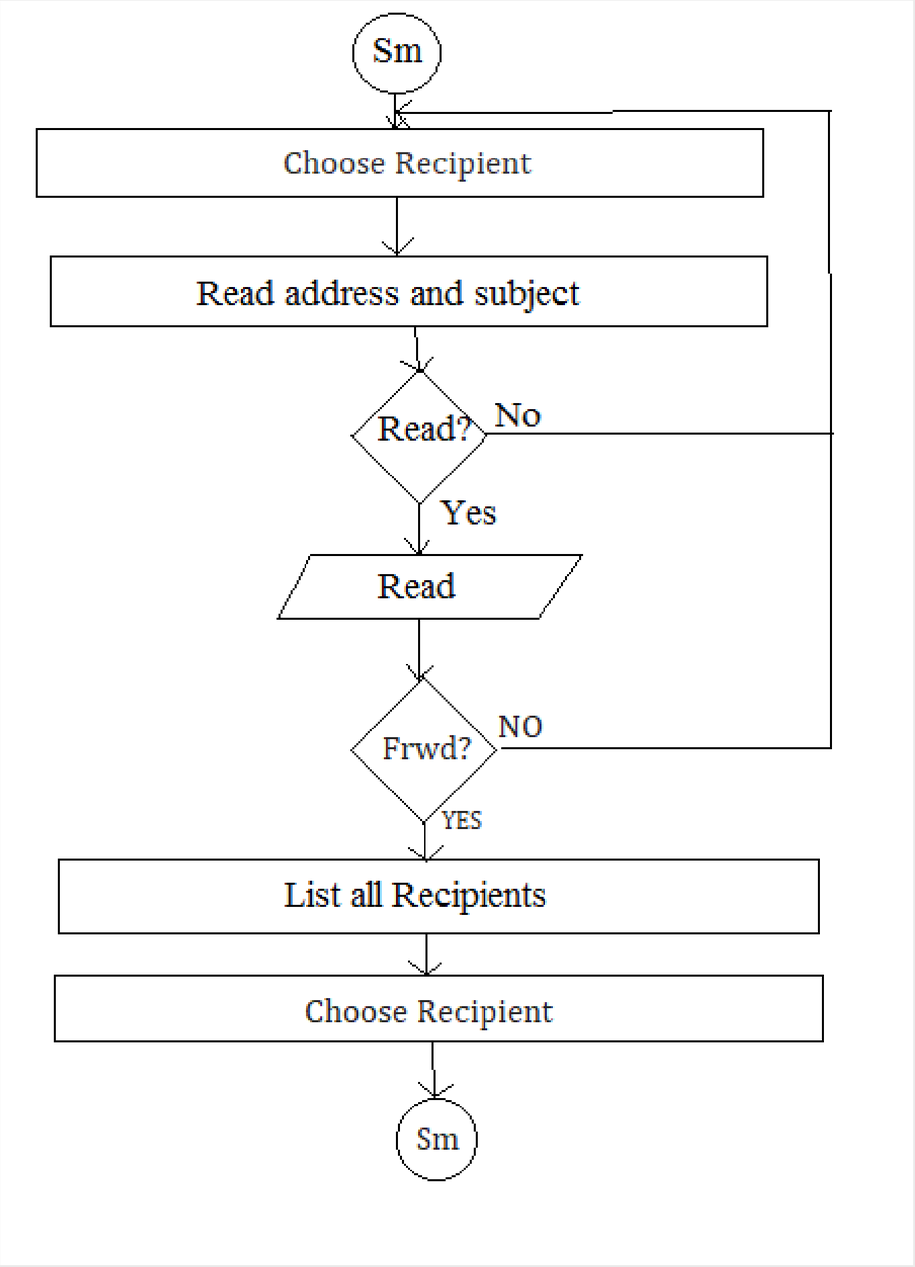
COMPOSE MAIL

- This is one of the most important options provided by the mail services.
- The functionality of compose mail option would not match the already existing mail system.
- Since the system is for visually challenged people and keyboard operations are completely avoided and composing mail would only be done through voice input.
- The user can hear the Prompt and compose the message they wanted to send.
- Once composed, the mail will be ready to send to a particular recipient.



SENT MAIL

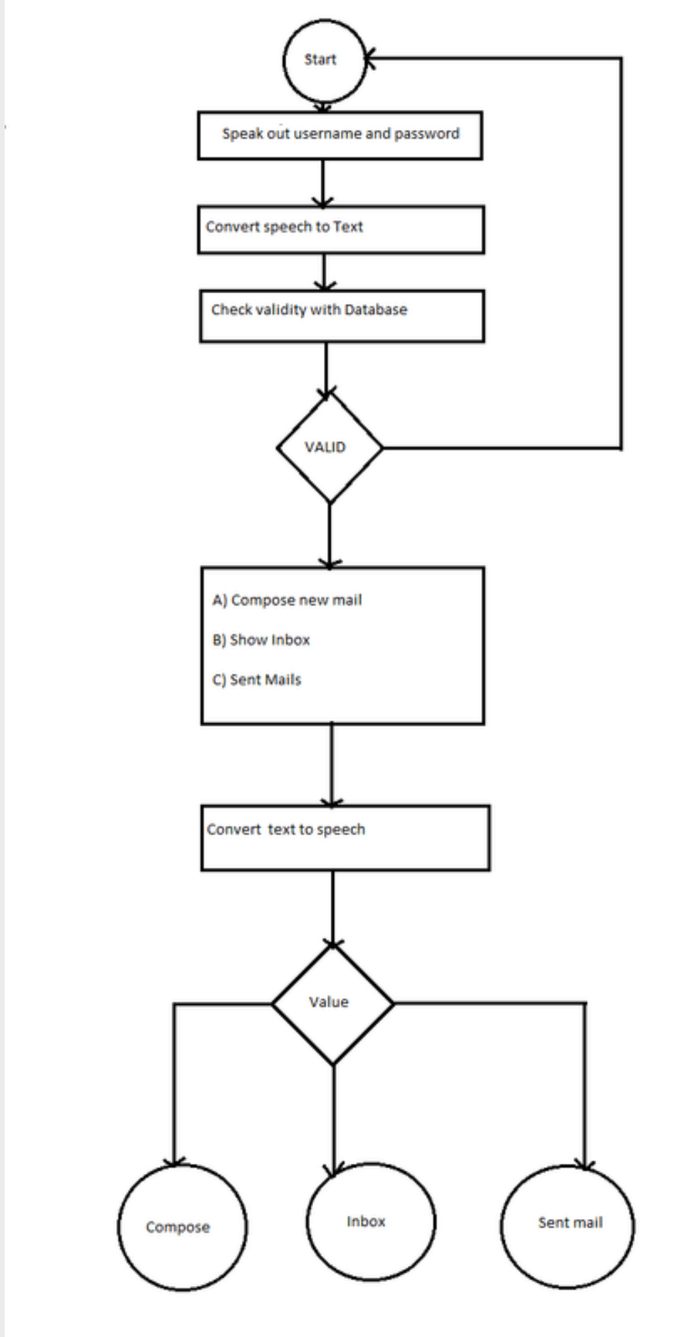
- This option will keep a track of all the mails sent by the user.
- If the user wants to access these mails, this option will provide them with their needs.
- In order to access the sent mails user will need to perform the actions provided by the prompt to navigate between mails.
- When trying to access particular mail user will be prompted as who the receiver was and what is the subject of the mail.
- This will help the user in efficiently understanding and extracting the required mail.



CONVERTOR

SPEECH-TO-TEXT

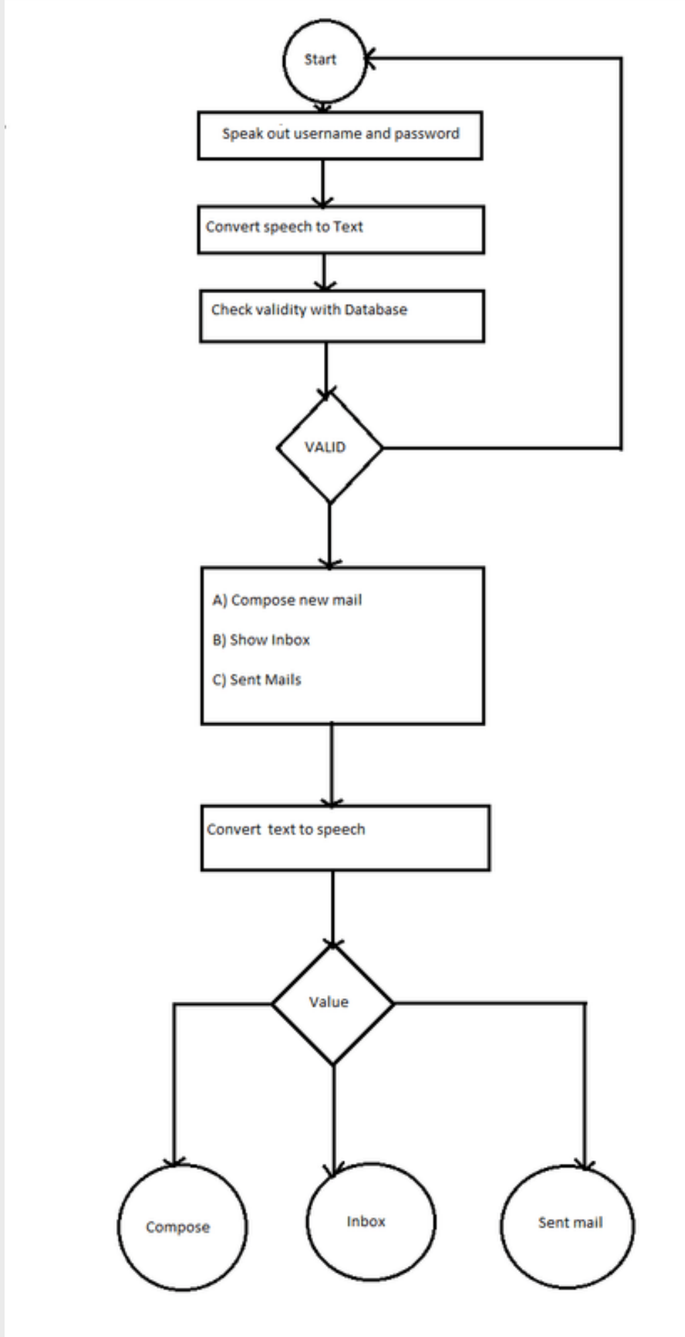
- Here, the speech is given as input using microphone and it processes the speech to identify the pronounced text.
- The output will be in the form of a text. So to convert a speech to a text there are various Libraries that can be used in python.
- In this phenomenon when the user gives the speech as the input, the system recognizes the speech and converts it into the text and asks verification.
- If everything is done and valid the user can send message by giving the appropriate command.



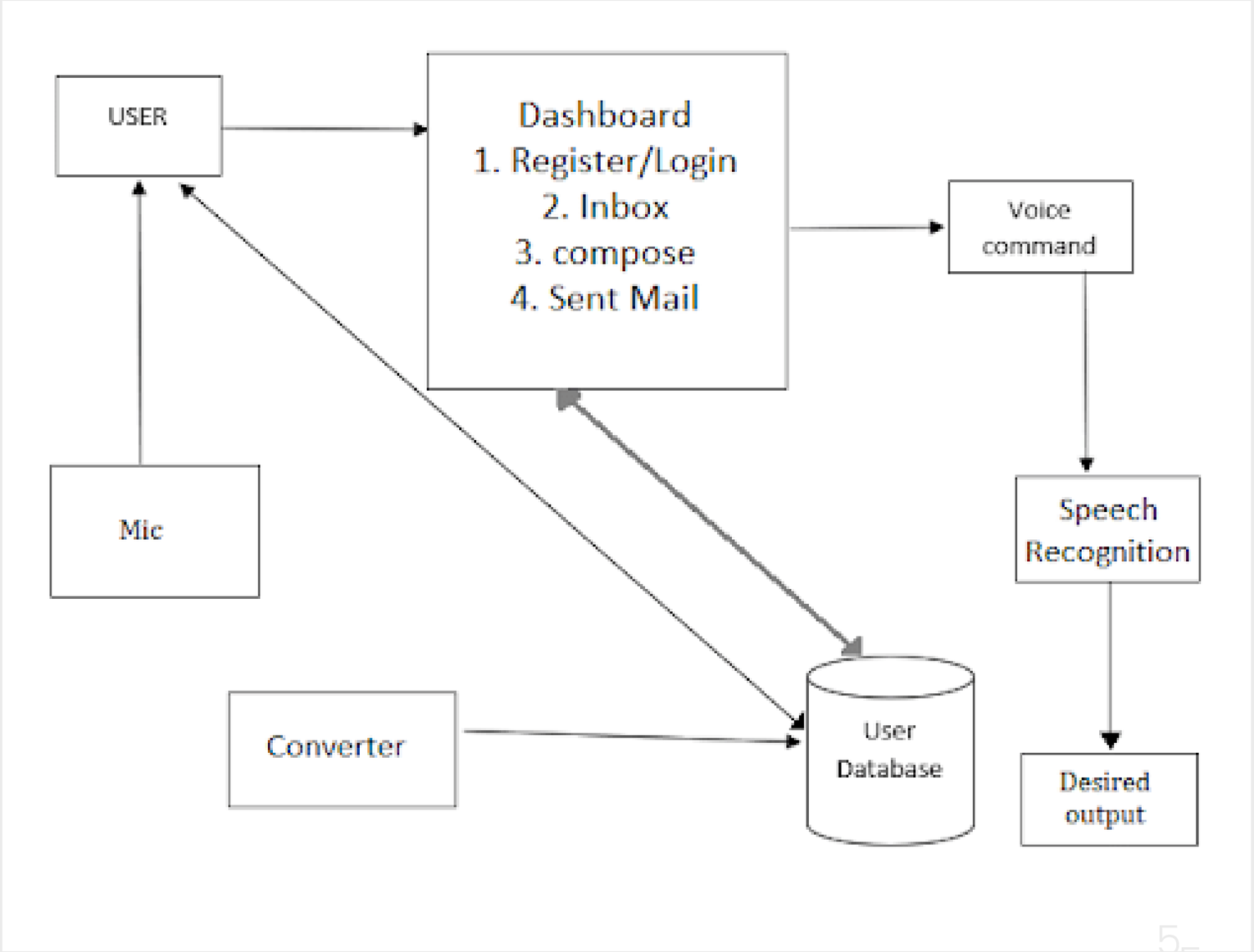
CONVERTOR

TEXT-TO-SPEECH

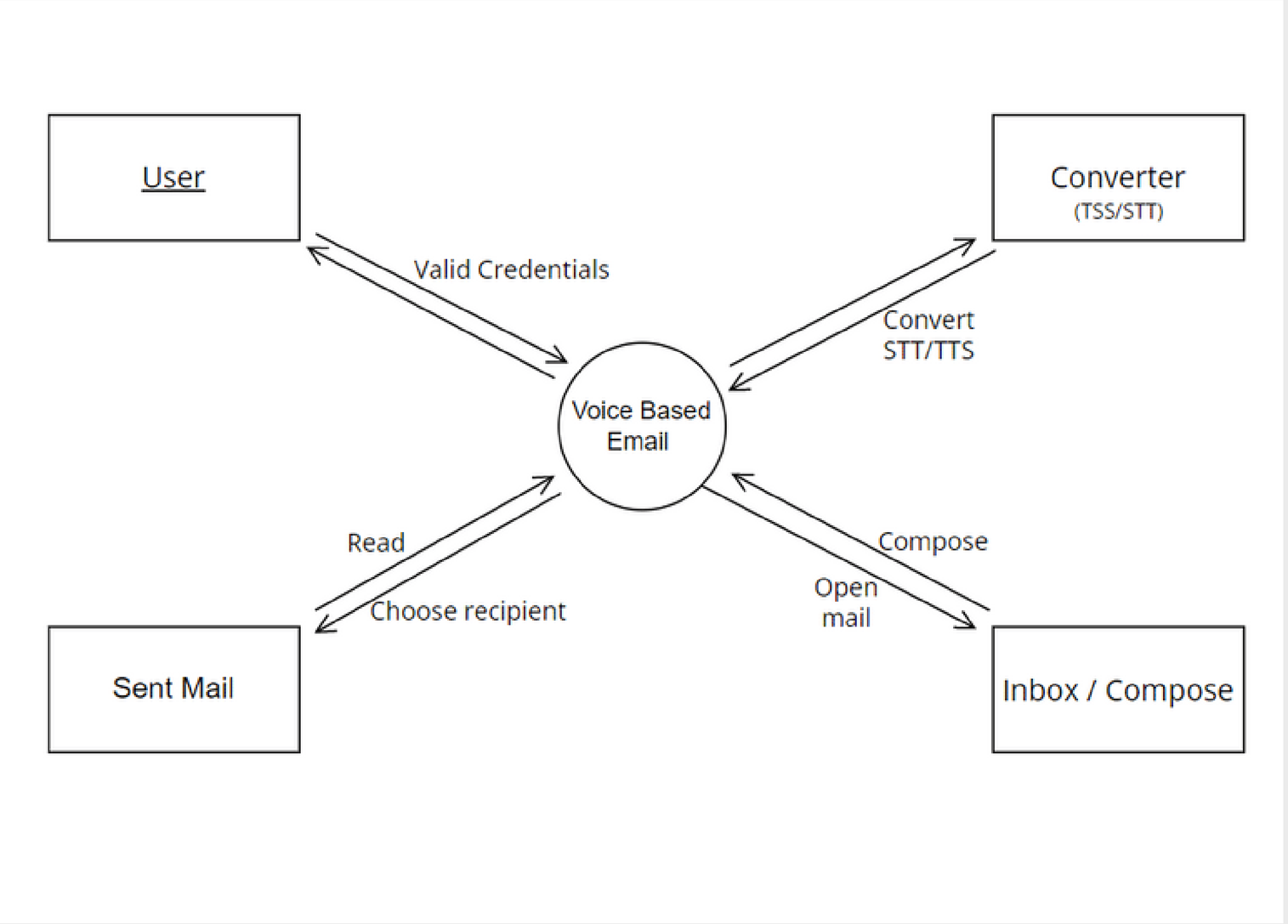
- Using techniques like speech synthesis the text can be converted into voice. In this text to speech converter the text is given as input and the speech will become as output.
- System includes reading messages in emails for visually challenged people. Although this is a difficult task this can be implemented by defining specific command.
- This accepts finite number of strings or characters and can read any text by recognizing the characters.
- It converts text to speech through which all sort of problems will be sorted for blind people.This mechanism helps the visually challenged people for communications.



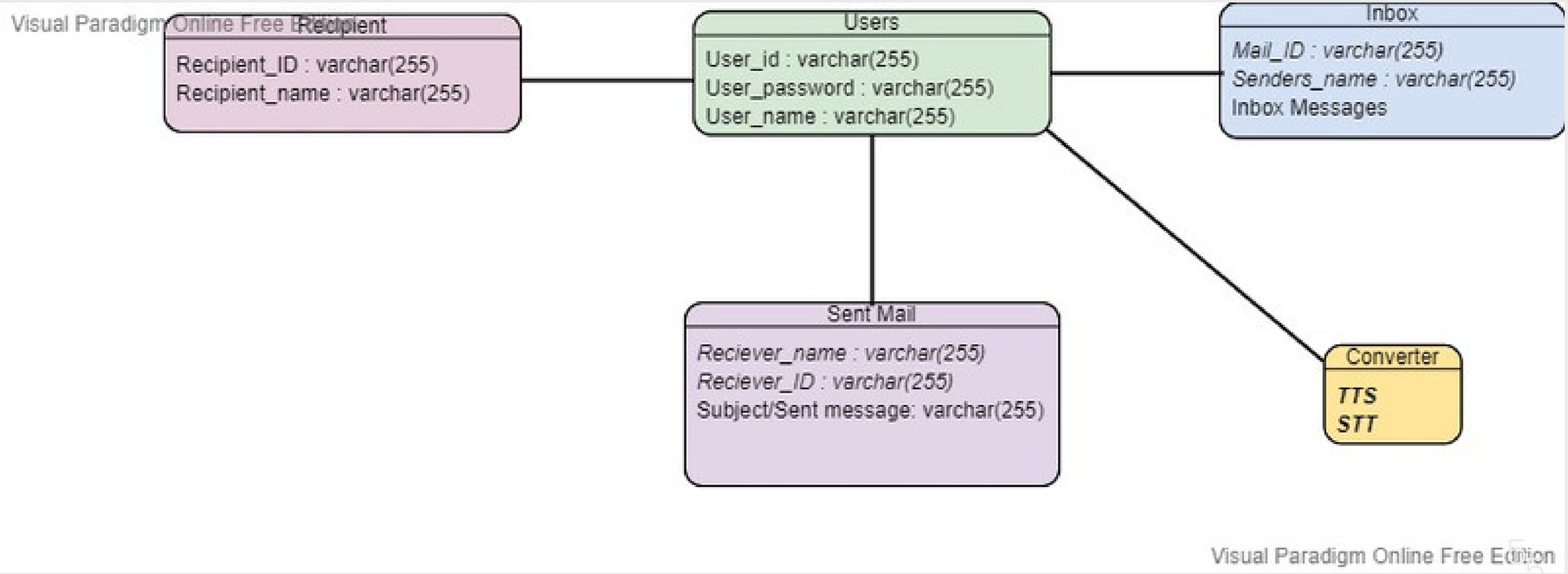
SYSTEM ARCHITECTURE



DATA FLOW DIAGRAM



DATABASE DESIGN



PROJECT DEMO

FUTURE ENHANCEMENT

- Currently available systems such as Screen readers, Text Notifiers, etc. also require some visual perception by disabled to create accounts and to use them.
- An interactive voice-based email system can help visually challenged to communicate easily in this modern world.
- Use of specifically designed sensors such as accelerometer, gyroscopes could get be embedded in many devices and smart phones as Micro Elements of Visually challenged.
- This system can be **upgraded to send an attachment.**
- It can be made **available to all the region's people**, and will continue to be available in **multiple languages.**
- Furthermore, the system **could employs sign language** and can be integrated into it.
- **intergerate with haptics & vibrations** motors and provide actual and physical feedback.
- Making it **completely autonomous.**
- From desktops. the application can also be **extended to work on mobile** phones.

CONCLUSION

On successful completion, This project will help not only the visually challenged but also other people who face problems accessing the email for communication. This will completely erase all the hurdles faced by the Visually impaired as it relies on IVR(Interactive Voice Response) and Voice commands. Here, we eliminate all sorts of physical input, as a result the user can send or receive email without any hassle and need not get the help of any third person.

Since the system uses only voice response, even a naive user or user without any previous experience can use this with ease. The system developed by us now works only on desktops. As use of mobile phones is emerging as a trend today, there is a scope to incorporate this facility as an application in mobile phones also. Also, security measures to be implemented during the login phase can be revised to make the system safer and reliable.

Thank you!