VOICE BASED EMAILS FOR VISUALLY CHALLENGED

A Project Report Submitted in the
Partial Fulfillment of the Requirements
for the Award of the Degree of

BACHELOR OF TECHNOLOGY

IN

COMPUTER SCIENCE AND ENGINEERING

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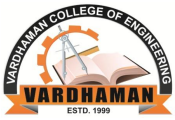

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CERTIFICATE

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Abstract

Communication is a vital aspect of connectivity among the people of various countries across the world.The communication technologies include telephone, smart phone etc., in which most of them are integrated with the internet. Letters were a style of communication in olden days. Now, they were replaced with mails. Email being the important one among the many features of the Internet serves as the basic prerequisite. But,the visually challenged one's face challenges when it involves the usage of the internet in spite of the availability of various screen readers. According to various estimations there are nearly 253 million people around the world who are visual challenged according to 2015 statistics.development isn't only meant for normal people.So,The main aim of this project is to provide an android application specially developed for the visually challenged people to send mails through voice commands(Voice Based Mails).

Keywords: Communication; Visually Challenged; Voice Based Mails

Table of Contents

List of Figures

Abbreviations

Abbreviation	Description
STT	Speech to Text
IVR	Interactive Voice Response
API	Application programming interface
STMP	Simple Mail Transfer Protocol
MIME	Multipurpose Internet Mail Extensions
UML	Unified Modelling Language
XML	Extensible Markup Language

CHAPTER 1

Introduction

1.1 Main idea of the project

Emails can be used for a variety of purposes, depending on the individual. It can be used for communication, telling a failure or an update, assisting the team with directions and guidelines to follow, a route map for a journey, cleaning or hospitalisation instructions, and anything else that comes to mind.Emails can be used to apply for admissions, obtain results, and receive employment offers in the educational setting. It facilitates communication and makes it easier for people to transmit messages.

Using emails We can contact the individual at any time of day, and he or she can read the mail and react at their leisure. As a result, the email will respect the individual's time and avoid sending unwanted messages.Traditionally, contacting individuals anywhere in the world was expensive. Mail may be sent to anyone with a mail address with a single click, making it simple to keep track of contacts. If the system is connected to the internet, this can be done at no cost.Emails can be used for a variety of purposes, depending on the user.

The most common mail services that are utilized in our day to day life can't be used by visually challenged people. To make these systems convenient for these people who are near-blind there are various technologies provided to them like screen reader, speech to text and text to speech, braille keyboard, etc. The users of this technique wouldn't have to have any basic information regarding keyboard shortcuts or where the keys are located. All functions are supported simple click operations making it very easy for any kind of user to use this technique. Also the user needn't worry about remembering which depression operation they have to perform so as to avail a given service because the system itself are prompting them on which click will provide them with

what operations.This application relies on using speech-to-text, thus enabling everyone to regulate their mail accounts using their voice only and be able to send, and perform all the opposite useful tasks. The system will prompt the user with voice commands to perform certain action and therefore the user will answer the identical.

1.2 Objective

The main objective of this project is to assist the blind to beat the challenges in sending mails.Usually they need to be captivated with another person for sending mails.This project attempts to create an email system that will allow even a naive, visually impaired individual to communicate using the services without any prior training. There is no need to utilise a keyboard with this technology. Instead, it will only work with mouse or touch actions and speech to text conversion.This project will make them independent within the process of sending mails.On whole this project make the work of sending mails plenty more easier.

1.3 Problem Definition

The visually challenged people find very difficult to use this technology because using them requires visual perception. However not all people can use the internet. To access the internet you would need to know what is written on the screen. There will be no use if it is not visible.Therefore, Internet becomes completely useless for the visually challenged and illiterate people.

1.4 Motivation

The primary motivation for creating this application is to assist visually impaired people in taking use of new technologies. These people can't even send emails, which is something that most people can do with ease. The primary goal of this initiative is to encourage visually impaired persons to use this basic technology.

CHAPTER 2

Literature Survey

2.1 Existing System

Simple e-mail systems are available during which only voice recognition text-to-speech systems are accessible by remembering the keyboard shortcuts to access. The user cannot make use of mouse pointer because it is totally difficult if the pointer location can't be traced which user should be trained about the keyboard on where each and each secret's located. If a user is new computer can therefore not use this service as they're not alert to the key locations.

The most common mail services that we use in our way of life cannot be employed by near-blind people. this can be because they are doing not provide any facility in order that the person ahead can listen the content of the screen. As they can not visualize what's already present on screen they can't comprehend where to click so as to perform the specified operations. For the those that are visually impaired and are employing a computer for the primary time isn't that convenient because it is for a standard user although it's user friendly.

2.1.1 Disadvantages of existing system

Disadvantages of this system are:

1.User have to use mouse connected to the computer and should perform mouse click events to send emails.

2.Web User Interface as the interface for system is not easy for the impaired people to use.

3.Not benefited because there are many languages that speech recognizers cannot recognize.

2.2 Proposed system

The voice based email system project is an application that allows blind individuals to simply utilise the email system. The suggested system focuses on providing fundamental features such as email composition, reading, sending, and receiving, as well as voice interaction. This makes it easier to use all of the above functions, as well as the ability to send text and voice-based emails. In the proposed system, an application is developed which help the visually challenged to access the mails and send the mails without any help of keyboard and mouse pointer. In this system, the types of technologies used are:
1.STT (Speech-to-text) : here whatever we speak is converted to text.
2.IVR (Interactive voice response): IVR is a technology that provides interaction between the user and the system. As the exact location of mouse pointer cannot be tracked by the blind user, the system has given the user a free will to click blindly anywhere on the screen. Thus user need not worry about location of the mouse pointer. This system will be perfectly accessible to all types of users as it is just based on simple mouse clicks and there is no need to remember keyboard shortcuts.

2.2.1 Advantages of Proposed System

Advantages of this system are:

1. Doesn't need any depression events to send emails.
2. Purely supported the voice commands given by the user.
3. To help the visually impaired one's access mails easily and efficiently.
4. To help them to send the mails without the assistance of another person.
5. To help challenged one's to beat the challenges faced to adopt to new technology.
6. The user only has to follow the instructions given by the IVR and use mouse clicks accordingly to induce the respective services offered.

2.2.2 Applications of Proposed system

Applications of this system are:

1.The disabilities of visually challenged people are thrashed.

2.This application makes the visually impaired feel like a normal user.

3.The IVR technology is very effective for them in the terms of guidance.

4.This helps for the betterment of society.

5.This project will also encourage developers to build something more useful for visually impaired or illiterate people, who deserves an equal standard in society.

6.The people having typing problems can also take advantage of this system

CHAPTER 3

Requirements

3.1 Software Requirements

As the main problem with existing system is that the user has to be well versed with the keyboard which may not be possible for all users.So,the proposed system completely eradicates the use of keyboard and it works on a single touch gesture.The proposed system is an android application.The whole proposed system is based on Voice Commands.

Software Requirements:-

Operating System:Windows

Coding Language:Java

Tool Kit:Android 4.4 ABOVE

Front End Android and Java

Back End:Android Shared Preferences

3.2 Tools

The whole project is a Android application.The Tools used in this project are:

1.Android studio

2.Text to Speech library

3.Speech Recognizer library

4.Java Mail API

3.2.1 Android Studio

Android Studio is the official IDE for Android, and it offers the most up-to-date tools for developing apps for any Android device. It comes bundled with a number of useful and necessary tools and libraries for developing Android apps. Android accounts for roughly 80 percent of this industry, so it's becoming increasingly important to generate a wide market for any product or project. We can work on the projects in either Java or Kotlin. The entire application was built in Java.

3.2.2 Text to Speech Library

This is used to synthesize speech from the text for immediate playback or to create a sound file.This project requires the library "**android.speech.tts. TextToSpeech**" to be imported into Android Studio.Once a TextToSpeech instance has completed its initialization, it can only be used to synthesise text. TextToSpeech.OnInitListener is used to be notified when the TextToSpeech engine has completed its initialization.

3.2.3 Speech Recognizer library

This is necessary in order to use the speech recognition function. The library "**android.speech.SpeechRecognizer**" must be loaded into Android Studio for this project to gain access to the voice recognition service. This service gives you access to the speech recognition system. The methods of this class can only be called from the main application thread. This API's implementation will almost certainly send audio to external servers for speech recognition. As a result, this API isn't meant to be used for continuous recognition, which would require a lot of power and bandwidth. To utilise this class, the application must have the "Manifest.permission.RECORD AUDIO" permission.

3.2.4 Java Mail API

The JavaMail API allows you to compose, send, and receive electronic messages (emails). The JavaMail API provides a framework for sending and receiving emails that is protocol and platform agnostic. The main classes of the JavaMail API are found in the javax.mail and javax.mail.activation packages. To get the benefits of this packages we have to load three jars into our project:

1.mail.jar

2.activation.jar

3.additionnal.jar

CHAPTER 4

Working

4.1 Description

1.The user interface for this project starts with a welcome screen made up of text views and image views. The text to speech tool gives vocal instructions to the user.
2.The user is asked to compose a message with stored mail or other mail. The user replies with touch gestures in this purpose or activity.
3.The on-click listener or touch gesture allows the user to navigate between the app's activities and respond to the app's instructions.
4.If the user responds positively to the compose option, the program directs the user to the intent or action, where the user enters the receipt email address by clicking on the microphone as directed by the app.
5.Speech Recognizer is used to record the voice input, which is then saved in a text box. In addition, the application accepts user input for the topic and message of the email in the same way.
6.The user is prompted to confirm and touch the screen as instructed to send the mail using the Java Mail API and eventually receive the confirmation in the alert box in the last activity.

4.1.1 Speech To Text

The speech-to-text converter recognises your voice, analyses your sounds by filtering what you say, and then digitises it into a format it can understand.The text that has been identified can be saved in a file.Our voice to text system gathers and converts speech to text in real time.Speech recognition systems are made up of various components: feature extraction, an acoustic models database built from training data, a dictionary, a language model, and

a speech recognition algorithm.The user will be prompted to talk about the sender and receiver details, which will be recognised and transformed into text in the language of our choice.

4.1.2 Text To Speech

It translates text to voice output using speech synthesis techniques. The blind utilise it to concentrate on written information; it's now widely used to transmit financial data, e-mails, and other documents. When offering instructions, text-to-speech is also employed on devices like portable GPS units to proclaim street names.This facility is used in this project to cross-check the information provided by the user. The details can be adjusted if there is a disruption or a miscommunication.

4.1.3 Sending Mail

The user can use voice commands to write emails, listen to what they've written.Mail can be sent using JavaMailAPI using STMP or MIME protocol.The MIME (Multipurpose Internet Mail Extensions) protocol is used by the email application to transmit emails. MIME is a format for extending the functionality of Internet e-mail protocols like SMTP. SMTP (Simple Mail Transfer Technology) is a dependable protocol for sending emails that operates in a straightforward manner by allowing the SMTP server to transmit email messages fast. The similar concept is used in our program, where emails are downloaded in response to the user's request.The JavaMailAPI may send email via the STMP or MIME protocols. The advantages of MIME over STMP are that it allows users to send and receive numerous sorts of digital material in e-mail, including photos, audio, video, and various types of documents and files. It also allows users to send and receive emails in a variety of languages, including Hindi, French, Japanese, and Chinese.

4.2 Design

1.User Interface Design:

Our application user interface is simply a standalone application (Desktop based application) which is very useful and allows user to access in fast and easy way than any other website or app.

2.Database Design:

This system maintains a shared preference for storing user details. Android offers numerous options for storing application data. Shared Preferences is one of these methods. You can save and retrieve data in the form of a key-value pair using Shared Preferences. Shared Preferences is a method of storing and retrieving tiny quantities of primitive data as key/value pairs to a file on the device storage, such as String, int, float, and Boolean, which make up your preferences in an XML file inside the program.

3.System Design:

This system is voice oriented. When user opens the application, it will give a voice message that application is about to use. The system will say all the option available in this email application such as user details, destination mail id and Send mail. We have to choose an option among the options available by using voice command.

4.3 Architectural Diagram

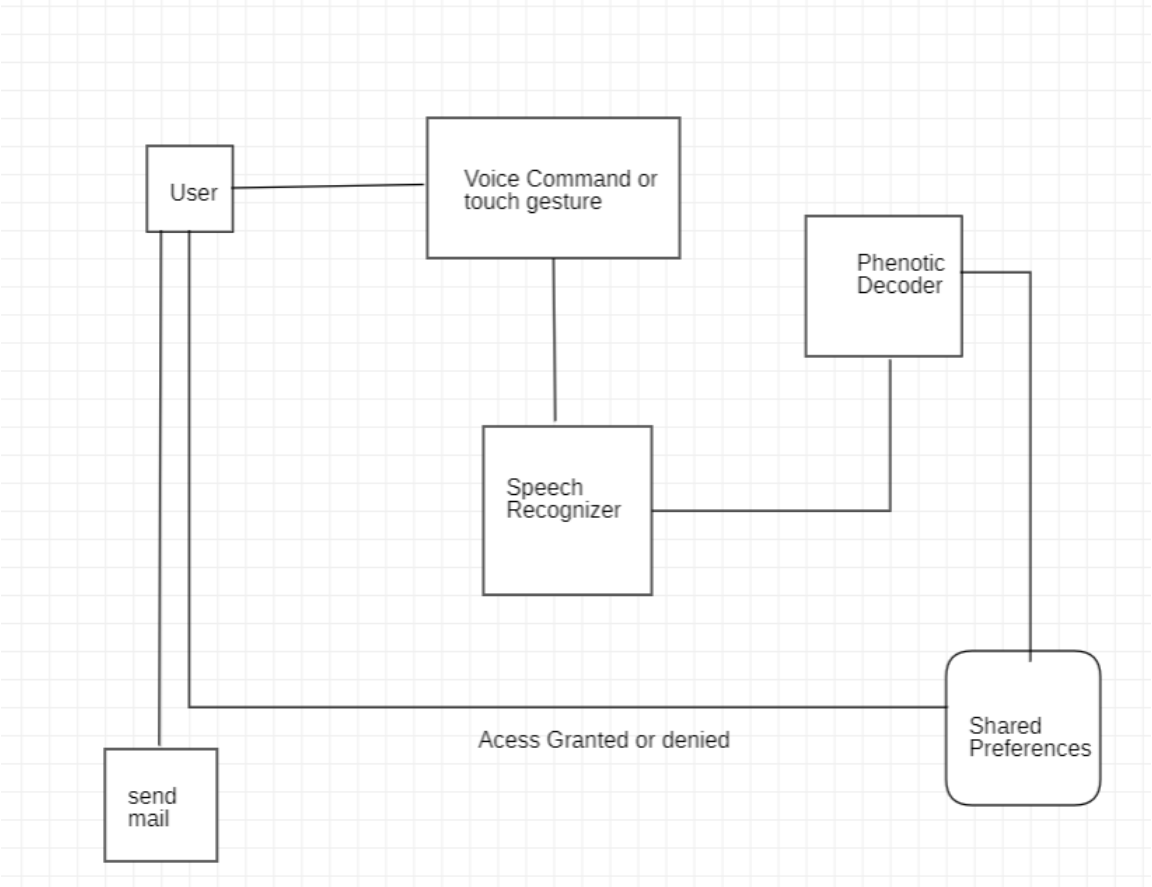

Figure 4.1: Architectural Diagram

The process will be:

1.First the user have to give the input using voice commands.

2.The given speech will be converted to text.

3.The user details which are given will be verified and access will be granted.

4.The user can then send the mail by giving appropriate recipient mail,subject and message.

4.4 UML diagrams

UML-Unified Modelling Language is used to depict the behaviour of and structure of a system.UML diagrams are used to understand the project using pictorial representation.Out of many UML designing tools,Star UML is most widely used.These diagrams are of two types:

- **Structural Diagrams**
    1. Class Diagram
    2. Object Diagram
    3. Component Diagram
    4. Deployment Diagram
- **Behaviour Diagrams**
    1. Use Case Diagram
    2. State Diagram
    3. Activity Diagram
    4. Sequential Diagram
    5. Collaboration Diagram

4.4.1 Class Diagram

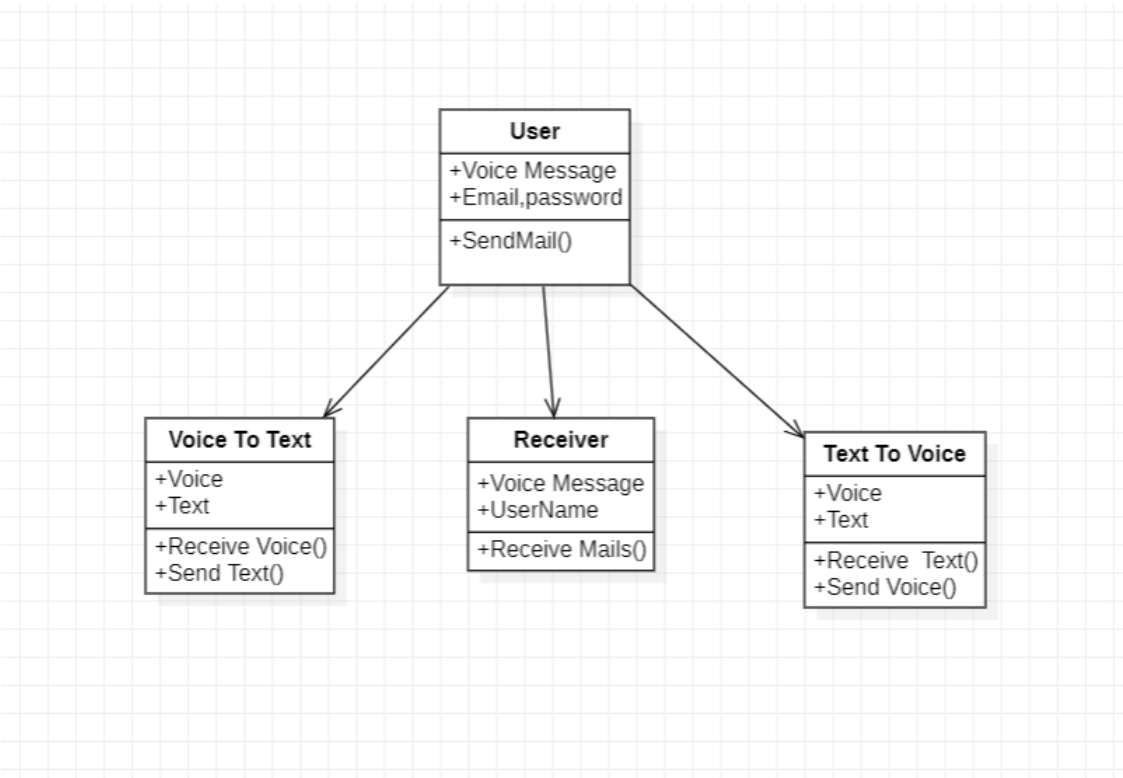

Figure 4.2: Class Diagram

It is a static diagram. It represents the application's static view. A class diagram is used for not only visualising, describing, and documenting distinct components of a system, but also for creating executable code for a software program collection of classes, interfaces, affiliations, collaborations, and restrictions is shown in a class diagram. A structural diagram is another term for it. A class diagram depicts a class's properties and functions as well as the system's limitations. Here we have four classes:User,Voice To Text,Receiver,Text To Voice with are connected using Association Relation.

Class Diagram consists of two fields:

Operations:

It consists of the various operations a class knows to carry out. Here The operations of

-User class:Send Mail

-Voice To Text class:Receive Voice,Send Text

-Receiver class:Receive Voice

-Text To Voice class:Receive Text,Send Voice

Attributes:

It consists of the data or information related to that class object. Here the attributes of

-User class:Voice Message,Email

-Voice To Text class:Voice,Text

-Receiver class:Voice Message,User Name

-Text To Voice class:Text,Voice

4.4.2 Use Case Diagram

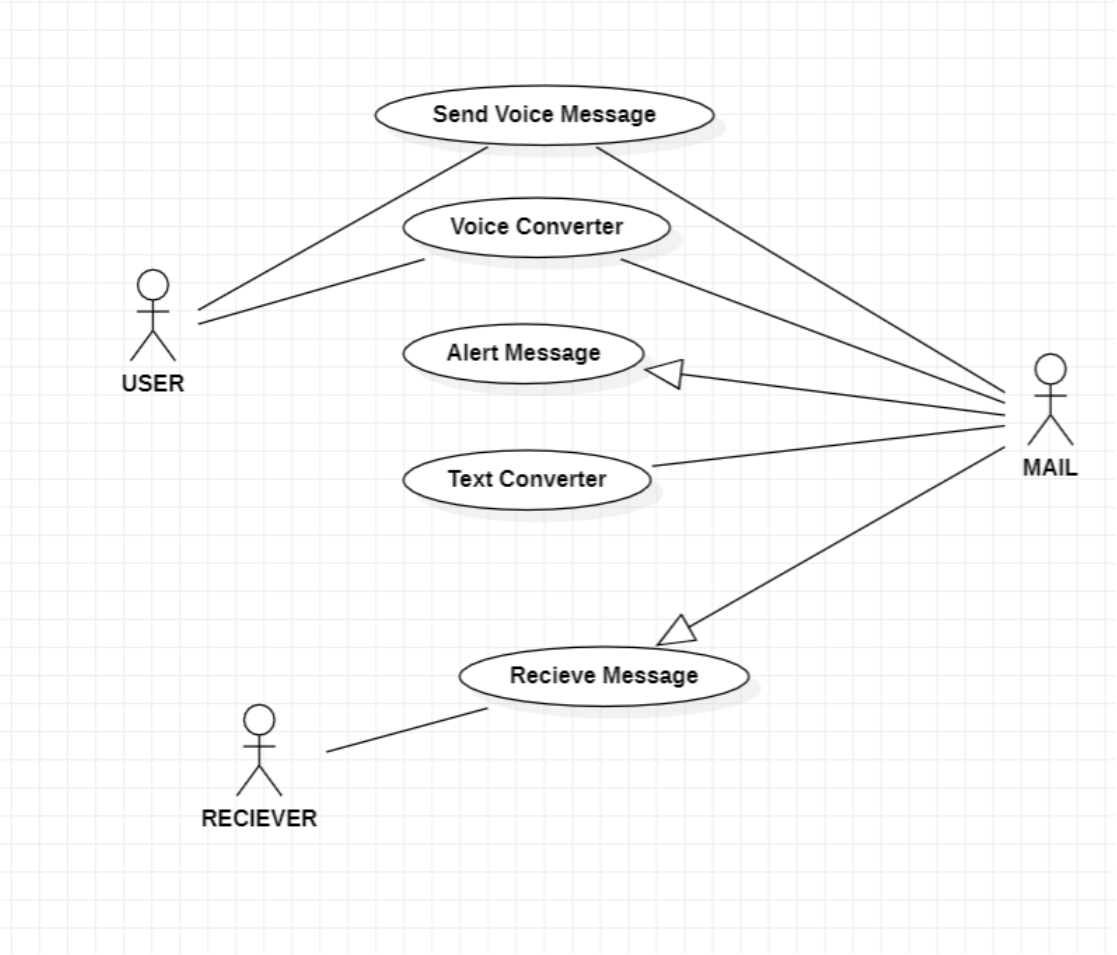

Figure 4.3: Use Case Diagram

A use case diagram can describe the specifics of your system's users (also known as actors) and their interactions with the system in the Unified Modeling Language (UML). A use case diagram doesn't go into great detail—don't expect it to depict the sequence in which activities are carried out, for example. A appropriate use case diagram, on the other hand, provides a high-level picture of the link between use cases, actors, and systems. Use case visuals, according to experts, should be used to augment a more descriptive written use case.
Use case components include:

Actors: Users who engage with a system are referred to as actors. A person, an organisation, or an external system that interacts with your application or system is referred to as an actor. They must be data-producing or data-consuming external objects.

System:A precise sequence of activities and interactions between actors and the system is referred to as a system. A scenario is another term for a system.

Goals: The most common use case's final outcome. The activities and alternatives utilised to achieve the objective should be described in an effective diagram.

In this use case diagram the actors are:User,receiver,mail.
The Use cases are:Send Voice Message,Voice Converter,Alert Message,Text Converter,Receive Message.

4.4.3 Activity Diagram

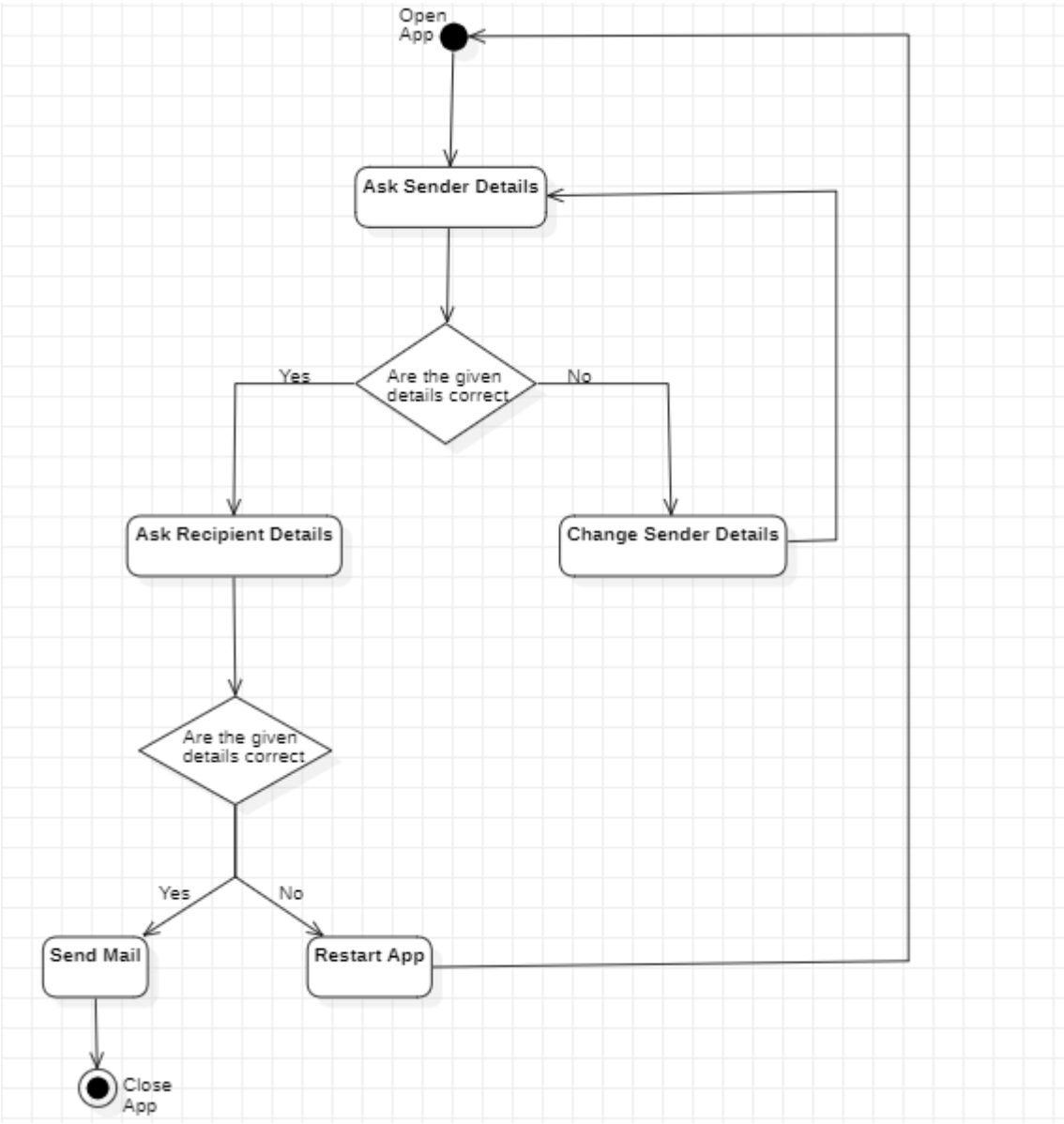

Figure 4.4: Activity Diagram

An activity diagram is a behavioural diagram that displays a system's behaviour. An activity diagram depicts the control flow from start to end, highlighting the many decision routes that exist while the activity is being carried out.

Notations used in an Activity Diagram are:

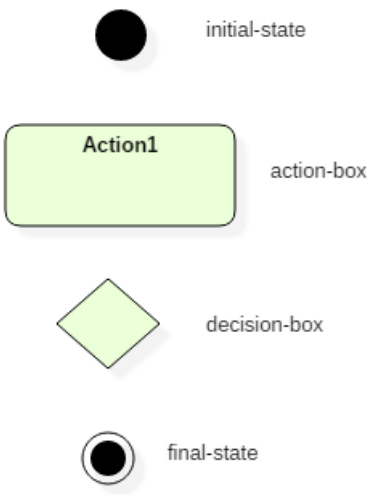

Figure 4.5: Activity Diagram Notations

Initial State:

The initial state depicts the starting state before an activity takes place. Unless we're showing layered activities, a process can only have one beginning state. The starting state of a system is represented by a black full circle.

Action Box:

An activity represents the performance of an action on or by things. A rectangle with rounded sides is used to depict an activity. Essentially, each action or event that occurs is represented as an activity.

Decision Box:

The decision node is used when we need to make a choice before deciding on the flow of control. The decision node's outgoing arrows can be labelled with conditions. There are usually two or more output arrows.

Final State:

A Final State or End State is the state that the system achieves when a certain operation or action is completed. The ultimate state is represented by

a filled circle within a circle notation. Multiple end states might exist in a system or process.

The process is:

1.This project's user interface begins with a welcome page that includes text and picture views. The user receives audible instructions from the text to speech technology.

2.The user is instructed to construct a message using either saved or other mail.In this goal or activity, the user responds using touch movements.

3.The user may browse between the app's activities and reply to the app's directions using the on-click listener or touch gesture.

4.If the user chooses to compose, the software takes them to the intent or action screen, where they enter the receipt email address by clicking on the microphone as guided by the app.

5.The voice input is recorded using the Speech Recognizer and stored in a text field. Furthermore, the program takes user input for the email's subject and message in the same way.

6.The user is requested to confirm and touch the screen as directed to send the letter using the Java Mail API, with the confirmation appearing in the alert box in the previous action.

4.4.4 Sequential Diagram

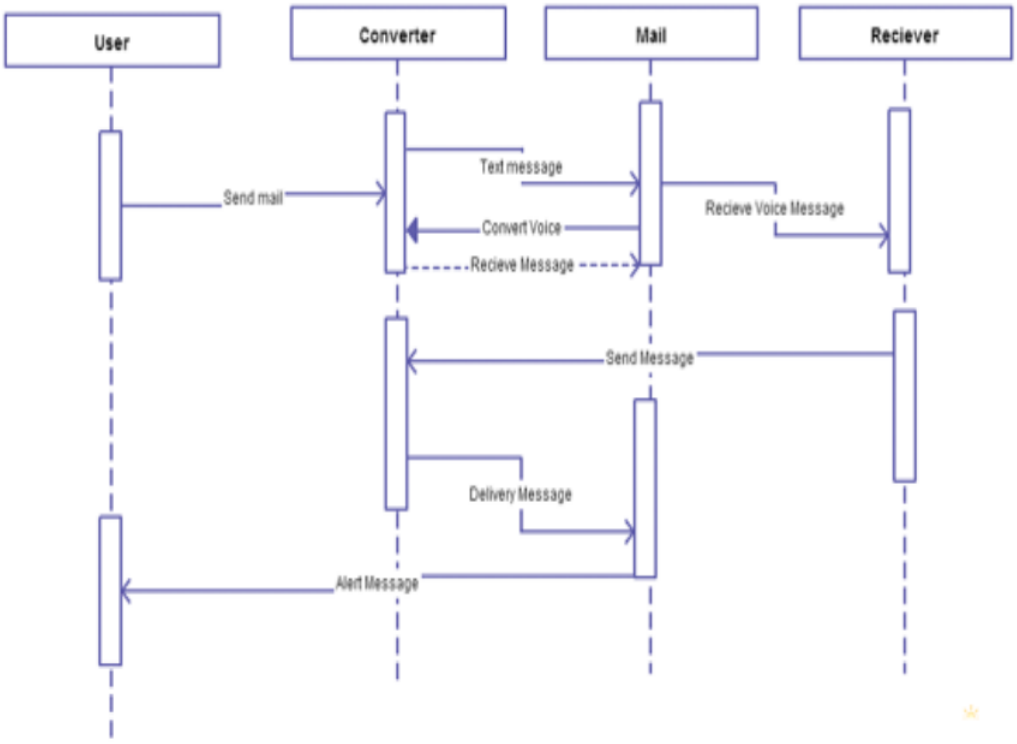

Figure 4.6: Sequential Diagram

A sequence diagram simply displays the order in which items interact. A sequence diagram is sometimes known as an event diagram or an event scenario. Sequence diagrams describes the order of working of components of a system work. Business people and software engineers use these diagrams to describe and understand requirements for new and current systems.

Notations used:

Actor:

Users who engage with a system are referred to as actors. A person, an

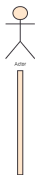

Figure 4.7: actor

organisation, or an external system that interacts with your application or system is referred to as an actor. They must be data-producing or data-consuming external objects.

Lifeline:

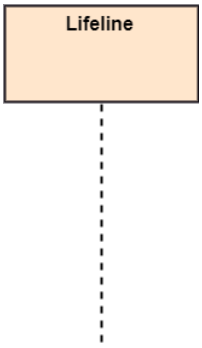

Figure 4.8: lifeline

A lifeline is a named element in a sequence diagram that represents an individual participant. A lifeline represents each incident in a sequence diagram. In a sequence diagram, the lifeline elements are at the top.

Message:

The messages are displayed by arrows and indicate the interaction between

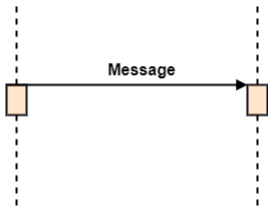

Figure 4.9: message

the items. On the lifeline, they are in the correct sequence. Messages and lifelines comprise the heart of the sequence diagram.
The actors in this sequential diagram are:user,converter,mail,receiver.
There are various messages through which the actors communicate. 1.First, the user must provide input via voice instructions.
2.The supplied speech will be transcribed.
3.The user information provided will be validated before access is allowed.
4.The user may now send the message by selecting the proper recipient, topic, and message.

Random papers are referenced here[1][2][3][4][5][6], Go check the References page.

CHAPTER 5

Implementation

5.1 Working of application

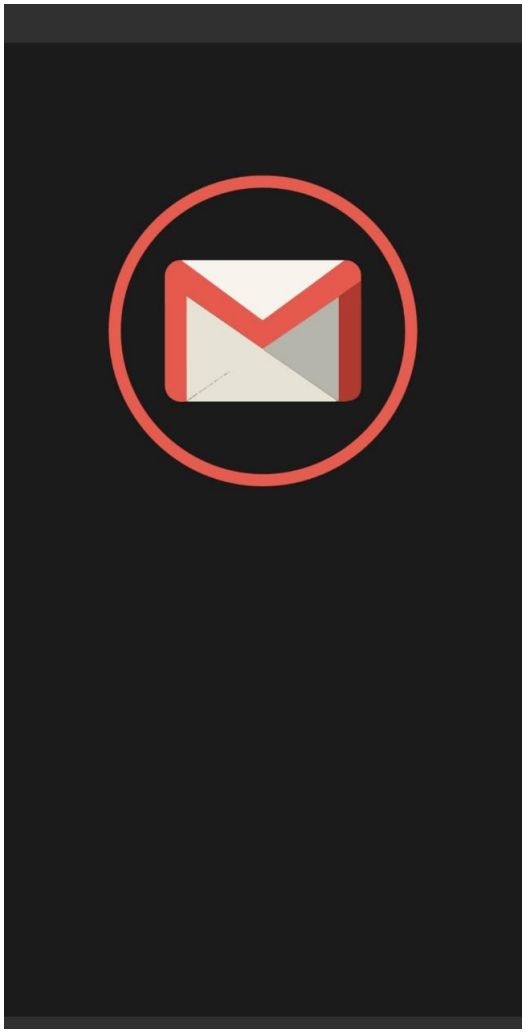

Figure 5.1: Opening of application

The user interface of the application starts with a welcome screen made up of image views. The text to speech tool greets the user and gives voice instructions on how to proceed.

5.2 Sender Details

Following the greeting, the voice instructions will direct you to inform the sender(user) of the sender's details, such as the user's email address and password.

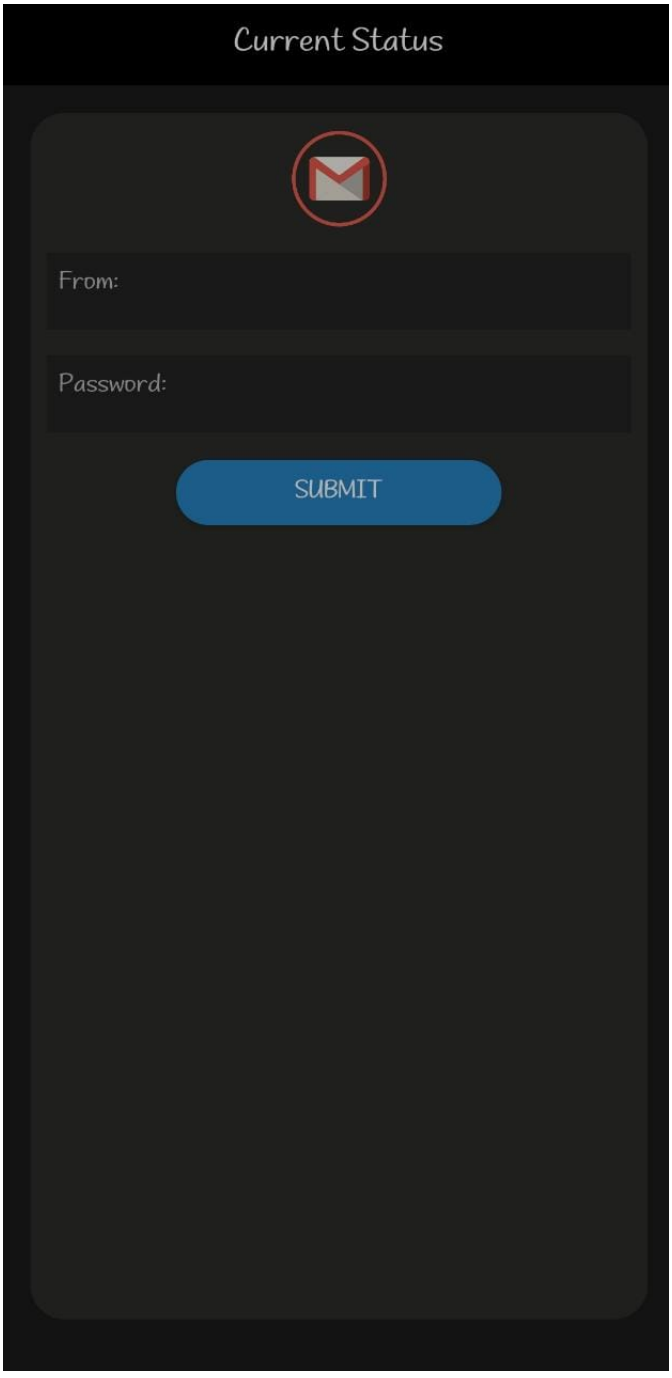

Figure 5.2: Sender Information

Click anywhere on the screen to activate voice help, which will listen to what the user is saying and convert it to text.

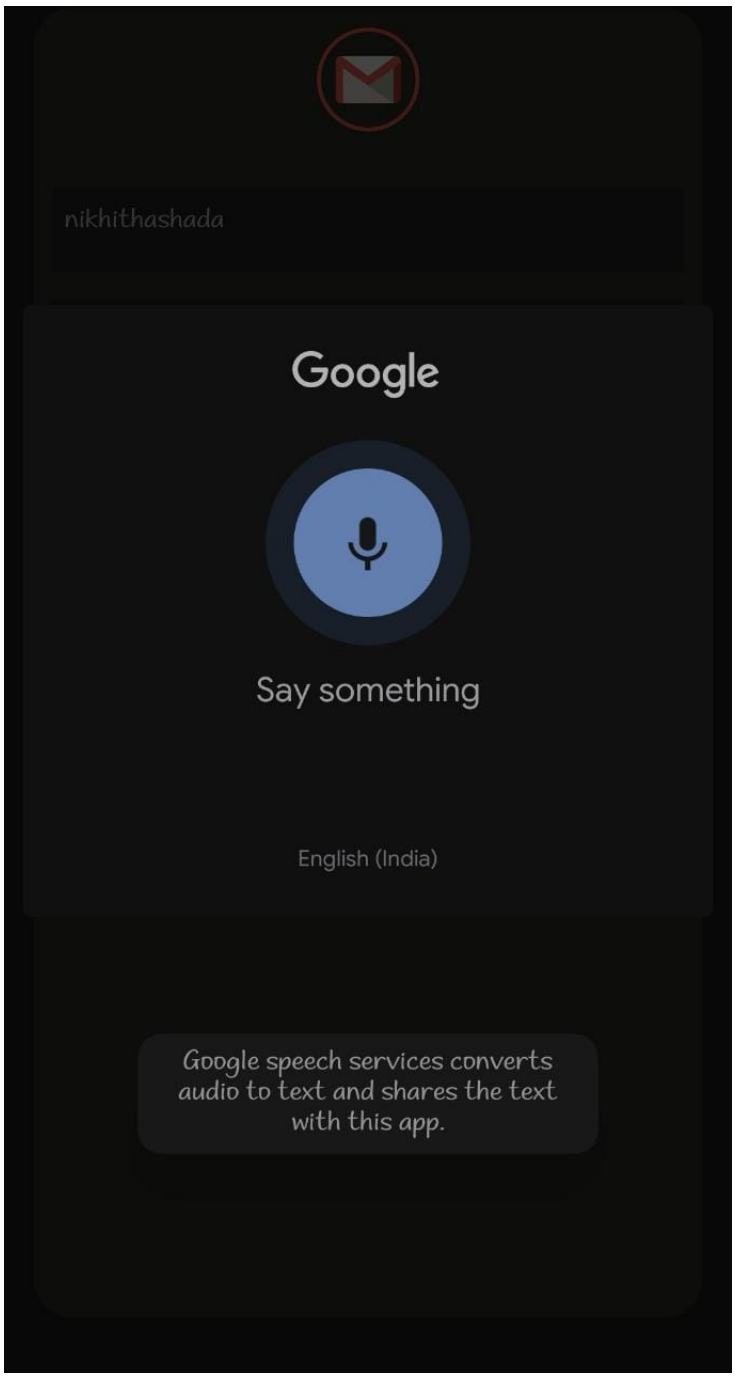

Figure 5.3: Voice Assistance

After providing the required information, text to speech will read out the information and ask if it is right(yes) or if any adjustments need to be made(no).

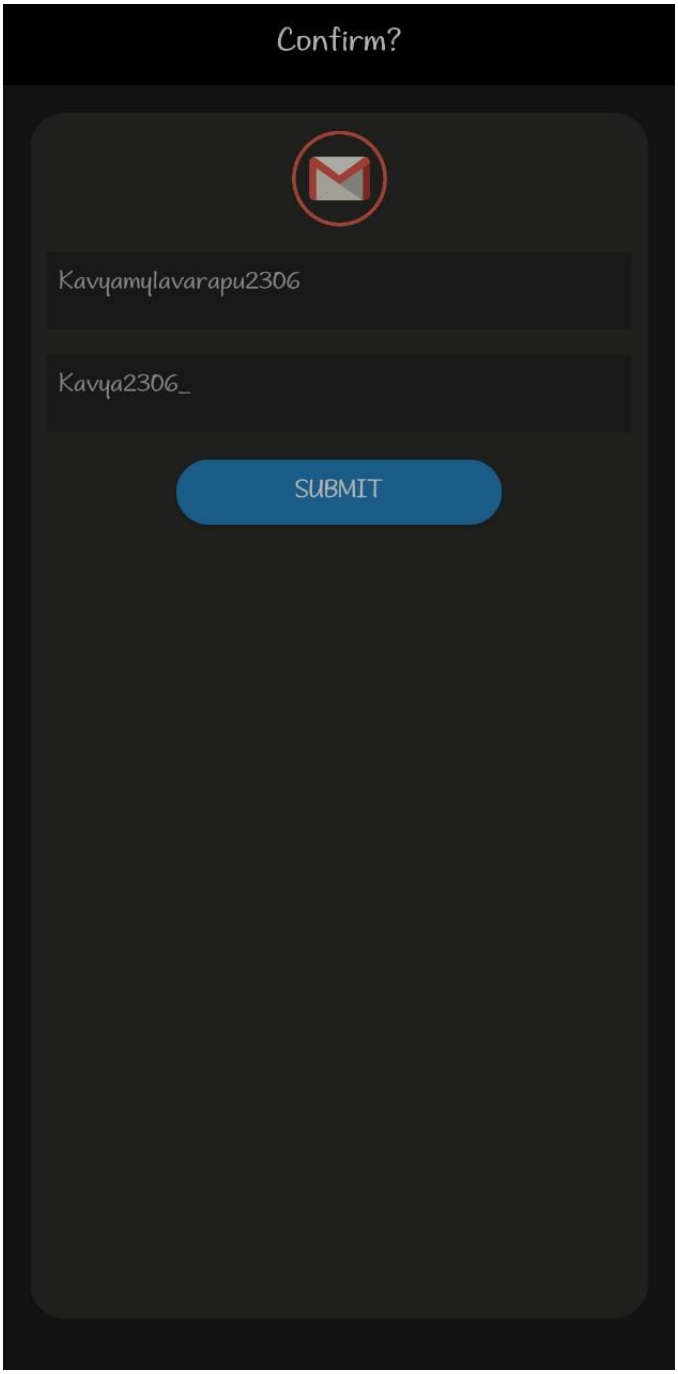

Figure 5.4: Sender Details

5.3 Receiver Details

If you said yes in the previous step, you'll be directed to this activity, where you'll fill out the recipient's information, the email's subject, and the message you want to send.

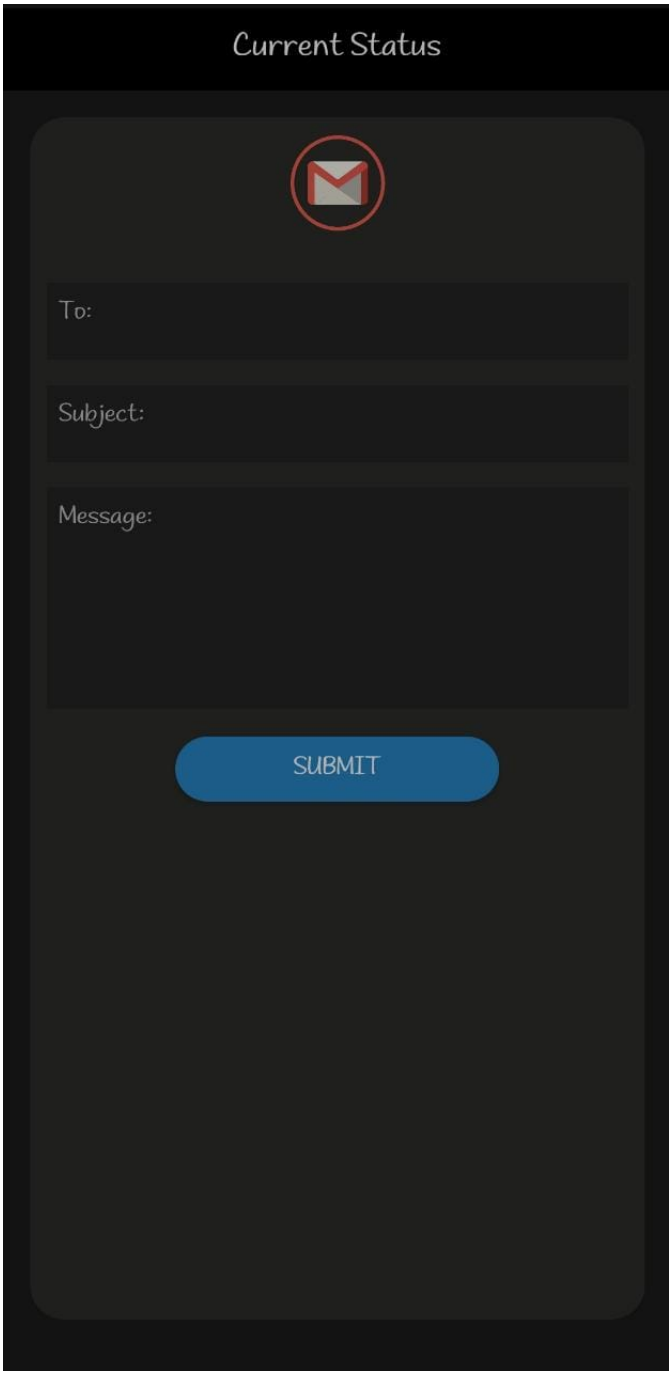

Figure 5.5: Receiver Information

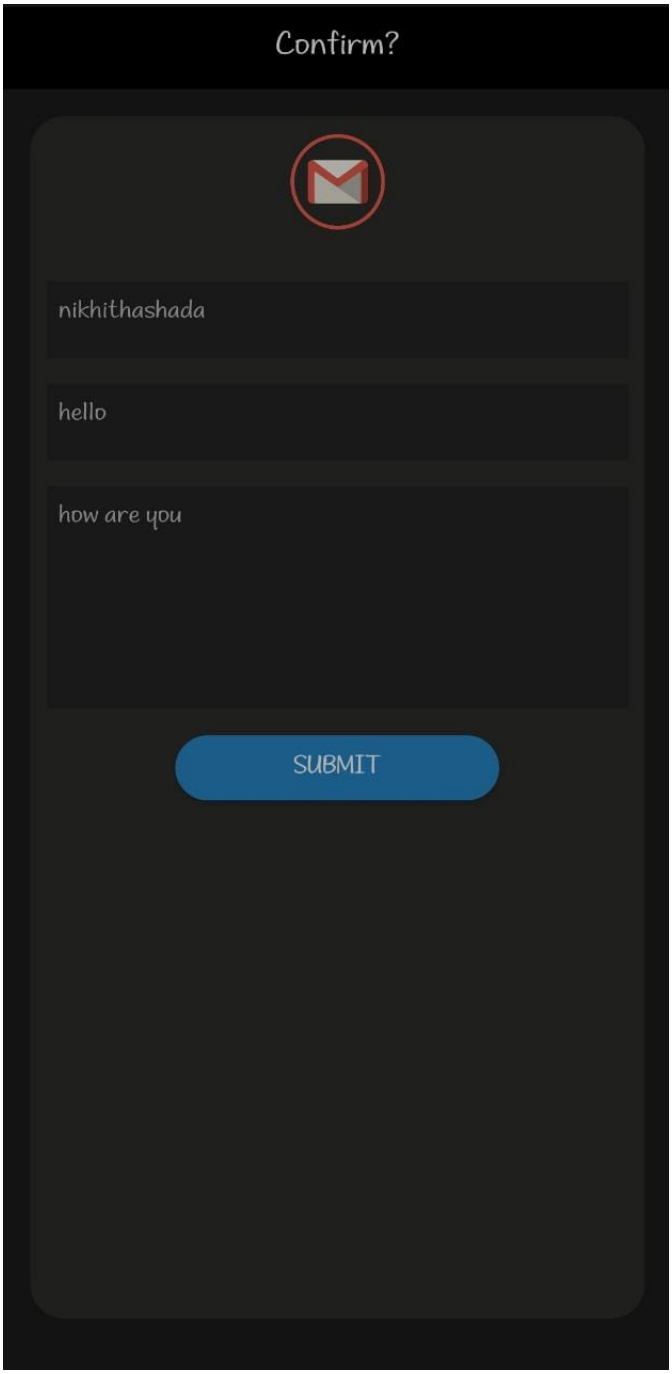

Figure 5.6: Recipient Details

After you've completed all of the fields, you'll be asked if everything is correct and if it's okay to send message or make changes.If you respond yes, the email will be sent from the specified user mail address to the provided recipient mail address.

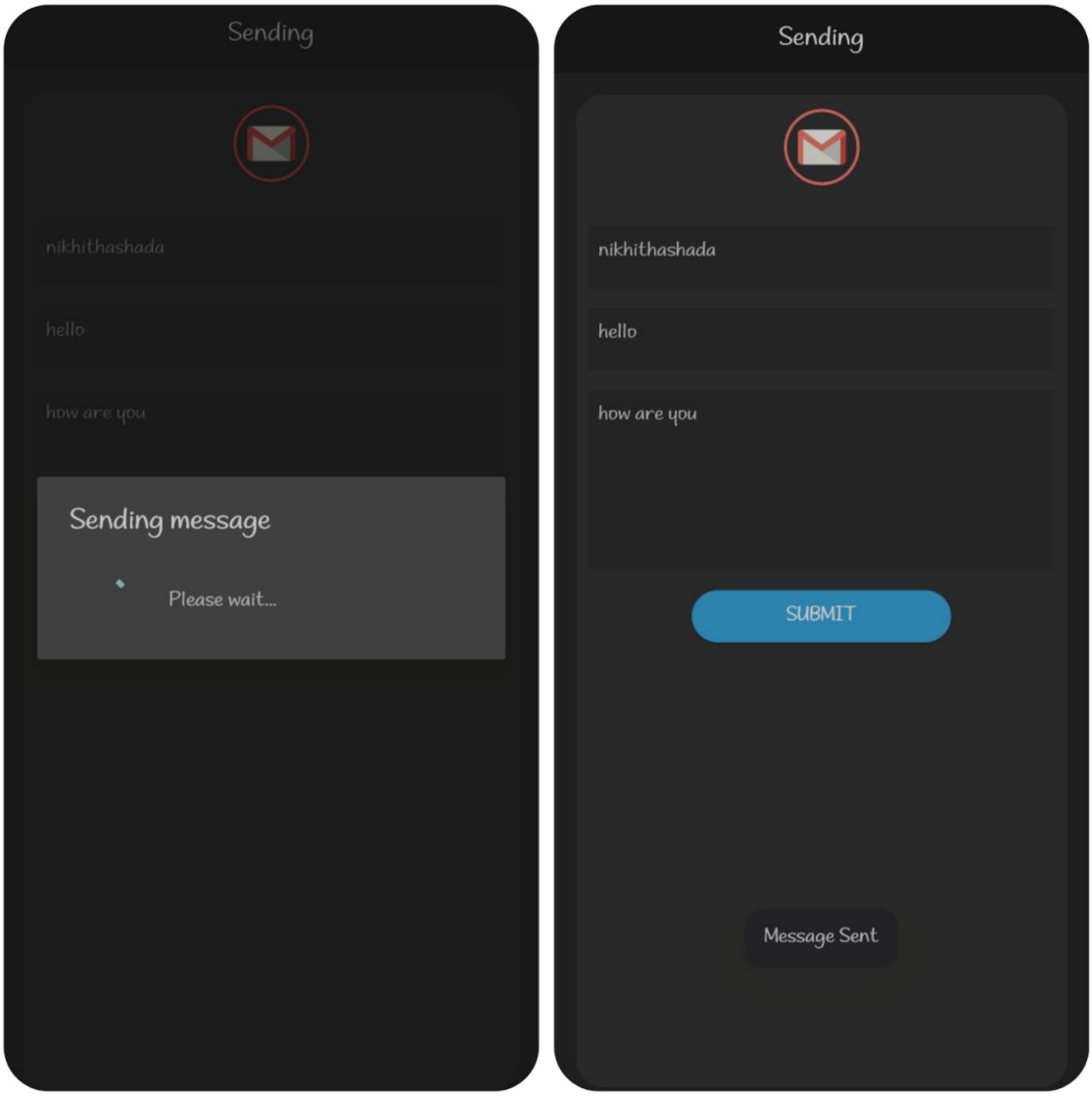

Figure 5.7: Sending Mail

5.4 Output

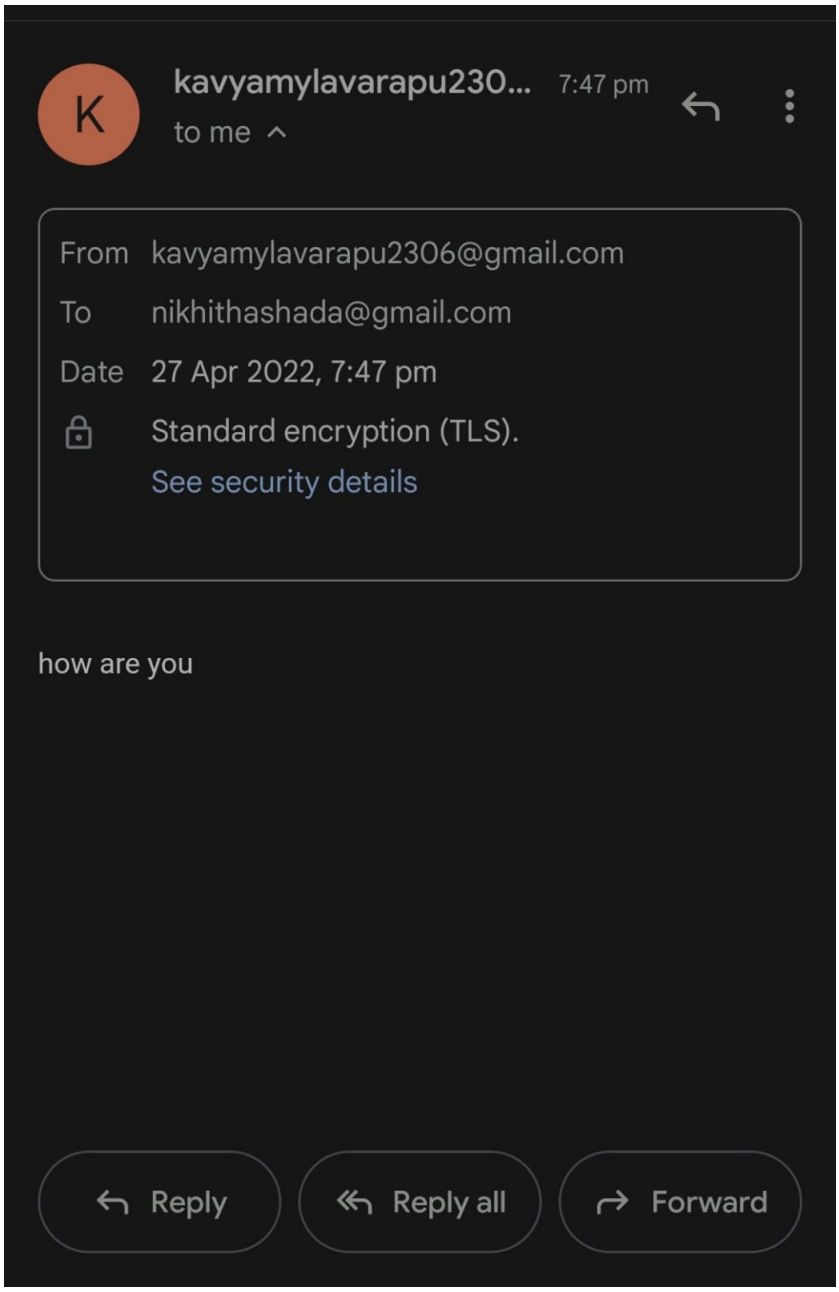

Figure 5.8: Received Mail

CHAPTER 6

Conclusions and Future Scope

6.1 Conclusions

The project's major goal is to develop email communication for blind individuals using voice commands due to their incapacity to use the internet and its functionalities. We succeeded in sending emails that included the sender's email address, subject, and message in the form of an audio message that would be converted to text. We were successful in developing text to speech and speech to text modules. We designed a storage system to make it easier for users to access their personal information.

This project, Voice based Email system for visually impaired persons,allowed blind and disabled people to simply and effectively access emails. It offers a voice-based mailing service that allows visually impaired people to send letters without the assistance of others. Previously, the user required some basic knowledge of keyboard shortcuts. All of these conceptions have been eradicated, and the visually handicapped have conquered all of their challenges. It makes advantage of a speech recognition program to give an efficient voice input technique for blind people mailing gadgets.It is also helpful for those who aren't familiar with typing texts.

6.2 Future Scope

In the future, the scope of voice could be expanded to include image attachments and other features accessible in standard E-Mail, such as indentation and fonts. We may additionally enhance this application by allowing it to read and delete emails. Also, security measures to be implemented during the login phase can be altered to make the system safer, and voice recognition can be included so that only the actual user's voice is taken into account.

REFERENCES

[1] *idea*. URL: https://www.geeksforgeeks.org/project-idea-voice-based-email-visually-challenged/.

[2] *Speech Recognizer*. URL: https://developer.android.com/reference/android/speech/SpeechRecognizer/.

[3] *Text To Speech*. URL: https://developer.android.com/reference/android/speech/tts/TextToSpeech.

[4] *UML Diagrams*. URL: https://www.geeksforgeeks.org/unified-modeling-language-uml-introduction/.

[5] *Java Mail API*. URL: https://www.javatpoint.com/java-mail-api-tutorial.

[6] *Voice mail*. URL: https://www.arcjournals.org/pdfs/ijrscse/v3-i1/5.pdf.