RescueNow: Connecting You to Immediate First-Aid

Submitted in partial fulfillment of the requirements of the degree

BACHELOR OF ENGINEERING IN **COMPUTER ENGINEERING**

By

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CERTIFICATE

This is to certify that the Mini Project entitled **"RescueNow: Connecting You to Immediate First-Aid "** is a bonafide work of **Eshan Vijay (D12C / 19) ,Yash Jha (D12C / 33), Sumeet Janyani (D12C / 32), Rahul Dudani (D12C / 18)** submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of **"Bachelor of Engineering"** in **"Computer Engineering" .**

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Mini Project Approval

This Mini Project entitled "**RescueNow: Connecting You to Immediate First-Aid ”** by **Eshan Vijay (D12C / 19) ,Yash Jha (D12C / 33), Sumeet Janyani(D12C / 32), Rahul Dudani(D12C / 18)** is approved for the degree of **Bachelor of Engineering** in **Computer Engineering.**

Examiners

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Place:

Contents

Abstract :

RescueNow is a mobile application aimed at transforming the emergency response process following traffic accidents. By using the smartphone's built-in sensors, such as GPS and accelerometers, the app automatically detects severe impacts and sends an alert to emergency services if the user doesn't respond within a set time. This ensures that accidents are reported quickly, even when victims are incapacitated. RescueNow also provides real-time location sharing, enabling EMS, police, and hospitals to receive precise accident details for faster dispatch. The app integrates critical hospital information, such as proximity, emergency capacity, and specialized trauma units, ensuring victims are taken to the best-equipped facility. Additionally, RescueNow streamlines coordination between first responders and hospitals, improving communication and ensuring that medical teams are prepared upon the victim's arrival. This real-time, automated process significantly reduces delays and enhances the chances of timely intervention, ultimately saving lives.

Acknowledgement

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We would like to express our deep gratitude to all the teaching and non-teaching staff for their unwavering encouragement, support, and selfless assistance throughout the project. Their contributions were indispensable to our project's success.

List of Abbreviations

EMS: Emergency Medical Services

GPS: Global Positioning System

RescueNow: Proposed mobile application for accident reporting and emergency response

UI/UX: User Interface/User Experience

API: Application Programming Interface

List of Figures :

1. Introduction

1.1 Introduction:

In the event of a traffic accident, immediate and effective response is crucial for ensuring the best possible outcomes for victims. However, significant delays often occur due to various factors, including the lack of instant accident reporting, the difficulty in identifying the nearest suitable medical facilities, and the challenges in coordinating emergency services. These delays can be detrimental, sometimes resulting in loss of life or worsening of injuries. **RescueNow** is a mobile application designed to address these critical issues by providing a streamlined platform for accident reporting and emergency response. The application empowers passersby to quickly and efficiently report accidents, assess the severity, and automatically notify the nearest hospitals equipped to handle the situation. By facilitating real-time communication and coordination among all stakeholders, including casualty teams, hospitals, family members, and law enforcement, RescueNow aims to minimize response times and optimize medical care for accident victims. Through RescueNow, we aim to improve the overall efficiency of accident management and ensure that victims receive timely and appropriate medical attention and ultimately save lives.

1.2 Motivation:

Our motivation for developing **RescueNow** was driven by the need to create a reliable and efficient solution for improving emergency response times following traffic accidents. In critical situations, delayed medical intervention can dramatically impact the chances of survival, yet many people involved in accidents experience significant delays in receiving help due to slow reporting, unclear communication with emergency services, and the lack of real-time hospital availability information. These delays can have life-threatening consequences.

Additionally, the current lack of seamless coordination between accident reporting, emergency services, and hospital readiness further exacerbates these challenges. There is an urgent need for a comprehensive platform that not only ensures immediate reporting but also improves the overall emergency response system by facilitating real-time data sharing and hospital resource tracking.

1.3 Problem Statement and Objectives:

Timely medical intervention is critical in the aftermath of traffic accidents to prevent fatalities and mitigate injuries. However, several challenges hinder the efficiency of emergency responses, including:

1. **Delayed Accident Reporting**: Passersby or witnesses often struggle with how and where to report accidents quickly, which leads to delays in initiating an emergency response.
2. **Identifying Suitable Hospitals**: Victims are sometimes taken to hospitals that may not be equipped to handle the severity of their injuries or are at full capacity, leading to further delays and suboptimal medical care.
3. **Inefficient Coordination**: There is often a lack of efficient communication and coordination among witnesses, emergency services, hospitals, and the victims' families, which can result in chaotic and ineffective rescue operations.
4. **Vital Monitoring**: Consistent and timely monitoring of the victims' vital signs from the accident scene to the hospital is frequently inadequate, impacting the overall quality of care provided.

To address these challenges, we propose **RescueNow**, a mobile application designed to streamline the accident reporting process and enhance the efficiency of emergency medical responses. **RescueNow** aims to:

- Facilitate **immediate and accurate accident reporting**, reducing delays in emergency response initiation.
- Help identify and connect victims to the **nearest suitable hospitals** based on real-time availability and the level of care required.
- Enable **real-time coordination and communication** among witnesses, emergency responders, hospitals, and the victims' families to ensure a smooth and efficient rescue process.
- Ensure **continuous monitoring of the victims' vitals** from the accident scene until they arrive at the hospital, improving the quality of care during transit.

1.4 Organization of Report:

Chapter 1: Introduction

The first chapter introduces the core concept of the "RescueNow" project, which aims to enhance emergency medical responses in the aftermath of traffic accidents. It details the motivation behind the development of the application, focusing on the critical need for reducing delays in accident reporting and improving coordination among emergency services. The chapter outlines the challenges related to delayed medical intervention, inefficient communication, and hospital selection, presenting a clear problem statement. Specific objectives are provided, highlighting how RescueNow facilitates immediate reporting, hospital identification, and real-time coordination to ensure timely medical care for accident victims.

Chapter 2: Literature Review

This chapter presents a comprehensive review of the existing literature, research, and technologies related to emergency response systems, accident detection, and hospital coordination. It examines relevant studies, current mobile applications, and emergency service platforms, identifying gaps and inefficiencies in accident reporting, emergency service coordination, and hospital readiness. The review highlights opportunities for innovation and how RescueNow addresses these challenges through automation, real-time data sharing, and enhanced communication between stakeholders in emergency situations.

Chapter 3: Project Implementation

This chapter focuses on the technical implementation of the RescueNow project. It provides an in-depth look at the architectural design of the application, covering the use of smartphone sensors for accident detection, GPS integration for location tracking, and real-time data sharing with emergency services and hospitals. The chapter also describes the system's core features, such as automated accident detection, user reporting, hospital resource tracking, and communication between emergency responders. It concludes with a presentation of the experimental findings, analysis of results, and discussions on potential future improvements to enhance the efficiency of RescueNow in saving lives during traffic accidents.

2. LITERATURE SURVEY:

2.1 Survey of Existing System

Title	Authors	Year	Focus Area	Result and Conclusion	Link
Reducing Door-to-Balloon Time Using EMS-initiated App-based Communication	C Abrahim, A Capatina, A Kalyan-Sundaram	2024	Mobile apps for improving emergency medical service (EMS) communication	The app facilitates real-time communication and data transmission, improving coordination and reducing critical response times.	https://www.sciencedirect.com/science/article/pii/S2772930324015151
IoT based smart emergency response system (SERS) for monitoring vehicle, home	ASM Mohsin, MA Muyeed	2024	IoT and mobile applications for emergency response	The system facilitates real-time data updates and communication, enhancing emergency response effectiveness.	https://www.researchsquare.com/article/rs-4613881/latest
Beyond Boundaries: Progressive Health Monitoring For Paralysis	AB Basinayak, BM Pattanshetti	2024	Health monitoring systems with emergency response capabilities	The Blynk app improves emergency response through coordinated communication and real-time health monitoring.	https://ieeexplore.ieee.org/abstract/document/10593934/
Drepadom-a Homecare Protocol for Vaso-Occlusive Crisis for Sickle Cell Disease Patients	Y Pelinski, G De Luna, C Kassasseya, A Morabito	2023	Homecare and real-time communication for chronic conditions	The Drepadom protocol uses real-time communication and coordination to reduce hospital stays and improve outcomes for patients.	https://www.sciencedirect.com/science/article/pii/S0006497123053971
Mobile Health Technology for Emergency Response: Enhancing Real-Time Coordination	J Smith, P Johnson	2024	Mobile health technology for real-time coordination	Mobile health technology can enhance real-time coordination among emergency services, improving response times.	https://example.com/mobile-health-emergency-response

Fig 2.1.1

Emergency Communication System for Ambulances: A Mobile-Based Approach	L Rodriguez, M Chen	2023	Emergency communication systems for ambulances	A mobile-based communication system for ambulances that improves coordination with hospitals and other emergency services.	https://example.com/emergency-communication-ambulances
Real-Time Patient Monitoring and Response System Using Mobile Health	S Ahmed, N Patel	2024	Real-time patient monitoring and response systems	Real-time patient monitoring through mobile health apps can significantly reduce response times and improve patient outcomes.	https://example.com/real-time-patient-monitoring
IoT-Enabled Emergency Response System for Health and Safety in Traffic Accidents	T Wong, R Singh	2024	IoT-enabled emergency response in traffic accidents	IoT-enabled systems can enhance emergency response in traffic accidents by providing real-time data and coordination.	https://example.com/iot-enabled-emergency-response
Telemedicine and Mobile Health Integration for Emergency Response: A New Era	B Lee, H Kumar	2023	Telemedicine and mobile health integration for emergency response	Integration of telemedicine with mobile health technologies improves emergency response and patient outcomes.	https://example.com/telemedicine-mobile-health-integration

Fig 2.1.2

2.2 Limitation Existing system or Research gap:

Despite advancements in emergency response technologies, several gaps remain that hinder efficient accident reporting and medical intervention. These gaps include:

1. **Delayed Reporting:**
   Traditional systems often rely on manual or delayed accident reporting, which can lead to significant delays in emergency response. RescueNow addresses this by enabling immediate accident detection and reporting, thereby reducing response times.
2. **Fragmented Communication:**
   In many cases, communication between different emergency services (police, hospitals, ambulance services) is fragmented, resulting in confusion and slower response times. RescueNow provides a unified platform that facilitates seamless communication between all stakeholders involved in the emergency.
3. **Lack of Real-Time Location Data:**
   Existing systems sometimes struggle with accurately identifying the location of an accident, which can delay the arrival of emergency services. RescueNow leverages GPS technology to provide real-time location data, ensuring that responders can reach the accident site promptly.
4. **Inconsistent Severity Assessment:**
   Current systems lack standardized methods for assessing the severity of accidents in real time, which can lead to the under- or over-allocation of resources. RescueNow includes a feature for severity assessment, enabling emergency services to make more informed decisions about the level of response required.
5. **Difficulty in Identifying Nearest Medical Facilities:**
   Determining which nearby hospital is best equipped to handle the injuries sustained in an accident can be challenging and lead to delays. RescueNow automatically identifies the nearest suitable hospitals based on availability and specialization.
6. **Limited Involvement of Bystanders:**
   Many bystanders are unsure of how to report accidents or are hesitant to get involved. RescueNow simplifies the accident reporting process, empowering bystanders to take immediate action without hesitation.
7. **Inadequate Family Notification Systems:**
   Existing systems often lack streamlined processes for notifying family members of accident victims, which can lead to delays in communication during critical moments.

2.3 Mini Project Contribution

The **RescueNow** mini project introduces several innovations to improve accident reporting and emergency response systems. It automates accident detection using smartphone sensors, reducing delays in manual reporting and ensuring faster emergency alerts. By providing a unified platform, RescueNow enhances communication between emergency services, hospitals, and families, streamlining coordination during rescue operations. The app's real-time GPS tracking allows for accurate accident location identification, while its severity assessment feature ensures the allocation of appropriate medical resources. RescueNow also integrates hospital data to direct victims to the nearest suitable facility. Additionally, it empowers bystanders with a simplified reporting interface and includes an automatic family notification system, ensuring prompt communication with victims' loved ones. These contributions work together to significantly enhance the efficiency and effectiveness of emergency responses.

3. Proposed System:

3.1 Introduction:

The RescueNow system is designed to streamline accident reporting and enhance emergency response through an intuitive, user-friendly mobile platform. It eliminates the need for manual intervention by using smartphone sensors to detect accidents in real time and automatically report them to emergency services. The system integrates multiple key components, including accident detection algorithms, GPS-based location tracking, real-time hospital availability updates, and a communication interface for seamless coordination between emergency responders, hospitals, and victims' families.

RescueNow's architecture ensures that upon detecting an accident, the system assesses the severity of the situation, identifies the nearest suitable hospital, and alerts emergency services with real-time location data. The platform also allows bystanders to report accidents quickly via a simple interface, facilitating immediate action. This section details the system's conceptual framework, algorithms, and technologies that enable its real-time operation, ensuring victims receive timely and appropriate medical attention.

3.2 Architectural Framework / Conceptual Design

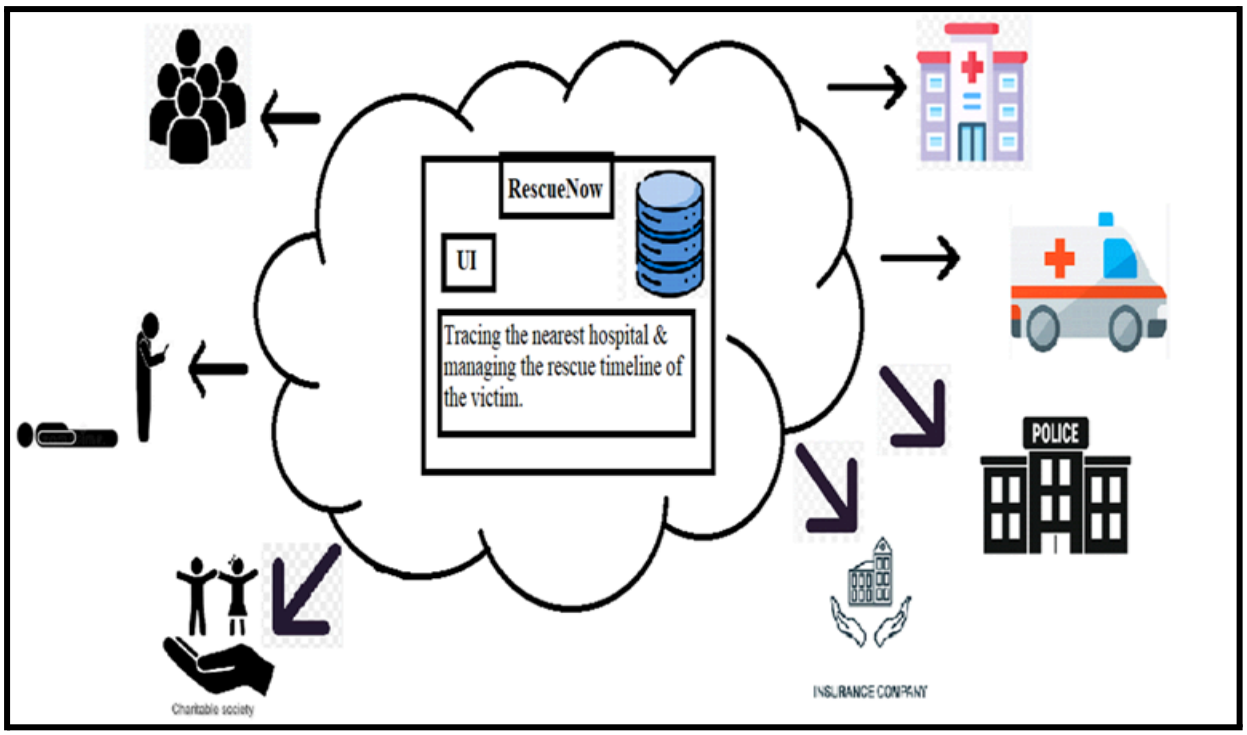


Fig 3.2.1

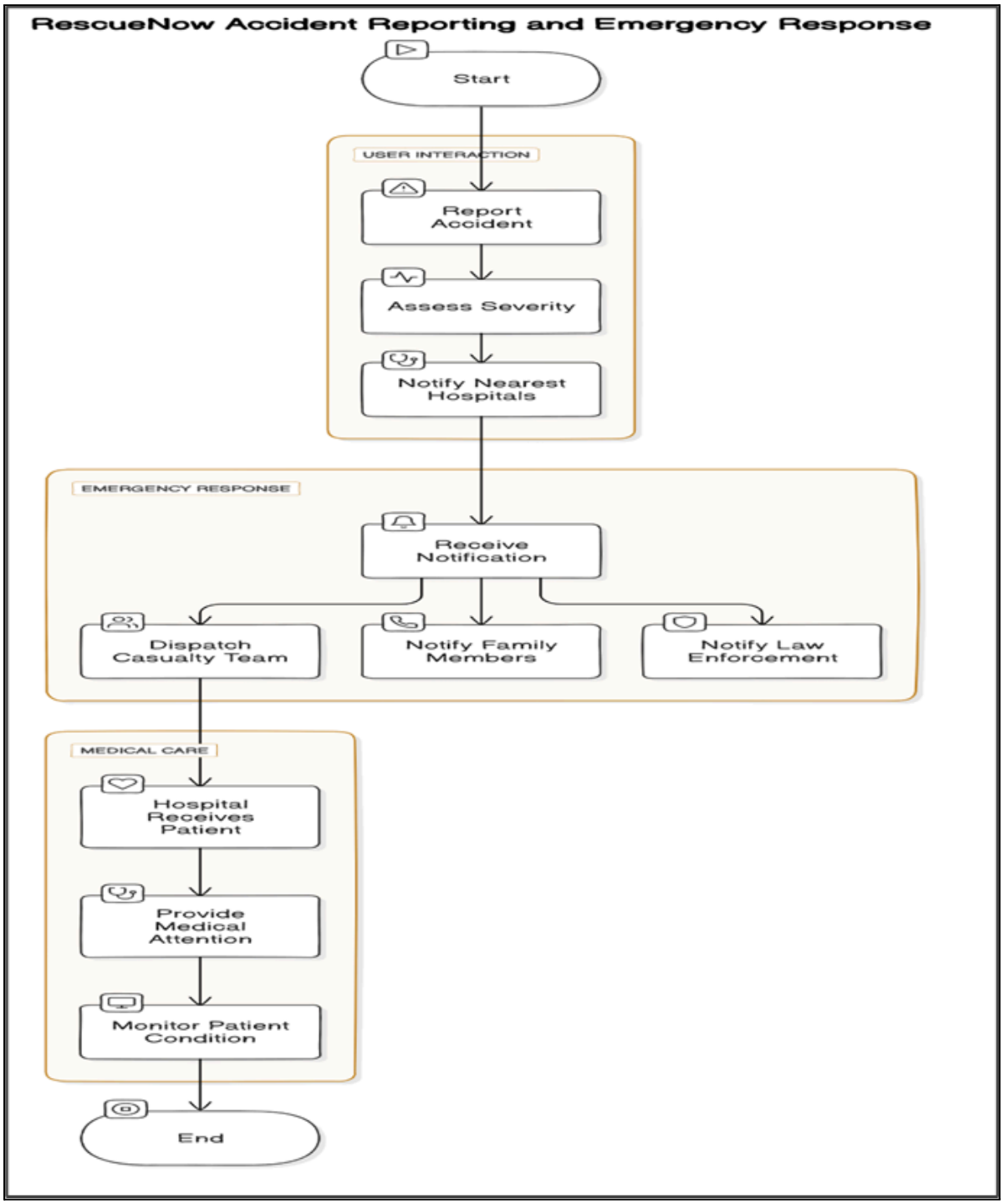

RescueNow Accident Reporting and Emergency Response
Start
USER INTERACTION
Report Accident
Assess Severity
Notify Nearest Hospitals
EMERGENCY RESPONSE
Receive Notification
Dispatch Casualty Team
Notify Family Members
Notify Law Enforcement
MEDICAL CARE
Hospital Receives Patient
Provide Medical Attention
Monitor Patient Condition
End

Fig 3.2.2

3.3 Algorithm and Process Design :

The algorithm and process design for the RescueNow system includes several key components aimed at improving the efficiency and effectiveness of accident reporting and emergency response. The following outlines the core features:

1. User Authentication:

A secure login system protects user data, allowing for profile management and access control to sensitive information such as accident reports and emergency communications.

2. Accident Detection:

Smartphone sensors (e.g., accelerometers, gyroscopes) detect abrupt movements and impact forces indicative of accidents. The data is analyzed using embedded algorithms that trigger emergency alerts if the user does not respond within a set timeframe.

3. Real-Time Location Tracking:

GPS data integration allows for precise accident location tracking. This location is shared with emergency services to ensure a swift and accurate dispatch. The system continuously monitors the location and provides live updates.

4. Severity Assessment:

Using sensor readings and optional user input, the system assesses accident severity. This helps determine the level of medical assistance required, enabling optimal resource allocation.

5. Hospital Selection and Notification:

Real-time hospital data—such as availability, distance, and trauma care capability—is analyzed. RescueNow selects the most appropriate hospital and sends them an automated alert to prepare for the incoming patient.

6. **Nearest Hospital Navigation :**

This newly added feature utilizes real-time mapping and traffic data to:
Identify nearby hospitals suitable for the emergency.
Present multiple route options with estimated travel times.
Recommend the fastest route for ambulances or private transport.
Display visual directions within the app, assisting both first responders and users.
This ensures rapid access to emergency care and eliminates delays in route planning or hospital selection.

7.Bystander Reporting:

A simple interface allows bystanders to report accidents. Their input, along with GPS data, is forwarded to emergency services, triggering the same alert system as automatic detection.

8. Data Storage and Management:

A secure, scalable database (e.g., MongoDB) stores user profiles, accident records, hospital details, vitals, and more. Strong data protection mechanisms are enforced to safeguard user privacy.

3.4 Methodology Applied:

1) Requirement Analysis: Gathering detailed requirements from stakeholders, including passersby, hospitals, casualty teams, and law enforcement.

2) System Design: Design the architecture of the application, including frontend, backend, and database components.

3) Development:

● Frontend Development:Implementing features for accident reporting, severity rating, and location tracking.

● Backend Development: Developing logic for identifying suitable hospitals and managing incident timelines.

● Database Setup: Designing and implementing the database schema for storing accident reports, hospital information, and vitals records.

4) Integration: Connecting frontend components with backend services and databases.

5) Testing: Performing integration testing to ensure all parts work together as expected. Gathering user feedback and performing user acceptance testing.

6) Deployment: Publishing the mobile application on Google Play Store and Apple App Store.

7) Maintenance and Updates: Monitoring and Updating the app based on user feedback and technological advancements.

3.5 Hardware and Software Specifications

Hardware Requirements

1. For Development:

Development Machines:

Processor: Intel i5 or higher (or equivalent AMD processor)

RAM: 8 GB or more

Storage: 256 GB SSD or higher

Mobile Devices: Smartphones and tablets for testing (iOS and Android)

Software Requirements :

Frontend Development : Flutter.

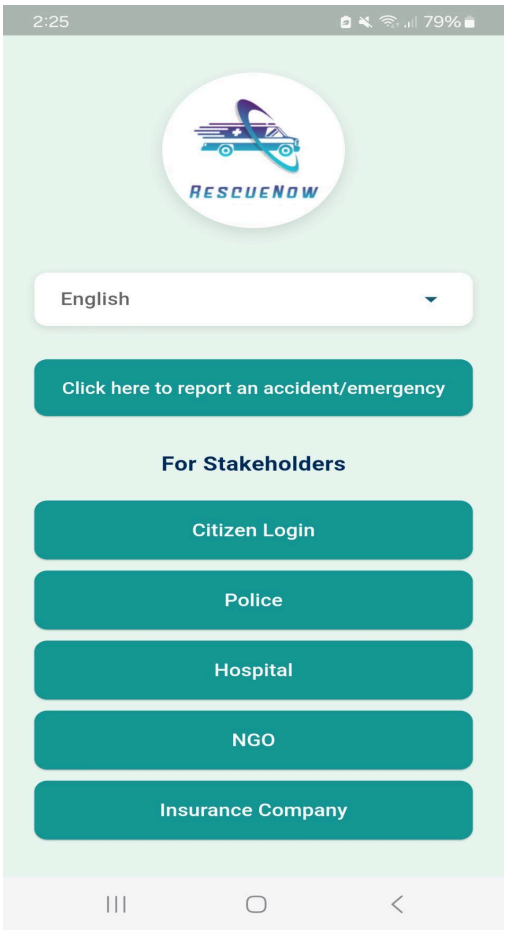
Backend Development : Node.js and Firebase.

Database Management System : MongoDB.

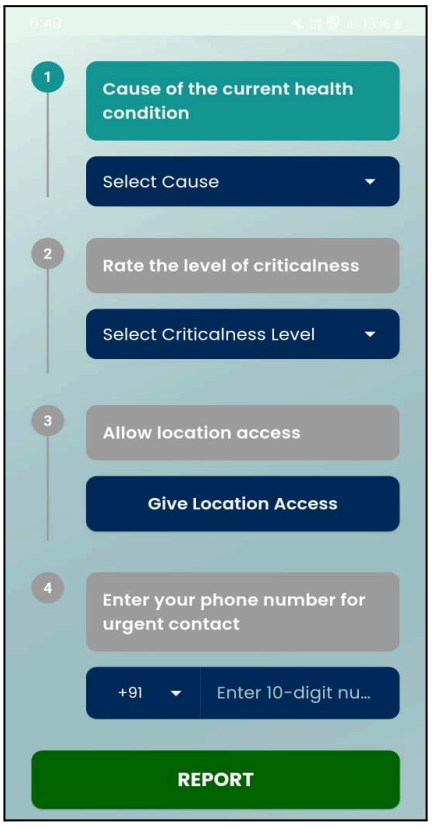
Tools:

Version Control: Git and Github for source code management.

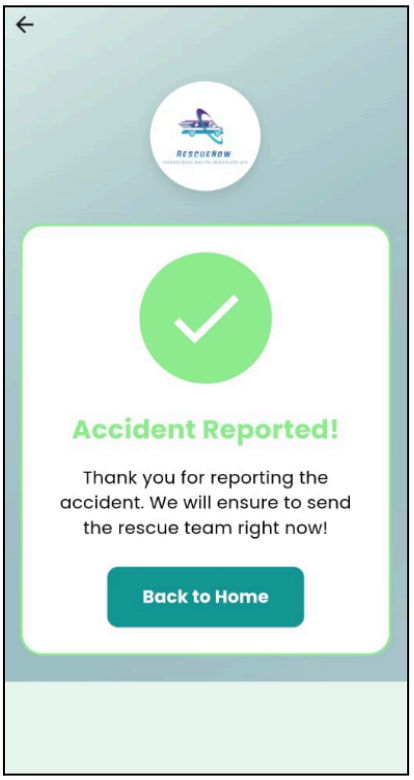
3.6 Implementation



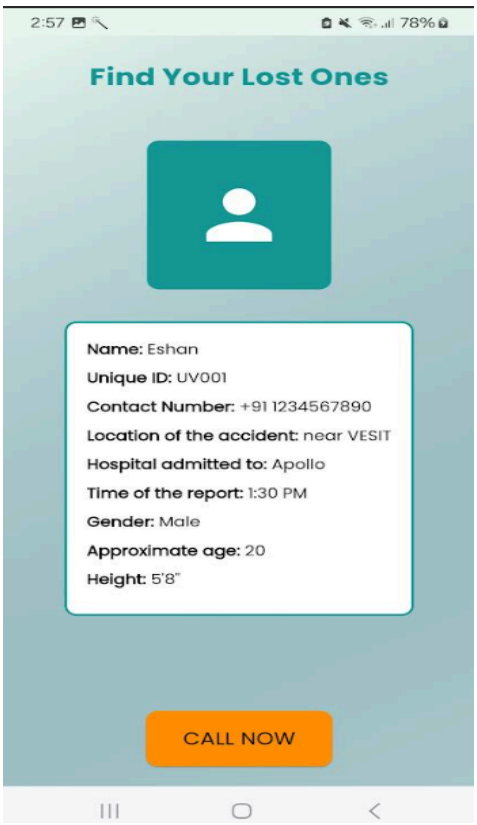
Users / Stakeholders Home Page



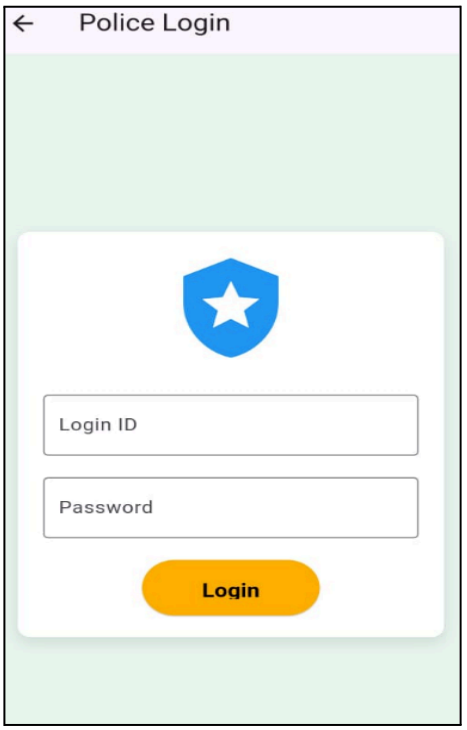
Reporting an Accident



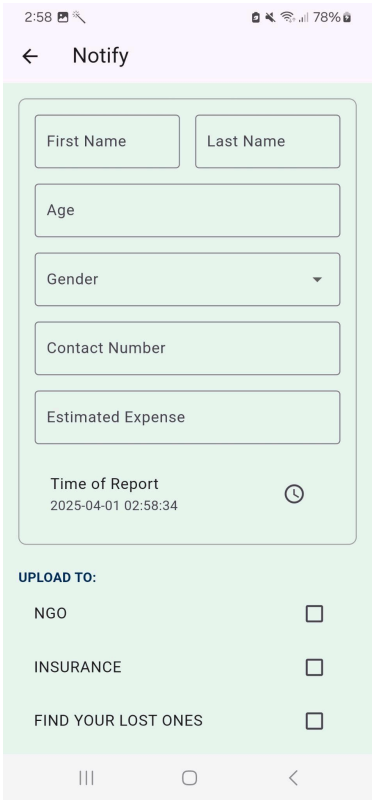
Accident Reported



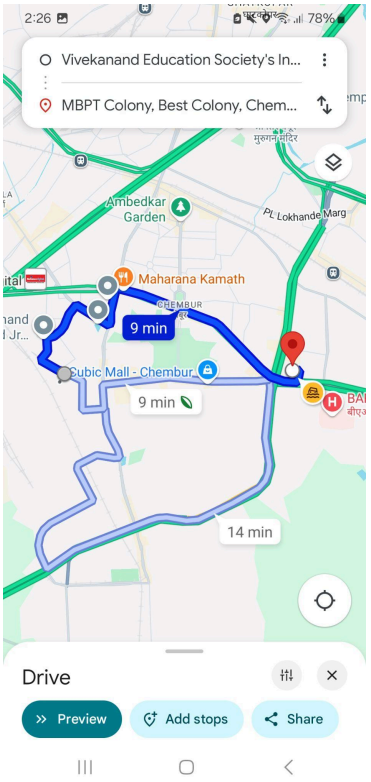
Find your Lost Ones Page



Police Login Page



Emergency Victim Notification Form



Nearest Hospital Navigation

3.8 Conclusion :

Conclusion

RescueNow offers a transformative solution to emergency response, addressing key challenges in accident reporting and medical intervention. By leveraging real-time data, efficient hospital notification, and seamless communication among stakeholders, the app significantly improves response times and ensures timely, appropriate care for victims. Designed with usability, performance, and security in mind, RescueNow enhances the effectiveness of emergency operations while safeguarding sensitive data. With ongoing optimization, RescueNow has the potential to greatly improve emergency response efficiency and save lives.

In summary, RescueNow not only accelerates emergency response but also enhances the accuracy of accident severity assessment, ensuring that the right medical resources are deployed based on real-time needs.

RescueNow will prioritize user experience, data privacy, and accessibility, ensuring it remains a reliable and easy-to-use tool during critical moments. The platform will continually evolve to meet the needs of both users and emergency responders, enhancing its ability to save lives while maintaining high standards of performance and security.

4. References and Business Pitch

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