



ENHANCED MAIL SERVICES WITH VOICE ASSISTANT

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Abstract: Email has become an essential part of our life, especially if one needs to contact a specially-abled people or illiterate. In such cases, they have to keep replying on someone due to the limitations in email facility. The objective of this project is to overcome the current limitation and provide an enhanced mail services that can connect all the people. This project focuses on developing a voice-based mail which is not limited to conversion of speech to text but also to be a helpful voice assistant. This android application also ensures the mail is sent in the form the receiver prefers, that is, as speech or text and language chosen by the user. Therefore, it is very helpful for people who wants to be self-reliant and ensures all the people can connect through easily breaking the limitations.

Keywords: Android Studio, Kotlin, Mail System, Speech to Text, Text to Speech and Voice Assistant.

ACM Classification Codes: D.1.1, D.1.5, D.2.11 and I.1.2

1. Introduction

The year 2020 proved that the internet is a crucial part of our lives. Every human being is widely accessing knowledge and information through the internet. The facilities availed through the internet was the only reliable means of communication and to also gain services. The current communications on the internet mainly rely on the email system for verification and information. However, visually impaired face difficulties in accessing these services provided through the internet [9].

Though there are many advancements in technology, the specially-abled people or illiterate find it very difficult to access email because of its limitations. The development in technology should be in a way that benefits everyone and provides easy access for communication but the specially-abled people and illiterate are being left out in the ever-growing technology. Hence, we have come up with this idea for the benefit of all the people to communicate with each other easily regardless of any physical boundaries and barriers.

2. Existing System

In the existing android mail application, when a mail is sent, an automatic conversion of the mp3 file is made and while sending, the user is asked to choose the client application i.e., Gmail or email or browser, through which the further activity is carried on. So, it's like an intent and not a proper mail app which helps the user. Further, the receiver who gets the mail should download it to listen and it would require mouse clicks for browser and in phone it gets stored in local storage. It gets hectic for the user to find the audio file from the vast data and give a proper response.

Drawbacks:

Though many web applications on mail services for blind are being developed nowadays, the major drawback is that user requires to use a lot of keyboard shortcuts, mouse clicks or a combination of both and also it doesn't focus on reducing the complexity. Although there are many screen readers, the probability of finding a small microphone to give the speech input is burdensome.

As we know that, the existing mail apps are flooded with lot number of sections such as inbox, sent, compose, trash, draft, spam and so on, all these doesn't make any difference to normal user since they have seen the user interface and used the mail but for specially-abled or illiterate it could turn out to be overwhelming to cope up with all these services and the amount of commands or shortcuts used to traverse the mail.

3. Proposed System

The proposed system will be via android application which will be helpful for visually impaired or physically challenged people (like paralyzed hands, handicap, etc.) and even illiterates. The app would assist the user throughout via speech.

The app would be supported to not only receive the user's voice and convert it to text but also assist the user with speech. We also generated a unique id of five-digit number for each user to avoid the conflicts arising because of a different phonetic input or mispronunciation of receiver's mail ID which may lead to the failure of sending the mail. This generated unique ID can be used as a proxy in the place of receiver's mail ID.

The most important aspect that has been kept in mind while developing the proposed system is accessibility. An application is said to be perfectly accessible only if it can be used efficiently by all types of people whether abled or disabled. Keeping this in regard, the proposed system was designed in a way that the user can view all the sent mails and received mails in a single module. This also makes easier it for the user to keep a track on mail transfers that are done from the application without any sort of inconvenience.

The proposed system also focuses on conversion of speech to text and vice-versa using speech recognizer and speech to text engine. This feature not only helps the specially-abled people but also the illiterates who can compose mail by just giving their mail content through voice input.

4. System Architecture

When the user 1 opens the app, he is assisted with the voice assistant from the beginning till the end. If user 1 wants to send a mail to user 2 through voice command user 1 provides the receiver's unique ID and fills the details with support of voice assistant, like, it says "Enter the subject", with the assistance the user fills out the subject and body of the mail. Then by commanding it to send, it goes to firebase.

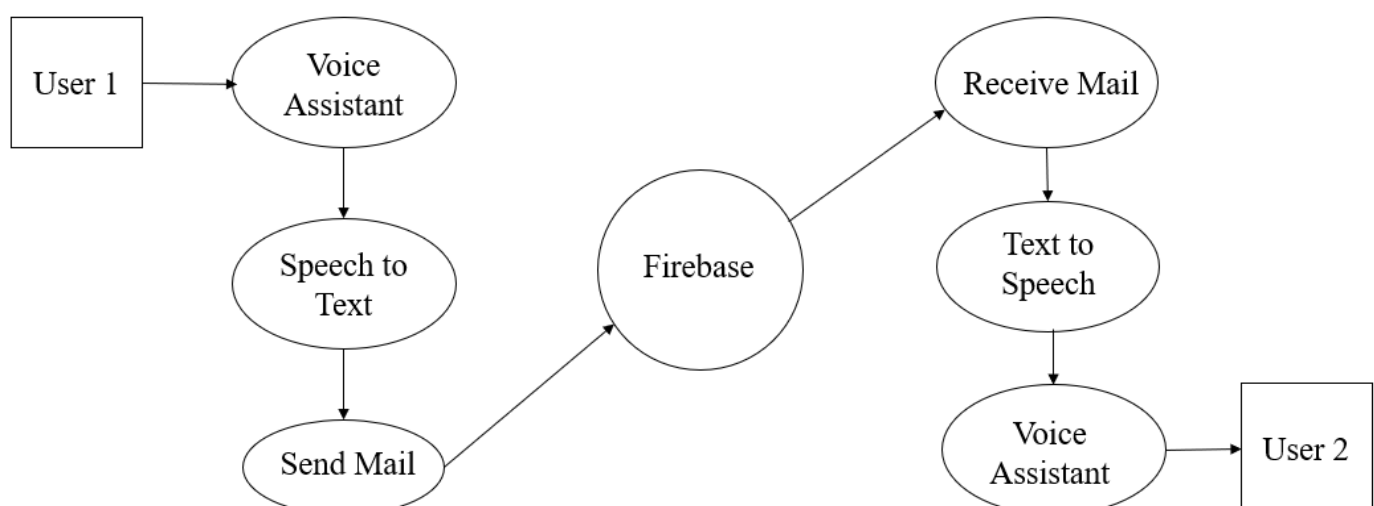


Fig 1. System Architecture of Mail App – Nimbus 2022

Firebase is an API that lets developers easily sync and store data in realtime. It's provided by Google and this tool is used for BaaS, for authentication, database and storage. There the mail is getting redirected to user 2's account.

5. Implementation

5.1. Module Description

5.1.1. Launch Screen

On opening the application, the user lands on launch screen where voice prompt saying "Welcome to Nimbus 2022" is given to acknowledge that the user is on correct page and they can navigate further. Here, they can be redirected to 'login' or 'sign up' Page.

5.1.2. Login

The user is asked to 'login' with their registered mail ID and password; In case the user forgot the account password, they can use command "forgot password" then on providing correct security pin they are redirected to change their password.

5.1.3. Sign up

To 'sign up' the user is asked to provide with their name, a valid mail ID, password, confirm password, security pin and voice-based or text-based mail. In case the password mismatches or any detail haven't been filled, voice prompt saying "Password mismatched" or "Enter mail" is said. Else it says "All details have been filled."

5.1.4. Mail Page

The user can view all the mail ID in the form of the generated five-digit unique ID. In this way, there won't be any misdirection when the pronunciation differs. Since, the dialect of numbers won't cause any confusion and redirect to its respective mail activity i.e., to view all sent, received and to compose mail. The user can also view Settings from this page.

5.1.5. Mail Activity

Here the user can view all sent and received mails from the respective mail ID and can also compose mail in the same module. This upgradation is made to reduce the complexity of using so many commands to navigate through the mail applications which contains so many modules.

5.1.6. Change Password/Forgot Password

The user is asked to fill their mail id along with security pin. If they both match, then the user is asked to provide a mail ID to which the code is sent. On receiving the code, the user then fills it along with the new password and is asked to confirm it. Only if the code is matched, the changes are made.

5.1.7. User ID

This page displays the user's unique five-digit ID that has been generated during the sign-up process. The user ID is present as text and also the voice prompt reads it out aloud.

5.1.8. Settings:

Here, the options given to the user are: Change password, User ID and Log out. On using the respective commands, the user is redirected to its respective pages or logged out.

5.2. Algorithm

Step 1: Start

Step 2: Import all the required packages

Step 3: If user is new

3.1: Then redirect to Sign Up page

3.2: Ask the user to fill the details

3.3: Authenticate with Firebase and update the database

Step 4: If existing user

4.1: Then redirect to Login page

4.2: Provide the credentials and authenticate with Firebase

Step 5: Go to mail activity, to read sent and received mails

Step 6: To compose mail, subject and content is given through voice input

Step 7: If user commands “Settings”, the voice assistant helps to redirect to ‘Change Password’, ‘User ID’ or ‘Log out’ according to the user’s wish

Step 8: If ‘Change Password’ is selected, the changes are then updated to Database

Step 9: If ‘Log out’, then the user is redirected to launch screen.

Step 10: Stop

5.3. Implementation

- We have used **Kotlin**, the official language for android development, and **XML** to design and develop our mail app.
- The mail app is built with the help of **Android Studio**.
- We divided the whole development process into modules and each module went through four phases i.e., Analysis, design, implementation and testing.
- The logo is designed using **Krita** (an application for Digital Art) and XML is used to create the UI, backgrounds and buttons.
- **Speech Recognizer** has been used to get the voice input from the user and convert it into text.
- Voice prompts have been given using **Text to Speech Engine**.
- For the backend, **Firebase** has been used for authentication, storage and database.
- To test the working model for our application we firstly used **Android Emulator** then for *Alpha Testing* we activated ‘Developer Options’ in mobile phone and tested it.

6. Result

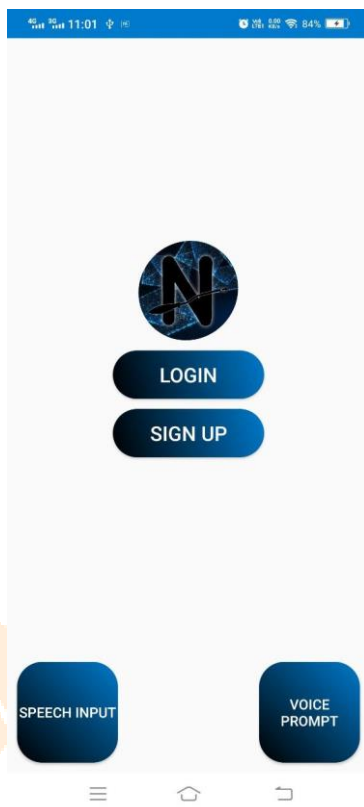


Fig 2. Launch Screen

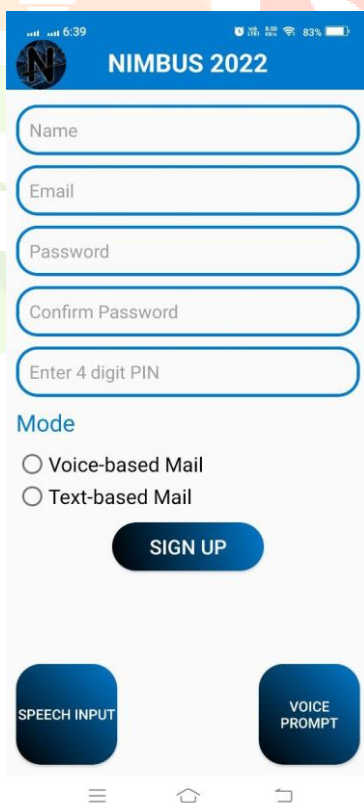


Fig 3. Sign Up

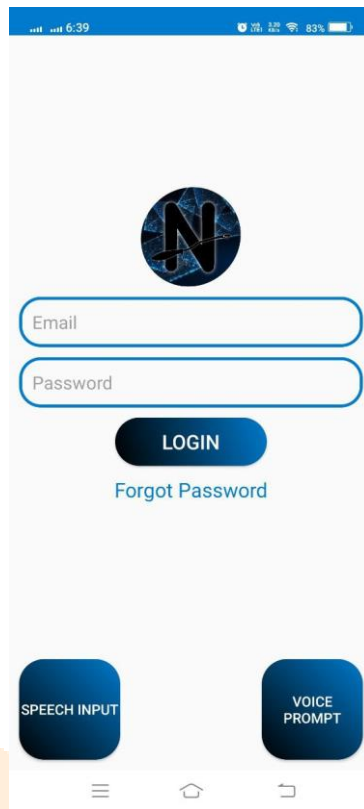


Fig 4. Login

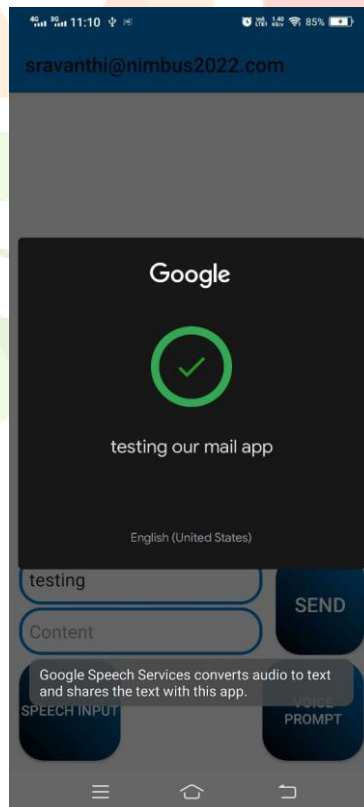


Fig 5. Filling Subject and Content through Voice Input

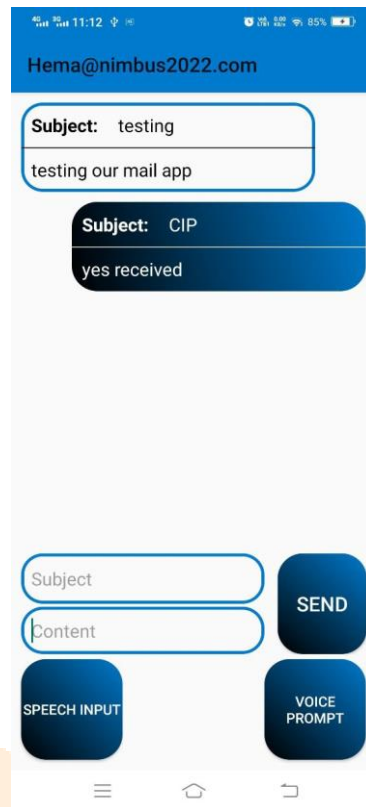


Fig 6. Read and Compose Mail

7. Future Scope

For future scope, language translations can be used for the better accessibility and easy communication. As we know that, sending an image through mail by/to a blind person is a difficult task, classifiers and object detections can be implemented. The user gets to know about the image through voice prompt after detection.

Furthermore, keeping in regard that it is an android application, phone vibrations according to braille or morse code can be introduced to send or receive mail to the users who are blind, dumb and deaf.

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