A
Major Project Report on

Chat Application Using Flutter

Submitted in partial fulfillment of the requirements
for the degree of
BACHELOR OF ENGINEERING
IN
Computer Science & Engineering
Artificial Intelligence & Machine Learning

by

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CERTIFICATE

This is to certify that the project entitled "**Chat Application Using Flutter"** is a bonafide work of Ritesh Jamdar (24206005), Om Brahmavale (24206008), Sahil Birje (24206011), Shreesh Nalawade (24206012) submitted to the University of Mumbai in partial fulfillment of the requirement for the award of **Bachelor of Engineering** in **Computer Science & Engineering (Artificial Intelligence & Machine Learning).**

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Project Report Approval

This Mini project report entitled "**Chat Application Using Flutter**" by **Ritesh Jamdar (24206005), Om Brahmavale (24206008), Sahil Birje (24206011), Shreesh Nalawade (24206012)** is approved for the degree of ***Bachelor of Engineering*** in ***Computer Science &Engineering***, (AIML) ***2024-25***.

External Examiner: _____

Internal Examiner: _____

Place: APSIT, Thane

Date:

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We declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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ABSTRACT

The Chat Application Using Flutter is a real-time messaging platform designed to facilitate seamless communication. Built with Flutter for the front-end and Firebase as the back-end, the application ensures a smooth user experience across iOS and Android devices. The app provides secure user authentication, instant messaging, and push notifications, allowing users to engage in real-time conversations with enhanced security and privacy.

This project addresses the lack of a dedicated university communication platform by offering an academic-focused chat solution. Unlike traditional messaging apps, this application integrates advanced account management features, allowing users to block, report, or delete accounts for better security and control. Furthermore, customizable light and dark themes improve accessibility and user experience.

The application is developed using Flutter's Material Design, with Firebase Authenticatio for user security and Firebase Cloud Messaging (FCM) for real-time notifications. Firestore is used for efficient data storage, ensuring scalability and future adaptability.

By leveraging modern development technologies, this chat application provides a fast, secure, and user-friendly messaging experience, making it an ideal solution for structured communication in academic and professional environments.

Keywords: Real-time Messaging, Flutter, Flutter, Firebase, Secure Authentication, Push Notifications, User Privacy.

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CHAPTER 1

INTRODUCTION

1. INTRODUCTION

In today's digital era, communication plays a vital role in both academic and professional environments. Traditional messaging platforms often lack features tailored to specific communities, such as universities or organizations, leading to inefficiencies in structured communication. The Chat Application Using Flutter is designed to bridge this gap by providing a real-time, secure, and feature-rich messaging platform.

This application is a cross-platform messenger developed using Flutter for the front-end and Firebase as the back-end, ensuring seamless performance across iOS and Android devices. It offers instant messaging, push notifications, and secure user authentication, making communication more efficient and reliable. Unlike conventional social media apps, which may contain distractions, this chat application is focused on academic and professional collaboration while maintaining data privacy and security.

To enhance user experience, the application incorporates customizable themes (light and dark mode) and advanced account settings, allowing users to block, report, or delete accounts when necessary. The use of Firebase Cloud Messaging (FCM) enables real-time notifications, ensuring users never miss important messages. Additionally, Firestore is implemented as the database, providing scalability and flexibility for future enhancements.

By integrating modern technologies such as Flutter, Firebase, and Firestore, this chat application ensures secure, scalable, and real-time communication for educational institutions and professional teams. It is built to address the growing need for efficient, distraction-free, and structured communication, making it an ideal solution for university networks and organizations.

CHAPTER 2

LITERATURE SURVEY

2. LITERATURE SURVEY

2.1 Overview of Existing Systems

Instant messaging applications have evolved significantly, with various platforms such as WhatsApp, Telegram, and Slack offering real-time communication. While these platforms provide text, voice, and video communication, they are often designed for general social or business use, lacking features tailored for academic collaboration. Additionally, concerns regarding data privacy, security, and control over communication have led to the demand for a more structured messaging platform.

Several studies highlight the importance of secure and dedicated communication tools, particularly in academic settings. Many universities and organizations still rely on email chains, social media groups, and third-party applications, which often result in distractions, inefficiencies, and security risks.

2.2 Core Features of Existing Systems

Existing real-time messaging applications typically offer the following features:

- **Real-time Text Messaging** – Instant message exchange between users.
- **User Authentication** – Secure login and registration via email or phone number.
- **Push Notifications** – Alerts for new messages and updates.
- **Media Sharing** – Ability to share images, videos, and documents.
- **Cloud-Based Storage** – Messages stored securely in a cloud database.

Despite these features, data security and privacy remain major concerns. Many existing apps collect user data for advertising and analytics, raising issues related to data ownership and confidentiality.

2.3 Need for a University-Focused Chat Application

Research suggests that a dedicated university communication platform should address the following challenges:

- **Ensuring Privacy & Security:** Unlike commercial messaging apps, an academic chat system should prioritize end-to-end encryption and user-controlled data privacy.
- **Reducing Distractions:** Social media and general-purpose messaging apps often include non-academic content that may hinder student productivity.
- **Academic Features:** Integration with learning management systems (LMS), assignment sharing, and academic group discussions enhances collaboration.

2.4 Literature Review

[1] Aakarsh Vats, Shadman Azim, Alok Singh Chauhan (2023) - "Chat Messenger App Using Flutter"

This study discusses the development of a Flutter-based chat application that integrates Firebase for authentication and real-time messaging. The research emphasizes the importance of cross-platform compatibility, UI/UX design, and push notifications to enhance user engagement.

[2] Madan Kumar. R (2020) - "Chat Application Using Flutter and Firebase"
The study explores the scalability and security aspects of Firebase in chat applications. It highlights how Firebase Authentication and Cloud Firestore enable real-time message delivery while ensuring data privacy.

[3] Prerana Talwar, Arundhati Raina (2022) - "Social Media App Using Flutter"
This paper examines how Flutter's state management techniques (Provider/Bloc) improve application performance. It discusses the importance of theme customization, user blocking/reporting features, and backend efficiency in social media applications.

2.5 Summary of Findings

Based on existing research, the Chat Application Using Flutter improves upon traditional messaging platforms by:

- Offering a dedicated, distraction-free communication space for academic and professional use.
- Ensuring enhanced security with Firebase Authentication and account management features.
- Providing cross-platform compatibility with Flutter's Material Design framework.
- Supporting real-time push notifications via Firebase Cloud Messaging (FCM).

This study establishes a strong foundation for the development of an efficient, secure, and scalable chat application tailored for universities and organizations.

CHAPTER 3

PROBLEM STATEMENT

3. PROBLEM STATEMENT

In academic and professional environments, effective communication is crucial for collaboration and productivity. However, existing messaging platforms such as WhatsApp, Telegram, and Slack are not specifically designed for educational institutions and often come with several limitations, including:

- **Lack of a Dedicated University Communication Platform** – Universities and educational institutions lack a structured and secure communication system tailored to their needs. Existing platforms mix personal, social, and academic conversations, leading to distractions and inefficiencies.
- **Data Privacy Concerns** – Many commercial chat applications store and analyze user data for advertisements or third-party analytics, raising concerns about data security and user privacy. A secure platform with controlled access is needed to ensure confidentiality.
- **Lack of Academic Features in Social Media Apps** – Popular messaging apps focus on general communication and lack features such as group discussions for academic subjects, file sharing for assignments, and integration with university portals.
- **Distraction from Non-Academic Content** – Traditional messaging apps include social media integrations, status updates, and promotional content, which can divert students and faculty members from their primary academic objectives.
- **Difficulty in Managing University-Wide Communications** – Universities require a structured messaging system where students, faculty, and administrators can communicate effectively without information overload or message clutter.

Objective of the Project

The Chat Application Using Flutter aims to resolve these issues by providing:

- A secure, real-time messaging platform tailored for academic use.
- User authentication and access control to ensure privacy and data security.
- Push notifications for important academic updates and real-time conversations.
- Customizable themes (light/dark mode) for enhanced user experience.
- Account management features like blocking and reporting to maintain a safe communication environment.

By addressing these challenges, this project provides a distraction-free, secure, and efficient communication system, enhancing collaboration among students, faculty, and administrators.

CHAPTER 4

Experimental Setup

4. EXPERIMENTAL SETUP

4.1 Hardware Setup

The following computer configuration was used for the development and testing of the Chat Application Using Flutter:

- **Processor:** Intel Core i5/i7 or AMD Ryzen 5/7 (or higher)
- **Memory (RAM):** Minimum 8GB (16GB recommended for smooth performance)
- **Storage:** SSD with at least 256GB of available space
- **Operating System:** Windows 10/11, macOS (for iOS testing), and Linux (Ubuntu)
- **Network:** Stable internet connection for real-time Firebase services

4.2 Software Setup

Software Tools

- Flutter SDK
- Firebase (for authentication, Firestore, and push notifications)
- Visual Studio Code or Android Studio (for development)
- Firebase CLI (for Firebase project configuration)
- FlutterFire CLI (for Firebase integration with Flutter)
- Emulator/Physical Device (for testing)

Flutter Packages

- firebase_core (for Firebase initialization)
- firebase_auth (for user authentication)
- cloud_firestore (for database storage)
- firebase_messaging (for push notifications)
- provider (for state management)
- flutter_local_notifications (for local notifications)

Firebase Configuration

- Enable Email/Password Authentication in Firebase Console.
- Set up Firestore Database with appropriate security rules.
- Add iOS and Android apps to Firebase and download configuration files (google-services.json for Android and GoogleService-Info.plist for iOS).

CHAPTER 5

Proposed System & Implementation

5. PROPOSED SYSTEM & IMPLEMENTATION

5.1 Block diagram of proposed system

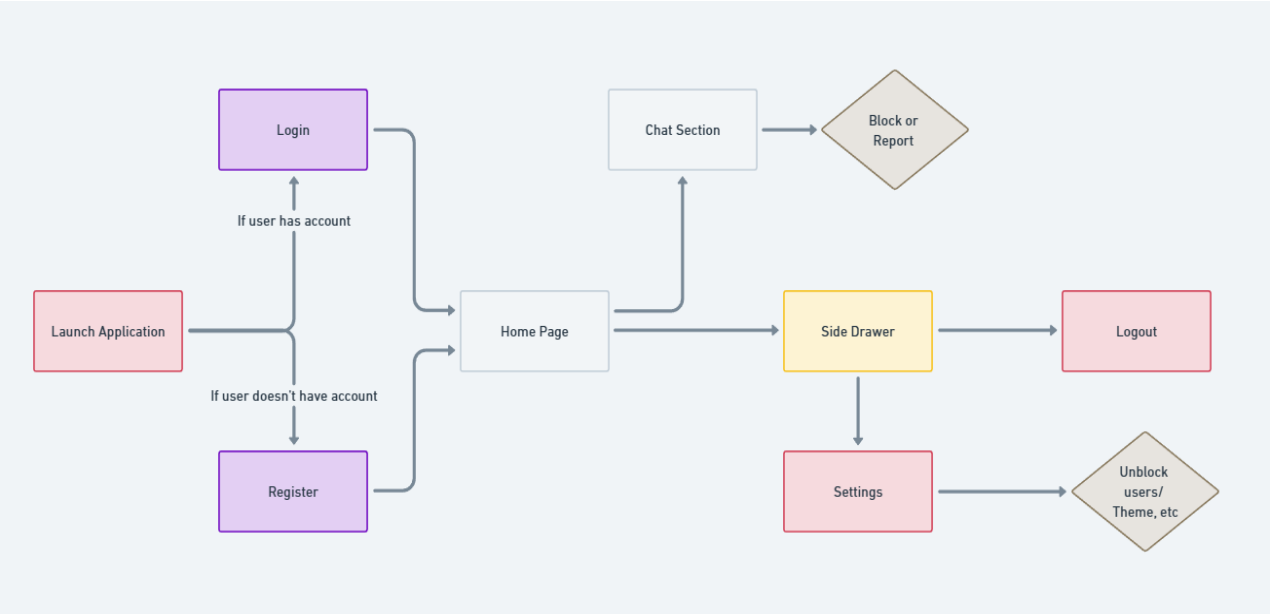

Fig 5.1 Block Diagram of Chat Application

5.2 Description of block diagram

1. **Login**: Likely a login section indicating that the application has an account system.
2. **Launch Application**: Suggests a part of the application that does not require an account.
3. **Register**: A section or button for new users to create an account.
4. **Chat Section**: Possibly a "Chat Section" or a main area of the application with key features.
5. **Side Drawer**: A side menu or navigation drawer for accessing different parts of the application.
6. **Logout**: An option to sign out of the account.
7. **Settings**: A section where users can configure preferences or options.
8. **Unload**: Might refer to a feature to remove or unload certain elements or data.
9. **Theme site**: An area to customize the visual theme or appearance of the application.
10. **Block/Unblock section:** Blocking users/ unblocking users.

5.3 Implementation

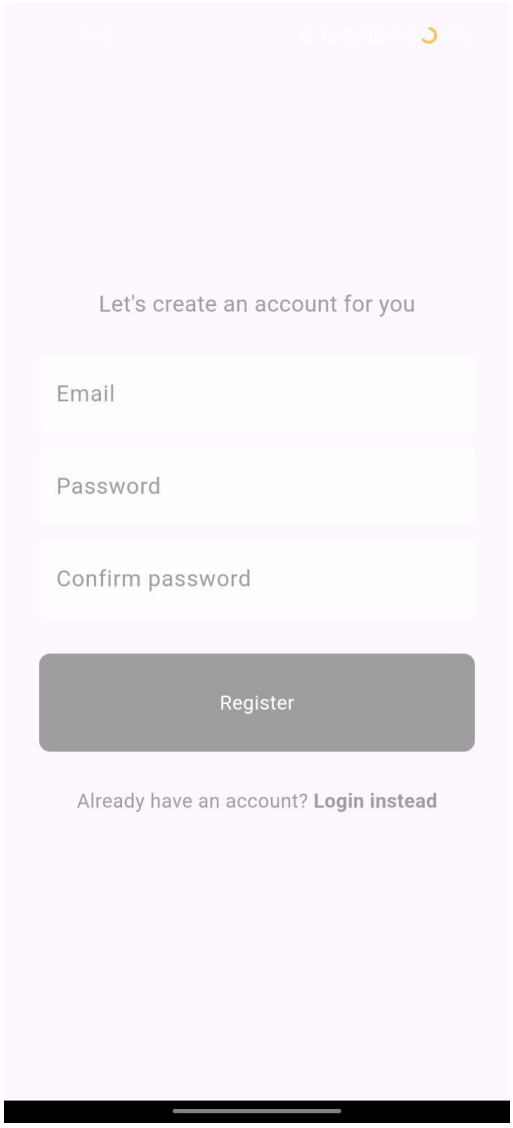

Fig 5.3.1 Registration page

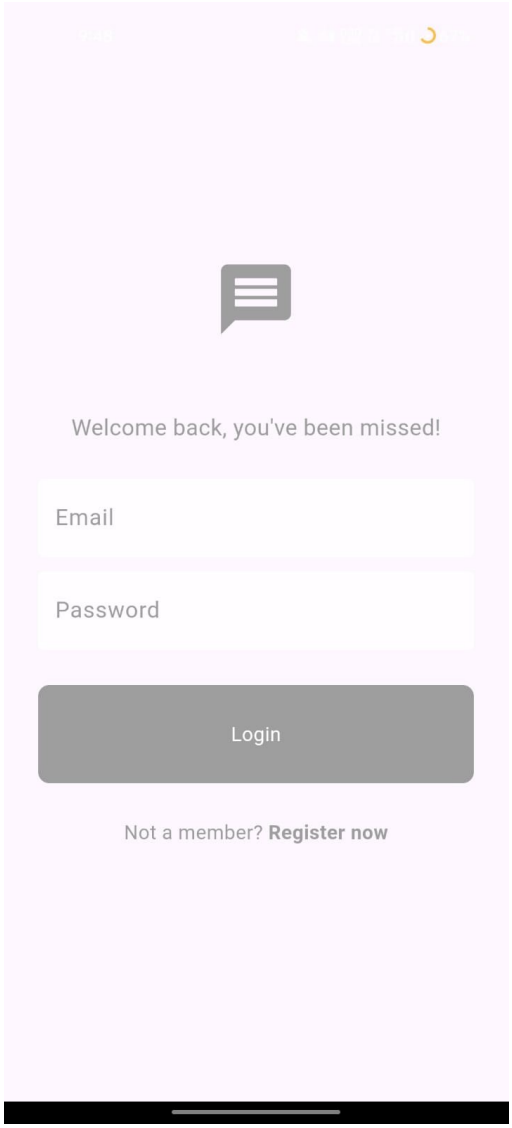

Fig 5.3.2 Log in Page

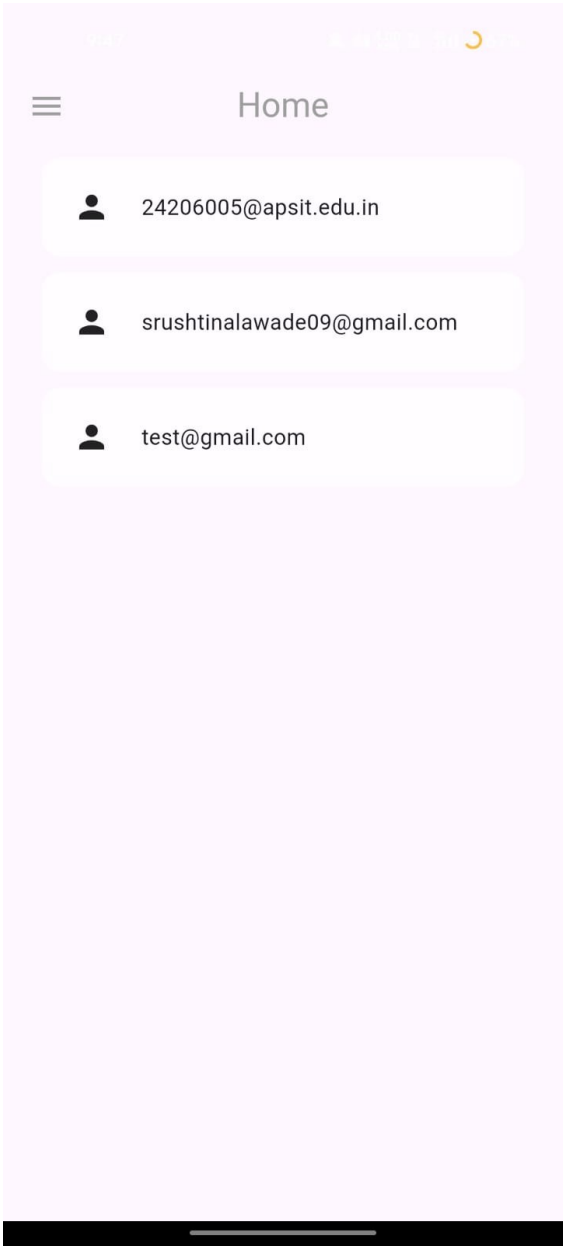

Fig 5.3.3 Users Page

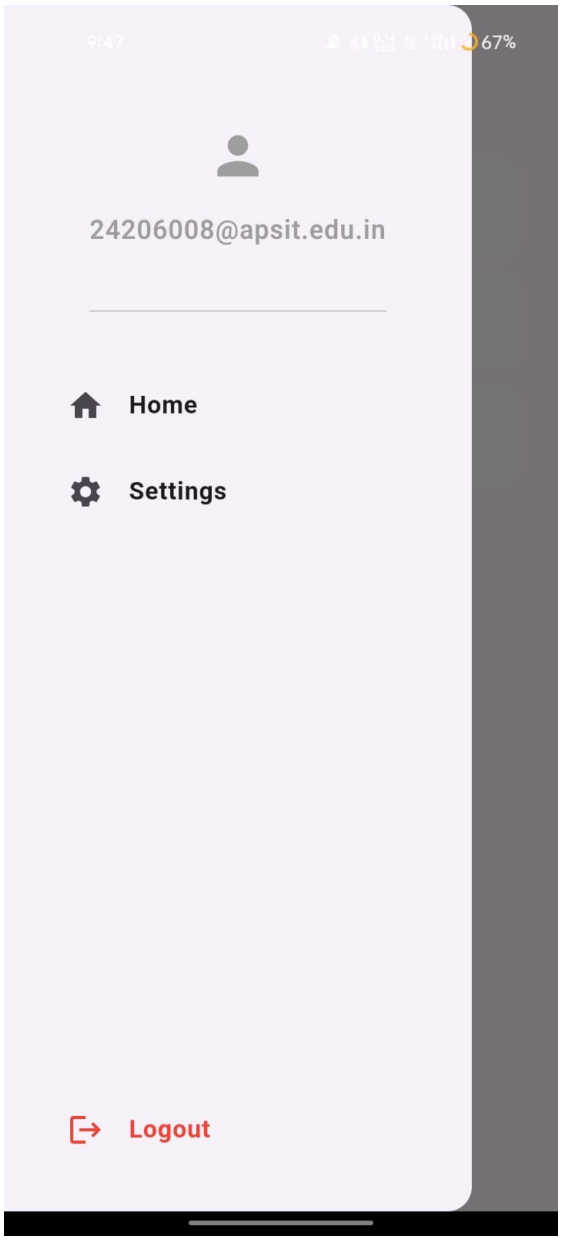

Fig 5.3.4 Sidebar

Fig 5.3.5 Settings page

Fig 5.3.6 Blocked Users Page

5.1 Overview of the Proposed System

The Chat Application Using Flutter is designed to provide secure, real-time, and structured communication for academic and professional environments. It ensures instant messaging, push notifications, and user authentication while maintaining data privacy. The application eliminates distractions commonly found in mainstream messaging apps, offering a focused and efficient communication experience.

5.2 Implementation

The application is developed using a modern technology stack to ensure efficiency and scalability.

- **Frontend:** Developed using Flutter, ensuring a smooth and responsive cross-platform experience.
- **Backend:** Uses Flutter and Express.js to handle real-time messaging and API requests.
- **Database:** Firestore for secure and scalable data storage.
- **Authentication & Notifications:** Firebase Authentication ensures secure login and user data protection, while Firebase Cloud Messaging (FCM) enables push notifications.

5.3 Advantages

This application offers multiple advantages over existing chat platforms:

- **Real-time communication** with minimal latency using firebase
- **Cross-platform compatibility**, supporting both Android and iOS devices.
- **Secure authentication** via Firebase, preventing unauthorized access.
- **User-controlled privacy settings**, including block, report, and delete account options.
- **Scalability**, allowing expansion to larger university networks or professional organizations.

5.4 Applications

The application can be effectively utilized in various domains:

- **University Communication:** Facilitates discussions between students, faculty, and administrators, ensuring structured academic communication.
- **Intercollege Collaboration:** Can be extended for communication between different universities, allowing students and faculty from multiple institutions to connect.
- **Corporate Environments:** Provides a secure and distraction-free communication tool for businesses and teams.
- **Project Teamwork:** Helps teams stay connected and collaborate efficiently without being distracted by social media or personal conversations.

5.5 Results

The application was successfully tested on Windows, macOS (for iOS testing), and Android devices. It ensures instant message delivery, push notifications, and seamless user authentication. Performance testing showed low latency in message transmission, making real-time conversations smooth and efficient. User feedback highlights better engagement and improved communication structure, proving the application's effectiveness in academic and professional settings.

CHAPTER 6

CONCLUSION

4. CONCLUSION

6.1 Conclusion

The Chat Application Using Flutter provides a real-time, secure, and scalable messaging platform for academic and professional use. With Flutter for the front-end and Firebase for authentication and push notifications, it ensures seamless cross-platform compatibility. Firestore supports efficient data storage, while enables instant messaging. The app prioritizes user security, privacy, and structured communication, making it an ideal solution for university and organizational needs.

6.2 Future Scope

- **Intercollege Communication:** The application can be expanded for college-wide and intercollege communication, connecting students and faculty across institutions.
- **Advanced Features:** Future updates can include voice/video calls, group chats, and AI-based moderation.
- **LMS Integration:** The app can be integrated with Learning Management Systems (LMS) for seamless academic collaboration.
- **Enhanced Security:** Additional end-to-end encryption can be implemented for increased data protection.

This project lays the foundation for a scalable and efficient communication platform with potential for broader academic and professional applications.

References

Research paper:

[1] Madan Kumar R. "Chat Application Using Flutter and Firebase", December 2020 , Vol 05 Issue 01

[2] Tanmay Sharma , Abhijay Singh, Nidhi Tyagi "Chat Messenger using Flutter" 30 April 2021, Vol 174

[3] Varun Gowda M J , "Community chat app using flutter(android, iOS & web)" 2023, Vol-09 Issue-4

[4] Christian Johansen, Aulon Mujaj "A Comparative Survey of Secure Instant Messaging Mobile Applications " , February 2021, Vol 02

[5] Danny Sebastian, Restyandito, , Kristian Adi Nugraha, "Developing of Middleware and Cross Platform Chat Application", 2021, Vol-12