

# Voice Based Email for the Blind

Rajat Relkar  
MT22054  
rajat22054@iiitd.ac.in  
Indraprastha Institute of  
Technology, Delhi

Pragya Yadav  
MT22116  
pragya22116@iiitd.ac.in  
Indraprastha Institute of  
Technology, Delhi

Vedant Godbole  
MT22088  
vedant22088@iiitd.ac.in  
Indraprastha Institute of  
Technology, Delhi

Saksham Sachwani  
MT22120  
saksham22120@iiitd.ac.in  
Indraprastha Institute of  
Technology, Delhi

Shivam Pandey  
MT22123  
shivam22123@iiitd.ac.in  
Indraprastha Institute of  
Technology, Delhi

## ABSTRACT

Voice-based email system for the blind allows people with visual impairments to send and receive emails using voice commands. The system is intended to give blind people an effective and accessible form of communication, removing the need for them to rely on other people to read and reply to their emails. With voice-based email, the user's spoken commands are translated into text using speech recognition technology, which is subsequently processed and forwarded to the intended recipient. Simple voice commands like "compose," "send," and "read" make it easy for users to traverse their inbox and create new emails with this system. The blind can keep their freedom and communication with friends, family, and coworkers by using voice-based email.

## KEYWORDS

Speech Recognition, Text-To-Speech, Speech-To-Text, Tanscription

## 1 INTRODUCTION

Email, a vital form of communication in the modern world, can be challenging for the visually impaired to use and manage. The issue originates from email programmes' dearth of accessibility capabilities, which makes it challenging for people with visual impairments to utilise them. The visually impaired need equal access to communication technologies because they make up a sizeable segment of the population. Those who are blind or visually handicapped may find it easier to read, write, and manage emails using the voice-based email system.

## 2 MOTIVATION

Developing assistive technologies that make use of machine learning is crucial since India has the highest number of visually impaired persons in the world—approximately 8 million—and the majority of these cases are avoidable. With the help of voice commands and email access, visually impaired individuals can access their emails and communicate through voice commands, resulting in an enhanced quality of life and improved social interaction.

## 3 PROBLEM STATEMENT

Our goal is to improve the conversion of speech data with background noise to text, as existing systems struggle to do so. The system is a complete email management system because it includes

special features like email navigation and management. Users with typing issues, disabilities, limited skills or knowledge, and elderly people can also benefit from voice-based email systems as it offers a user-friendly and straightforward communication method.

## 4 LITERATURE REVIEW

[1] This research solution is based on the creation of a desktop programme that will enable users with visual impairments to quickly and simply retrieve email by integrating it with certain email clients, providing users the ability to access their features. However, there is a requirement for a system that is more inclusive of users with speech disabilities or individuals with different languages and also there is a dependency for additional hardware cost of mic if using a desktop.

[2] The paper outlines a novel technique intended to improve email accessibility for those with specifically only having visual impairments. Those with physical limitations can also benefit from the system, creating the potential to be expanded to include other uses in the future. The study focuses on ways to strengthen the sense of community among people with vision impairments in this constrained setting. However, there is a need for a comprehensive email management platform which is also inclusive of individuals with limited cognitive abilities, physical disabilities which hinders their ability to type, elderly people etc.

[3] The article describes a web application that employs voice commands to operate the system. Users can access numerous services with speech commands and register for utilizing a voice-assisted method. In order to access services and acquire all the necessary information through voice commands, the system will prompt users to carry out particular actions. The system will function in accordance with the various areas of the dashboard to give the user the requested service.

[4] The article highlights a system that offers email services using speech recognition and mouse clicks. The requirement for using a keyboard has been completely eliminated. The user can enter their login credentials, which is verified and encrypted before redirecting them to the dashboard. When the user replies to a voice command from the system to do an action, the system transforms the voice command to text and carries out the requested action, such as sending an email or performing other tasks. However, implementing

speech based login verification creates the need for careful consideration of security and privacy. Unauthorized attacks and access should be prevented and the system should be robust against voice mimicking or other types of threats. Therefore, it is recommended to implement additional security measures, such as multi-factor authentication, to ensure the system is secure.

[5] The present email systems are reliant on visual impressions making them ineffective for those with visual impairments. In order to give visually impaired persons a straightforward and convenient way to access email, the paper suggests a new email system based on voice control principles designed to be further helpful to people with other disabilities, the system.

## 5 NOVELTY

Our voice-based email system enables users to constitute and send e-mails without the need to type on a keyboard, building a faster communication and a more proficient than ever before voice based system. The user simply needs to speak out the message, and our speech recognition technique computes the rest, ensuring correct transcription and delivery as it is built upon the following techniques:

### 5.1 NLP Technology

NLP technology to recognize the interests and intentions of the users and receive or compose emails with the help of speech-to-text transcription algorithms.

### 5.2 Personalized voice commands

Personalized speech instructions are utilized in the e-mail system for the visually impaired users to generate customized commands for the execution several tasks within the email domain, making the communication more natural and designed to their particular needs and interests.

### 5.3 Smart inbox organization

Smart inbox organization employs Machine learning techniques like Decision Trees or Neural Networks to classify and arrange the emails on the basis of priority based on the visually impaired person's previous email interactions constructing an easier-to-use, navigate and manage their e-mail excluding the need for manual arrangements.

### 5.4 Multilingual Language Support

Multilingual language support empowers the system to distinguish and respond to different languages allowing for a more inclusive system where users who speak a certain language different from the default language to handle their e-mails can enjoy an improved, more accessible and usable system.

## 6 PROPOSED METHODOLOGY

The proposed system will use state-of-the-art speech recognition technology and natural language processing algorithms to convert the user's voice commands into text and then into actionable email commands. With the aid of voice-based email technology, users can create and send email messages entirely orally. For those who

prefer speaking to typing or who have trouble using a keyboard, this innovation is meant to make emailing simpler and more accessible. Users can dictate their emails and deliver them to recipients using speech-based email by using just a few straightforward voice commands.

- Voice recognition system: The email system records spoken input from patients who are blind or visually challenged and accurately transcribes it.
- User Input: The user will be required to provide their login information and confirm their entry.
- Input Validation: The user is then directed to the main menu, where he or she can select one of the five options for the email operation to be carried out: inbox to check the received emails, compose mail to send the desired email to the desired recipient, trash to check the deleted emails, and sent mails to check the user's outbox.
- Speech-to-text transcription: After the user dictates their message, the system uses a speech-to-text transcription technology to turn it into text.
- Text-to-speech output: The system reads out the contents of the user's messages to them using a text-to-speech tool when they are listening to their messages. Overall, the voice-based email system user interface ought to be simple to operate and navigate, with audible prompts that are easy to understand and voice recognition that works as expected.

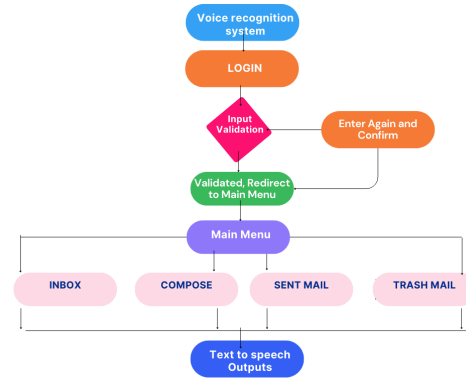


Figure 1: Workflow

## 7 BASELINE RESULTS

The Voice Based email system has been designed in a way that the visually impaired can provide speech inputs to interact with the user interface and the email system will provide him/her with the desired functionalities.

### 7.1 LOGIN

The login page will allow the users to access their email accounts with the help of their speech inputs as the means of authentication which would be particularly useful for users who have difficulty typing, individuals with disabilities, people with limited skills or education or elderly people. The Following methodology has been implemented to curate the speech-based login page: An interactive

user interface that prompts the user to input their email address using speech inputs. Applying speech recognition tools to capture the user's email address. The email address is then validated by checking it against a database of registered users using sqlite. If the email address is valid, the user is then prompted to provide their password using speech recognition. Now, similarly the password is validated by checking it against the user's stored password. If the password is valid, grant the user access to their email account.

Figure 2: Login

## 7.2 MAIN MENU

After the user's credentials have been validated, he/she will be redirected to the main menu where the user will be prompted to select an option from a list of options: compose, inbox, sent, trash, and logout. The following steps have been taken to implement the main menu: The user interface for the main menu that prompts the user to select an option from compose, inbox, sent, trash, and logout. Google speech recognition tools to capture the user's speech input. The option would then be authenticated against the list of the given 5 options. Appropriate action would be taken if the selection is found to be valid and if not valid then the user will be prompted to try again.

Figure 3: Main Menu

## 7.3 COMPOSE MAIL

If the selection made by the user is "Compose", the user will be asked to input the recipient's email address via speech and then the recipient's email address will be captured accordingly. After that, the user will be asked to speak the email subject and body. After validating those, the user will be asked to compose the email and send it.

## 7.4 INBOX

If the selection made by the user is "Inbox", the user's inbox will be fetched and the google text to speech tool will read out the email messages in their respective inboxes.

## 7.5 SENT MAIL

If the selection made by the user is "Sent", the user's outbox/sent mails will be fetched and the google text to speech tool will read out the sent out email messages.

## 7.6 TRASH

If the selection made by the user is "Trash", the user's deleted emails will be fetched and the google text to speech tool will read out the deleted email messages.



Figure 4: System Prototype

## 8 DATABASE AND CODE

Database, code and related work to assist in the reproduction of our research can be found at : <https://github.com/relkar-rajat/IR-Project-Group-24>

## 9 EVALUATION

- The Voice-Based Email System is an email management system designed to be accessible to individuals with visual and physical impairments, limited cognitive abilities, and older people.
- The system is voice-controlled, eliminating the need for typing, and features email navigation and management capabilities. The system employs Google's Speech Recognition Library to convert speech to text and identifies the user's speech input through a parameter called 'confidence.'

- The login page allows users to access their email accounts using speech input for authentication, validated using speech recognition tools and a database of registered users.
- After authentication, the user is redirected to the main menu, where they can select an option from a list of options, including compose, inbox, sent, trash, and logout.
- The system allows users to compose emails, read their inboxes and sent items, and delete emails using voice commands. The system aims to improve the translation of speech data to text, particularly in noisy environments.

## 10 CONCLUSION

In conclusion, our voice-based email system employing NLP technology, smart inbox organization, personalized speech instructions, and multilingual language support can considerably improve ease of access and usability for the visually impaired as well as disabled users. The scheme can recognize user intent with the help of speech-to-text conversion technique, facilitating users to receive or compose e-mails without the hassle of manual interaction with the system. Personalized speech instructions enrich the user experience by letting customization of the e-mail system to their particular

needs and preferences. Smart inbox organization utilizing machine learning techniques can classify and rank emails on the basis of the user priorities automatically making the tedious email management task easier for the visually impaired. To sum up, multilingual language support assists the system to distinguish and respond to different languages, enabling the email system to be more inclusive and available to a broader range of users.

## REFERENCES

- [1] Aishwarya Belekar, Shivani Sunka, Neha Bhawar, and Sudhir Bagade. Voice based e-mail for the visually impaired. *International Journal of Computer Applications*, 175(16):8–12, 2020.
- [2] V. Renita Dr. P. Lakshmi Harika M. R. Pradhissha, M. Vasanth. Voice based mail system for visually impaired. *INTERNATIONAL JOURNAL OF ENGINEERING RESEARCH TECHNOLOGY (IJERT)*, 11(5).
- [3] Harsh D Shah, Amit Sundas, and Shabnam Sharma. Controlling email system using audio with speech recognition and text to speech. In *2021 9th International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions)(ICRITO)*, pages 1–7. IEEE, 2021.
- [4] S Subhash, Prajwal N Srivatsa, S Siddesh, A Ullas, and B Santhosh. Artificial intelligence-based voice assistant. In *2020 Fourth world conference on smart trends in systems, security and sustainability (WorldS4)*, pages 593–596. IEEE, 2020.
- [5] Paulus A Tiwari, Pratiksha Zodawan, Harsha P Nimkar, Trishna Rotke, Priya G Wanjari, and Umesh Samarth. A review on voice based e-mail system for blind. In *2020 International Conference on Inventive Computation Technologies (ICICT)*, pages 435–438. IEEE, 2020.