Echoes: Voice Enhanced Chat Application

Software Engineering Lab Mini-Project

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The project source code is available on GitHub: Link

Contents

1 Introduction **4**
- 1.1 Problem Statement . . . 4
- 1.2 Software Lifecycle Model: Incremental Process Model . . . 4
  - 1.2.1 Advantages of the Incremental Model . . . 4
  - 1.2.2 Increments in the Project . . . 5

2 Software Requirements Specification (SRS) for Echoes **5**
- 2.1 Introduction . . . 5
  - 2.1.1 Objective . . . 5
  - 2.1.2 Project Scope . . . 5
  - 2.1.3 Environmental Characteristics . . . 5
- 2.2 Overall Description . . . 5
  - 2.2.1 Product Perspective . . . 5
  - 2.2.2 Product Features . . . 5
  - 2.2.3 User Classes . . . 6
  - 2.2.4 Operating Environment . . . 6
  - 2.2.5 Design and Implementation Constraints . . . 6

3 Functional Requirements **6**
- 3.1 User Registration and Authentication . . . 6
- 3.2 Text Messaging . . . 6
- 3.3 Audio Messaging . . . 6
- 3.4 Contact Management . . . 6
- 3.5 Cross-Platform Accessibility . . . 7

4 Non-Functional Requirements **7**
- 4.1 Performance . . . 7
- 4.2 Security . . . 7
- 4.3 Usability . . . 7
- 4.4 Reliability . . . 7

5 Future Enhancements **7**

6 Diagrams and Charts **8**
- 6.1 Data Flow Diagram (DFD) . . . 8
- 6.2 Structured Charts . . . 8
- 6.3 Object-Oriented Design Diagram . . . 9
  - 6.3.1 Use Case Diagram . . . 9
  - 6.3.2 Class Diagram . . . 9
  - 6.3.3 Activity Diagram . . . 10

6.3.4 Sequence Diagram 10

7 Results **11**

7.0.1 Register page 12
7.0.2 Login page 13
7.0.3 Home page 14
7.0.4 Add contact feature 15
7.0.5 Chat page 16

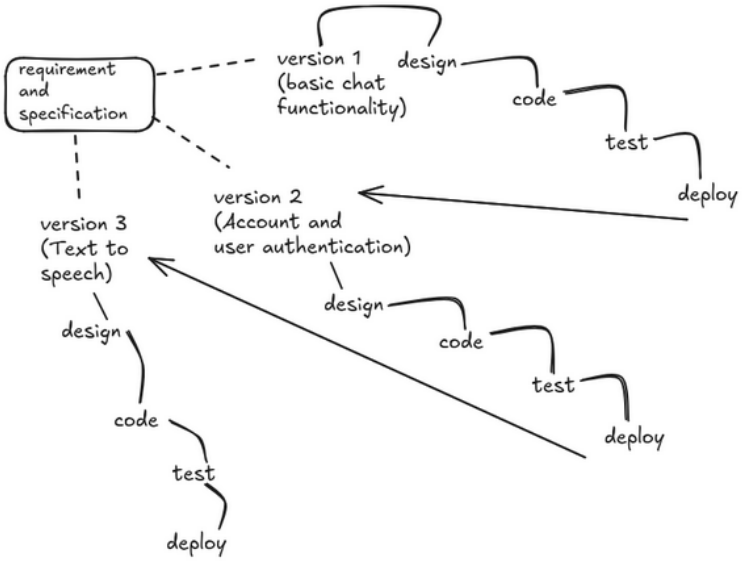
1 Introduction

1.1 Problem Statement

This project aims to create a communication platform known as **Echoes**, featuring text and voice messaging capabilities. The platform focuses on inclusivity, particularly for visually impaired users, by enabling them to communicate through text and voice channels seamlessly. The goal is to provide an accessible, user-friendly environment, bridging the gap in digital communication.

1.2 Software Lifecycle Model: Incremental Process Model

The incremental development model is selected for **Echoes** as it allows iterative enhancements and gradual feature additions. This approach prioritizes a minimum viable product (MVP) with incremental user-driven improvements, especially from the visually impaired community.



1.2.1 Advantages of the Incremental Model

- Early development of core functions
- Flexibility and adaptability
- Reduced project risks
- User-focused development

1.2.2 Increments in the Project

1. **Basic Chat Functionality (Text-Based):** Initial development of the text-based chat.
2. **Account Generation and Authentication:** Adding user sign-up and login features.
3. **Text-to-Speech Feature:** Integration of a text-to-speech API for voice messaging.

2 Software Requirements Specification (SRS) for Echoes

2.1 Introduction

2.1.1 Objective

This document outlines the requirements for developing **Echoes**, a chat application enabling real-time text and audio communication.

2.1.2 Project Scope

Echoes allows users to send and receive text and audio messages. It supports real-time communication and is accessible across multiple devices.

2.1.3 Environmental Characteristics

Echoes operates within existing web and mobile infrastructures, designed to be user-friendly and accessible.

2.2 Overall Description

2.2.1 Product Perspective

Echoes is a reliable communication platform with integrated text and audio messaging, aimed at high-quality user experience.

2.2.2 Product Features

- Text Messaging: Real-time text message functionality.
- Audio Messaging: Record and send audio messages.

- Contact Management: Add, edit, and manage contacts.
- Cross-Platform Support: Accessible on Android, iOS, and web browsers.

2.2.3 User Classes

General Users: Individuals seeking a chat application for text and audio communication.

2.2.4 Operating Environment

- Mobile Devices: Compatible with Android and iOS.
- Web Browsers: Accessible via standard browsers.

2.2.5 Design and Implementation Constraints

- **Scalability:** Must handle increasing users without performance issues.
- **Data Privacy:** Compliance with GDPR for user data confidentiality.
- **Third-Party Services:** Stable internet connectivity required.

3 Functional Requirements

3.1 User Registration and Authentication

Users can register, log in, and authenticate to access the application features.

3.2 Text Messaging

Enables real-time text message sending and receiving.

3.3 Audio Messaging

Allows users to record and send audio messages.

3.4 Contact Management

Provides functionality to manage contacts.

3.5 Cross-Platform Accessibility

Ensures consistent user experience on Android, iOS, and web platforms.

4 Non-Functional Requirements

4.1 Performance

- **Responsiveness:** Application should respond within 2 seconds.
- **Scalability:** Support up to 10,000 concurrent users.

4.2 Security

- **Authentication:** Secure authentication mechanisms to prevent unauthorized access.

4.3 Usability

- **User Interface:** Intuitive and user-friendly.
- **Accessibility:** Adheres to accessibility standards for users with disabilities.

4.4 Reliability

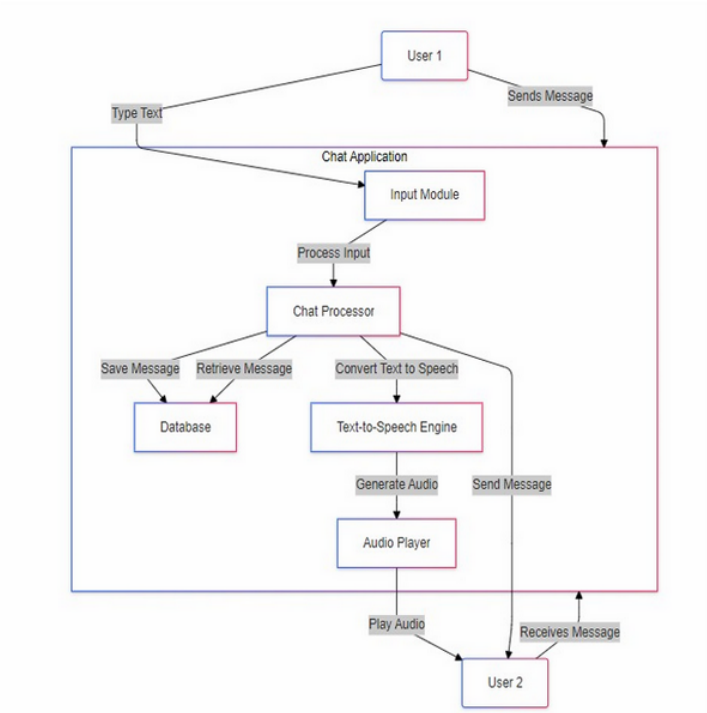
- **Uptime:** Target uptime of 99.9%.
- **Error Handling:** Robust error handling.

5 Future Enhancements

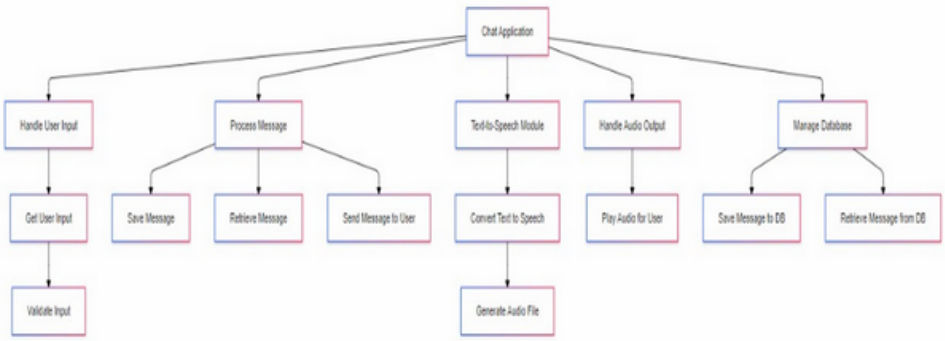
Custom Voice Messages: Future iterations may include custom voice messages based on text, tailored to the user's voice by fine-tuning text-to-speech models.

6 Diagrams and Charts

6.1 Data Flow Diagram (DFD)

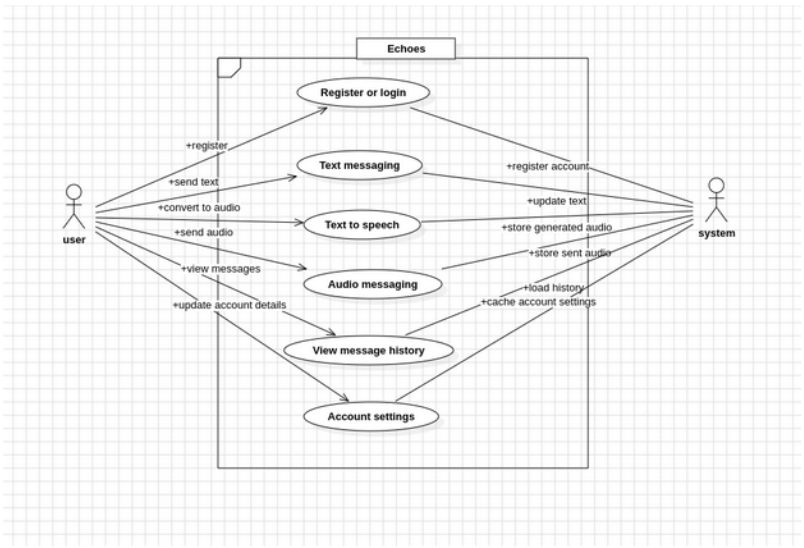


6.2 Structured Charts

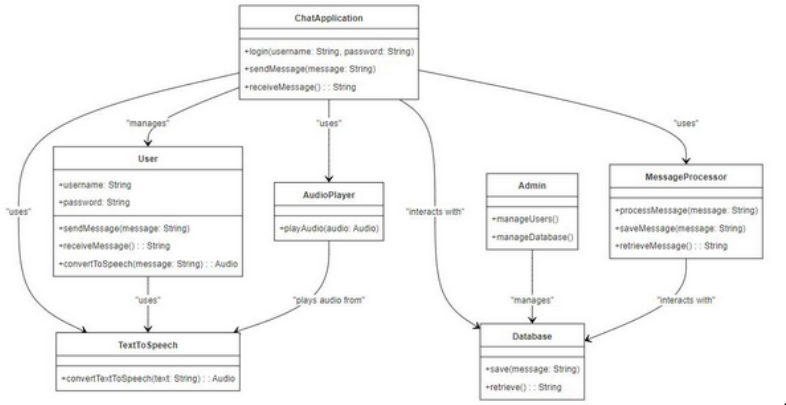


6.3 Object-Oriented Design Diagram

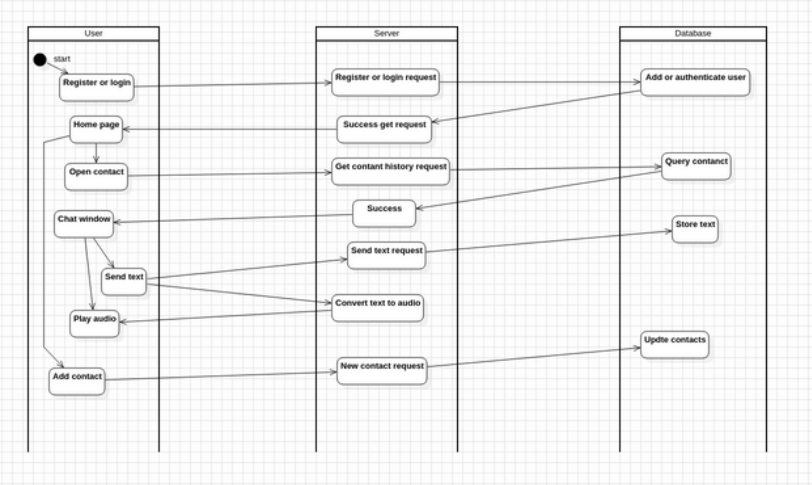
6.3.1 Use Case Diagram



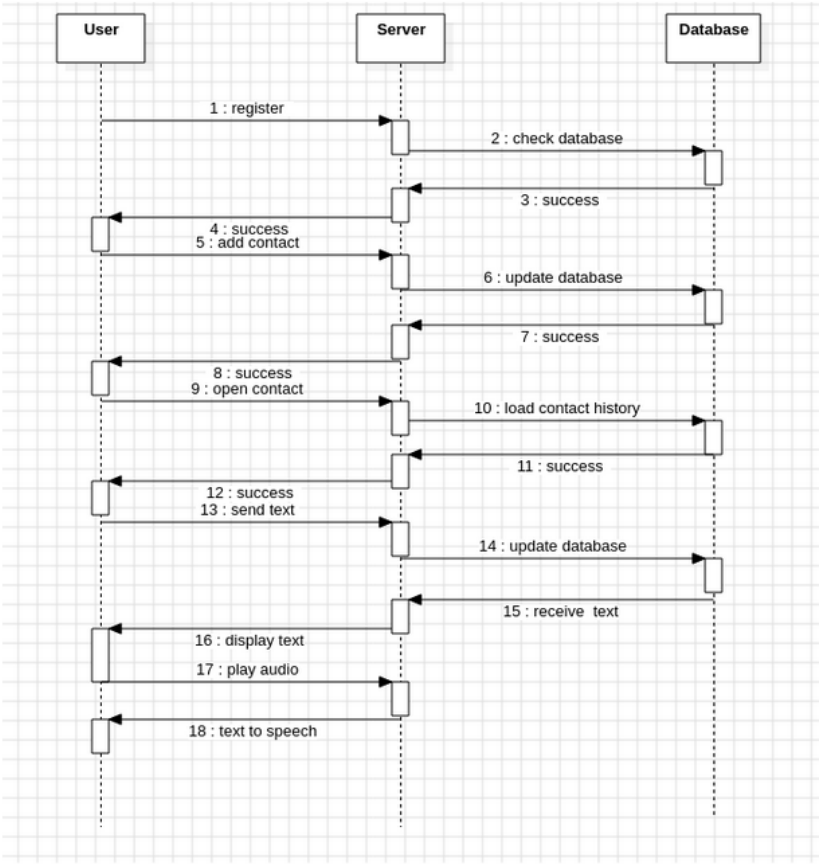
6.3.2 Class Diagram



6.3.3 Activity Diagram



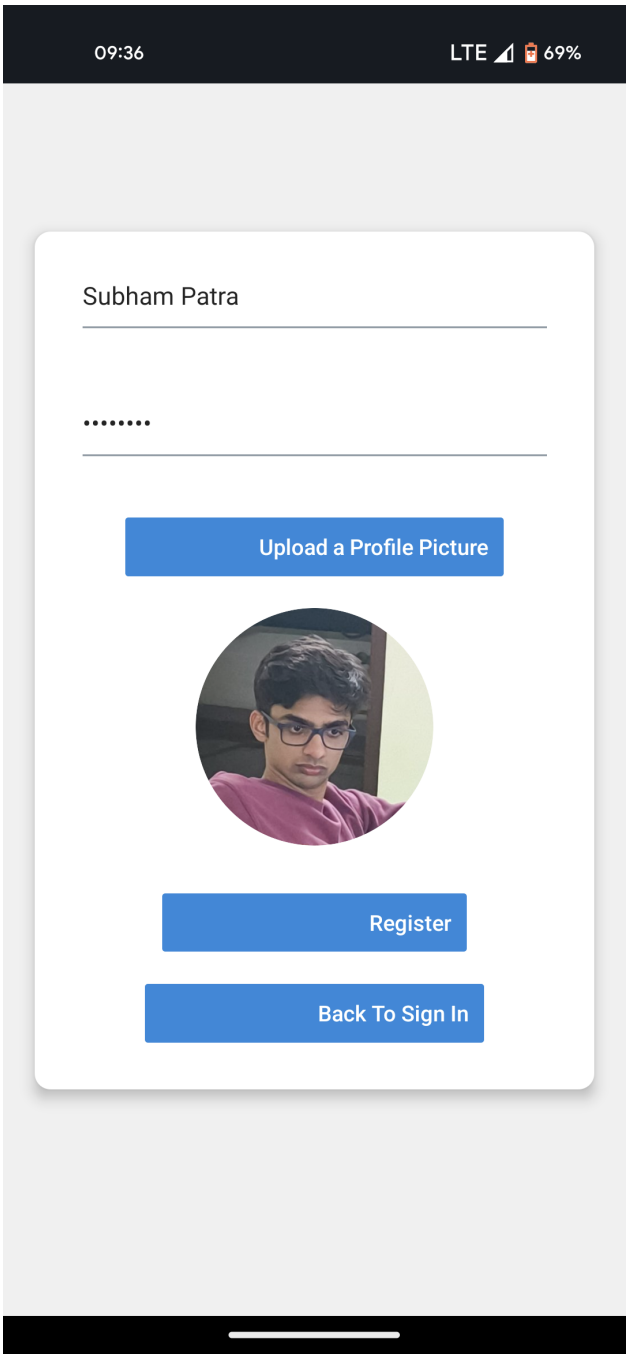
6.3.4 Sequence Diagram



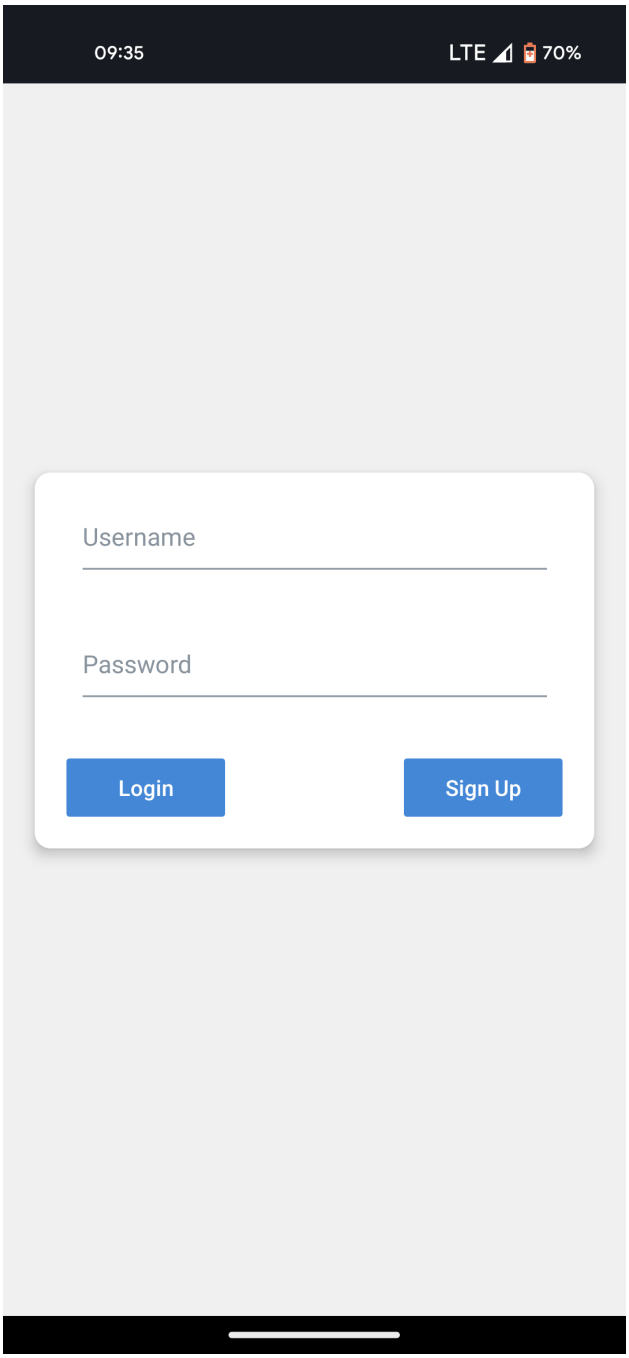
7 Results

This section presents the evaluation and outcomes of the project development process, including performance metrics, user feedback, and incremental development insights.

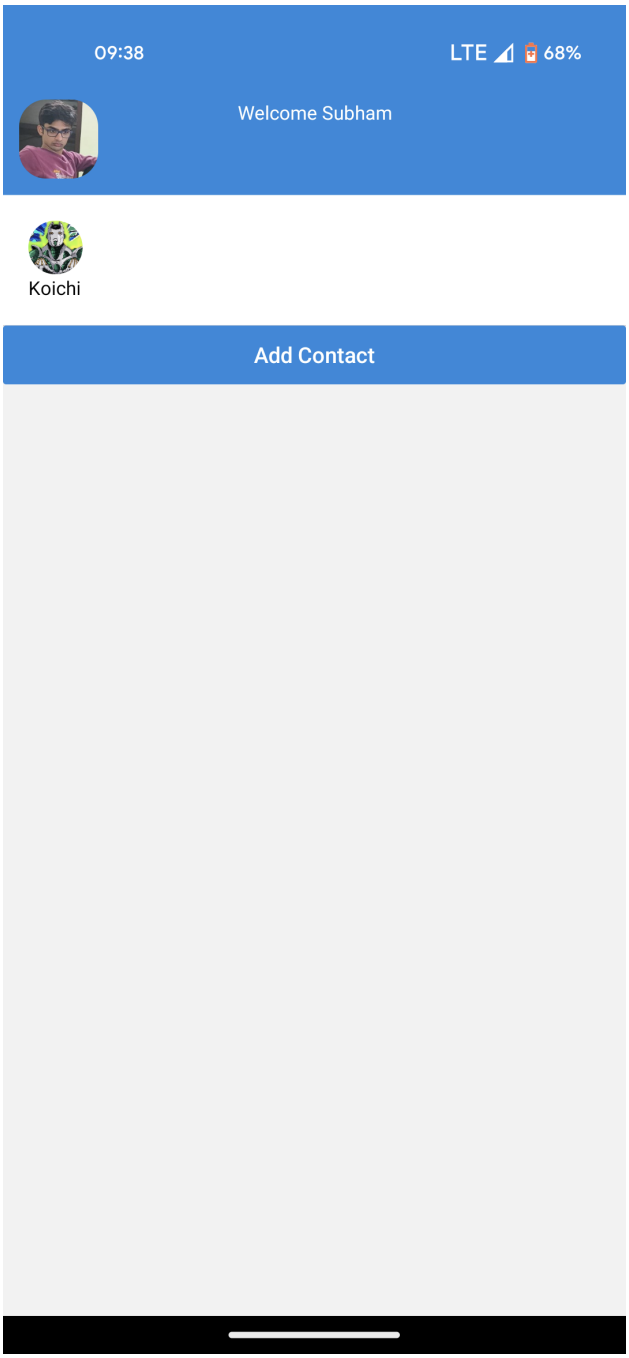
7.0.1 Register page



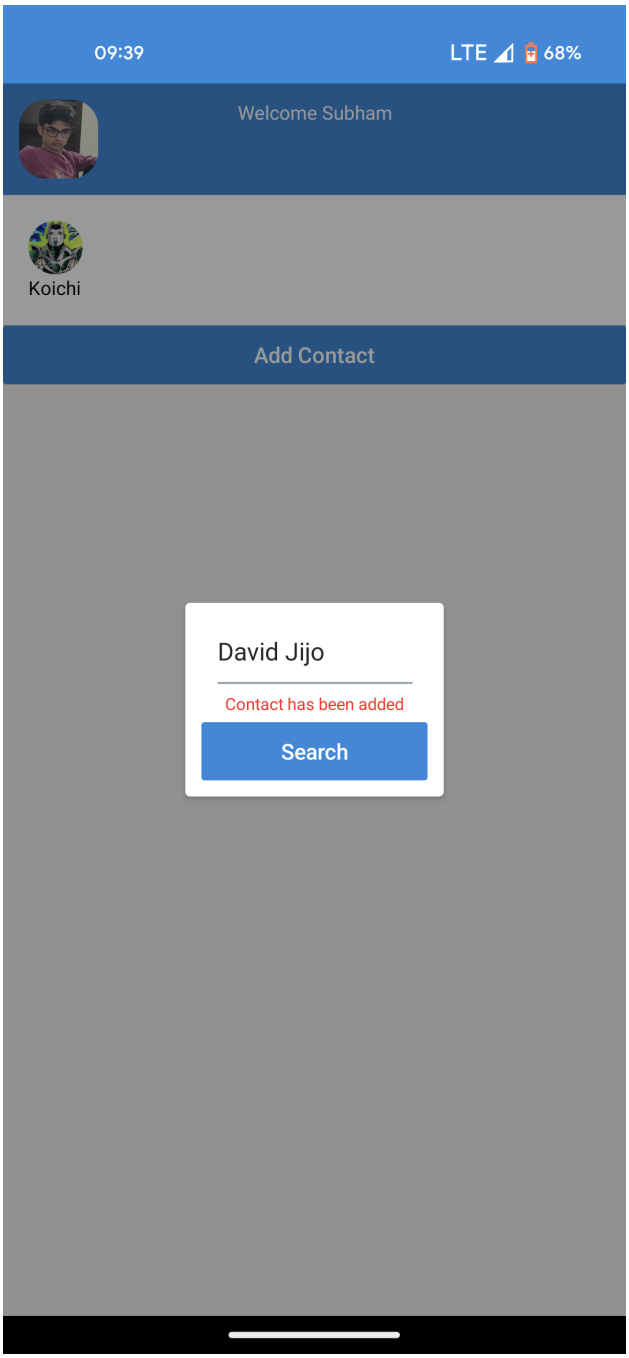
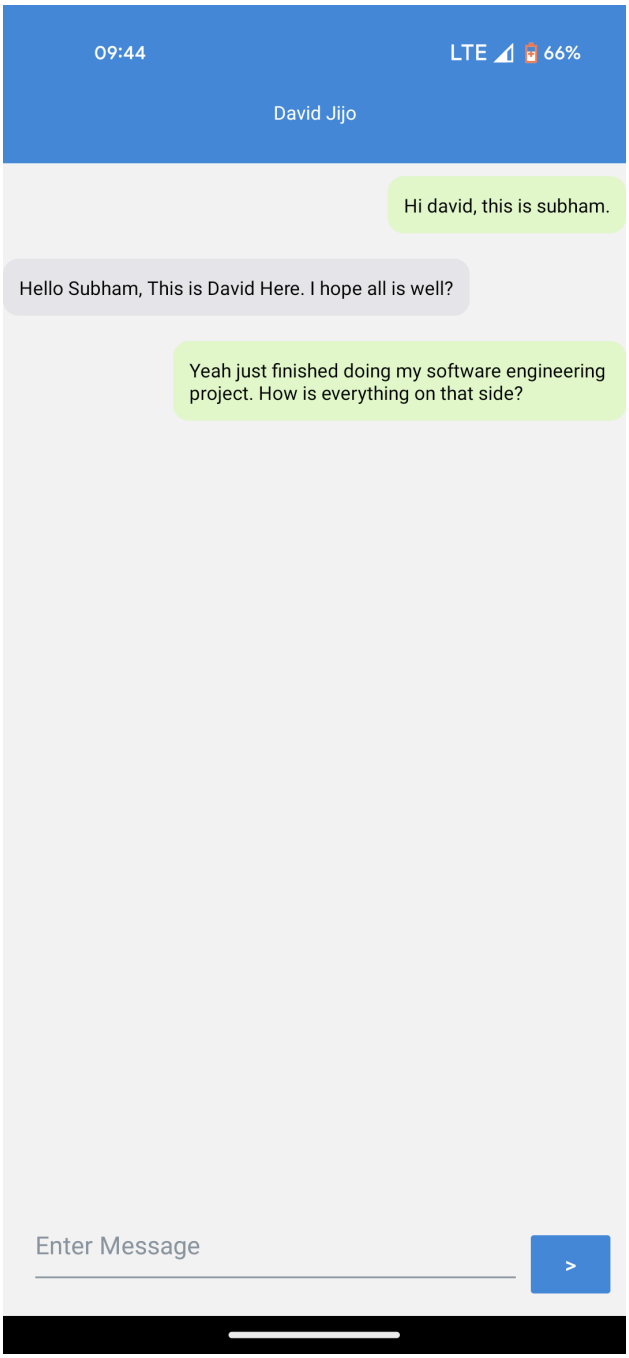
7.0.2 Login page



7.0.3 Home page



7.0.4 Add contact feature



7.0.5 Chat page