Skybox

Project submitted for the partial fulfilment of the requirements for the course

CSE 305L: Software Engineering Lab

Offered by the

Department of Computer Science and Engineering

School of Engineering and Sciences

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CONTENTS

ABSTRACT

In the rapidly evolving landscape of digital communication, email remains a fundamental tool for personal and professional interactions. However, traditional email services often present challenges related to efficiency, effectiveness, and user experience. To address these challenges and elevate the email communication experience, we present Skybox, an innovative email platform designed to revolutionize how users compose, manage, and interact with emails.

Skybox goes beyond conventional email services by integrating advanced features such as email writing templates, AI-driven chat for composing emails, real-time support chat, and mail delivery status tracking. These features are aimed at enhancing email writing efficiency, improving communication effectiveness, and providing users with greater control and visibility over their email interactions.

Through this project, we aim to redefine the email experience, empower users with innovative tools, and set new standards in email communication. Skybox represents a step forward in leveraging technology to facilitate efficient and meaningful email interactions, catering to the evolving needs of users in the digital age.

1. INTRODUCTION

In today's digital era, email services have become indispensable tools for staying connected, managing tasks, and exchanging information. To enhance the email experience and address common user challenges, our project, Skybox, aims to develop a feature-rich email platform that goes beyond traditional email services.

Skybox is a modern email application that combines the familiar functionality of Gmail with innovative features designed to streamline email writing, enhance user productivity, and improve communication efficiency. By integrating innovative features such as email templates, AI-driven chat for composing emails, support chat, and mail delivery status tracking, Skybox seeks to redefine how users interact with their emails.

This project report outlines the objectives, methodology, and all the components of Skybox, highlighting its unique features and the value it aims to deliver to users.

1.1 PROBLEM STATEMENT

Despite the popularity of email services, users often need help with productivity and efficiency in email communication. The main problem is time-consuming email composition. Writing emails from scratch can be time-consuming, especially for repetitive or standard communications.

Skybox aims to address these challenges by introducing innovative features that empower users to compose emails more efficiently, communicate effectively, and gain real-time information about the delivery status of their emails. Through the integration of AI-driven technologies and real-time support capabilities, Skybox strives to elevate the email experience and redefine email communication for modern users.

1.2 OBJECTIVES

1.2.1. Enhance Email Writing Efficiency:

- Implement email writing templates and AI-powered chat to assist users in composing emails quickly and effectively.
- Reduce the time spent on repetitive or standard email communications.

1.2.2. Improve Communication Effectiveness:

- Introduce AI-driven features to enhance the clarity and impact of email communication.
- Enable users to convey messages more effectively, leading to better understanding and response.

1.2.3. Provide Real-Time Support:

- Integrate a support chat feature within the email interface to facilitate real-time assistance for users.
- Improve user experience by addressing queries and issues promptly within the email platform.

1.2.4. Enhance User Productivity:

- Offer innovative features such as mail delivery status tracking to provide users with visibility into the status of their sent emails.
- Empower users with tools that enhance productivity and efficiency in email management.

1.2.5. Redesign User Interface for Intuitive Experience:

- Create a user-friendly and visually appealing interface that enhances usability and navigation.
- Prioritize user experience through intuitive design and seamless interactions.

1.2. 6. Ensure Security and Reliability:

- Implement robust security measures to protect user data and ensure confidentiality in email communications.
- Enhance system reliability and uptime to provide a dependable email service to users.

1.2.7. Differentiate from Traditional Email Services:

- Introduce unique features and functionalities that set Skybox apart from existing email services.
- Offer a compelling alternative that addresses the evolving needs and expectations of users.

1.2.8. Drive Innovation in Email Technology:

- Pioneer new technologies and methodologies in email communication to push the boundaries of traditional email services.
- Continuously innovate and iterate to deliver cutting-edge solutions in the email domain.

2. PROPOSED SOLUTION APPROACH

2.1. Requirements Gathering and Analysis:

- Conduct thorough requirements gathering through stakeholder interviews, user surveys, and customer discussions.
- Define functional and non-functional requirements for Skybox, considering features like email templates, AI chat, support chat, and delivery status tracking.

2.2. User-Centric Design:

- Develop detailed user personas and user stories to understand user needs and expectations.
- Create wireframes and interactive prototypes to visualize the user interface and gather early feedback from stakeholders and potential users.
- Iterate on design based on feedback to ensure an intuitive and visually appealing user experience.

2.3. Architecture and Technology Selection:

- Design a scalable and modular architecture for Skybox, considering frontend (UI/UX) and backend components.
- Select appropriate technologies and frameworks based on project requirements (e.g., React.js/Vue.js for frontend, Node.js/Python for backend, MongoDB/PostgreSQL for database).
- Integrate third-party APIs or services for AI capabilities, real-time chat, and email delivery tracking.

2.4. Feature Development:

Implement core features of Skybox, including:

- Email Writing Templates: Develop a template system with customizable email formats and predefined templates.
- AI Chat for Email Composition: Integrate natural language processing (NLP) to assist users in composing emails through conversational AI.
- Real-Time Support Chat: Implement a chat system for users to interact with support agents directly within the email platform.
- Mail Delivery Status Tracking: Develop mechanisms to track email delivery and provide users with status updates (e.g., delivered, read).

2.5. Security and Privacy Measures:

- Implement robust security measures to protect user data, including encryption of sensitive information and secure authentication mechanisms.
- Adhere to privacy regulations (e.g., GDPR, CCPA) and best practices for data handling and storage.

2.6. Testing and Quality Assurance:

- Develop comprehensive test plans covering unit testing, integration testing, system testing, and acceptance testing.
- Perform usability testing to evaluate the effectiveness of email templates, AI chat, and support chat features.
- Conduct performance testing to ensure scalability, responsiveness, and reliability under load.

2.7. Deployment and Continuous Integration/Continuous Deployment (CI/CD):

- Set up deployment pipelines using CI/CD tools (e.g., Jenkins, GitLab CI/CD) for automated build, testing, and deployment processes.
- Deploy Skybox to cloud infrastructure (e.g., AWS, Azure) for scalability and reliability.
- Implement monitoring and logging to track application performance and detect issues in real-time.

2.8. User Training and Documentation:

- Prepare user documentation and training materials to onboard users and guide them on using Skybox's features effectively.

2.9. Maintenance and Support:

- Establish post-launch maintenance procedures to address bugs, performance issues, and feature enhancements.

2.10. Iterative Development and Continuous Improvement:

- Adopt Agile methodologies for iterative development and prioritize feature enhancements based on user feedback and market trends.
- Continuously monitor user engagement and usage patterns to inform future iterations and updates of Skybox.

3. REQUIREMENTS GATHERING & ANALYSIS

3.1.Discussion I with Customer -

We want a web application to send emails.
Users should be able to log in to view their incoming and compose & send mails.

Features -	Feasibility
Text editor to compose email	☑
Page to view incoming emails	☑
Search for emails	☑
Search for contacts	☑
Settings	☑
Login Page/Logout	☑

3.2. Discussion 2 with customer -

To organize the many emails, we want to categorize them as starred, spam, trash etc. Attachments should also be allowed while composing the emails. We want to attach documents, ages, videos, emojis. While composing lengthy emails, we may need more time to complete it in one session and send it immediately. So, some features to save drafts will also be useful.

Features-	Feasibility
Categories of mails:	
• all	☑
• starred	☑
• spam	☑
• drafts	☑
• sent	☑
• trash	☑
Attachments	☑
• documents	☑
• media	☑
• emojis	☑
• links	☑
Drafts	☑
• composing	☑
• Saving	☑

3.3. Discussion 3 with Customers-

Please add more features in search like searching by categories or time durations. Add the functionalities to schedule emails and send them at a specified time. Also, create a help or support system where some FAQs are addressed.

Features	Feasibility
Search ● categories ● from id ● to id ● from time ● to time	☑
Schedule Send ● set time ● compose mail ● save mail	☑
Schedule receive snooze	□
Help/Support Chat	☑

4. SPECIFIC REQUIREMENTS

4.1 EXTERNAL INTERFACES

- A user-friendly UI that is accessible via web browsers
- RESTful APIs for integrating with external systems

4.2 FUNCTIONAL REQUIREMENTS

4.2.1 Sending emails

- Users can use our text editor to compose emails.
- They can also utilize our templates.
- Users can add attachments, links etc to emails.
- Users can specify recipients and CC or BCC recipients.
- Users can write a subject line for the emails.

4.2.2 Receiving emails

- Users can receive emails in their inbox.
- Users can open and read emails.
- Emails are displayed with sender, subject and timestamp.

4.2.3 Organizing emails

- Users can assign labels to the emails in their inbox.
- Users can move emails to specific folders.

4.2.4 Searching emails

- Users can search for emails based on keywords, sender, recipient, subject, categories etc.
- Search results are displayed in an organized & sorted manner.

4.2.5 Support Chat

This feature will help & answer that to use the frequently asked questions the user wants to ask. This makes the web app easier to use.

4.2.6 Templates to Compose Emails

Provide users with ready-made templates that enable them to world and personalize frequently sent meals This increases the user's productivity by helping them wile great emails

4.2.7 Tracking Status

- Delivery Status
- Received Status
- Read status

This feature helps the were to know whether the email they have sent has been received by the recipient or not, or whether they have read it or not

4.2.8 Schedule Send

This enables the users to send the email they have composed previously whenever they want at a desired time.

4.2.8. Paraphrasing

Users can paraphrase any mail by clicking on the paraphrase button in the compose window.

4.2.9. Summasing

Users can summrise any mail by clicking on the summarise button in the compose window. This will help them to read emails quickly.

4.3 NON-FUNCTIONAL REQUIREMENTS

4.3.1 Performance

The system should be able to handle a large amount of users and user data which are working concurrently without much performance degradation. Emails should be delivered & received promptly, with minimal latency.

4.3.2 Reliability

The email system should have a high amount of available time and minimum downtime for upgrades and maintenance. Failure correction mechanisms are required to ensure uninterrupted service.

4.3.3 Scalability

The system architecture should be designed to scale horizontally to accommodate increasing user demand. Scalability testing should be conducted regularly to assess the system's ability to scale.

4.3.4 Compatibility

The system is compatible with a wide range of web browsers. Chrome, Firefox, Safari and Edge.

4.3.5 Usability

The user interface will be kept intuitive and user-friendly, requiring minimal training for users to navigate and use Skybox effectively..

4.3.6 Security

The system shall implement robust security measures to protect against phishing attacks unauthorized access, data breaches and phishing attacks

4.4. USER INTERFACE REQUIREMENTS

4.4.1. Clean and intuitive layout

We need a visually appealing and easy-to-navigate interface with an organised inbox layout and clear navigation.

4.4.2. Responsive Design

Ensure the interface adapts seamlessly to different devices, providing a consistent user experience.

4.4.3. Composition Interface

We need a clean and uncluttered interface for composing emails, with clear fields for the sender, recipient, subject, etc.

4.4.4. Iconography

Designs of clear and intentive icons are required, because they will be used to represent actions & features of the web application.

4.4.5. Feedback & Error Handling

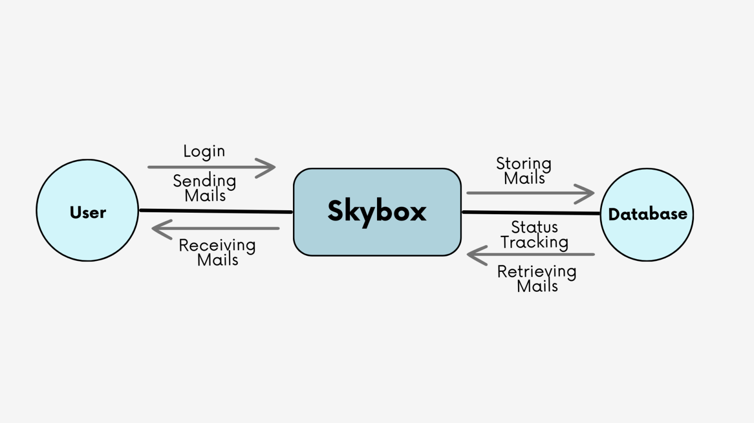
Constant feedback and improvements need to be done to assist users' needs and resolve issues effectively.

5. SYSTEM DESIGN

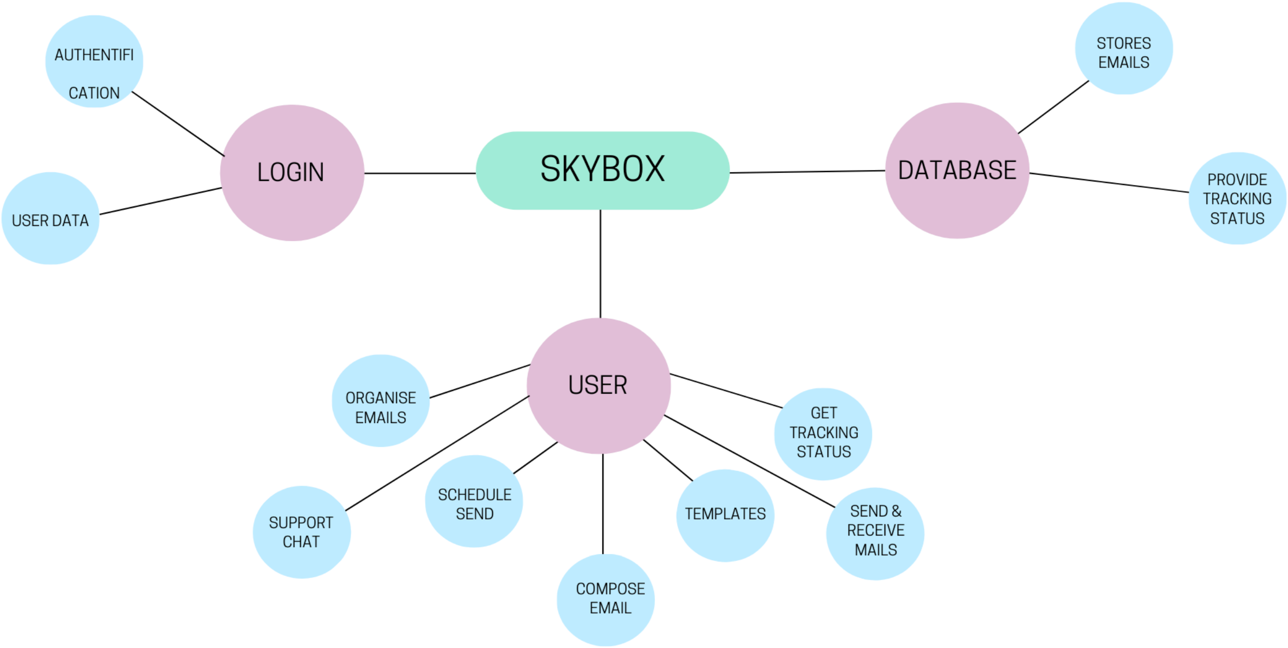
5.1. DATA FLOW DiAGRAMS

5.1.1. 0-level DFD

This diagram shows the three main components of the Skybox web application which are the user

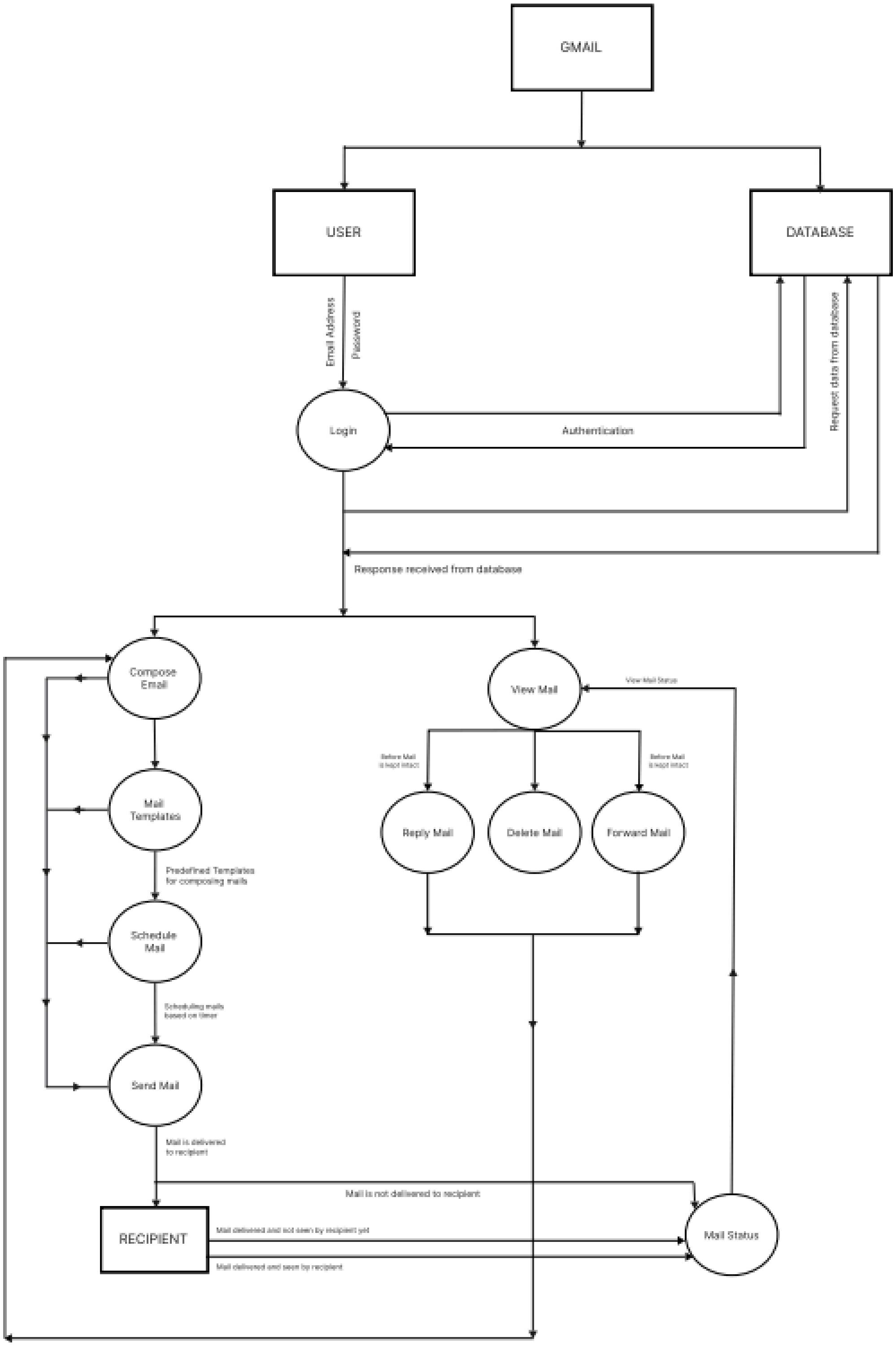


5.1.2. 1-level DFD



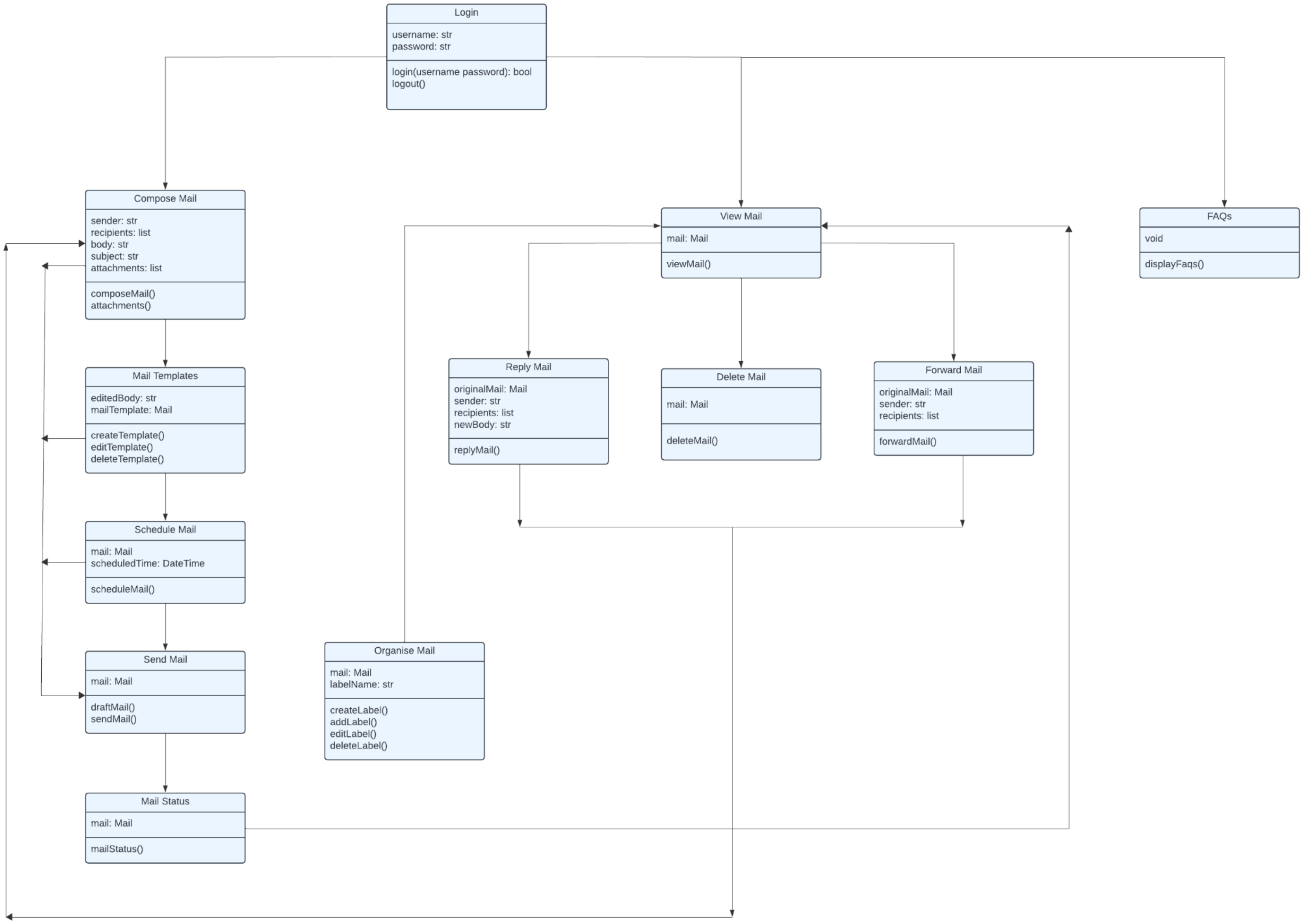
This diagram shows our functionalities in more detail. We can also see how these functionalities are divided among the three core parts of our application. First, we can see the login part where the user should enter their data, such as mail ID and password. Next, the functionalities that the user can use are shown. These include writing, composing and sending emails, templates for writing emails, quickly, and new innovative editing tools.

5.1.3. 2-level DFD


GMAIL
USER
DATABASE
Email Address
Password
Login
Authentication
Request data from database
Response received from database
Compose Email
View Mail
View Mail Status
Before Mail is kept intact
Before Mail is kept intact
Mail Templates
Reply Mail
Delete Mail
Forward Mail
Predefined Templates for composing mails
Schedule Mail
Scheduling mails based on timer
Send Mail
Mail is delivered to recipient
Mail is not delivered to recipient
RECIPIENT
Mail delivered and not seen by recipient yet
Mail delivered and seen by recipient
Mail Status

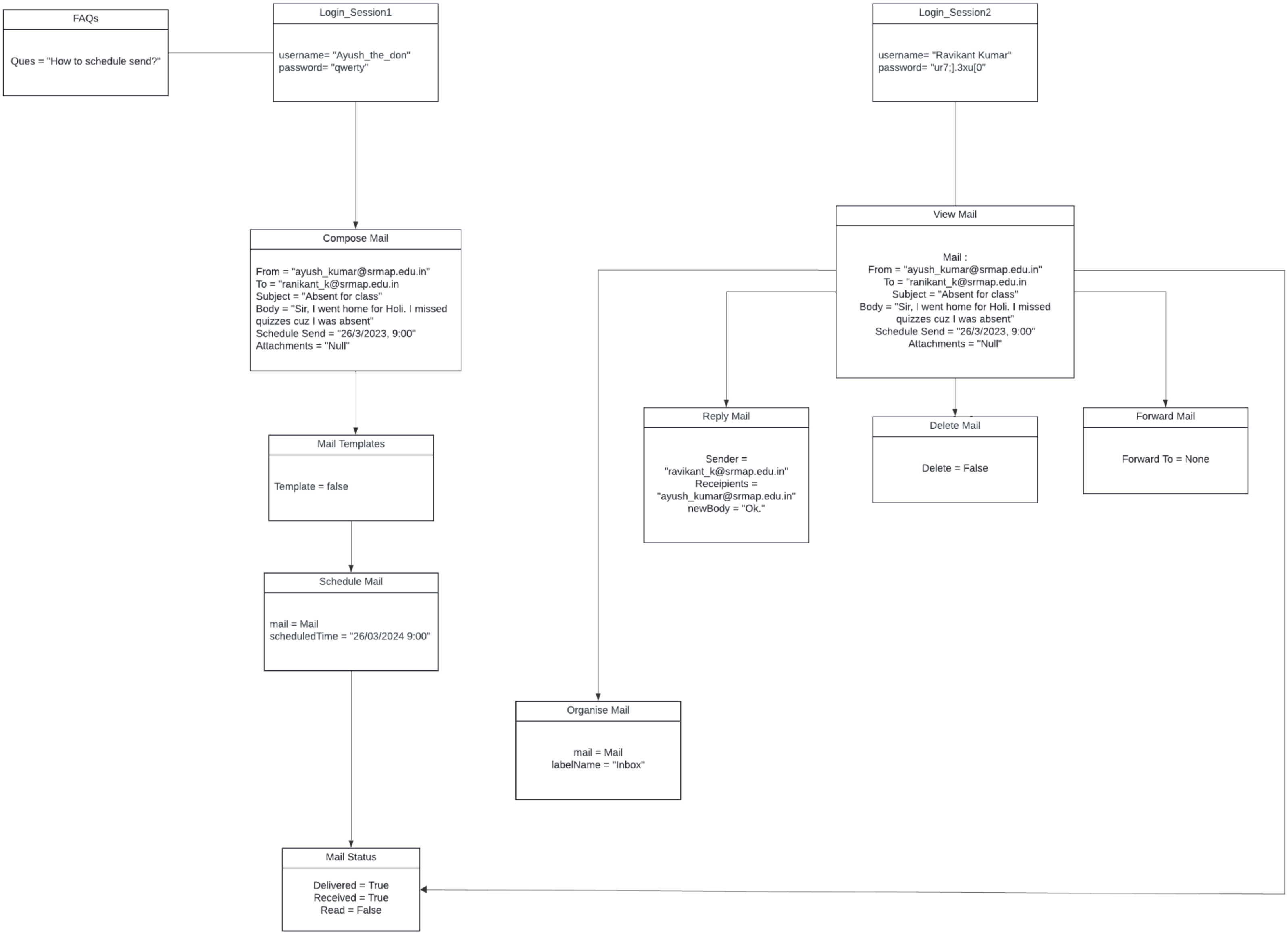
This diagram shows a more detailed view of the modules and how they are interconnected to work together efficiently. Skybox has 2 major parts, the user side and the database side. After logging in, the user has access to the different features for sending and receiving mails, On the other hand, the database provides all their information to authenticate them and show their emails.

5.2 CLASS DIAGRAM



Class diagrams are a type of UML (Unified Modeling Language) diagram used in software engineering to visually represent the structure and relationships of classes in a system. Here, the classes used in implementing the Skybox program are depicted.

5.3. OBJECT DIAGRAM

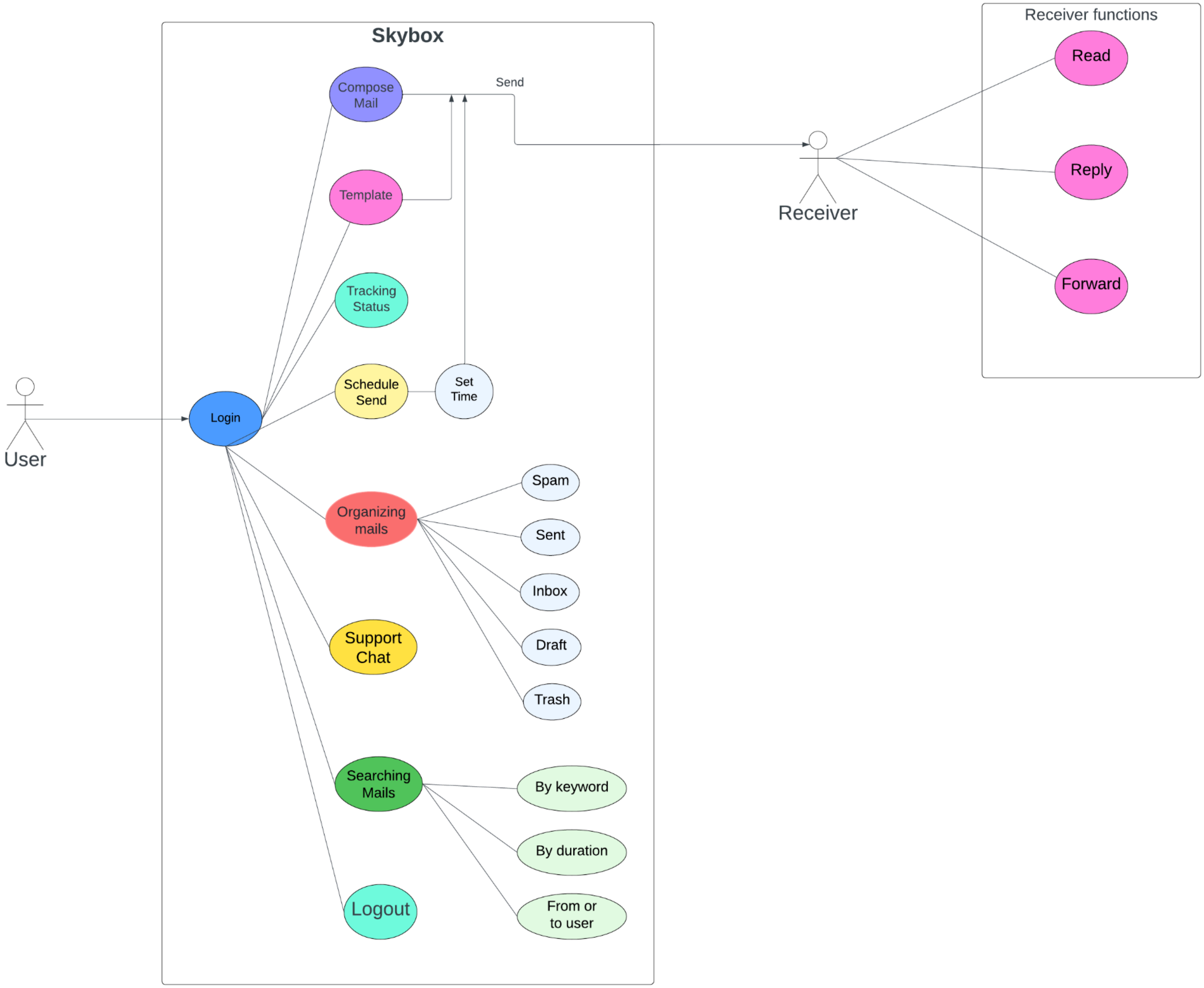

FAQs
Ques = "How to schedule send?"
Login_Session1
username= "Ayush_the_don"
password= "qwerty"
Login_Session2
username= "Ravikant Kumar"
password= "ur7;].3xu[0"
Compose Mail
From = "ayush_kumar@srmap.edu.in"
To = "ranikant_k@srmap.edu.in
Subject = "Absent for class"
Body = "Sir, I went home for Holi. I missed quizzes cuz I was absent"
Schedule Send = "26/3/2023, 9:00"
Attachments = "Null"
View Mail
Mail :
From = "ayush_kumar@srmap.edu.in"
To = "ranikant_k@srmap.edu.in
Subject = "Absent for class"
Body = "Sir, I went home for Holi. I missed quizzes cuz I was absent"
Schedule Send = "26/3/2023, 9:00"
Attachments = "Null"
Reply Mail
Sender = "ravikant_k@srmap.edu.in"
Receipients = "ayush_kumar@srmap.edu.in"
newBody = "Ok."
Delete Mail
Delete = False
Forward Mail
Forward To = None
Mail Templates
Template = false
Schedule Mail
mail = Mail
scheduledTime = "26/03/2024 9:00"
Organise Mail
mail = Mail
labelName = "Inbox"
Mail Status
Delivered = True
Received = True
Read = False

Object diagrams display objects, their attributes, and the links between them, providing a snapshot of the system's structure during execution.

Here, we have instantiated two login sessions, one for the sender, and another for the receiver. This helps to showcase the various functionalities of Skybox that are available for both parties. The user logs in and composes mail, for which he can also use templates and AI prompt. He may also schedule send the mails. The receiver, on the other hand, can organize, reply to, forward or delete any received mail. He can also paraphrase it.

Both users have access to Support FAQs for the entire session.

5.4. USE CASE DIAGRAM



This is the use case diagram for Skybox which explores the different ways any user may use the application. More details on the use cases can be found in the next section.

6. USE CASES

6.1. Composing & sending emails

- The user enters a recipient mail address
- The user adds the subject me and writes the mail body.
- The user attaches files if necessary
- User clicks. the send button to send the email

6.2. Receiving and Reading emails

- The user logs in to their account.
- The user navigates to the inbox.
- The user clicks on an email to open & read it
- User may reply, forward, archive or delete the email as needed

6.3. Paraphrasing

- The user opens any mail or composes a mail.
- The user clicks on the paraphrase icon.
- The paraphrased text appears instead of the original text in the compose window.

6.4. Summarising

- The user opens any mail.
- The user clicks on the summarise icon.
- The summarised text appears instead of the original text in the compose window.

6.5. Organising emails

- The user logs in and navigates to the inbox
- The user clicks on the icon on the email to categorise it as starred /important/span /archived etc.

6.6. Searching for emails

- The user uses the search bar to search for emails by keyword, sender, recipient, or categories.
- They may also specify the duration by using date within or categories
- Guard displays the search results matching the user's query

6.7. Tracking email status

- The user navigates to the sent mail Category.
- User clicks on the mail of which they wish to see the status.
- A pop-up shows them whether the mail has been delivered or read or is still pending.

6.8. Using Templates to Compose Email

- The user clicks the ‘Compose Mail’ button and then navigates to the templates section.
- They choose a template and it opens in the composer.

- They modify the contents as they need.
- They send the email.

6.9. Logging In

- Users can access the email system on different devices.
- They log in with their email id and a confidential password
- User experiences a consistent interface and synchronization of mails on all devices.

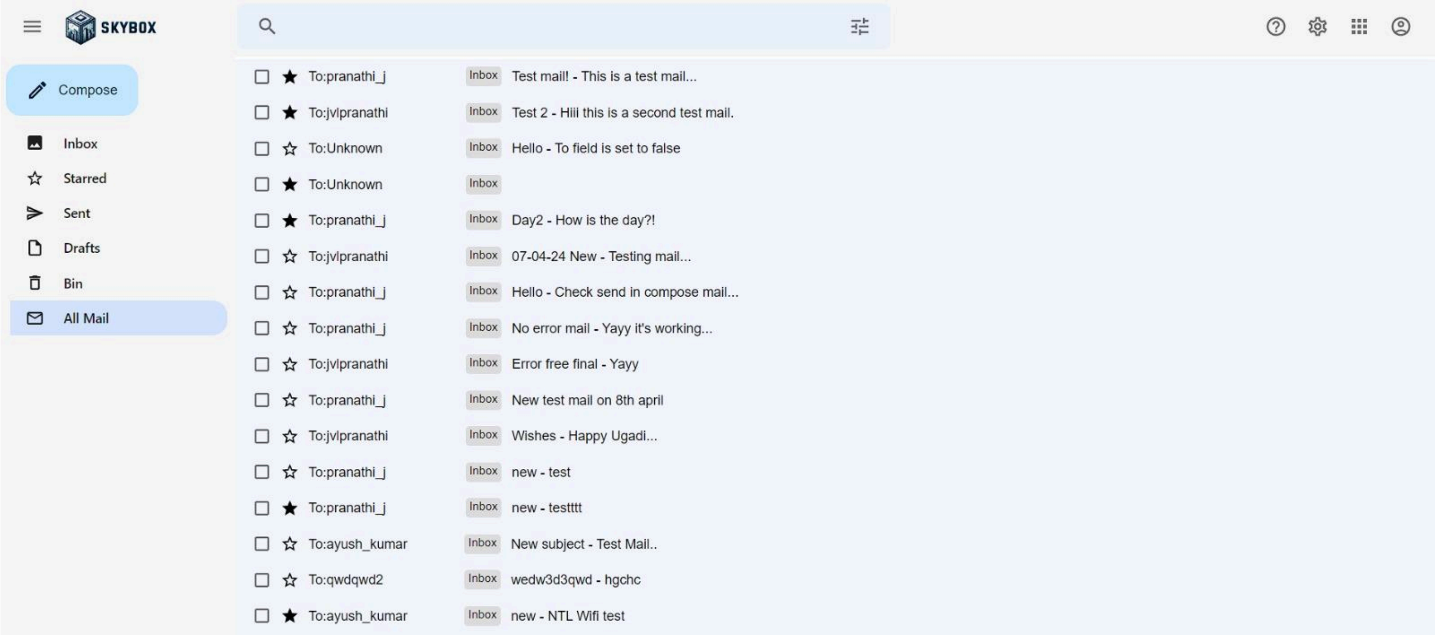
6.10. Schedule Send

- The user composes an email and chooses schedule send from the toolbar.
- Use specifies a time when the mail is to be sent.

6.11. Support Chat

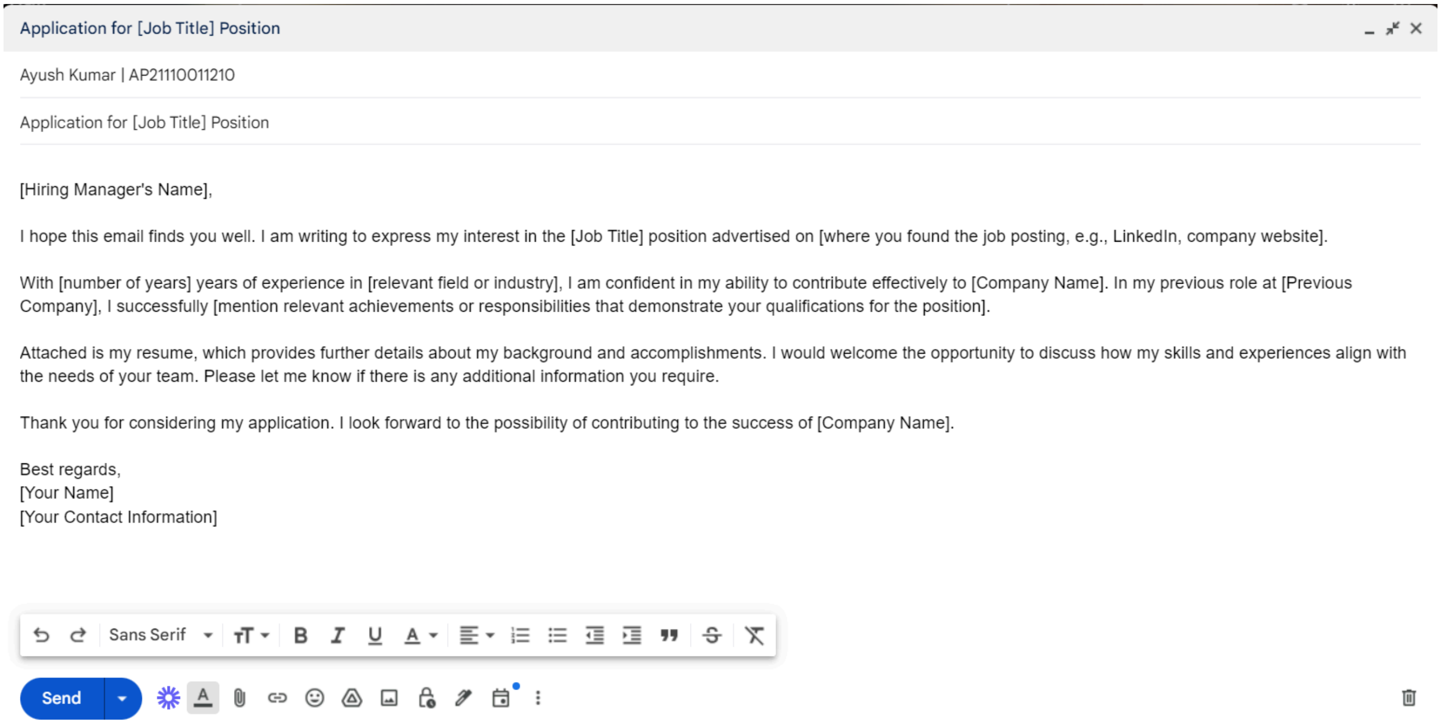
- The user clicks on the 'support icon
- A menu of FAQs appear
- The user reads & closes the menu.

7. OUTPUTS



□	★	To:pranathi_j	Inbox	Test mail! - This is a test mail...
□	★	To:jvlpranathi	Inbox	Test 2 - Hiii this is a second test mail.
□	☆	To:Unknown	Inbox	Hello - To field is set to false
□	★	To:Unknown	Inbox	
□	★	To:pranathi_j	Inbox	Day2 - How is the day?!
□	☆	To:jvlpranathi	Inbox	07-04-24 New - Testing mail...
□	☆	To:pranathi_j	Inbox	Hello - Check send in compose mail...
□	☆	To:pranathi_j	Inbox	No error mail - Yayy it's working...
□	☆	To:jvlpranathi	Inbox	Error free final - Yayy
□	☆	To:pranathi_j	Inbox	New test mail on 8th april
□	☆	To:jvlpranathi	Inbox	Wishes - Happy Ugadi...
□	☆	To:pranathi_j	Inbox	new - test
□	★	To:pranathi_j	Inbox	new - testttt
□	☆	To:ayush_kumar	Inbox	New subject - Test Mail..
□	☆	To:qwdqwd2	Inbox	wedw3d3qwd - hgchc
□	★	To:ayush_kumar	Inbox	new - NTL Wifi test

Fig 7.1. The inbox page



Application for [Job Title] Position

Ayush Kumar | AP21110011210

Application for [Job Title] Position

[Hiring Manager's Name],

I hope this email finds you well. I am writing to express my interest in the [Job Title] position advertised on [where you found the job posting, e.g., LinkedIn, company website].

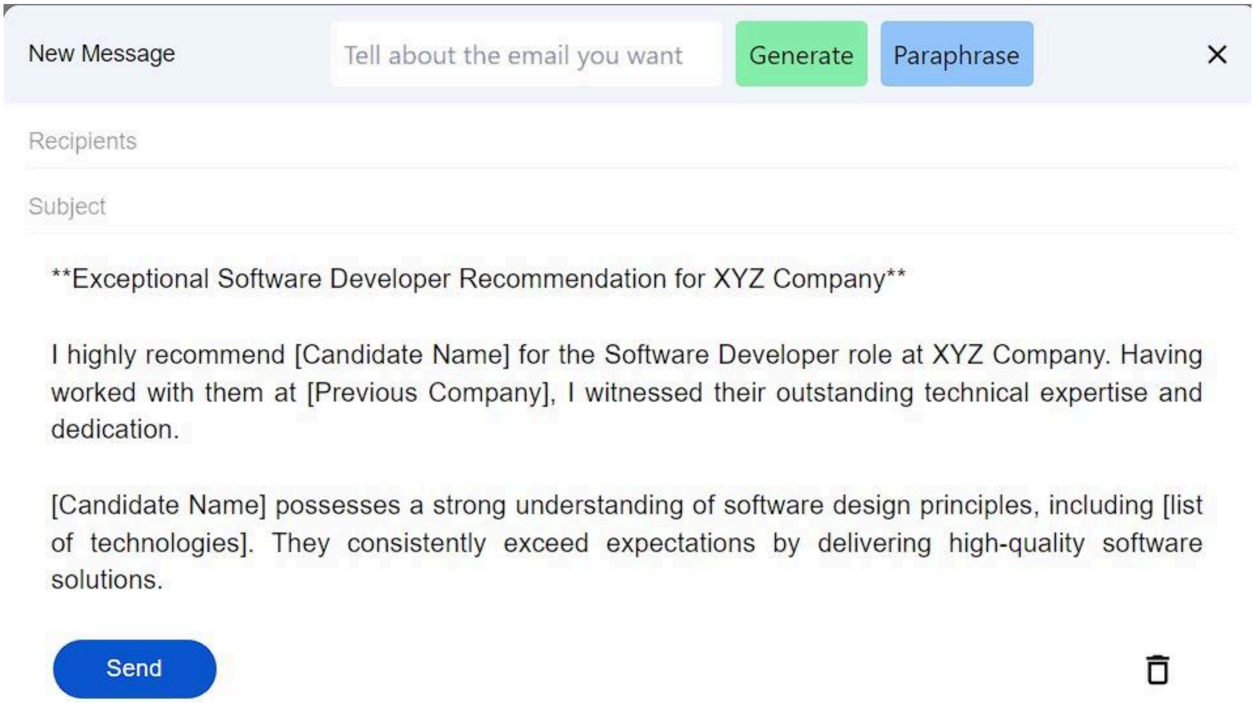
With [number of years] years of experience in [relevant field or industry], I am confident in my ability to contribute effectively to [Company Name]. In my previous role at [Previous Company], I successfully [mention relevant achievements or responsibilities that demonstrate your qualifications for the position].

Attached is my resume, which provides further details about my background and accomplishments. I would welcome the opportunity to discuss how my skills and experiences align with the needs of your team. Please let me know if there is any additional information you require.

Thank you for considering my application. I look forward to the possibility of contributing to the success of [Company Name].

Best regards,
[Your Name]
[Your Contact Information]

Fig. 7.2. Templates for composition of mails

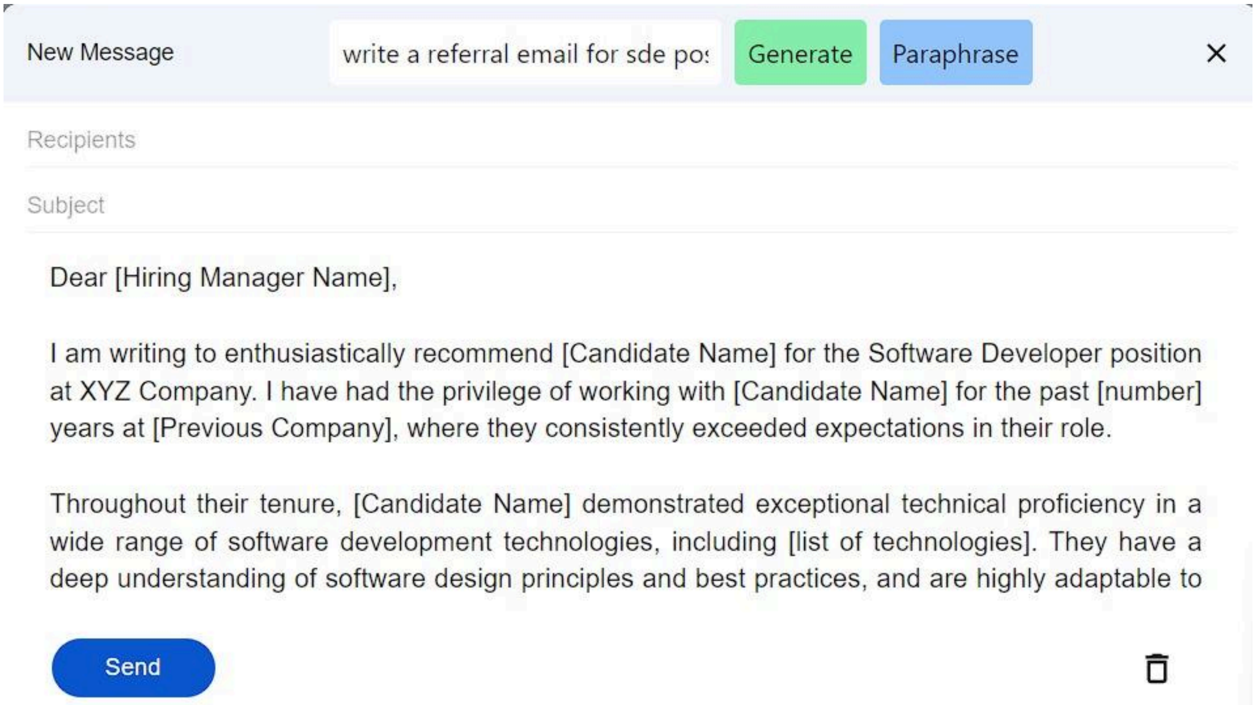


Exceptional Software Developer Recommendation for XYZ Company

I highly recommend [Candidate Name] for the Software Developer role at XYZ Company. Having worked with them at [Previous Company], I witnessed their outstanding technical expertise and dedication.

[Candidate Name] possesses a strong understanding of software design principles, including [list of technologies]. They consistently exceed expectations by delivering high-quality software solutions.

Fig 7.3. User’s AI-generated / original email



write a referral email for sde po:

Dear [Hiring Manager Name],

I am writing to enthusiastically recommend [Candidate Name] for the Software Developer position at XYZ Company. I have had the privilege of working with [Candidate Name] for the past [number] years at [Previous Company], where they consistently exceeded expectations in their role.

Throughout their tenure, [Candidate Name] demonstrated exceptional technical proficiency in a wide range of software development technologies, including [list of technologies]. They have a deep understanding of software design principles and best practices, and are highly adaptable to

Fig 7.4. Paraphrased email

8. CONCLUSION

The development and implementation of Skybox represent a significant advancement in the realm of email communication technology. By integrating innovative features such as email writing templates, AI-driven chat, real-time support chat, and mail delivery status tracking, Skybox aims to enhance user productivity, improve communication effectiveness, and provide a modernized email experience.

As we move forward, continuous iteration and enhancement of Skybox will remain crucial. We are dedicated to refining existing features, addressing user suggestions, and exploring new functionalities to further elevate the email experience. Additionally, ongoing efforts will focus on optimizing security measures, enhancing scalability, and expanding integration with emerging technologies to solidify Skybox as a leading email service provider.

In summary, Skybox is poised to make a lasting impact on how individuals and organizations communicate via email, offering a comprehensive suite of tools and capabilities to streamline email interactions and foster meaningful connections.

9. FUTURE SCOPE

Looking ahead, the future scope for Skybox encompasses several areas of development and expansion:

1. Feature Enhancements: Continuously enhance existing features such as email templates, AI chat capabilities, and support chat functionalities based on user feedback and market trends.

2. Mobile Application: Develop a dedicated mobile application for Skybox to provide seamless email access and functionality on smartphones and tablets.

3. Enhanced Security Measures: Implement additional security measures (e.g., multi-factor authentication, advanced encryption) to enhance data privacy and protection.

4. Integration with Productivity Tools: Integrate Skybox with popular productivity tools (e.g., calendars, task managers) to create a unified digital workspace for users.

5. Localization and Globalization: Extend Skybox's reach by supporting multiple languages and regional preferences to cater to a global user base.

By pursuing these future initiatives, Skybox aims to remain at the forefront of email innovation, offering an unparalleled email experience that empowers users and organizations to communicate effectively and efficiently in an increasingly connected world.