SAFE HER – [A SMART SAFETY SOLUTION IN BANGLADESH]

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APPROVAL

This Project titled on " Safe Her", submitted by "**Shejuti Akter, ID: 213-51-057**", to the Department of Information Technology & Management, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Bachelor of Science in Information Technology & Management, and approval as to its style and contents.

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DECLARATION

It hereby declares that this project has been done by me under the supervision of **Moni Akter, Lecturer,** Department of Information Technology and Management (ITM), Daffodil International University. It also declares that neither this project nor any part of this has been submitted elsewhere for award of any degree.

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ABSTRACT

High rates of harassment, stalking, abuse and public insecurity affect women's everyday lives and mental health in Bangladesh, so safety and security of women is a huge social issue. There are still not enough quick support networks and reliable sources to help women in distress, despite laws and awareness campaigns. In this way, the project **"Safe Her - A Smart Safety Solution for Bangladesh"** provides a comprehensive technological mobile application that is designed to provide women with protection by community, real time support, and quick response.

This smart solution **"Safe Her"** aggregates several other clever features into one single application such as One tap SOS emergency help, Real time GPS location tracking, shake to alert to seek help, and Hospitals, Police stations, women support groups directary. It allows the user to create a reliable social network of friends or relatives who can keep an eye on your safety in real time and send messages to other verified users in the area in case of emergency.

A separate admin dashboard for emergency responders, and support centres is also included in the application. Authorities can keep an eye on reported incidents, handle users, get in touch with victims, and plan a multi-agency response thanks to this backend system. Incident dashboards, user authentication, offender blacklisting.

Through the use of credible social networks, transparency of location and time sensitive notifications, we would like to not only react to, but also prevent emergencies. This project has a practical solution to a persistent problem with the help of realizable safety requirements and available technology.

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CHAPTER 1: INTRODUCTION

1.1 Project Overview

" Safe Her " is a smart phone application that provides women in Bangladesh with community-based protection, SOS alarms and help on the spot. It links women to the police, support groups, and other people they can trust.

“Safe Her” lets people quickly tell their emergency contacts, share their current location, and get help from nearby verified users or authorities, whether they are travelling alone, being harassed. Women of all ages, but especially those who work, go to school, or are tourists and live in rural areas. It does this by giving them a way to stop problems before they happen and handle them when they do.The people watching Women of all ages, but especially those who work, live in rural areas.

1.2 Important Features for Users

A. SOS Button: Button that sends a notification to authorities and specified contacts with just on click.
B. Current location: Real time location tracking so that you can share your current location with your family or closest friends**.**

C. Shake to Alert: This feature is perfect in case of emergency because you can send an SOS alert immediately when you shake your phone.

D. Nearby Safe Zones: Helps the user find hospitals, shelters and police stations around her.
E. Trusted Circle: Users have the option to create a private network of individuals who keep an eye on their whereabouts.

F. Community Support: Assists users in times of need by matching them with verified local people.

Admin and Authorities:

A. Admins can keep an eye on and handle reported cases in real time with the Incident Dashboard. By approving user verification ensures the platform's security.

B. Multi-Agency Integration: Creates a chance for responses fast through communication with police, fire, and ambulance services.

C. Blacklist System: Maintains records of dangerous areas and repeat offenders.

1.2.1 Project Scope

A. Instant SOS Alert: For prompt assistance, use this one-tap emergency alert system.

B. Live Location Tracking: Providing reliable contacts with real-time GPS tracking.
C. Trusted Circle: Permit users to form a personal safety group with friends and family.
D. Nearby Safe Zone: The app alerts users in the area who have been verified and are ready to help.
E. Community Support Network: Permit alerts to be sent to helpers in the area.
F. Women Help Centers: Make a database of government women's help centers, NGOs, and legal aid organizations accessible.
G. Law Enforcement Admin Dashboard: All user reports are viewed and managed by administrators.
H. User Verification System: In order to be sure that the system is not dangerous, it can be used to register and verify the users in a safe way.
I. Multi-Agency Integration: Collaboration with the police, fire and ambulance departments to ensure that the emergency can be handled immediately.

Out of scope for version 1:

A. Reporting or alerting offline without network or internet access.
B. Threat Prediction Using Artificial Intelligence (AI).
C. Biometric verification (Face/Fingerprint Unlock).
D. Emergency commands that are activated by voice.
E. Support for Multiple Languages Besides English and Bangla.

Limitations:

A. steady connection to the Internet.
B. Version 1 only works in Bangladesh.
C. Predictive analysis and machine learning (not in this version).

1.3 Project Purpose

The goal of **"Safe Her"** is to make a safety apps that is smart and trusted. This apps will let women in Bangladesh report crimes, protect themselves in real time, and get in touch with emergency services and people they can trust if something bad happens. Bangladeshi women really need a digital safety tool that can help them with the problems they have in both public and private settings. This program fills that need. It is a helpful tool that can be used to respond to emergencies and stop them from happening in the first place. Use smart technologies such as location tracking, SOS tips and alarms, report and get help from the community. Send women SOS alerts that can be sent when you shake or tap your phone. This way, you can get help immediately if you need. Tell people you trust where you are at all times so they can make sure you are able to get around and travel safely

1.3.1 Background

In the last few years, the protection of women in Bangladesh has become more vital to the whole country. Reports of sexual harassment, stalking, domestic violence and safety have been widely reported in the news for children and women from all over the world. Threats that violate women's rights, make women feel like they're not safe in cities, in schools, buses and trains, at work and even at home.

Women don't complain what happened and don't ask for help because they're ashamed to be humiliated, afraid to be blamed, because they can't provide formal treatment.

That's why, in this case, we should be protected more than ever. There are more and more people in Bangladesh who use smart phones and the Internet every day - especially women and young people.

Women can send SOS alerts by shaking or tapping their phones. Have a solid group of verified responders, family and friends, and people in your area.

The main "Safe Her" is to make a safety apps that is smart, easy to use, and trusted. This apps will let women in Bangladesh report crimes, protect themselves in real time, and get in touch with emergency services and people they can trust if something bad happens. Bangladeshi women really need a digital safety tool that can help them with the problems they have in both public and private settings. This program fills that need. It is a helpful tool that can be used to respond to emergencies and stop them from happening in the first place. It uses like Location tracking, SOS notifications, and getting help from the community.

1.3.2 Problem Statement

A. Absence of real-time functionalities in the event of poor connectivity.
B. The inability to promptly sound an alarm without first unlocking the phone.
C. Limited backing for safe zones based on location (such as the closest police stations or hospitals).
D. Emergency services and the local language are not integrated.
E. Disguised activation methods, such as voice or shake detection, are absent.

1.3.3 Literature Review

A. BhaiThamen: With features like data-based preventative measures and silent alarms, this app supports women in unsafe circumstances.

B. Daak: Daak is a smartphone app developed by the community that lets human's text other app users and specific contacts to ask for help. You can use it even when you're not connected to the internet, and it suggests to others to warn you about emergencies and gives you a real-time share of your location. The app is very useful in areas with bad internet access.

C. The Broadcast Journalists Centre and Switch Bangladesh Foundation created the HELP (Harassment Elimination Literacy Programme) app, which makes it simple for women who suffer sexual harassment on train or bus to report it. It enables quick assistance by connecting users with duty officers and volunteers at local police stations.

D. **SuperWomen:** With features like location sharing, emergency SMS alerts, voice-activated sirens, and a lawyer chatbot, this clever mobile app targets Asian women in both urban and rural areas.

1.3.4 **Shurokkha:** Shurokkha was created to make Bangladesh's social safety and security the system stronger. Saves women, children and foreigners from different kinds of harassment and violence for 24 hours. If the exact location is given, it is possible to get help from the nearest policeman or police station immediately.

1.3.5 Motivation

There are a few reports of harassment, stalking and abuse reports in Bangladesh found outside of schools, on the streets and at work. Lots of people do not tell the police about things because they are scared, embarrassed and do not have proof. The purpose of this app is to fill that space by allowing users to share their current location, send SOS alerts right away, and call the police or trusted contacts at just one tap of the SOS alert button. This makes mobile apps a great way to give women more power. When a woman is in danger, help from the community and bystanders often fails to materialise in time. The goal was to make a network that links certified local people who can be first responders, which would make things safer.

Objectives

A. Set up an SOS alert system that can be turned on by tapping or shaking the device.

B. Let trusted contacts see your location in real time.

C. Use map APIs to add safe zones that are close by, like hospitals, police stations, and friends' homes.

D. Add a trusted circle feature so that people can keep track of each other and help each other.

E. Use Firebase as the backend to make sure that updates happen in real time and that everything is synced in the cloud.

1.3.6 Goals

A. Create an Ecosystem of Trusted Support.
B. Raise Awareness of Public Safety.
C. Offer prompt and efficient emergency assistance.
D. Use real-time tools to assist law enforcement.
E. Make a Safety Map of Bangladesh Based on Data.
F. End the Silence Culture Regarding Harassment.
G. Decrease Reliance on Postponed Institutional Assistance.
H. Provide Users with Verified Support Network Connections.

1.3.7 Expected Outcomes

A. Faster response time in an emergency.
B. More involvement from families and communities.
C. Better reporting and documentation of incidents.
D. More people know about women's safety.

1.4 Stakeholders

A. Governmental Organisations: ICT Division, Ministry of Women and Children Affairs, and other pertinent divisions. Partnerships, awareness campaigns, policy support, and possible funding achieving SDG pledges and national safety objectives.

B. NGOs and Women's Support Organisations: Crisis response centres, shelters, and NGOs working to protect women's rights. Victims can get help with legal action or follow-up help by looking in the app's help directory. helping victims, empowering women, and discovering them early.

C. Emergency Response (Ambulances, Fire, Emergency Medical personnel); If it is an accident, a medical emergency, or a violent event, talk to users. saving lives while simultaneously making sure that emergency help arrives in an well-organized manner.

D. Law Enforcement Organizations: Women's protection units, and local police stations. Get incident alerts, check reports, send assistance, and interact with users through the admin dashboard. utilising real-time data for policing, minimising gender-based crimes, and promptly reacting to threats.

1.5 Trusted Contacts: The emergency contacts the fact that the user decides can be parents, spouses, siblings, or close friends. Get alerts right away, find out where someone is in an emergency, and get help right away.

1.6 Primary Users (Bangladesh women): Bangladeshi women from stay-at-home moms to commuters to Bangladeshi professionals to students to women living in the countryside. The safety elements of the primary users of the application (including incident reporting, live tracking, SOS alerts, instant personal safety, quick emergency response, user-friendly and privacy protection) are most important to the people who use it.

1.7 Project Schedule

Following are the project schedules:

1.7.1 Gantt Chart

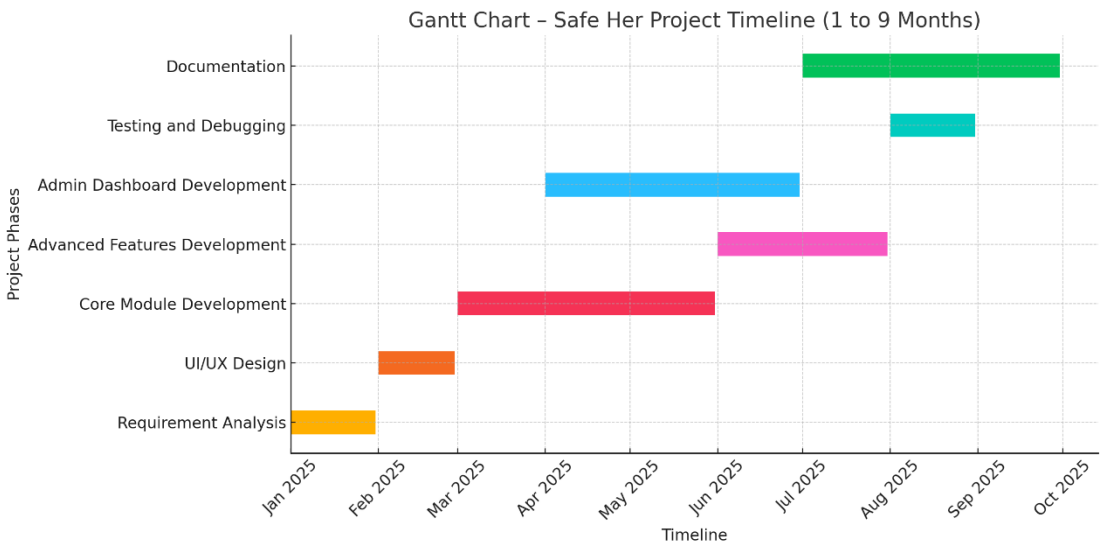


Figure 1.2: Gantt Chart

1.7.2 Release Plan / Milestone

Release Plan	Time	Description
Alpha Release	Week 4	A. Basic UI implemented. B. Login, alerts.
Beta Release	Week 6	A. Admin dashboard integrated.
Final Release	Week 10	A. All modules. B. Full testing completed. C. Final version submitted.

Table 1.1: Release Plan / Milestone

1.8 Risk Analysis

Following Parameters for risk analysis:

1.8.1 Challenges

A. **Technical Risk:** App Failure Risk (such as memory leak, bug, device incompatible). Inaccurate location data may affect features like safe zones, live tracking, and SOS. The app may not work correctly on low-end smartphones or on certain Android versions. system malfunctions can cause significant user or incident data to be lost. Real-time alerts or data synchronisation may be hampered by server issues.

B. **Security And Privacy Risk:** Accessing personal user data or evidence without permission. There is a chance that someone could use or intercept the user's location. Admins using their access rights for things they shouldn't be doing.

C. **Legal & Ethical Risks:** Not following privacy laws in Bangladesh or anywhere else in the world. People sending in fake incident reports or using the system in the wrong way. Delays or lack of cooperation from people outside the company.

1.8.2 Assumptions and Dependencies

A. Users Will Have Access to Smartphones and the Internet.
B. NGOs and Support Centres Are Open to Working Together.
C. Users Will Supply Correct Data.
D. Cloud Database Services and Firebase.
E. Police and emergency responders in your area.

1.6.3. Regulatory and Compliance Notes

A. Keeping and protecting data private.
B. Legal Reporting and Law Enforcement.
C. Following the rules of ethics and safety.

1.9 Ethical Considerations

A. **User's/data's privacy:** Users should always be able to see and control their data: location, identity, reports.
B. **Consent with knowledge**: Users should have to choose to use SOS alerts, share location in real time, reports.
C. **Access and fairness:** The app should be able to help all women, no matter where they live, how much money they have, how good they are with technology.
D. **Protection Against Abuse:** False reports, bad use of location data, Trolling through community support.

CHAPTER 2: SOFTWARE REQUIREMENT SPECIFICATION

2.1 Functional Requirements

User Functions:

The following functions are for users.

A. **SOS Emergency Alert**:
   - Users can send an SOS alert with just a single tap.

B. **Live Location Sharing**:
   - User can share his/her location to some people.

C. **Nearby Safe Zone Locator**:
   - The application shows you nearby places that are safe such as police stations, hospitals, shelters for women.

D. **Reporting Incidents**:
   - Reports harassment, physical assault, threat made in person, can be done by user.

E. **Community Support Request:**
   - User can request community support (ask nearby verified app users for help).

F. **Shake to Alert:**
   - User can set off an SOS alert by shaking the device.

G. **Trusted Circle Management:**
   - The user can create a circle of people he trusts (parents, family and friends).

H. **Creation and Access of Accounts:**
   - Allow users to create an account and login using their phone number, email address, google social media accounts.

Admin Functions:

A. **Admin Authentication and Access Control:**

   Role Based Access: Super Admin, Police Admin, NGO Admin will be supported by the admin panel**.**

B. View and respond to reports of incidents made by users Time and date, location of user, text description

C. **User Management:** View and search profile of users, ban users who reported abusive and false information.

D. **Safe Zone Directory Management**: Hospitals, police stations and shelters for women.

E. **Admin to user communication:** Admins can send alerts, chat, ask for more details.

2.2 SWOT Analysis

Strengths:

A. **Emergency Features:** SOS alerts, keeping track of your location, calling the admin for help.

B. **Scalable and Modular Backend:** Backend that can support complex modules and will be ready for the future.

C. **Cross Stakeholder Integration:** NGOs, users, trustworthy contacts are integrated into one system.

D. **Community based responder system:** Adds an extra layer of safety in places where the police response times are slow.

E. **User Interface:** Easier to use since it supports 2 languages and is easy to navigate.

Weaknesses:

A. **Dependence on the Internet:** SOS Alert and where am I need a stable mobile data or Wi-Fi connection.

B. **Building Trust Is Necessary:** They may not want to send in their location because they are not sure how they will be used.

C. **Limited Platform Coverage:** Its now only on Android; the iOS is not out yet.

D. **Digital Literacy Barrier:** Older women and women who live in the countryside may not be able to use apps**.**

Opportunities:

A. **Social media campaigns and awareness programs:** This would help people to trust and use the service more if we had community ambassadors or partnership with universities.

B. **Room for more features:** AI based crime prediction, geo-fencing, live police coordination, when you press SOS it will trigger the police, IOS version, wearable tech.

C. **Connecting with National Helplines:** APIs will connect 999, Women Help Lines, and Shelters services.

Threats:

A. **Data leak or security breach**: If there is just one security breach, users will not trust us and will cause legal issues as well.
B. **Public misunderstandings:** They may not trust the service and may not use it because of the rumors.
C. **Misuse of Community Help:** If there is no strict moderation, the helpers may act unethically and some may be misusing the data.
D. Change in Google Play Store's permissions policy might not allow future updates.
E. **Lack of institutional response:** If law enforcement and non-governmental organisations do not use it, the users may lose faith in the system.
F. **Digital illiteracy:** All the people who are supposed to use mobile apps are not supposed to use them because they have not been educated or trained to do so.

2.3 Data Requirements

A. **Data requirements User Data requirements**: Email, Emergency contact, User/Account ID.
B. **Incident report information:** Incident location, Incident description
C. **Community support:** Response time, User input
D. **Analytics data and system logs:** alert response, how frequent do they use the app
E. **Partner / Integration information (Police, hospital, NGOs):** Service type, Organization ID.

2.4 Performance Requirements

Response Time Requirements:

2.4.1. Reaction Time:

A. Within two to three seconds of sending out an SOS alert and emergency contacts when you press SOS, the app must be able to send out an SOS alert and emergency contacts.
B. When there is an active SOS session, the live location tracking must be updated every 5 – 10 seconds.
C. The app must be able to load trusted contacts, safe zones and help center lists within two seconds.

2.4.2 Scalability:

Scalability the system must be able to cope with the dynamic addition of new NGOs, police stations and new safe areas without any disruption to users. As the system is adopted, the system must be able to scale to a minimum of one million users without any disruption.

2.4.3 Mobile App Performance:

A. On most Android phones (Android 7+ and 2GB RAM+), the app should open within 3 seconds.
B. When the app is in the background, it should continue to provide tracking and SOS assistance.
C. While on an active SOS, it should not exceed 5% battery an hour.

2.4.4 Data Consistency and Reliability:

A. Even under heavy load, all the SOS data, incident data, and user data should be saved without any data being lost.
B. The data should be accurate between admin, backend, and the mobile dashboard.

2.5 Dependability Requirements

2.5.1 Reliability Requirements:

A. The program should ensure that its emergency functions like location sharing and SOS work with 99.9% uptime.
B. Under normal network conditions, trusted contacts should always receive SOS alerts within 3–5 seconds.
C. If the application crashes, it should automatically restart or fallback to its previous state gracefully.

2.5.2 Security Requirements

A. All the user data that includes location, reports, and information must be encrypted when it is sent and when it is saved.
B. One time passwords must be secure and have a time limit.
C. In the future, access to the admin must be based on role and have strong passwords or two-factor authentication.

2.5.3 Availability Requirement

A. The app must be available 24/7 on all compatible devices.
B. The app's basic functions like the SMS fallback and SOS button must work when there is poor signal strength or when the device is offline.

CHAPTER 3: SYSTEM ANALYSIS

3.1 Use Case Diagram:

User:

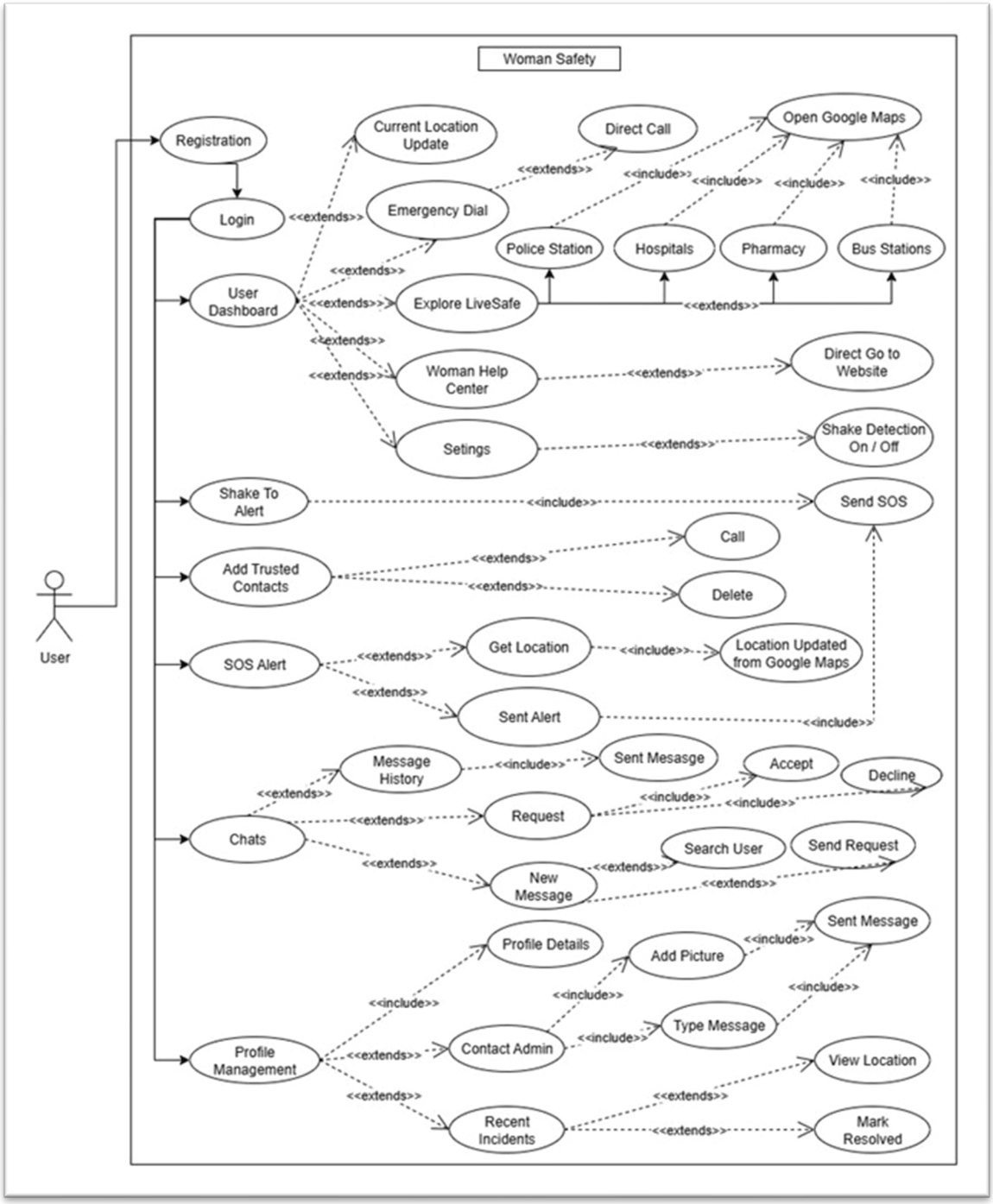


Figure 3.1: Use Case (User)

Use Case (Admin):

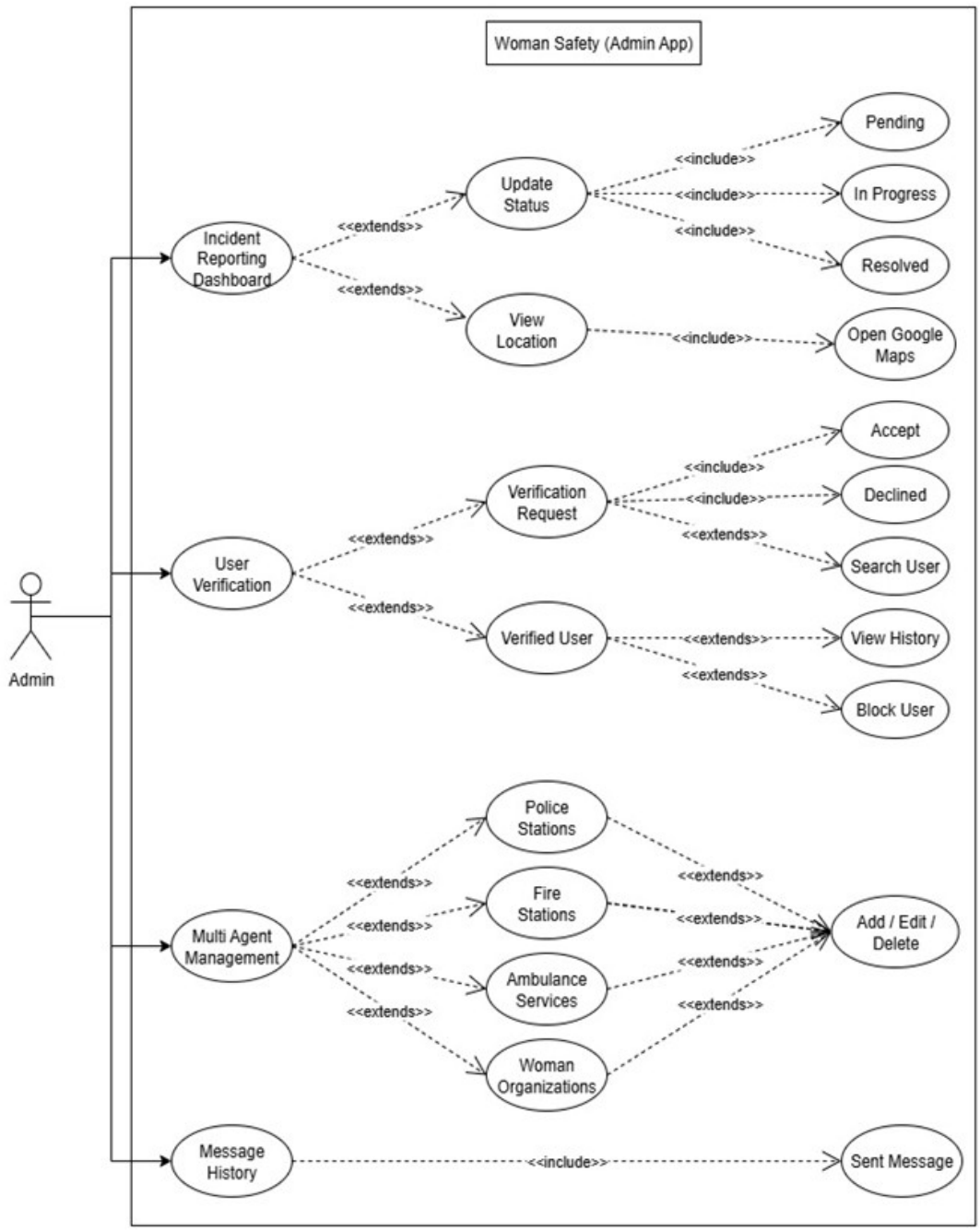


Figure 3.2: Use Case (Admin)

3.2 Use Case Description

Identifying Use Cases:

A. **UC-01:** User Registration & Login
B. **UC-02:** User Dashboard

C. **UC-03:** Shake to Alert
D. **UC-04:** Add Trusted Contacts
E. **UC-05:** SOS Alert
F. **UC-06:** Chats
G. **UC-07:** Profile Management

Identifying Use Cases for Admin:

A. **UC-08:** Incident Reporting Dashboard
B. **UC-09:** User Verification
C. **UC-10:** Multi Agent Management
D. **UC-11:** Message History

Use Case ID	UC-01
Use Case Name	User Registration & Login
Description	User can register and login to account.
Actors	User
Pre-Condition	User must have email address.
Basic Flow	A. User will first click on "Register Now". B. User will fill the form and click on sign up. This will redirect to "User Dashboard". C. After successful registration the user can login to the account with valid credentials.
Post-Condition	User successfully created account and login.

Table 3.1: UC-01(User Registration & Login)

Use Case ID	UC-02
Use Case Name	User Dashboard
Description	Users can update their current location, dial emergency call, explore LiveSafe option, direct go to woman help center websites and can access settings.
Actors	User
Pre-Condition	User must login to his/her account.
Basic Flow	A. User will land on User Dashboard after login. B. User can update their current location. C. User can direct call to emergency services. D. User can use explore LiveSafe option to locate nearby police stations, hospitals, pharmacy and bus stations with the help of Google Maps. E. User can access woman help center to direct go to websites. F. User can use the settings to ON/OFF the shake detection feature.
Post-Condition	User successfully accessed user dashboard.

Table 3.2: UC-02 (User Dashboard)

Use Case ID	UC-03
Use Case Name	Shake to Alert
Description	User can shake his/her phone to send SOS.
Actors	User
Pre-Condition	User must login to the account.
Basic Flow	A. User will open the app. B. User will shake the device to send SOS Alert.
Post-Condition	User successfully sent SOS alert.

Table 3.3: UC-03 (Shake to Alert)

Use Case ID	UC-04
Use Case Name	Add Trusted Contacts
Description	User can add trusted contacts.
Actors	User
Pre-Condition	User must login to the account.
Basic Flow	A. User will go to Contacts. B. User will select add trusted contact button. C. User will add the trusted contact. D. User can direct call or delete the added contact.
Post-Condition	User successfully added trusted contacts.

Table 3.4: UC-04 (Add Trusted Contacts)

Use Case ID	UC-05
Use Case Name	SOS Alert
Description	User can send SOS alert.
Actors	User
Pre-Condition	User must login to the account.
Basic Flow	A. User will tap on SOS button. B. User will update their exact location by pressing Get Location button. C. Users will send SOS alert by pressing Send SOS button. Admin will get notification in the app and user trusted contacts will get SMS on their phone.
Post-Condition	User successfully send SOS alert.

Table 3.5: UC-05 (SOS Alert)

Use Case ID	UC-06
Use Case Name	Chats
Description	User can message other users.
Actors	User
Pre-Condition	User must login to the account.
Basic Flow	A. User will go to Message section. B. User can open a chat from message history and can send a message. C. User can accept or reject any message request given by other users.

	D. User can search by typing user location or using user name to send request for new chat.
Post-Condition	User successfully messaged other users.

Table 3.6: UC-06 (Chats)

Use Case ID	UC-07
Use Case Name	Profile Management
Description	User can manage his/her profile.
Actors	User
Pre-Condition	User must login to the account.
Basic Flow	A. User will go to profile option and see the profile details. B. User can directly message to the admin by pressing Contact Admin button. C. User can see the recent incidents of his/her and can see the locations or mark resolved.
Post-Condition	User successfully managed profile.

Table 3.7: UC-07 (Profile Management)

Use Case ID	UC-08
Use Case Name	Incident Reporting Dashboard
Description	Admin can manage the incident reporting.
Actors	Admin
Pre-Condition	User must submit any incident.
Basic Flow	A. Admin will go to incident reporting dashboard. B. Admin can update the status of incident such as pending, in progress, resolved. C. Admin can view location of incident. On tapping view location will redirect to Google Maps.
Post-Condition	Admin successfully managed the incidents.

Table 3.8: UC-08 (Incident Reporting Dashboard)

Use Case ID	UC-09
Use Case Name	User Verification
Description	Admin can manage the user accounts.
Actors	Admin
Pre-Condition	User will submit information for account opening.
Basic Flow	A. Admin will go to user verification option. B. Admin will check verification request of users. Admin can accept or declined it. C. Admin can search users by entering name of the users.

	D. Admin can view history of verified users. E. Admin can block any user.
Post-Condition	Admin successfully managed user accounts.

Table 3.9: UC-09 (User Verification)

Use Case ID	UC-10
Use Case Name	Multi Agent Management
Description	Admin can manage the multiple agents.
Actors	Admin
Pre-Condition	Admin will have to gather information of agents.
Basic Flow	A. Admin will go to multi agent management section. B. Admin can add, edit or delete any police stations, fire stations, ambulance services & woman organizations information.
Post-Condition	Admin successfully managed multiple agents

Table 3.10: UC-10 (Multi Agent Management)

Use Case ID	UC-11
Use Case Name	Message History
Description	Admin can chat with users.
Actors	Admin
Pre-Condition	User must message admin.
Basic Flow	A. Admin will go to message section.

	B. Admin will send message to users.
Post-Condition	Admin successfully messaged users.

Table 3.11: UC-011 (Message History)

3.3 Activity Diagram

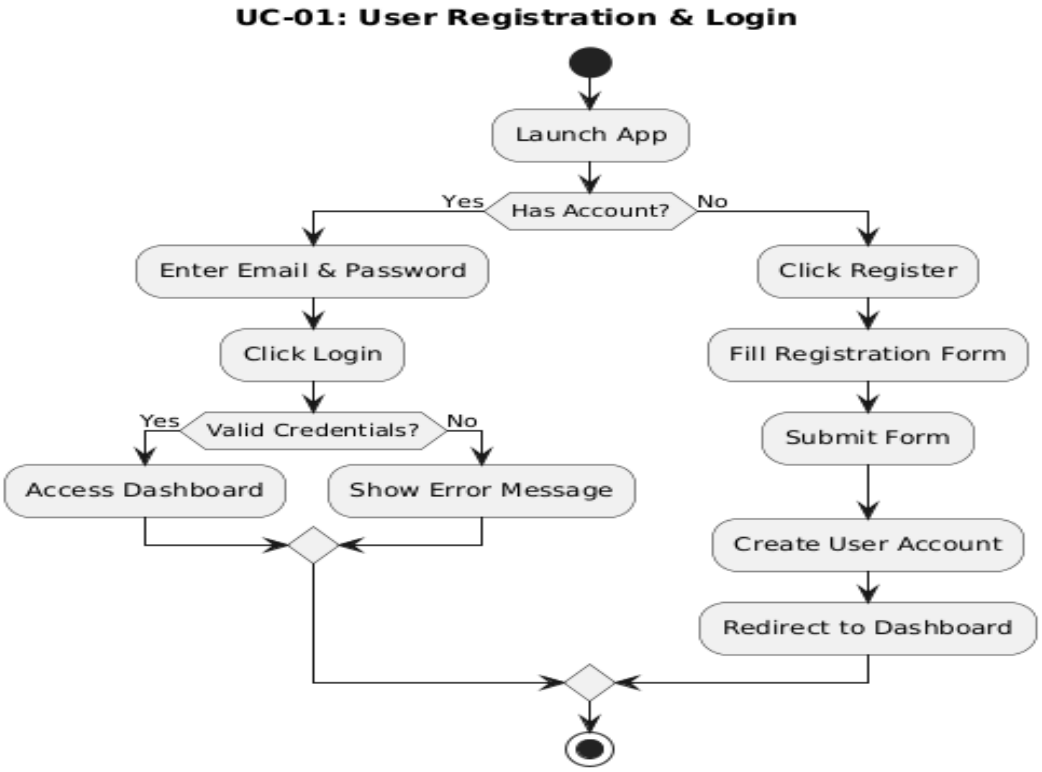


Figure 3.3: UC-01 (User Registration & Login)

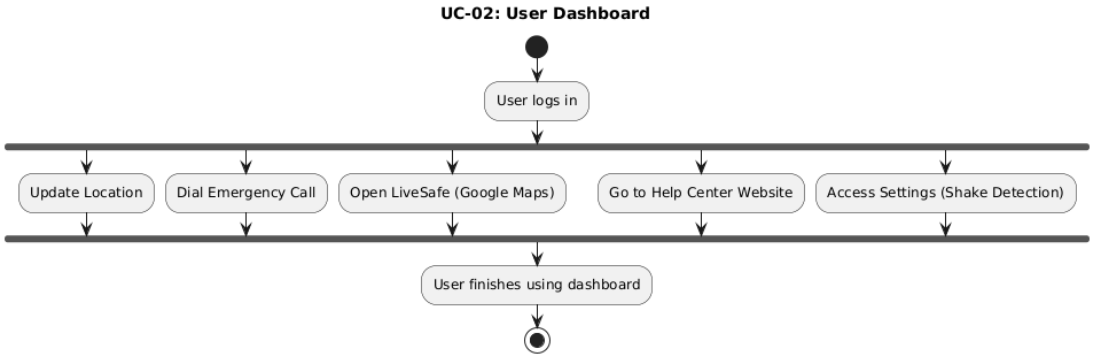


Figure 3.4: UC-02(User Dashboard)

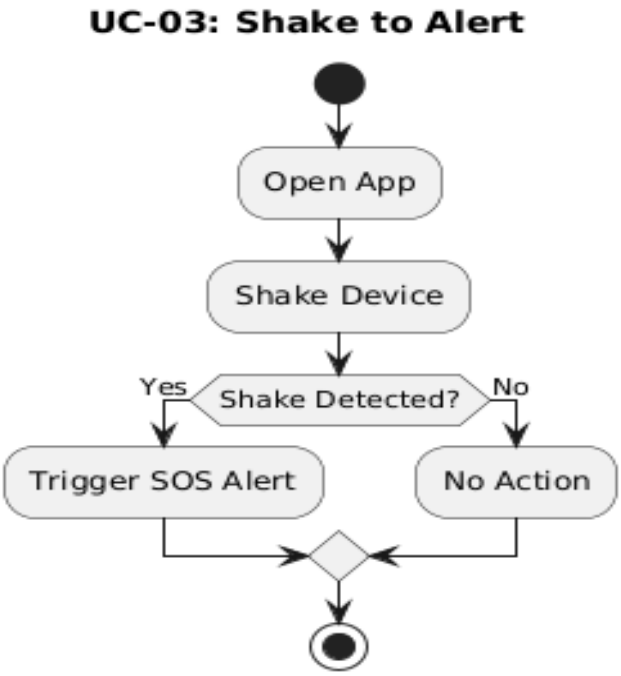


Figure 3.5: UC-3(Shake to Alert)

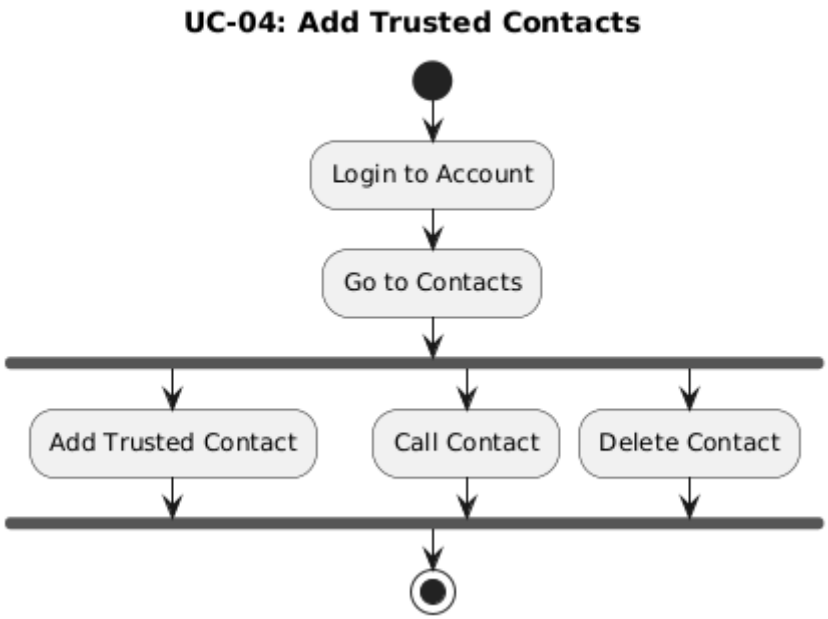


Figure 3.6: UC-04(Add Trusted Contacts)

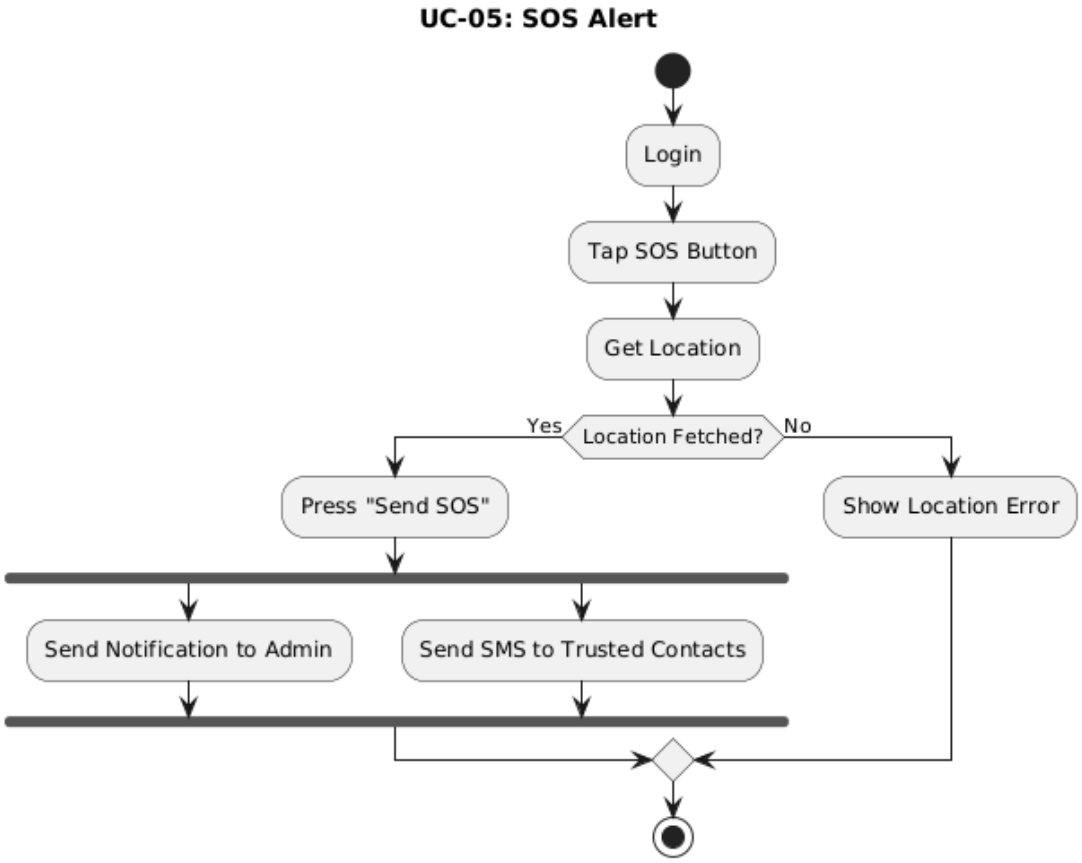


Figure 3.7: UC-05(SOS Alert)

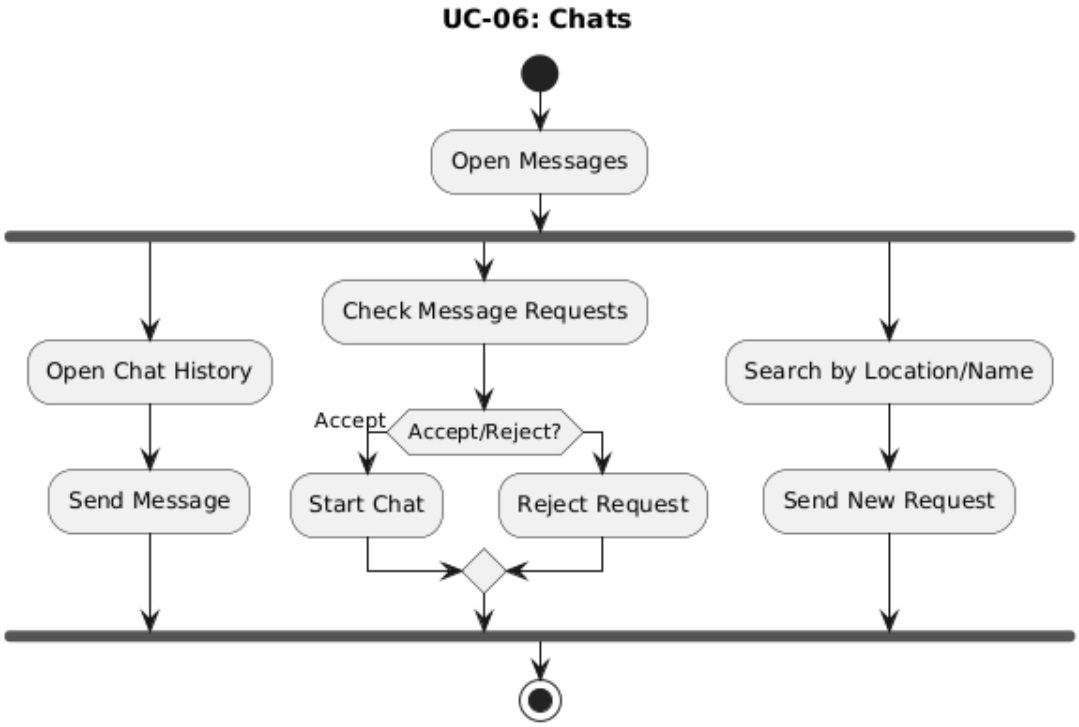


Figure 3.8: UC-06(Chats)

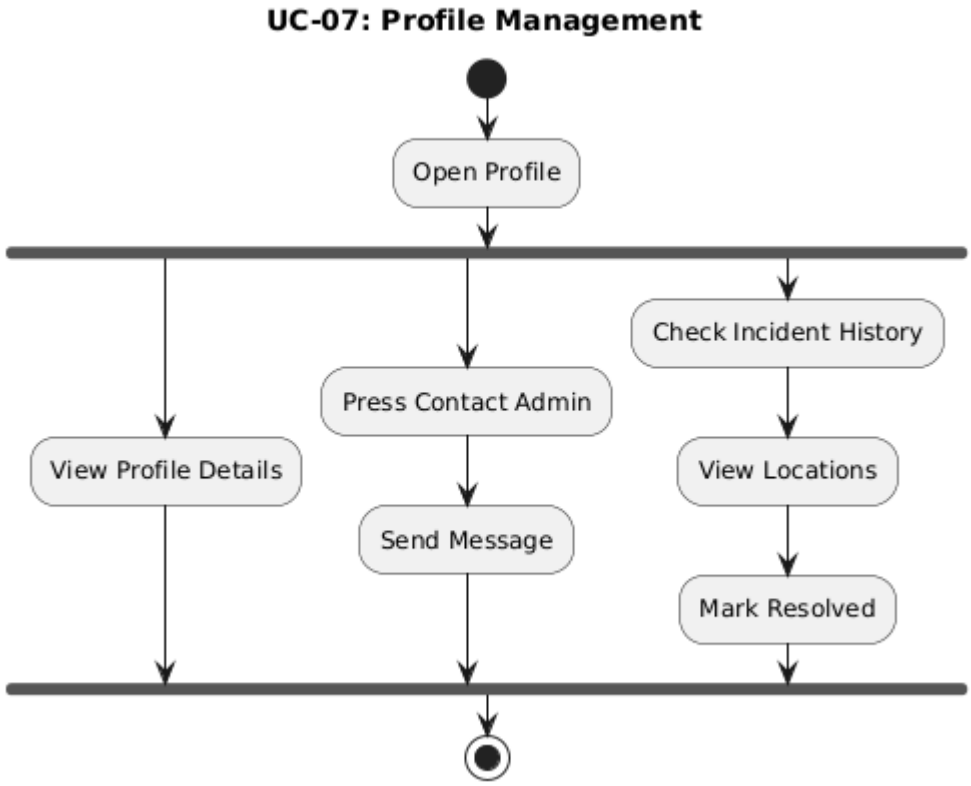


Figure 3.9: UC-07(Profile Management)

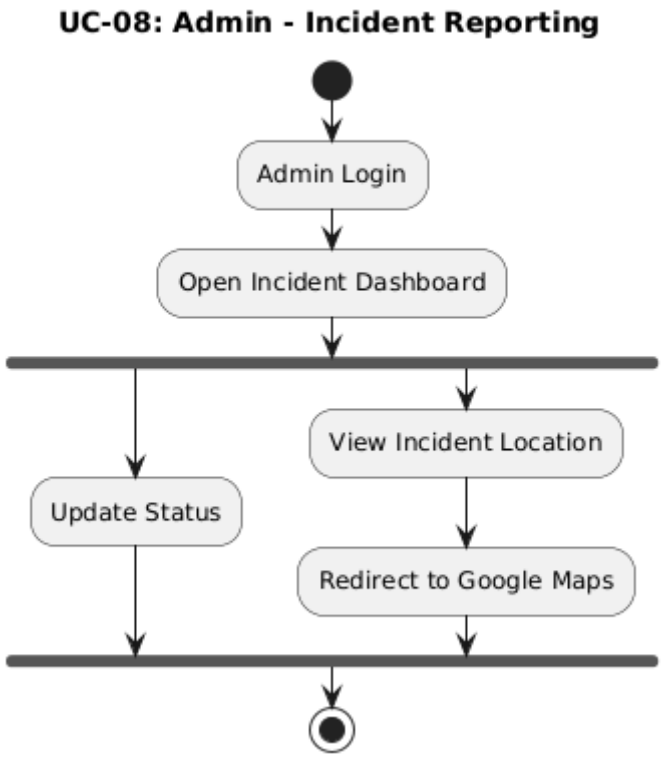


Figure 3.10: UC-08(Admin-Incident Reporting)

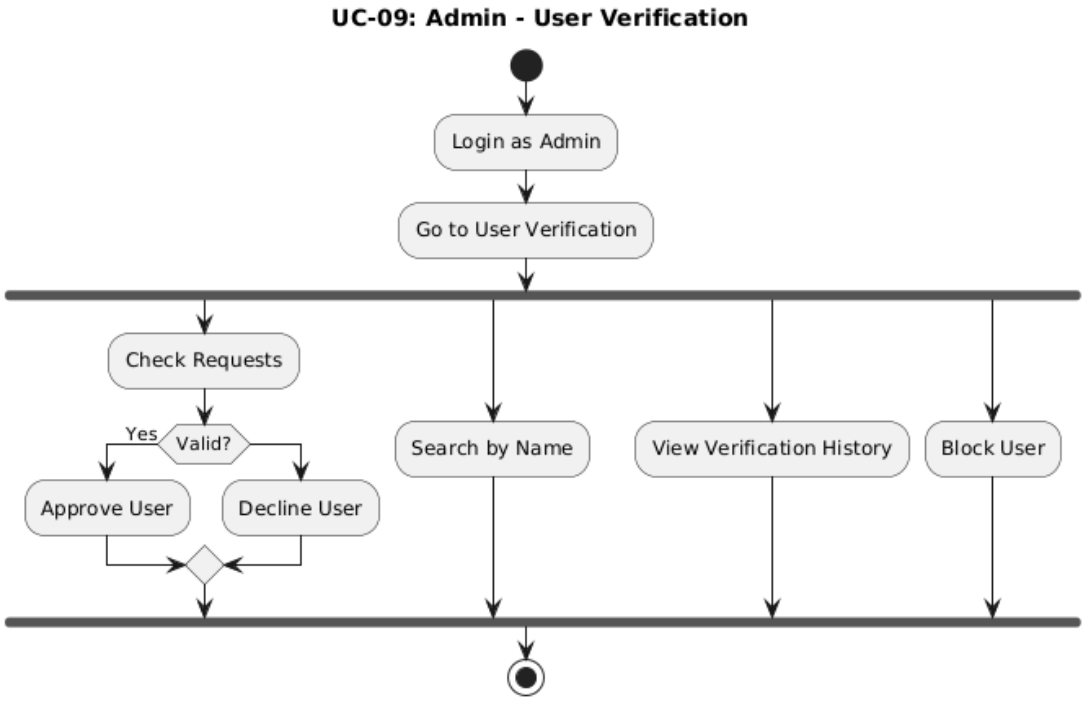


Figure 3.11: UC-9(Admin- User Verification)

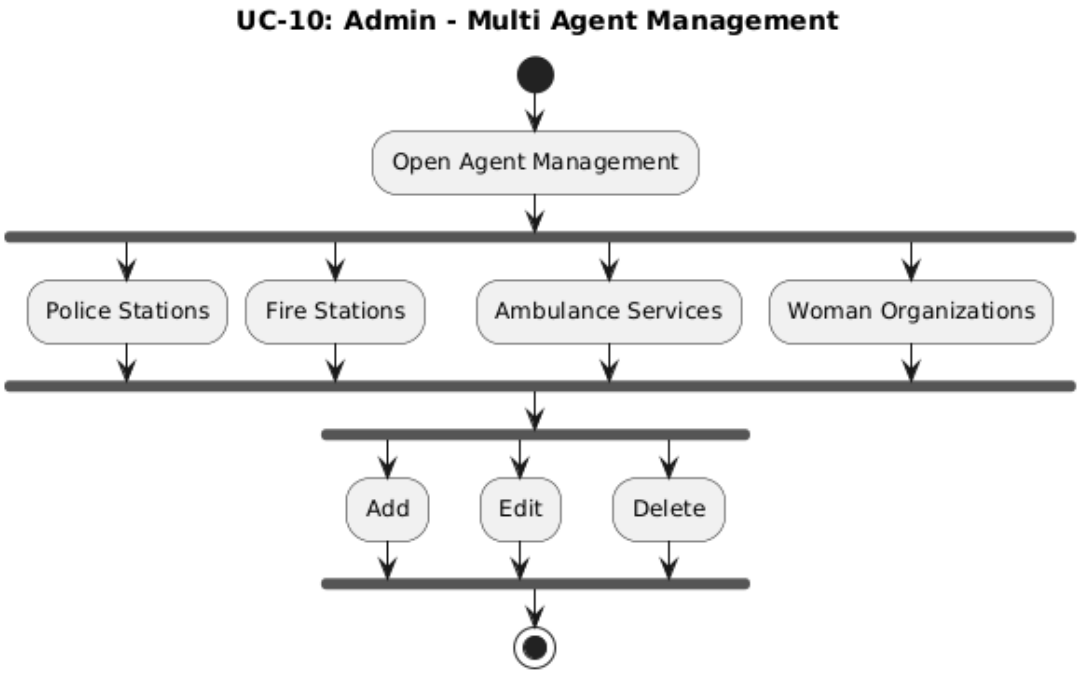


Figure 3.12: UC-10(Admin- Multi Agent Management)

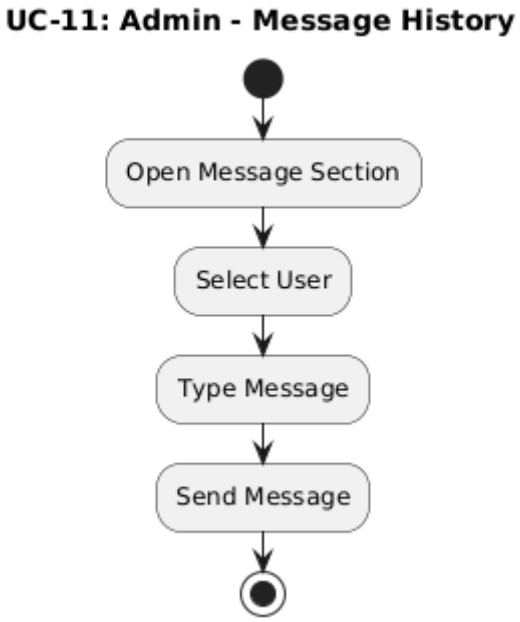


Figure 3.13: UC-11(Admin-Message History)

3.4 Sequence Diagram:

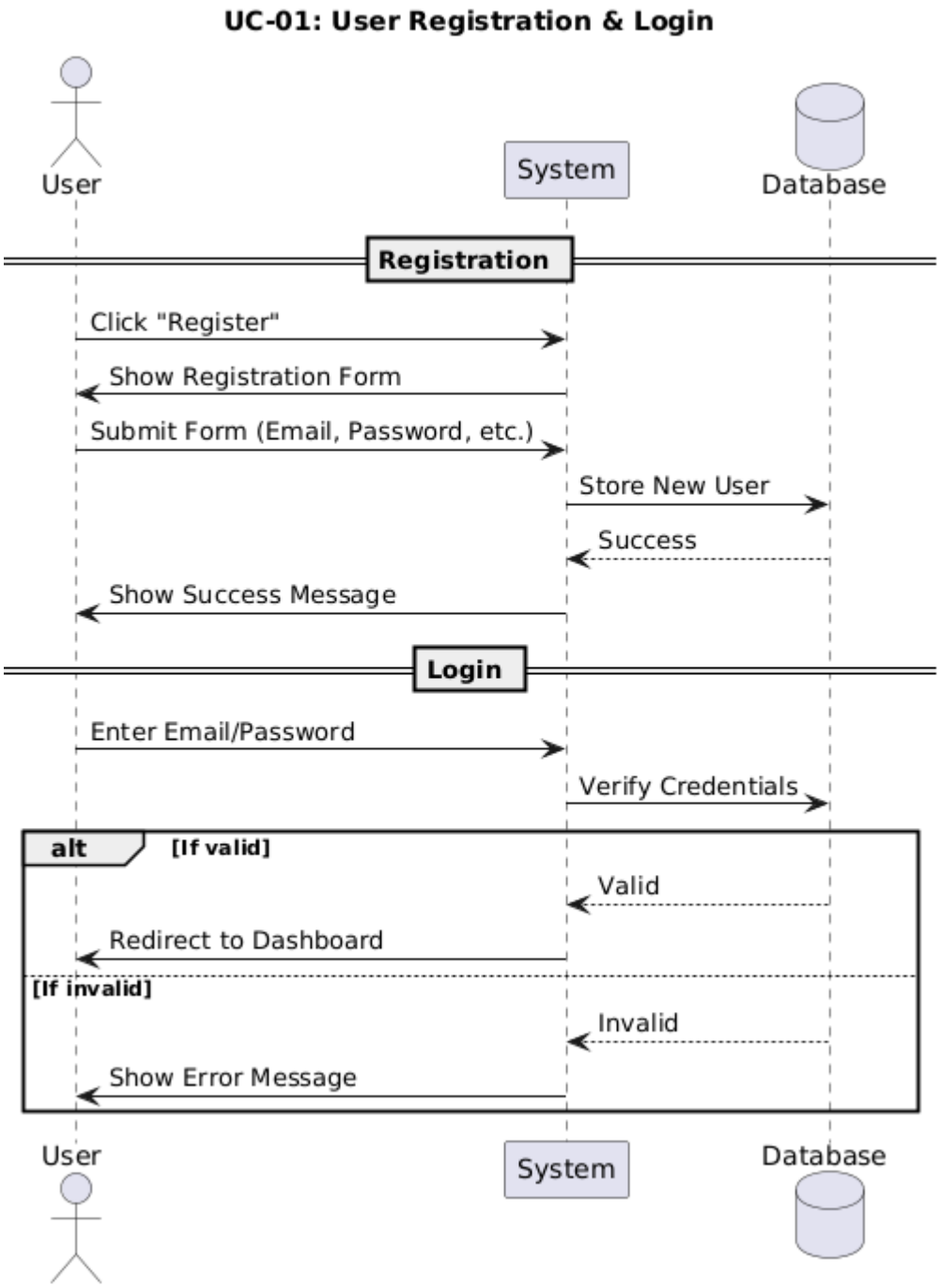


Figure 3.14: SD-01(User Resgistration & Login)

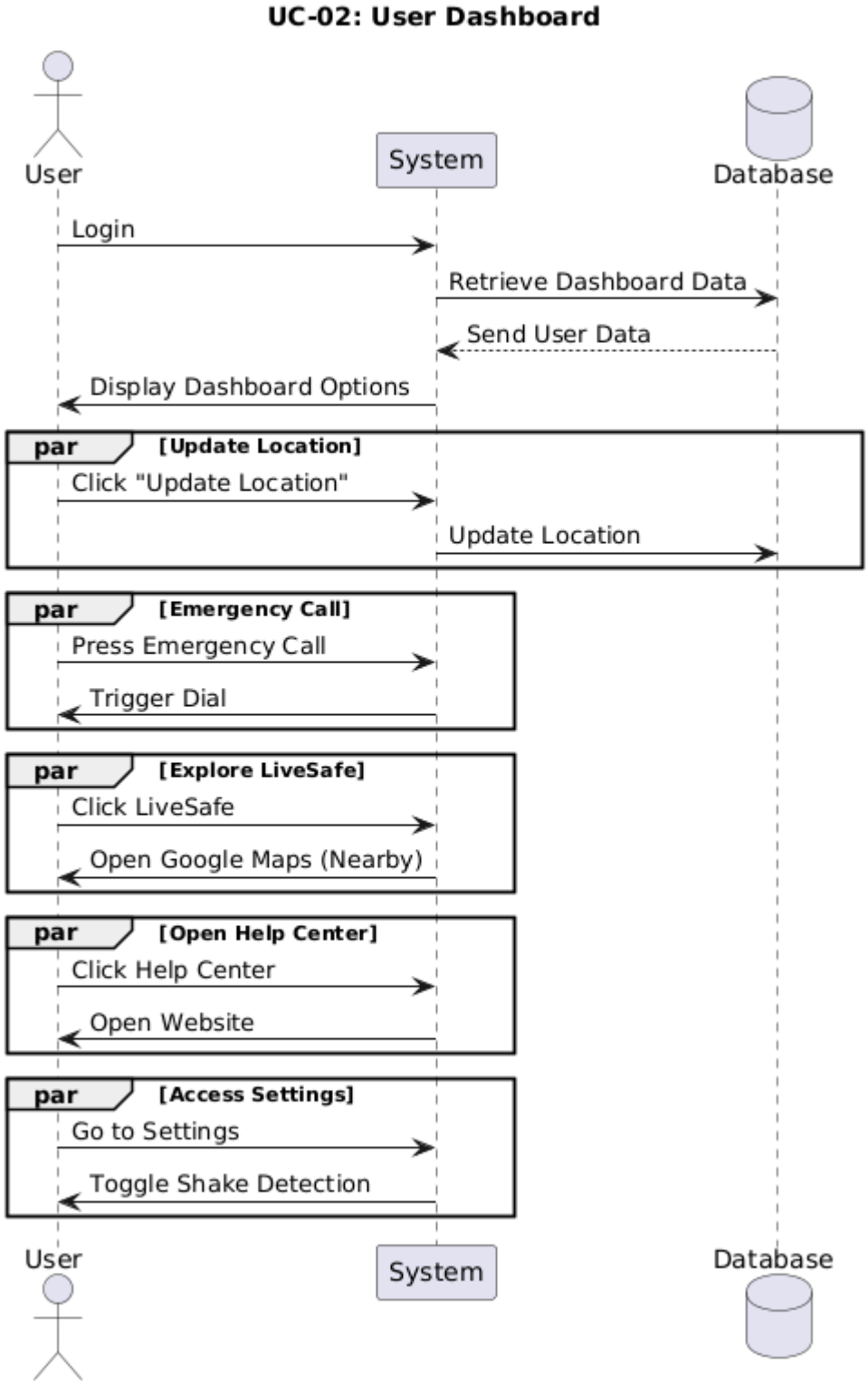


Figure 3.15: SD-02(User Dashboard)

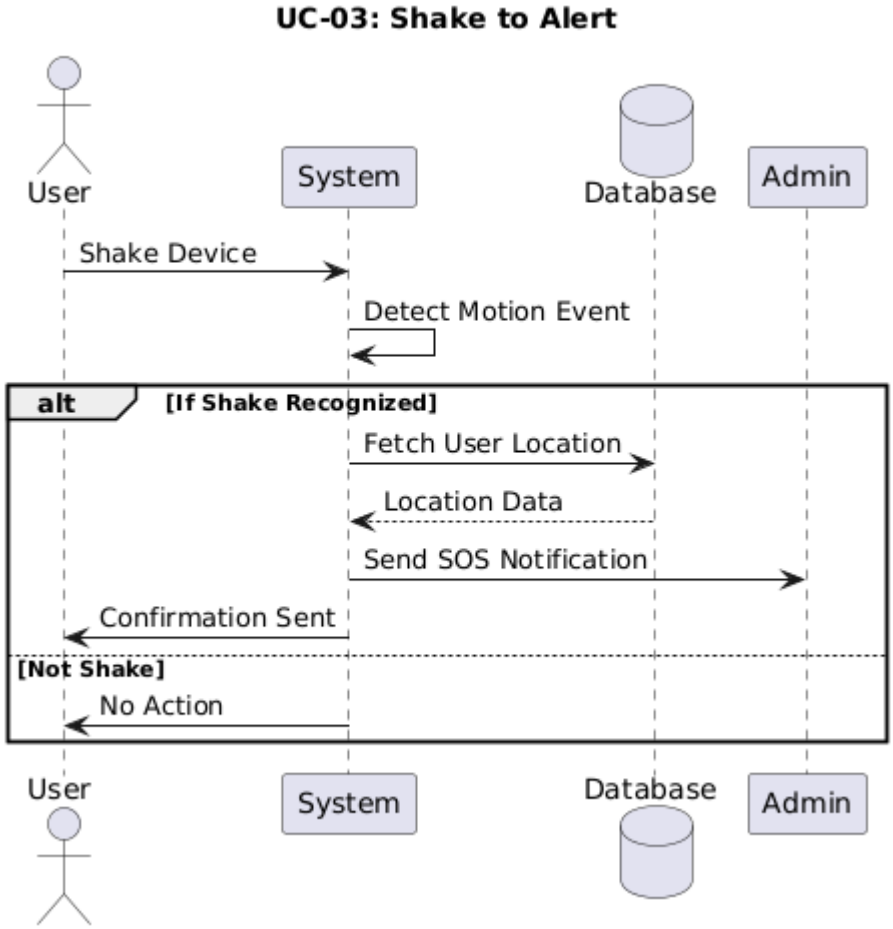


Figure 3.16: SD-03(Shake to Alert)

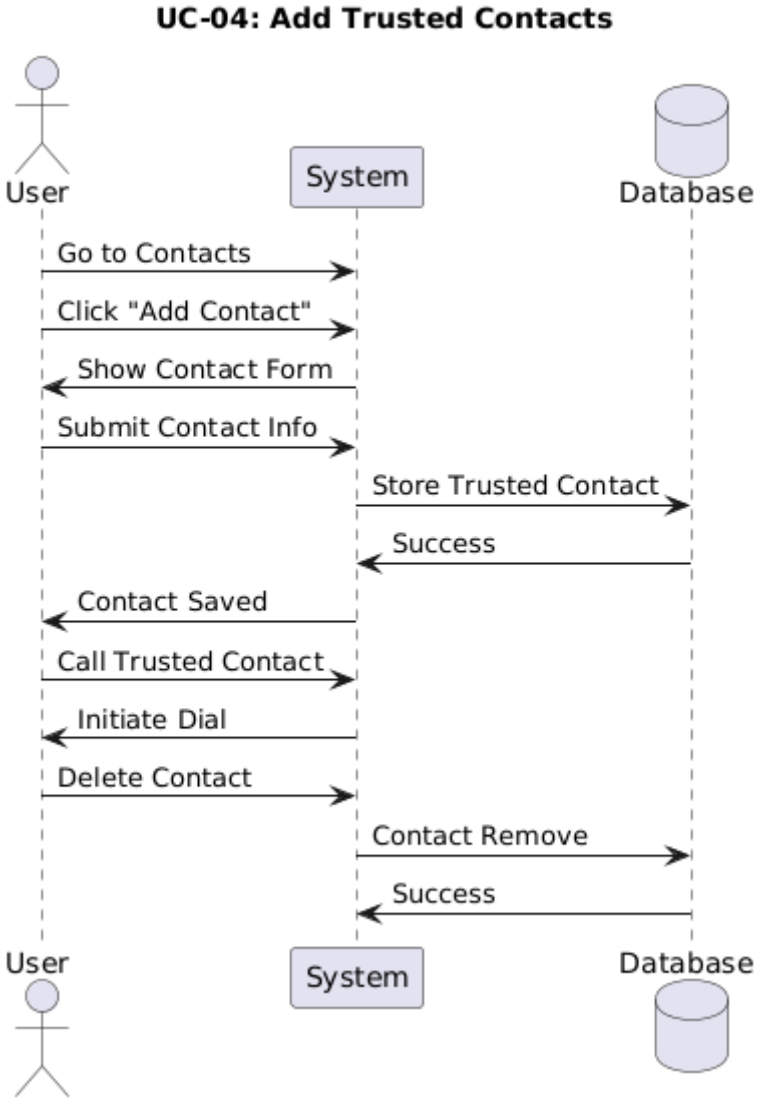


Figure 3.17: SD-04(Add Trusted Contacts)

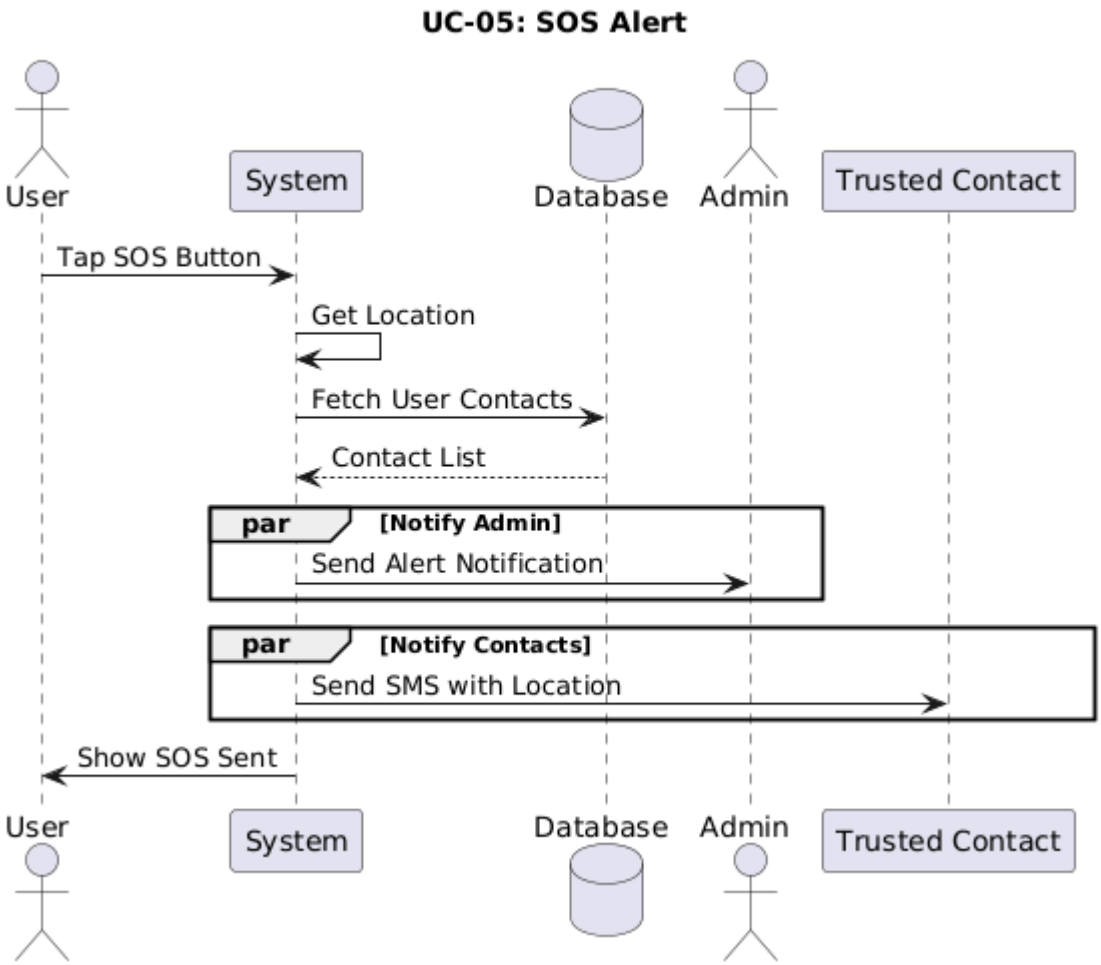


Figure 3.18: SD-05(SOS Alert)

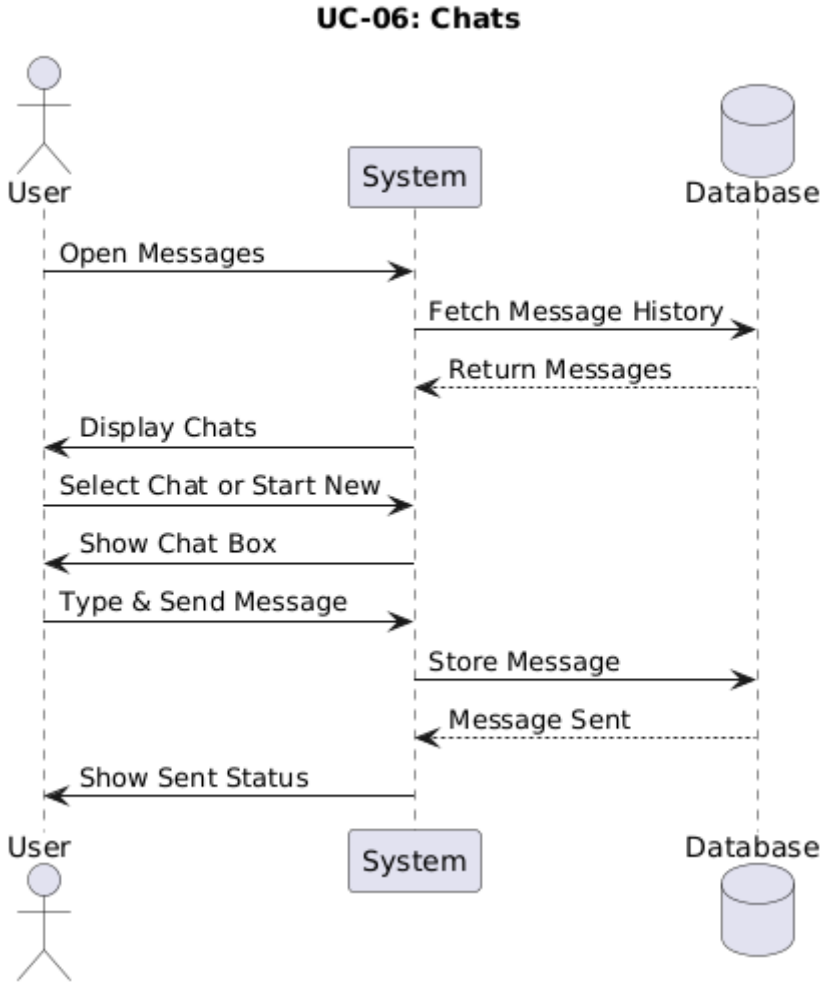


Figure 3.19: SD-06(Chats)

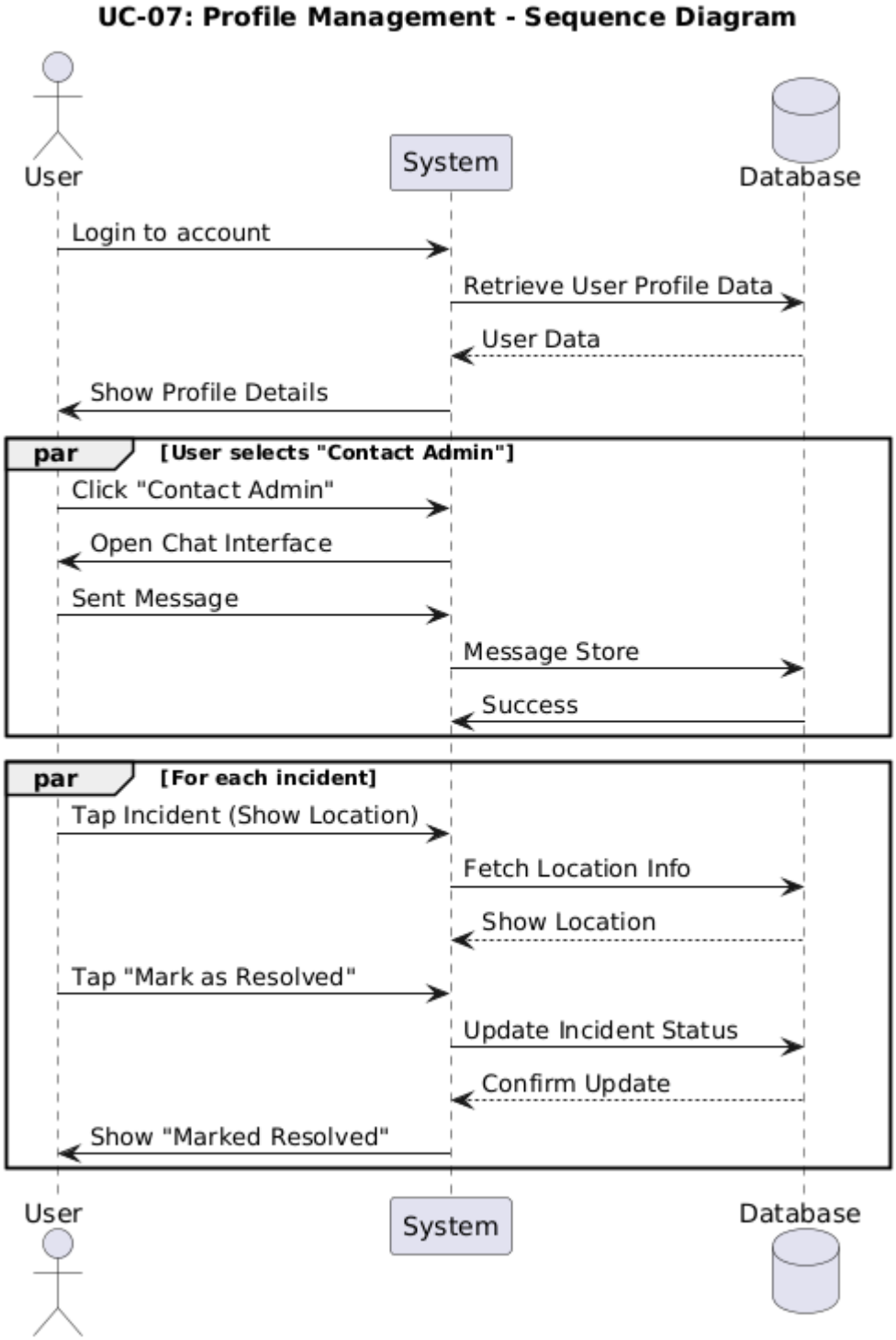


Figure 3.20:SD-07(Profile Management)

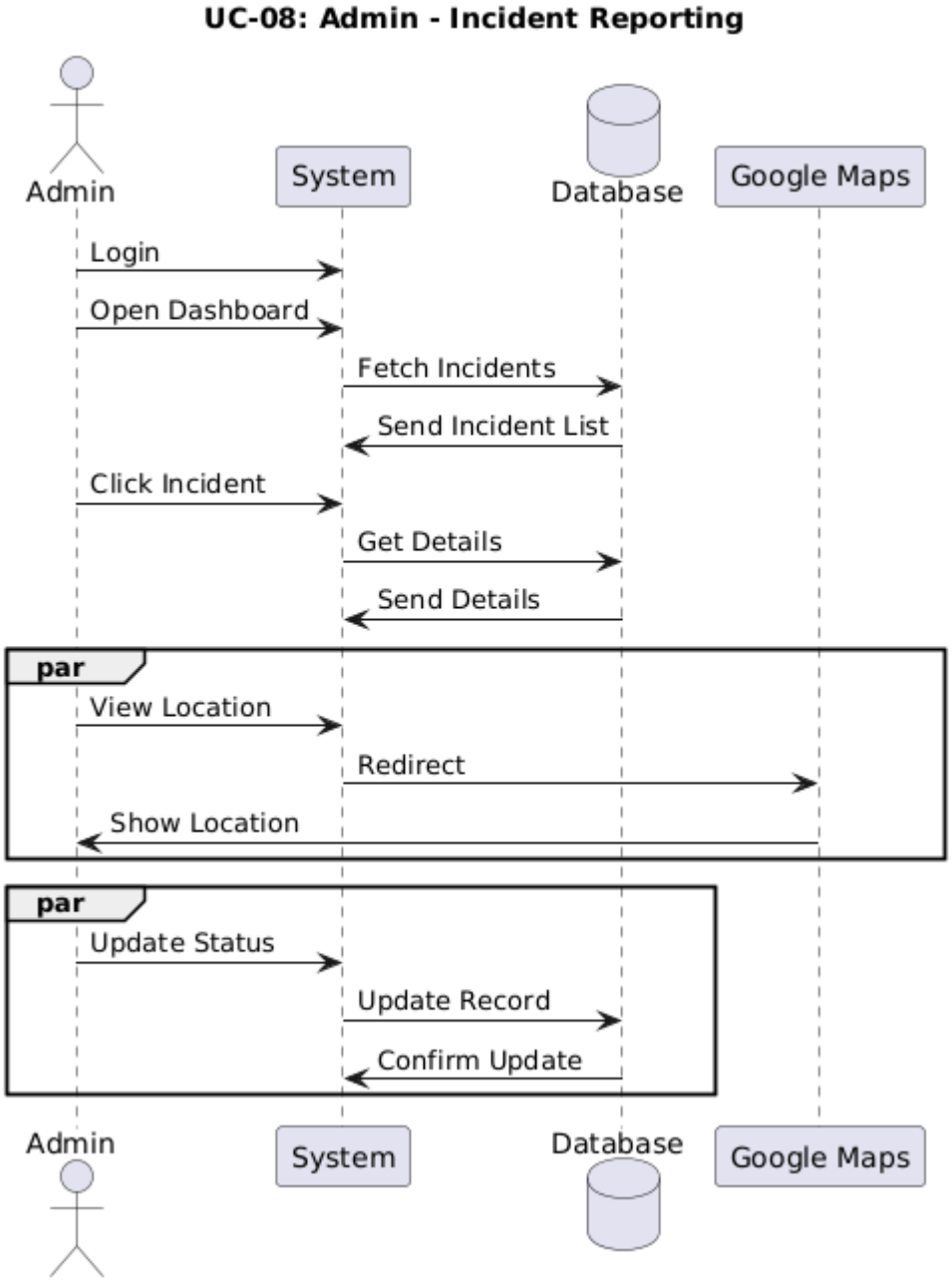


Figure 3.21: SD-08(Admin- Incident Reporting)

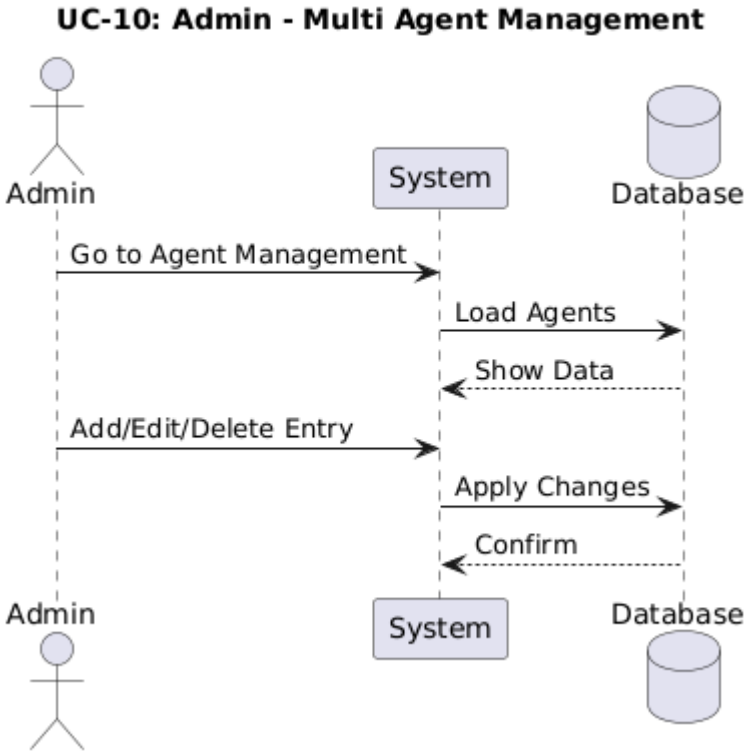


Figure 3.22: SD-10(Admin- Multi Agent Management)

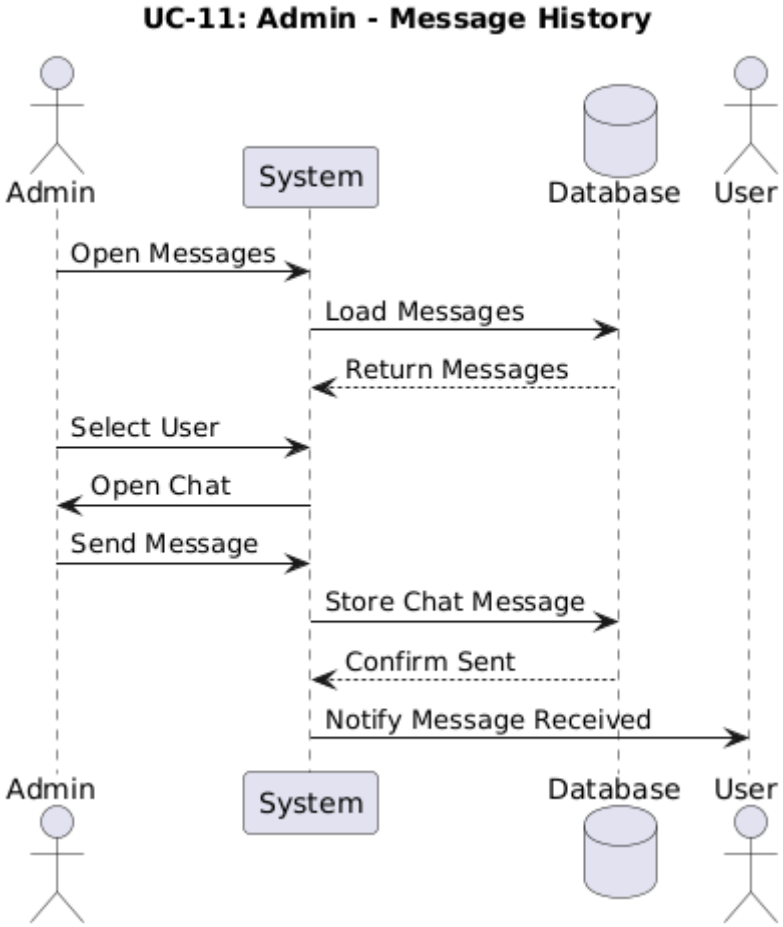


Figure 3.23: SD-11(Admin- Message History)

CHAPTER 4: SYSTEM DESIGN SPECIFICATION

"**Safe Her"** is a smart safety app for Bangladeshi women which allows them to get assistance in an emergency by sending out an SOS alert, sharing their location live, reporting incidents, and contacting trusted contacts, police stations, NGOs, and nearby help centres. The system has a mobile client, a backend server, an admin dashboard and possibly a community response layer.

4.1 Database Design Diagram

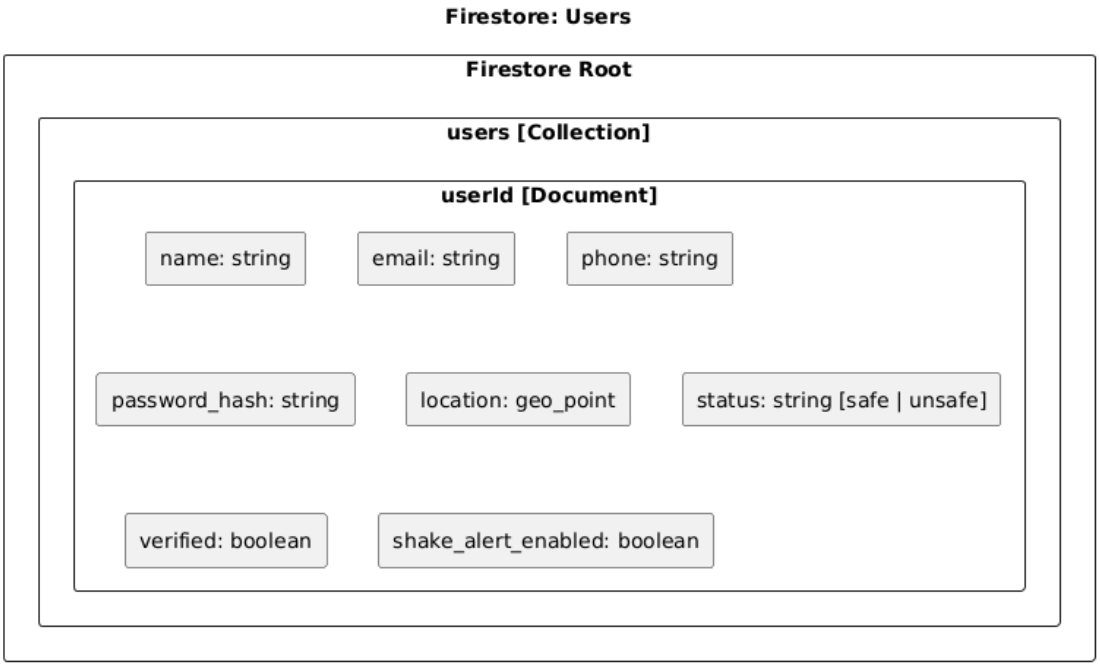


Figure 3.24: DD-01(User)

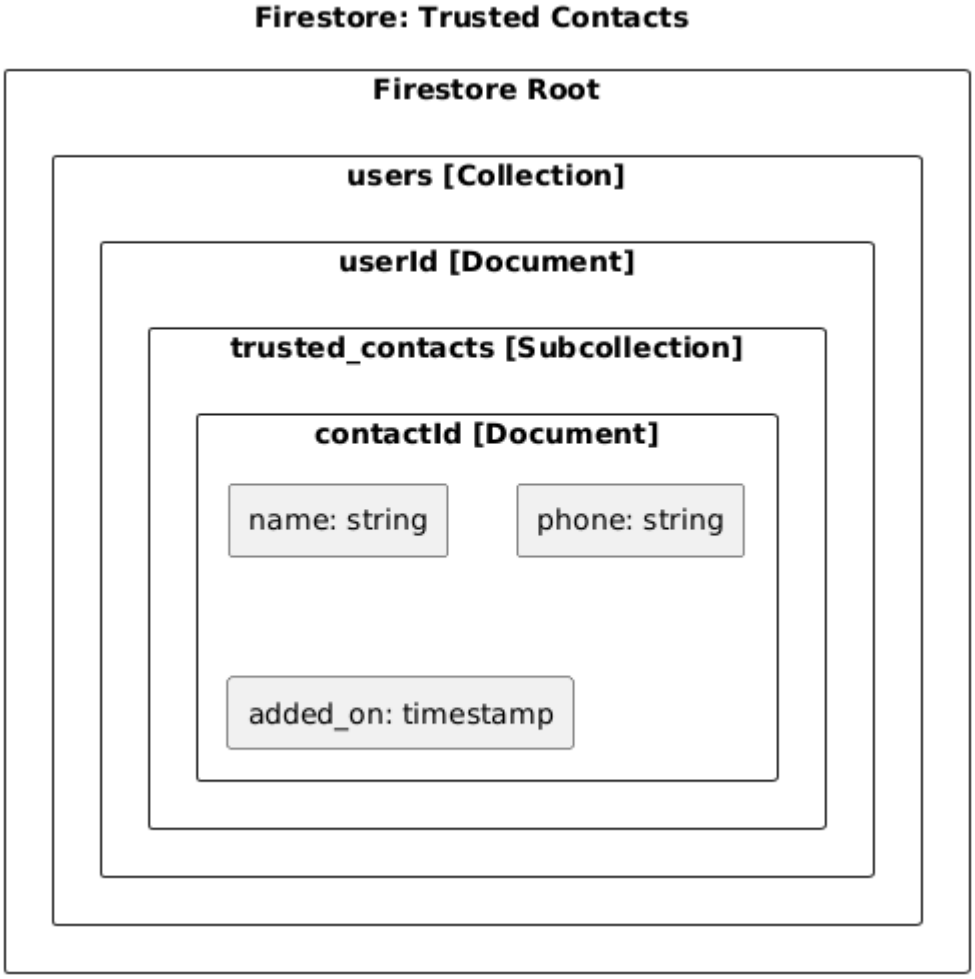


Figure 3.25: DD-02 (Trusted Contacts)

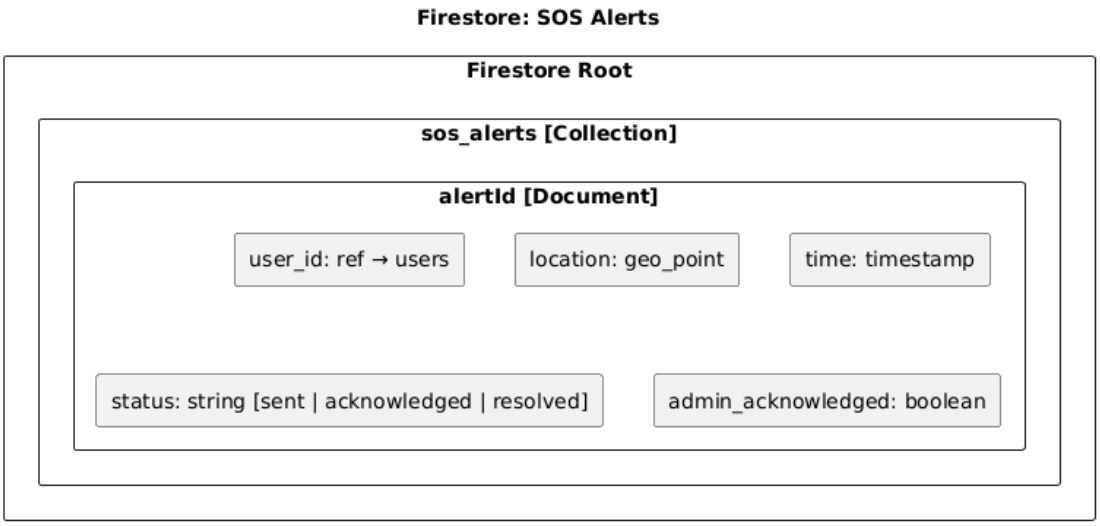


Figure 3.26: DD-03(SOS Alerts)

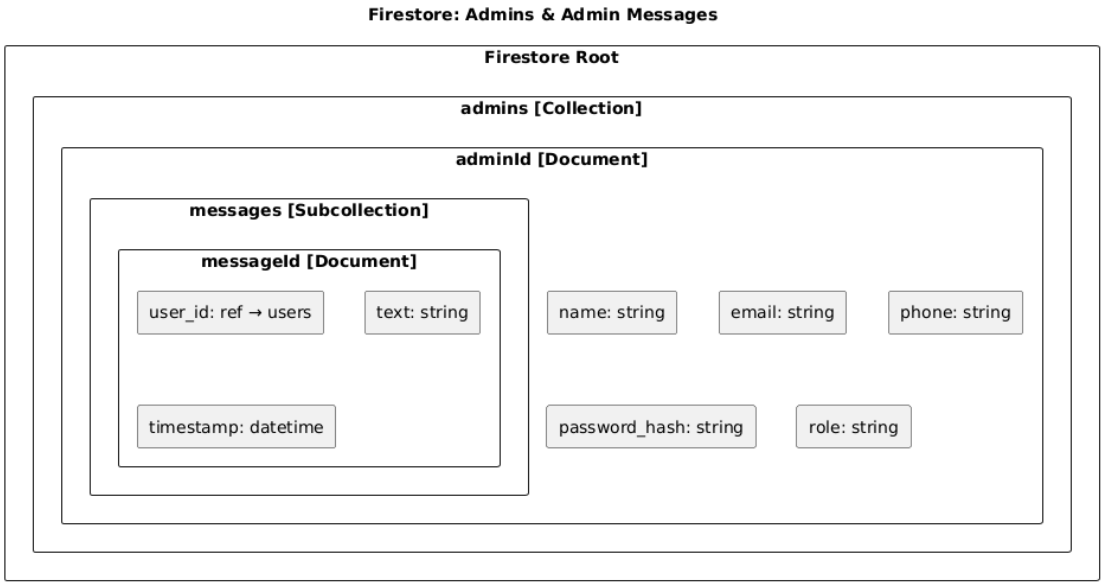


Figure 3.27: DD-04 (Admins & Admin Messages)

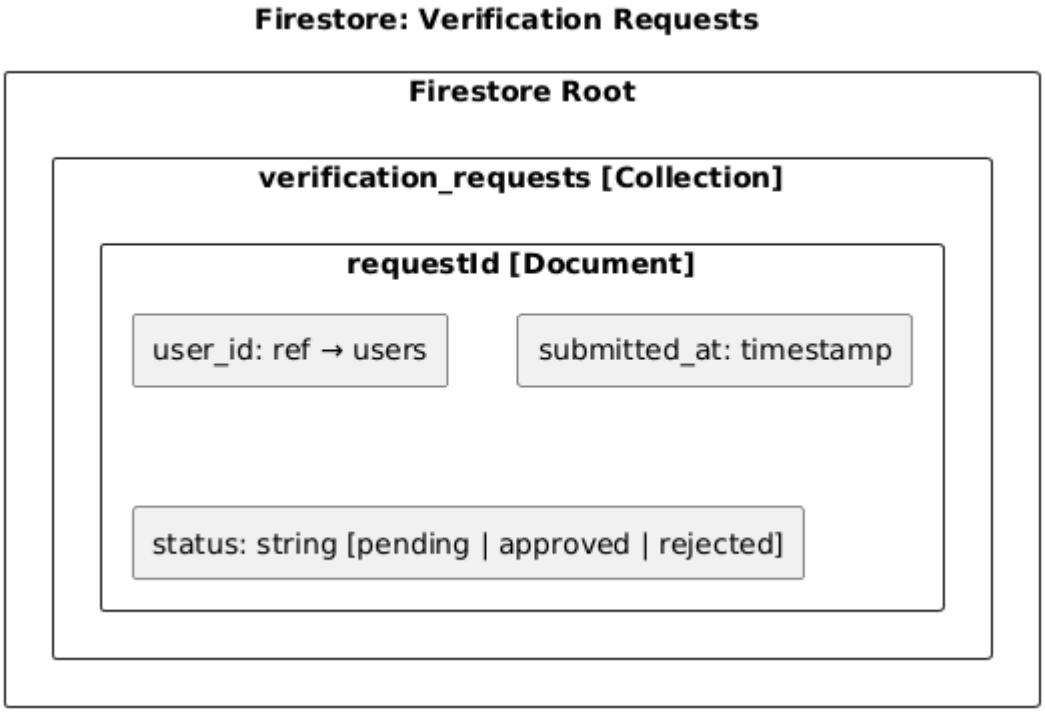


Figure 3.28: DD-05 (Verification Requests)

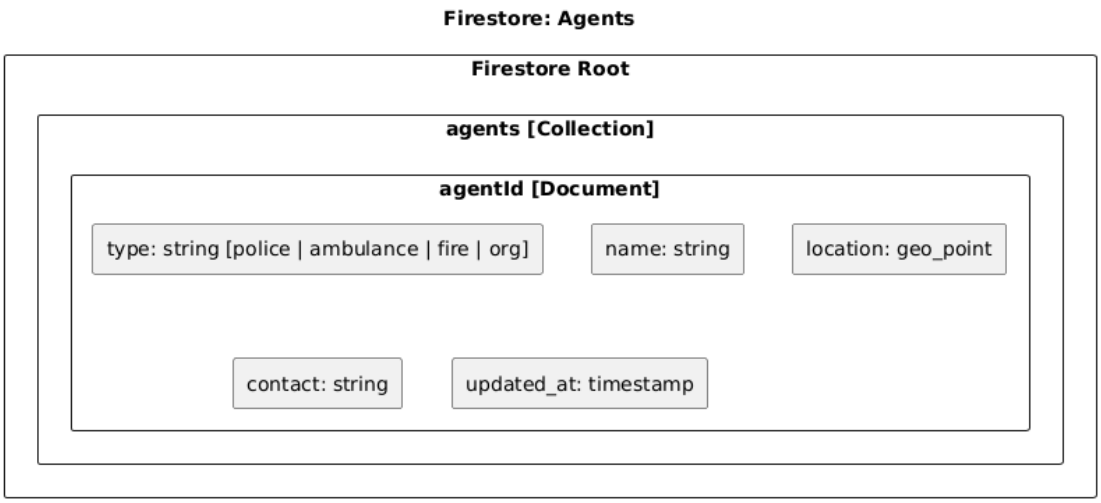


Figure 3.29: DD-06 (Firestore: Agents)

4.2 Development Tools & Technology

To fulfill the needs of a Safety apps, we have used technologies which are fast, modern and reliable. We have also ensured that the developed solution is maintainable and extendable for future.

4.2.1 Implementation Tools & Platform

4.4.1.2 Android Studio:

We used Android Studio as the IDE to make the app. Android Studio had everything required to make, test, benchmark, and debug an app. Also, real-device debugging, emulators, and UI preview helped us make the app.

4.4.2.1 Dart Development tools:

We used Dart Dev Tools to search for memory leaks, jank (animations that don't move smoothly), and slow rendering in our app and widget. This ensured that the app runs well and quickly even when the network connection is weak.

4.4.2.2 Firebase Platform:

We used Firebase as the backend as a service (BaaS) to give our app and authentication to our app's cloud services that are real-time, scalable, and secure. We used it for these purposes-

A. **Firebase Authentication:** Users, volunteers, and admins can sign up and login safely using email or phone.
B. **Cloud Firestore:** A cloud database where we can save and update users, reports, alerts, and shelters data in.

C. **Firebase Cloud Messaging:** To send an alert and a notification to the user's device.
D. **Firebase Storage:** To save the videos and pictures the users sent in or gave to shelters.

4.4.2.1 GitHub

The flow of testing and change management, we were able to setup a version control system for our source code using GitHub. We were able to branch and branch our code to work on different features using GitHub. We were able to easily create a branch for every one of our features and pull it into the main branch successfully. In this way, the code is stable and easy to track, and less likely to have errors when integrating.

4.4.2.1 Google Maps API:

A map where we can show the real-time location of the user.

A. Use an interactive map to show the real-time location of users.
B. Use the Places API to show verified places such as police stations, NGOs, or emergency shelters.
C. Set off geofencing alerts if a user enters a known high-risk area (this will be possible in the future with the geolocator plugin).

4.4.2.1 Visual Studio Code

Component	Technology/ Tool	Purpose
Fronted	Flutter	UI Development
Language	Dart	App Logic, async functions
IDE	Android Studio, VS Code	Development & debugging
Backend	Firebase	Auth, Database, Storages, Notifications
Maps (In Future)	Google Maps API	Display relief centers
Version Control	GitHub	Source Code Management

Table 4.0: Summary of Technologies Used

Why these tools were chosen:

A. **Cross-Platform Collaboration Development**: We can create an app for both Android and iOS using Flutter and Dart with the same codebase. This saves us a lot of work and time.

B. **Developer Pros & Cons:** It was easier and smoother to test and make changes with Flutter Hot Reload and GitHub.
C. **User Experience:** Now a better user experience app, user friendly for non techies and Material Design implemented**.**

CHAPTER 5: SYSTEM TESTING

5.1 Testing Features

Test No.	Features	Description	Test Criteria
TC01	SOS Button	Pressing SOS sends location to contacts.	Contacts receive alert, Map Link
TC02	Admin Control Panel	Admins manages all the modules on the admin control panel.	Sending Alert
TC03	Location Sharing	Share real-time location with trusted circle.	Live Location updates shown on map.
TC04	Ui Responsiveness	Navigate between screens smoothly.	Smooth transitions and user feedback.
TC05	Emergency Request	User can direct messages to admin.	Location, details
TC06	Offline Condition	No internet during alert.	Alert queued and sent when connection resumes.
TC07	Trusted Circle Feature	Add, Edit, Remove trusted contacts.	Contacts updated in firebase.
TC08	User Authentication	To get into the system, you need to register and log in.	Good and bad login scenarios, empty fields, password rules, and session persistence.

Table 5.1 Testing Features

5.2 Testing Strategies

To make sure the ‘’Safe Her’’ app works consistently in real-world scenarios, we used a black-box testing strategy to test the responsiveness, usability, and functionality.

5.2.1 Test Approach

A. **Unit Testing:** Every important and essential feature such as location share, shake, and SOS warning**.**
B. **Integration Testing:** Check the communication between the Firebase backend and Flutter frontend.
C. **Real-Device Testing:** Real-Device Android smartphones with different OS version and smartphone specifications were included in the test.
D. **Field Simulation:** Field emergency simulation, low battery, quiet mode, location share failure.

5.2.3 Testing Schedule

Following testing schedule for the last phase of development in week 4:

Week	Description
1-4	Unit Testing of all modules.
4-8	Integration and interface testing.
8-10	User Acceptance testing.
10-12	Regression testing and bug fixing.

5.2.4 Traceability Matrix

Test Case	Requirement	Status
TC01	SOS Button	**Pass**
TC02	Admin Control Panel	**Pass**
TC03	Location Sharing	**Pass**
TC04	Ui Responsiveness	**Pass**
TC05	Emergency Request	**Pass**
TC07	Trusted Circle Feature	**Pass**
TC08	User Authentication	**Pass**

5.3 Testing Environment (Hardware/Software Requirements)

Hardware Environment:

- **A.** User Device: Real Android Phones (Samsung).
- **B.** RAM: 2GB or above.
- **C.** Location: Sensor based on GPS and accelerometer.
- **D.** Network: 4G, (WI-FI, or Mobile Data).

A. Software Tools:

- **A. Frontend:** Flutter SDK Dart Programming Language.
- **B. Backend:** Firebase Authentication Cloud Firestore Realtime Database Cloud Functions Cloud Messaging.
- **C. API and Libraries:** Google Maps API Permission Handler Shake Detector
- **D. Development Tools:** Android Studio or Visual Studio Code Git for version.

5.4 Test Cases:

Test Case No.	Test Case Name	Component	Sub Component
TC01	SOS Button	Emergency Alert	One tap SOS system

Step	Action	Expected Result	Pass/ Fail	Comments
1	Press the SOS button (With Internet).	Responders, trusted contacts, and the administrator receive an SOS alert instantly through an API. A confirmation message shows up.	Pass	The main SOS function works over the internet.
2	Press the SOS button if you don't have internet.	Fallback SMS sends your location to your emergency contacts.	Pass	Requires SIM & SMS permissions.

		Confirmation is shown.		
3	SOS alert saved in the database	A new alert record was made in Firestore/DB with a timestamp, user ID, and location.	Pass	Checked through the admin dashboard.
4	No contacts you trust have been saved.	The app asks the user to add contacts for emergencies.	Pass	Handles missing data well.

Designed By	**Designed Date**	**Executed By**	**Executed Date**
Shejuti Akter	02 Jan 2025	Shejuti Akter	05 Feb 2025

Table 5.4 TC01

Test Case No.	**Test Case Name**	**Component**	**Sub Components**
TC02	Admin Panel Control	Admin Dashboard	Report Moderation, Alerts

Step	**Action**	**Expected Result**	**Pass\Fail**	**Comments**
1	Login As Admin	Dashboard loads	Pass	Admin Login functional.
2	SOS alert for details	Displays user information, the time, the location, and buttons for actions.	Pass	Alert data showed up correctly.

3	View incident reports list.	Every report that has been submitted is shown in a list or sortable table.	Pass	Search and filtering options.

Designed By	Designed Date	Executed By	Executed Date
Shejuti Akter	04 Jan 2025	Shejuti Akter	11 Feb 2025

Table 5.4 TC02

Test Case No.	Test Case Name	Components	Sub Components
TC03	Location Sharing	Location Manager	GPS, Network, Settings, Permission

Step	Action	Expected Result	Pass/Fail	Comments
1	User taps “Share Location” button on home screen.	The user's current location is retrieved and shown.	Pass	You need to give permission for location.
2	Location sent through SOS alert.	Admin and trusted contacts get the right coordinates.	Pass	Includes map link.
3	Location permission is denied	Enable location to share.	Pass	The user was told to turn on permission.

Designed By	Designed Date	Executed By	Executed Date
Shejuti Akter	05 Jan 2025	Shejuti Akter	15 Feb 2025

Table 5.4 TC03

Test Case No.	Test Case Name	Component	Sub Component

TC04	UI Responsiveness	Theme & Display	System Settings & preference

Step	Action	Expected Result	Pass/Fail	Comments
1	On a typical Android phone (6" screen), launch the app.	layout loads properly, displaying every UI element.	Pass	tested using a standard screen size.
2	Open app on small screen 4.5 inch.	UI components correctly scroll or resize.	Pass	Scrolling is necessary, but it works.
3	Press buttons quickly.	Visually, buttons don't overlap or get stuck.	Pass	No duplication or glitches.
4	Check the settings on your device for low brightness and high contrast.	The application stays visible, and the colour contrast is readable.	Pass	used accessibility contrast tools to verify.

Designed By	Designed date	Executed By	Executed date
Shejuti Akter	06 Jan 2025	Shejuti Akter	16 Feb 2025

Table 5.4 TC04

Test Case No.	Test Case Name	Component	Sub Component
TC05	Offline Condition	Offline Component overview	SMS Sender, Call Option

Step	Action	Expected Result	Pass/Fail	Comments
1	Try to log in without internet.	Login doesn't work; app says "No Internet"	Pass	Auth needs the internet.
2	When offline, tap "Contact NGO."	App shows a mistake or gives you the option to send an SMS or make a phone call.	Pass	Links to other sites are disabled without a signal.
3	Track live location with intermittent signal.	When the signal returns, the app updates and displays "location paused" during the drop.	Pass	Updates are handled intermittently.

Designed By	Designed Date	Executed By	Executed Date
Shejuti Akter	07 Jan 2025	Shejuti Akter	20 Feb 2025

Table 5.4 TC05

Test Case No.	Test Case Name	Components	Sub Component
TC06	Trusted circle feature	Alert Dispatcher	SOS trigger, sender

Step	Action	Expected Result	Pass/Fail	Comments
1	Add a trusted contact (Name, Phone number)	The contact is stored locally or in the cloud	Pass	Verifies and saves contact.

		and added to the trusted list.		
2	Open "Trusted Circle" from the app.	Appears on the trusted contact management screen.	Pass	UI loads instantly.
3	Open Trusted Circle on different device.	The cloud is used to sync contacts.	Pass	Successful sync.

Designed By	**Designed Date**	**Executed By**	**Executed Date**
Shejuti Akter	8 Jan 2025	Shejuti Akter	25 Feb 2025

Table 5.4 TC06

Test Case No.	**Test Case Name**	**Component**	**Sub Component**
TC07	User Authentication	Authentication	Login/Signup

Step	**Action**	**Expected Result**	**Pass/Fail**	**Comments**
1	For the first time, launch the application.	The user is taken to the sign-up/login page.	Pass	Prior to logging in, the splash screen loads.
2	Invalid Email entered.	"Invalid Email" is the displayed error.	Pass	Email format validation functional.
3	Submit valid email, password	User registered successfully and redirected to login.	Pass	Registration functional.
4	Tap logout from dashboard	Redirected to login screen	Pass	Logout flow working.

Designed By	**Designed Date**	**Executed By**	**Executed Date**

Shejuti Akter	15 Jan 2025	Shejuti Akter	05 Mar 2025

Table 5.4 TC07

CHAPTER 6: USER MANUAL

6.1 User Manual (User)

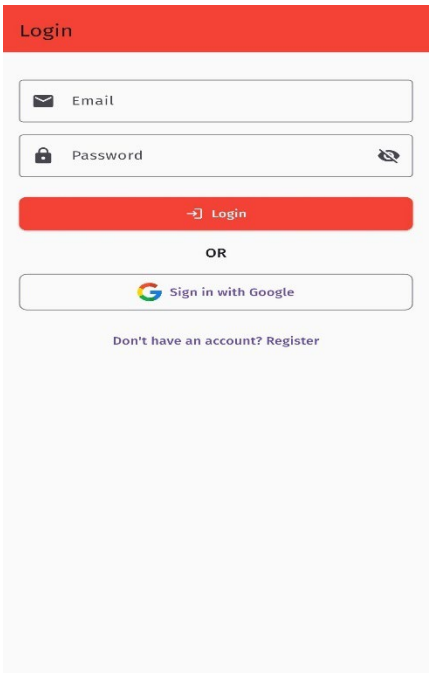


Figure 6.1: Login Page.

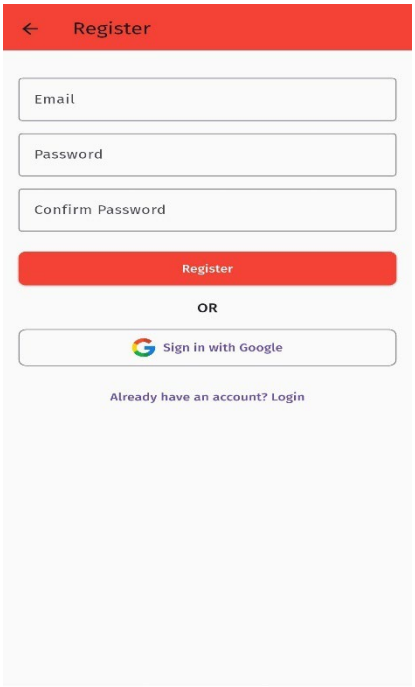


Figure 6.2: Register Page.

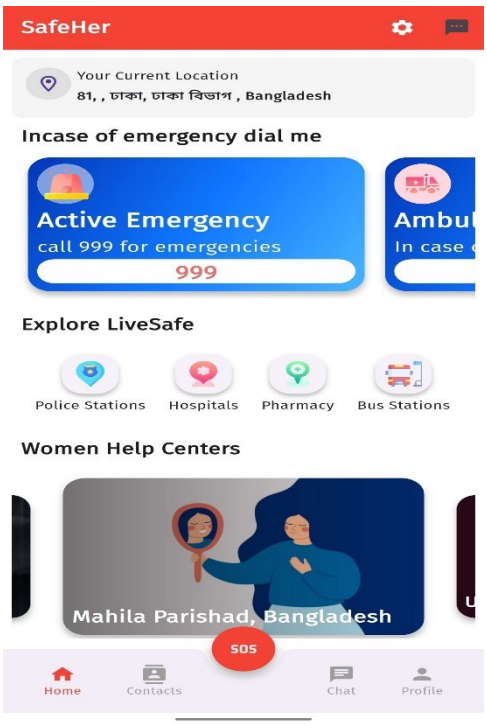


Figure 6.3: Dashboard.

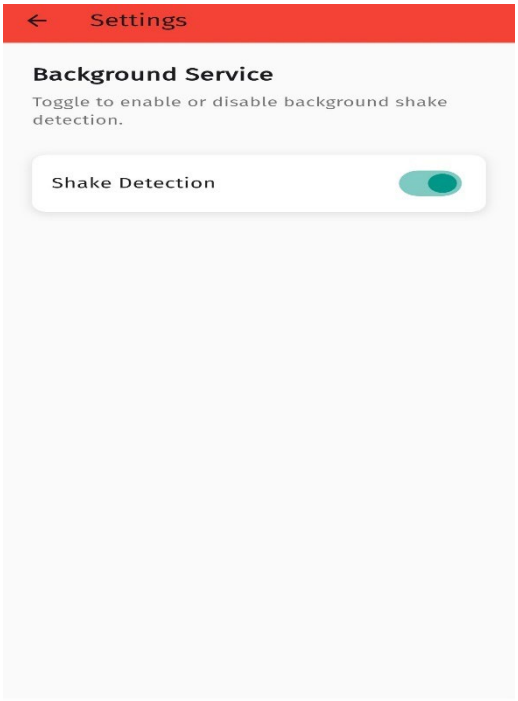


Figure 6.4: Shake Alert Button.

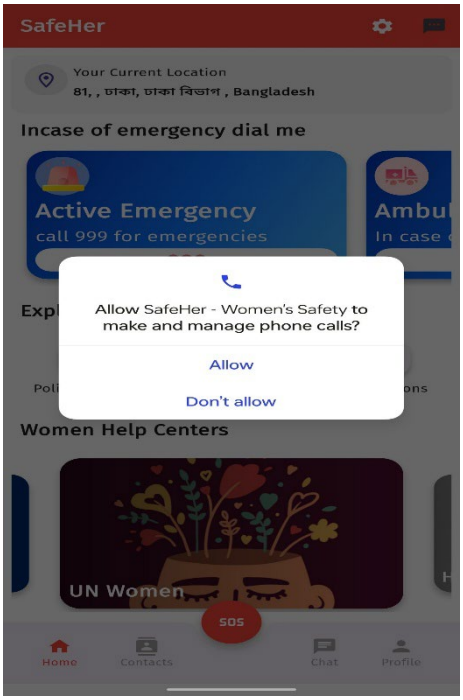


Figure 6.5: Permission for Call.

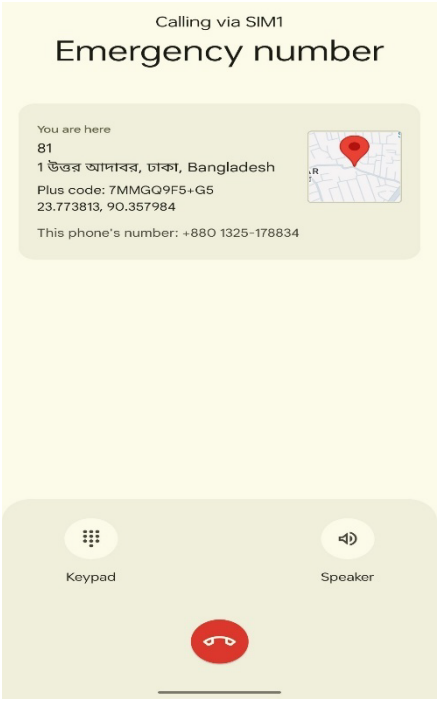


Figure 6.6: Active Emergency Call (999).

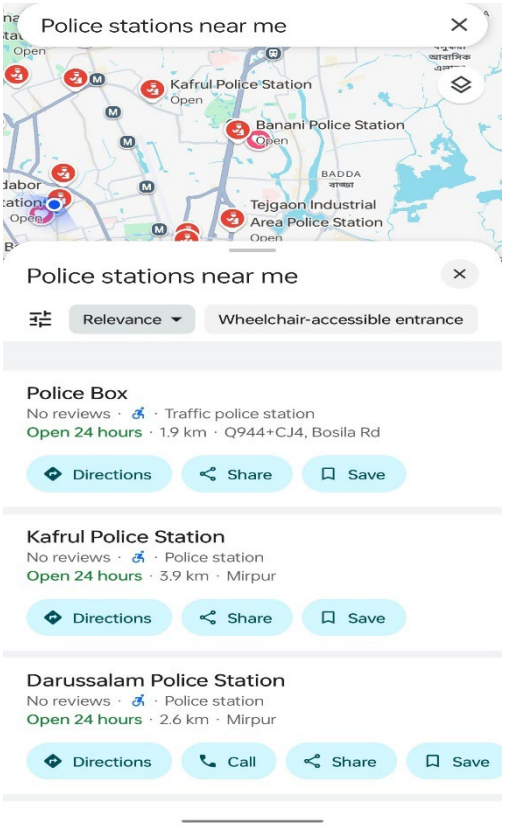


Figure 6.7: Near me (Police Station).

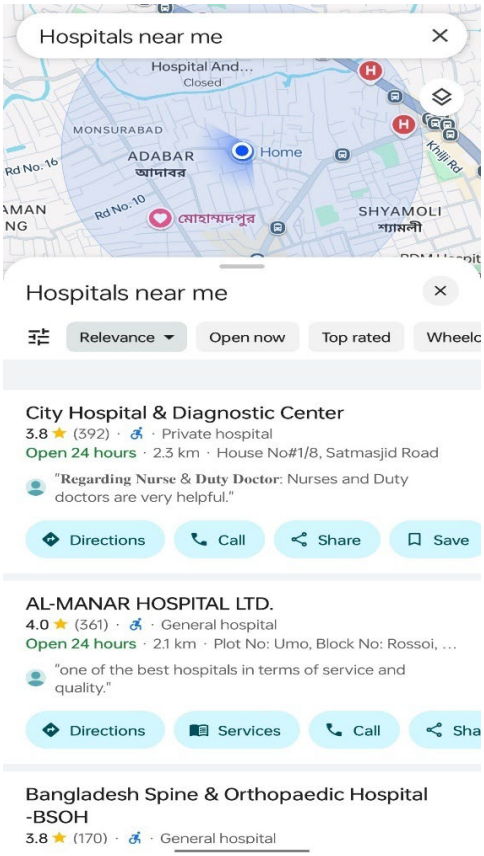


Figure 6.8: Hospitals.

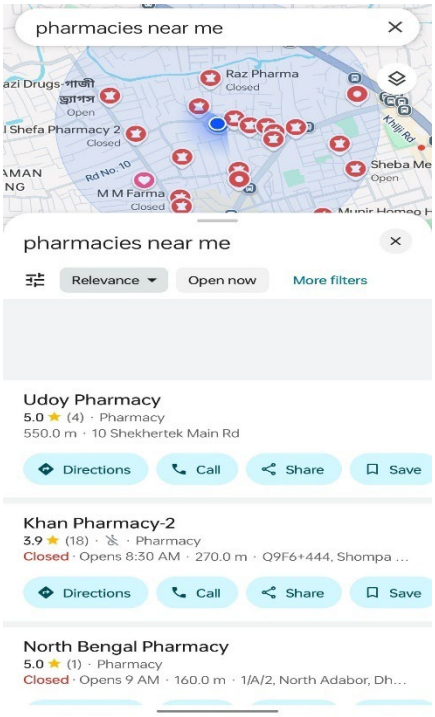


Figure 6.9: Pharmacies.

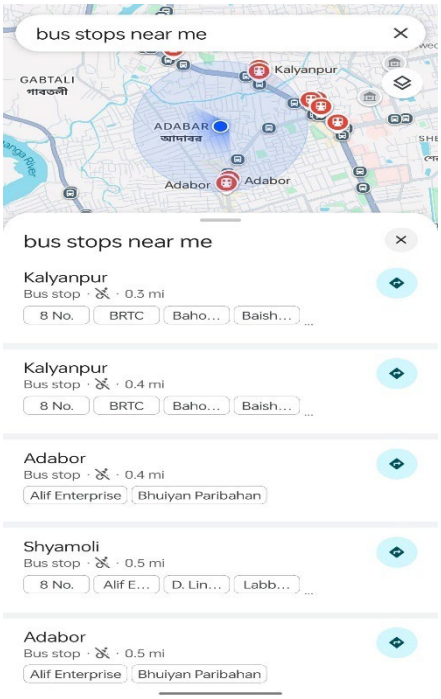


Figure 6.10: Bus Stops.

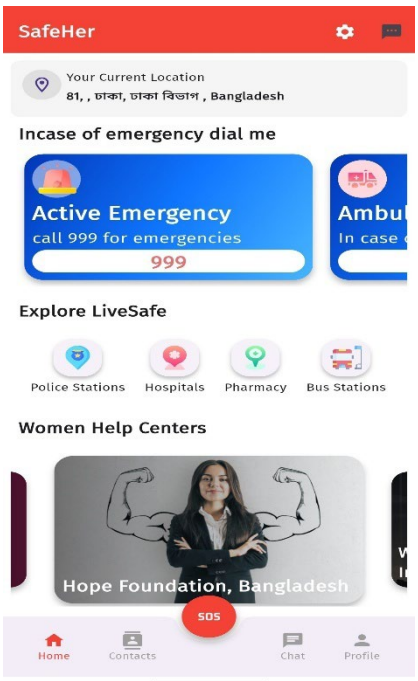


Figure 6.11: SOS Alert Button.

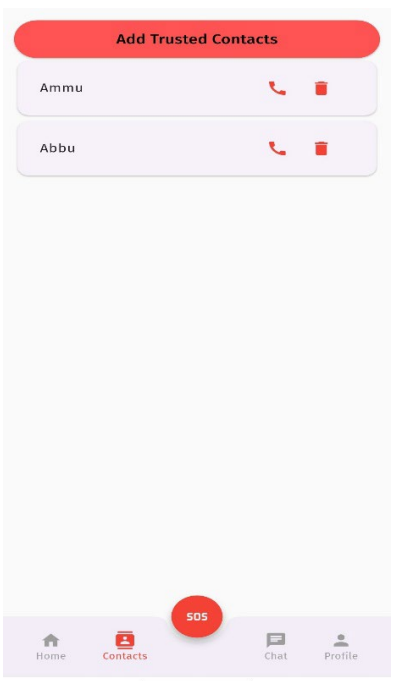
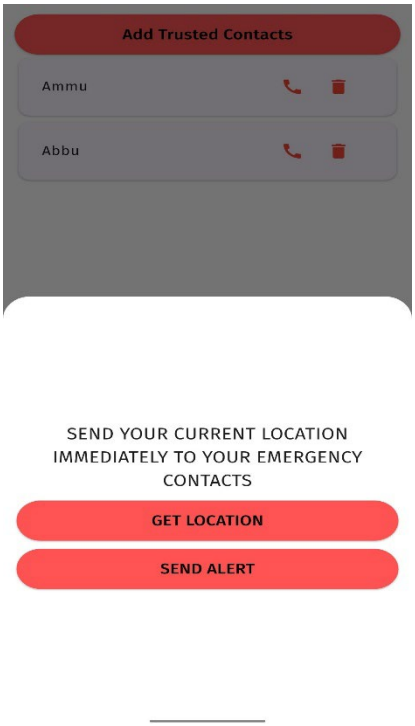


Figure 6.12: Add Trusted Contacts.



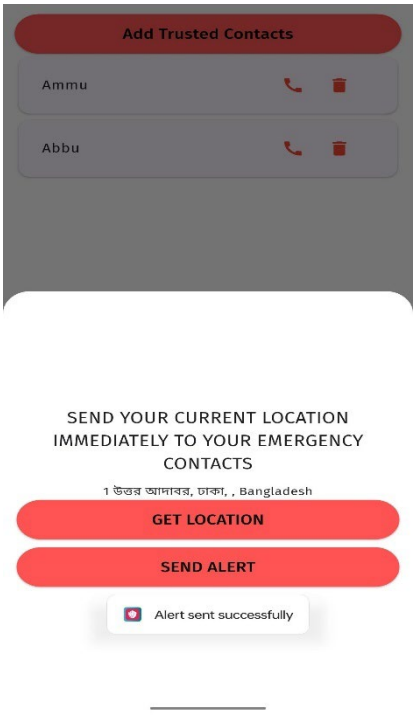
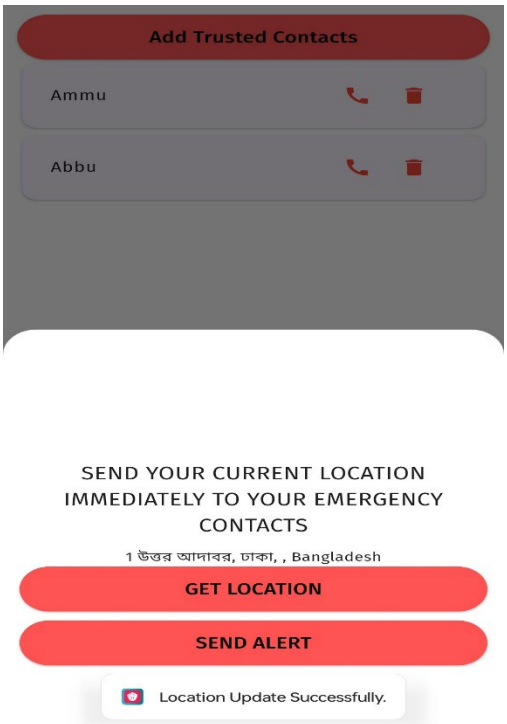


Figure 6.13: Get Location & Send Alert. **Figure 6.14: Alert sent successfully.**



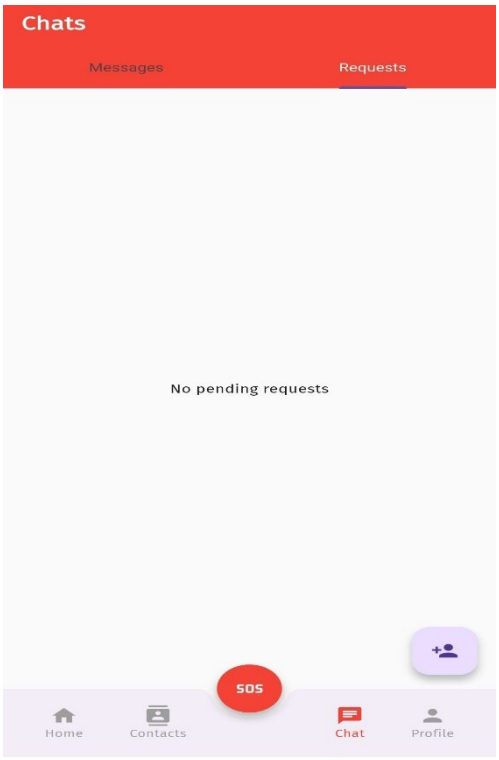


Figure 6.15: Location update successfully. **Figure 6.16: Find User for Messages.**

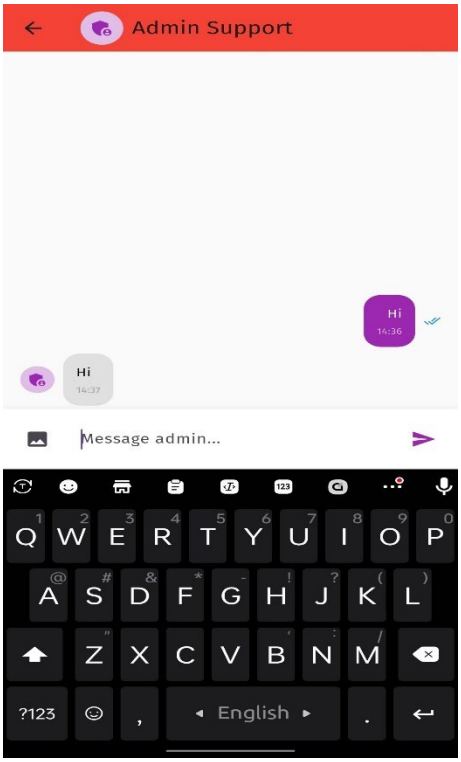


Figure 6.17: Admin Support.

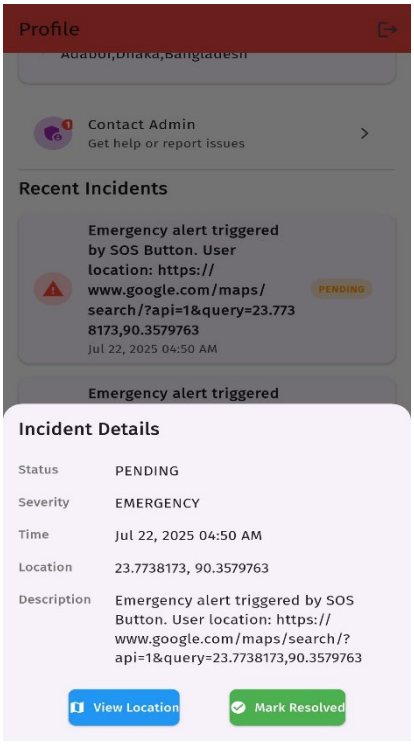


Figure 6.18: Incident Details.

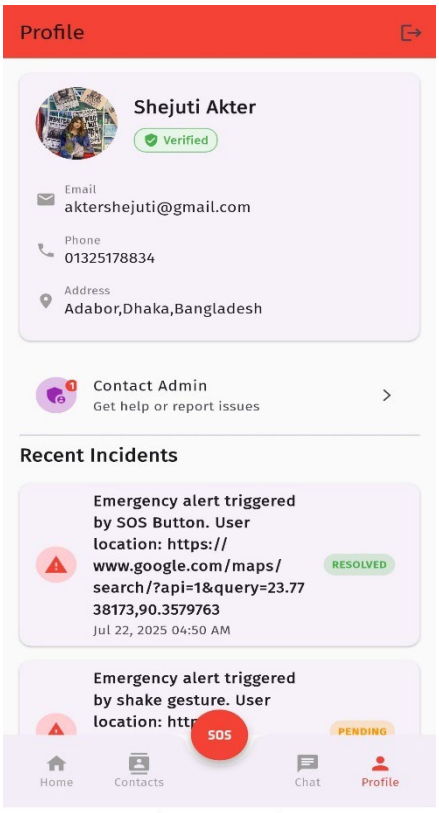


Figure 6.19: User Profile.

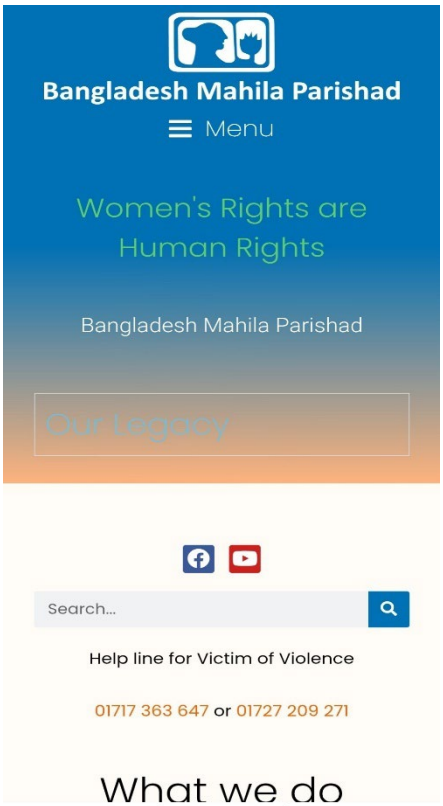


Figure 6.20: Community Support.

6.2 User Manual (Admin)

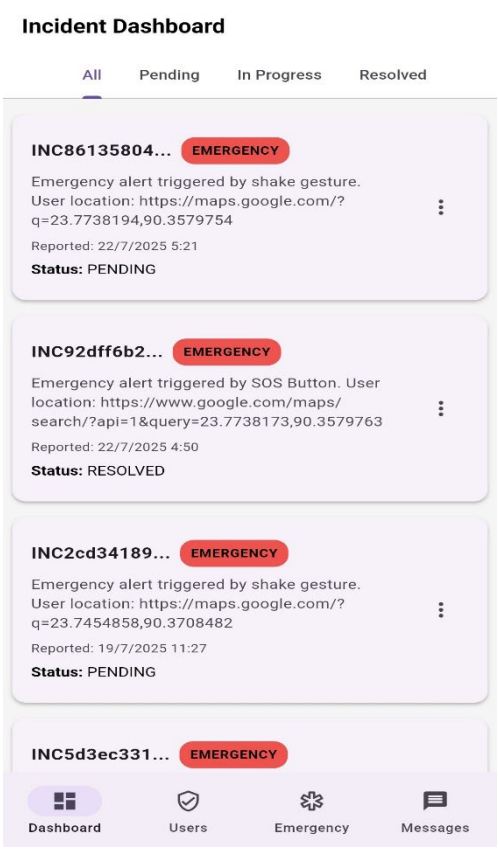


Figure 6.21: Admin Incident Dashboard.

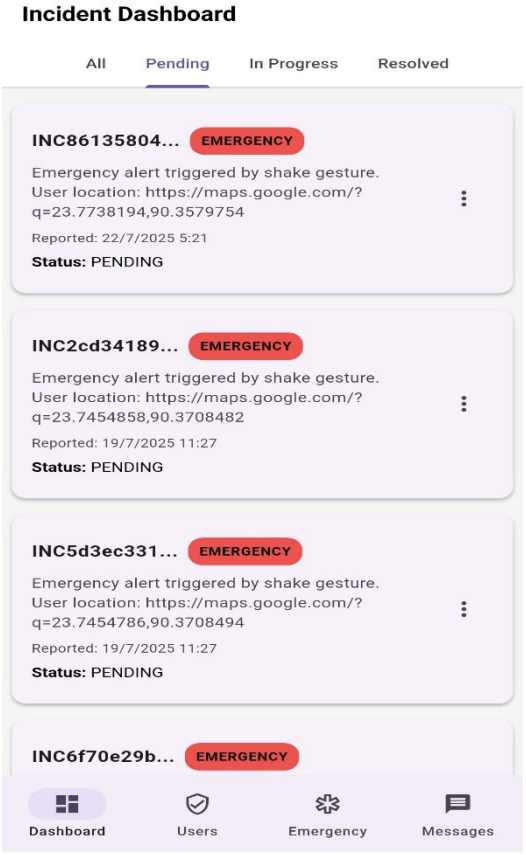


Figure 6.22: Pending Status.

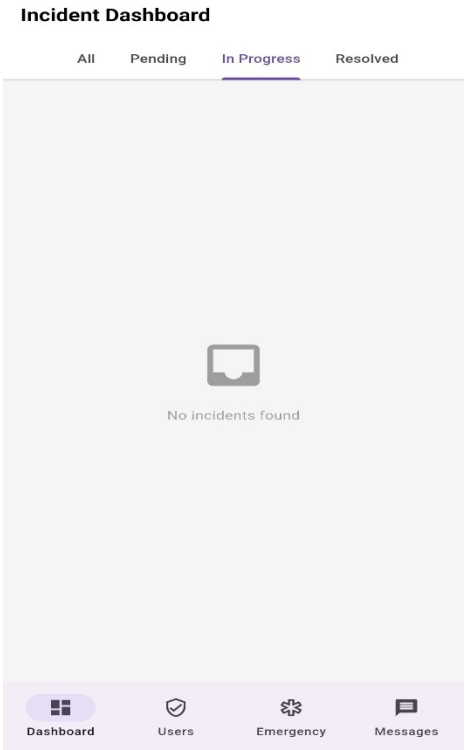


Figure 6.23: Incident in Progress.

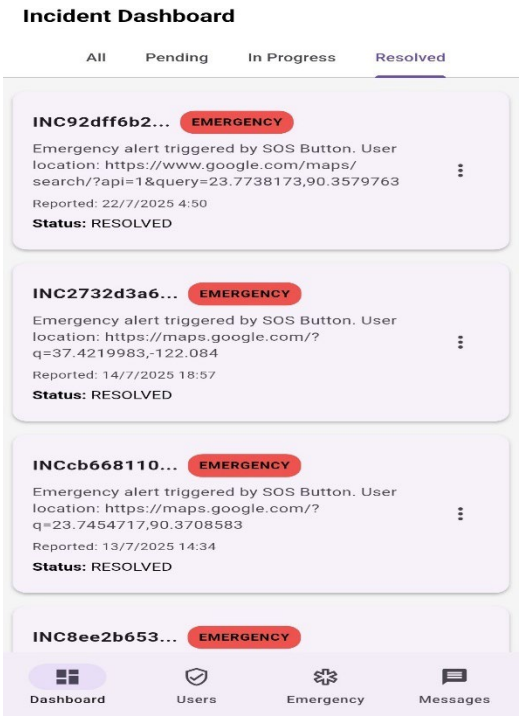


Figure 6.24: Case Resolved.

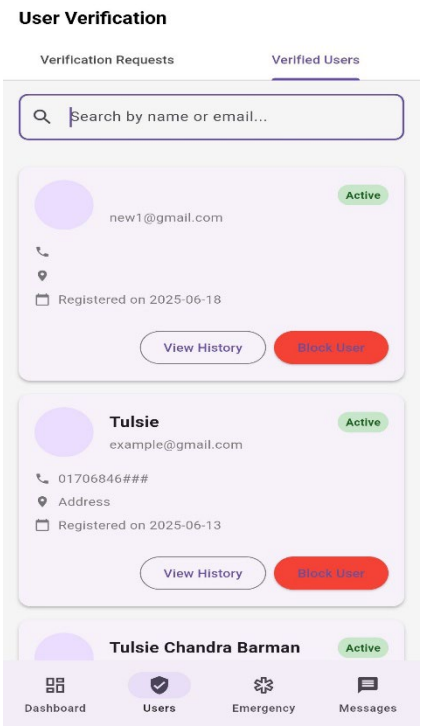


Figure 6.25: Verified Users.

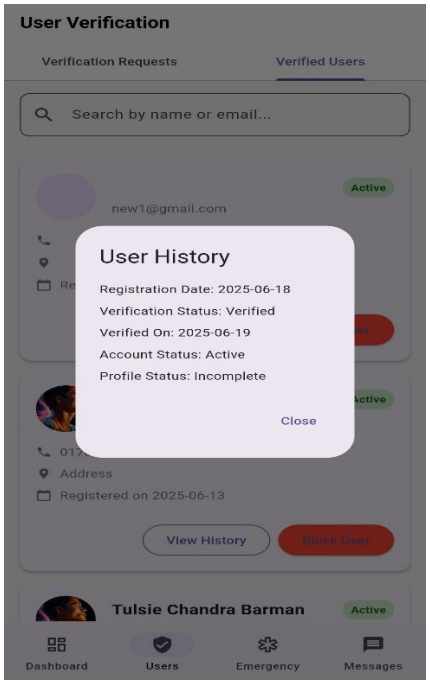


Figure 6.26: User History.

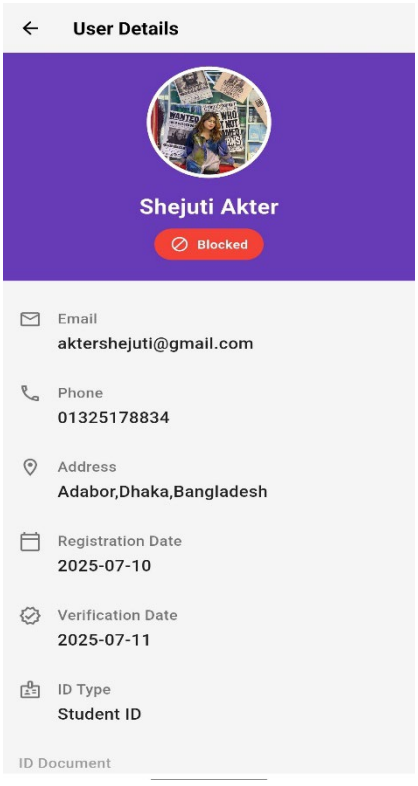


Figure 6.27: Block User.

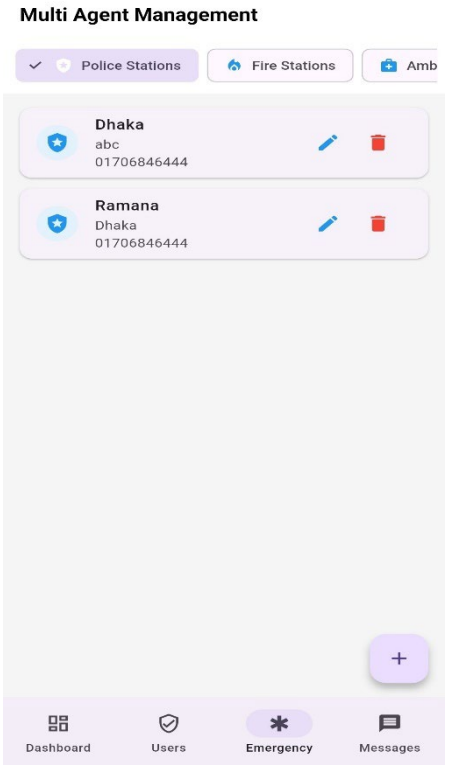


Figure 6.28: Multi Agent Management. (Police Station).

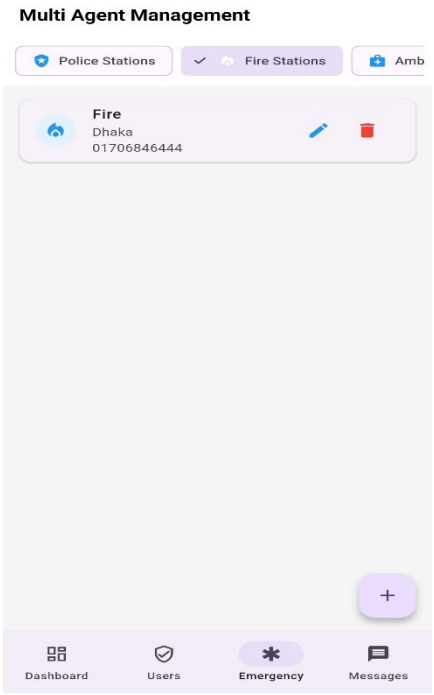


Figure 6.29: Multi Agent Management (Fire Station).

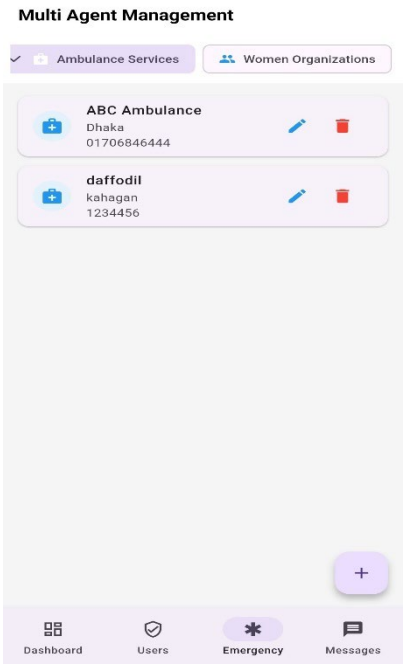


Figure 6.30: Multi Agent Management (Ambulance Service).

CHAPTER 7: PROJECT SUMMARY

“Safe Her” is a mobile safety app, it uses the location based on smart services, trusted communication and emergency help to empower and protect women in Bangladesh. For women's sake, provide an intelligent and reliable emergency system. Create a fast reaction channel between the victims and the authorities or trusted group. Possible data driven awareness of incidence trends and high impact areas. Empowering women to report, defend, and take charge of their own safety.

7.1 GitHub

We have uploaded all the files and source code for "Safe Her" to Github. Full source code for "Safe Her" Firebase configuration files. "Safe Her" Flutter Frontend for. Safe Her's screenshot. Design of admin dashboard, documentation, tests, etc. This way, the colleges, developers, and other students can review and participate in the project. They can expand it too.

GitHub Repository: https://github.com/ShejutiAkter/safe_her.

https://github.com/ShejutiAkter/safe_her_admin.

7.2 Critical Evolution:

What Went Good:

A. **Basic Features:** Location sharing, trusted contact alert, and SOS button all worked as expected and provided reliable real-time response.
B. **Admin Dashboard:** Realistic maps and case tracking allow administrators to effectively monitor and handle incidents.
C. **Choice of Technology:** Realistic communication and quick development with little backend overhead were possible with the use of Firebase, Google APIs, and the Android SDK.
D. **Security & Privacy:** Firebase Auth was used to protect and encrypt user data, including contacts and reports.

What Can Be Better:

A. Trusted Circle Limitations: Right now they are fixed, but they can be improved with group management, dynamic tagging (homework), or auto-prioritization.

B. Scalability: Your current Firebase plan may not be able to support this on a larger scale. You might need to move to cloud services that can grow (GCP with load balancing).

C. Support for multiple languages: Bengali support is limited. The full Bangla translation and adding the RTL layout to make it more popular can be done**.**

D. Panic Mode and Voice SOS: There is no hidden trigger and no voice-based SOS. Future versions might have shake detection or hot-word listening.

7.3 Limitation:

A. **Lack of voice activation:** Shake to alert, voice-activated panic button, and a biometric panic button are all missing from the app**.**

B. **Android-Only:** Android only it will be, iOS users can't use it.

C. **Admin Role:** Same level access given to all administrator which is not good to collaborate with multiple organisations.

7.4 Financial Statement:

Items	**Details**	**Monthly Cost (BDT)**
Android Apps Development	UI/UX, Core Functionally	80,000
Admin Dashboard (Web)	NGOs, Admin Use	30,000
Backend Set-Up (Firebase)	API, Storage Configuration	20,000
Device Testing	Real-Device testing cost	10,000
UI/UX Design (Figma/Adobe)	Wireframes, icons	15,000
Third-Party API Integration (SMS, Maps)	Google Maps	10,000
Subtotal (Development)		165,000 BDT

7.5 Future Scope:

A. Voice Based SOS & Panic Mode:

a) With voice recognition trigger, you can alarm for help without using hands, for example, Help Me!

b) With hidden trigger mode (a shortcut in lock screen or in a phone app) only, you can also alarm by shaking the phone**.**

B. Secure Login & Biomatric:

a) Face and fingerprint unlock will be available, so you can open the app quickly and safely**.**

b) Allow biometric authentication to ensure accountability for cancelling location sharing and other important actions.

C. Multiple Language:

a) Fully translated into Bengali language and change language in the app.

b) In future, we will be adding more regional languages depending on the need.

c) For older and visually challenged users, please increase the font size and other accessibility features.

7.6 Conclusion:

The **"Safe Her"** project aims at creating a reliable, intelligent and simple safety solution for Bangladeshi women. It provides quick protective means in an emergency situation by leveraging on trusted contact groups, offline first data store, mobile technology and nearby location context. Features such as Trusted Circle, Live location sharing, incident reporting and the SOS button are available. The app includes a responsive admin for law enforcement, responders and NGOs. It also supports offline alerts via SMS. Despite its limitations, the project has a good starting point and can be improved to encourage accountability and awareness within the community.

APPENDICES:

Appendix A: Backend Development (Firebase)

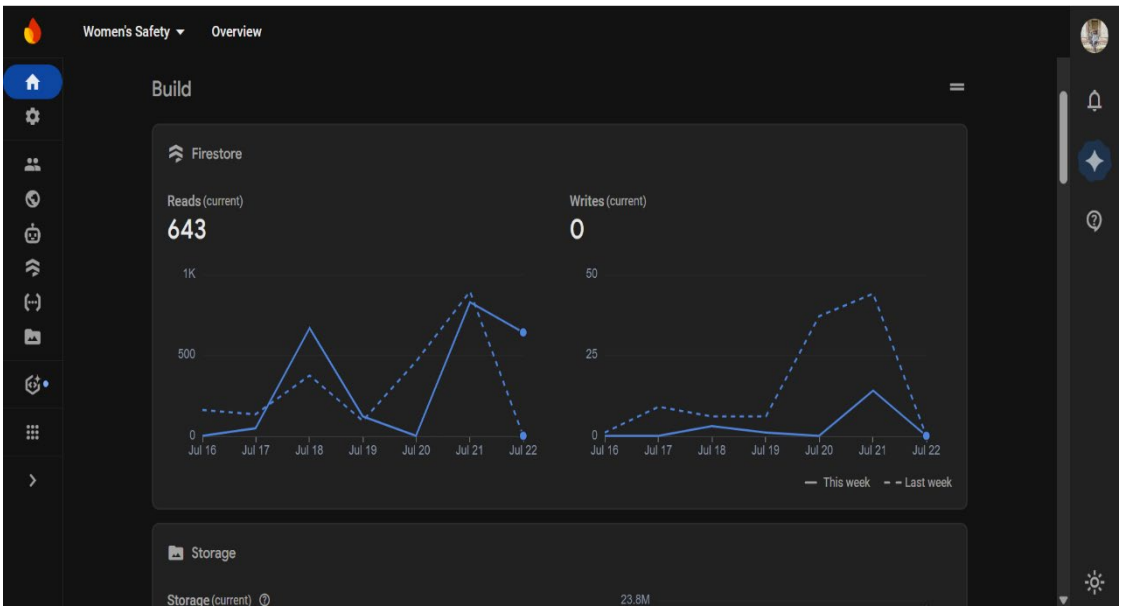


Figure A: Firebase Dashboard.

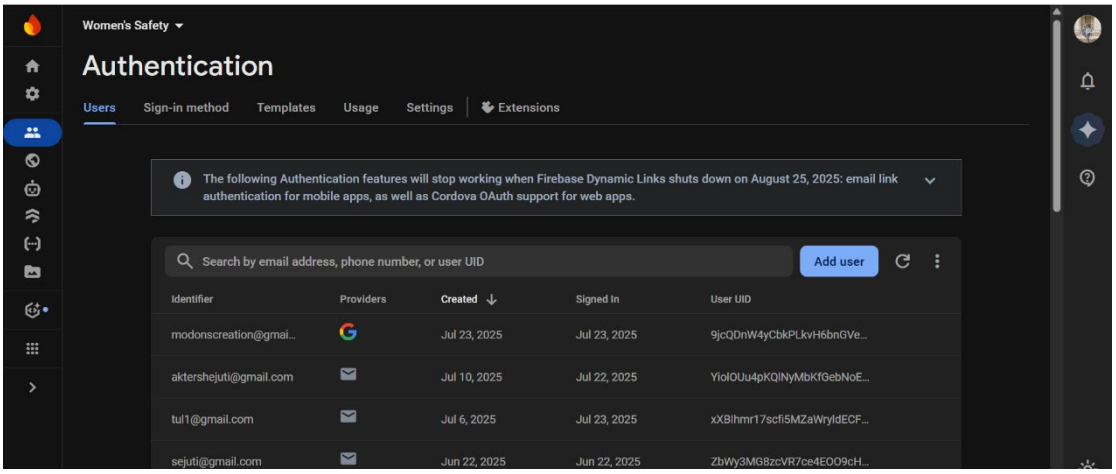


Figure B: Firebase Authentication.

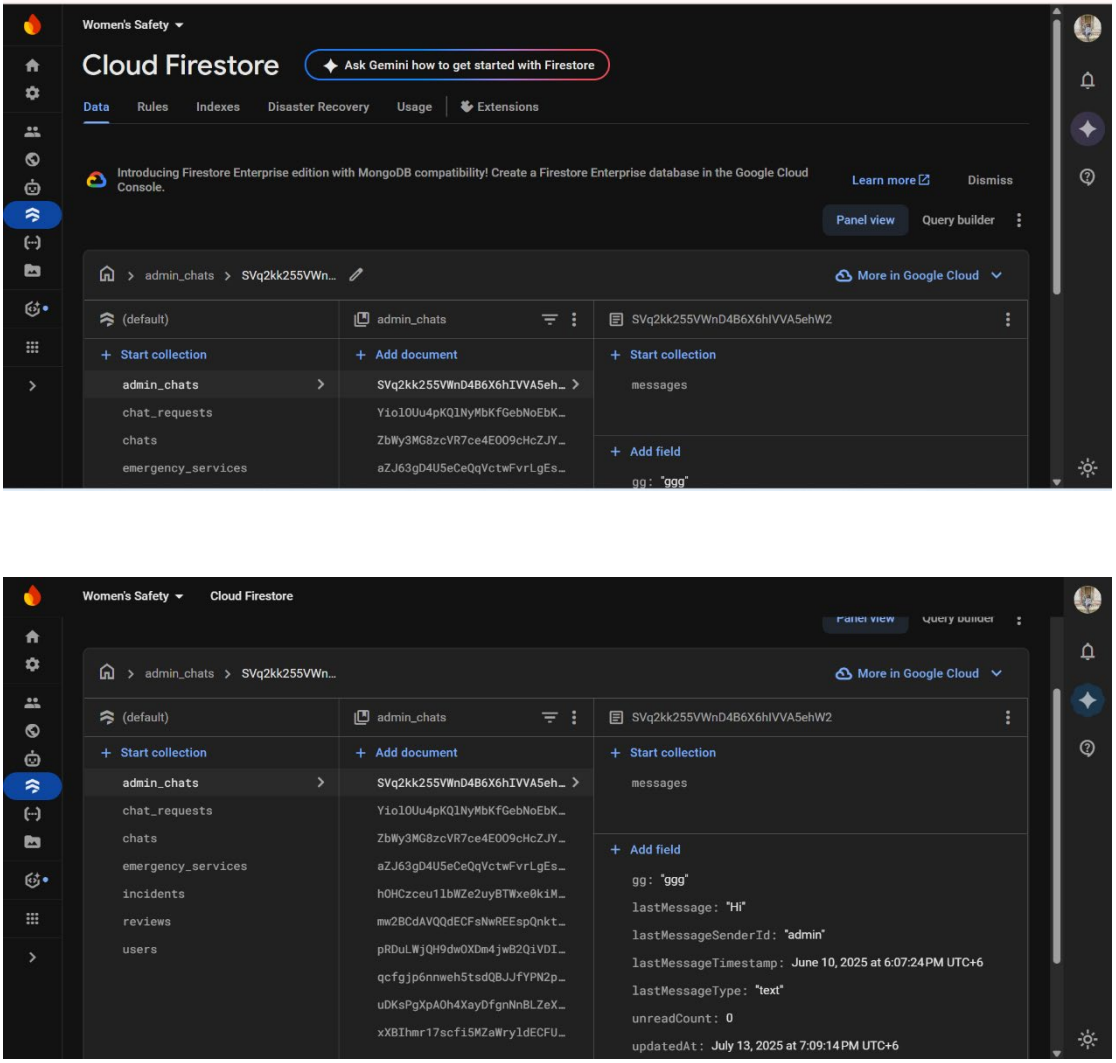


Figure C: Firebase Storage (Cloud Firestore).

Appendix B: Glossary of Term

Term	Definition
Firebase	A cloud-based backend platform used for authentication.
NoSQL	A non-relational database model used in Firebase Firestore.
UC	Use Case.
AD	Activity Diagram.
SD	Sequence Diagram.
DD	Database Diagram.
UI/UX	User Interface / User Experience.
SDK	Software Development Kit.
SOS	Emergency button requesting urgent help.

Table A: Glossary of Terms

Appendix C: References

A. N. Gupta, A. Jain, and M. Bhardwaj, **"Women Safety App: An Android Based Application,"** International Journal of Advanced Research in Computer and Communication Engineering, April 2017.

B. A. Patil and R. Mane, **"Mobile Application for Women Safety,"** International Journal of Engineering Research & Technology (IJERT), April 2017.

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F. Flutter Documentation:

Website: https://flutter.dev/docs.

G. GitHub:

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Retrieved from:

https://github.com/ShejutiAkter/safe_her.

https://github.com/ShejutiAkter/safe_her_admin.

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