EMERGENCY RESPONSE SYSTEM

PROJECT REPORT

PREPARED BY

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SAM/IT/2021/F/0076

HIGHER NATIONAL DIPLOMA IN INFORMATION TECHNOLOGY

Advanced Technological Institute

Sammanthurai

Sri Lanka

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By

MR. Dheen Mohamed (SAM/IT/2021/F/0076**)**

THE REPORT

Submitted in partial fulfilment of the requirements

Of

HIGHER NATIONAL DIPLOMA IN INFORMATION TECHNOLOGY

Advanced Technological Institute,
Sammanthurai, Sri Lanka.

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IT SPECIALIZATION PROJECT REPORT HEADER SHEET
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Dedicated to

My ever-loving parents, friends, and

lecturers for their genuine support and

encouragement…

ABSTRACT

This project develops a comprehensive mobile application for emergency situations in Sri Lanka, leveraging smartphone technology to enhance response capabilities. It aims to provide an intuitive, user-friendly solution for efficient, real-time emergency management, addressing the crucial need for swift action. This emergency response system include main four category which is Ambulance service, Police service, Fire station service and Rescue team service .And first I do this project to Ambulance service. I initially focused on developing the project for ambulance service.

In Sri Lanka, the existing emergency response system for ambulance services primarily relies on call responses. However, the introduction of this application represents a significant advancement in emergency healthcare infrastructure. By integrating geolocation tracking and facilitating robust communication channels, the application enhances the efficiency and effectiveness of ambulance services. Geolocation tracking enables emergency responders to pinpoint the exact location of individuals in distress, drastically reducing response times and ensuring swift assistance reaches those in need. Moreover, the enhanced communication capabilities provided by the application enable seamless coordination between emergency dispatchers, ambulance crews, and healthcare facilities, ensuring a smoother workflow and better patient outcomes.

This innovative approach not only modernizes the emergency response system but also addresses critical gaps in accessibility and responsiveness. With the application's implementation, Sri Lanka's ambulance services can transcend the limitations of traditional call-based systems, ushering in a new era of precision, reliability, and timeliness in emergency medical care. By leveraging technology to its fullest potential, the nation is poised to provide a higher standard of emergency response services, ultimately saving more lives and safeguarding the well-being of its citizens.

ACKNOWLEDGEMENTS

To successfully complete this project, it is required a much amount of time, research and hard work and dedication. Though without the support of many respected individuals it wouldn't be possible to complete the project successfully. we would like to offer my deep gratitude to the Almighty to do this website project. Then we have to thank the Advanced Technological Institute, Sammanthurai

Further, we should extend our sincere thanks to the supervisor Mr. A.A.M.Tharik, the Co-supervisor and the head department of Information Technology Mr. AAM.Matheeh, the director Mr. SL. Musthafa and also, we thank other academic and non-academic members for the guidance given within the ATI premises.

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Thank You.

MR.Dheen Mohamed (SAM/IT/2021/F/0076)

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LIST OF ABBREVIATIONS

DFD	Data Flow Diagram
ERS	Emergency Response System
SQL	Structure Quarry Language

CHAPTER 1

INTRODUCTION

In today's fast-paced world and also in our country Sri Lanka, emergencies can occur at any time and any place, so the need of efficient emergency response systems has become more crucial than ever. Our project address this critical need by developing a comprehensive mobile application tailored for emergency situations. With the ubiquity of smartphones and the rapid advancement of mobile technology, there exists a unique opportunity to leverage these platforms to enhance emergency response capabilities. By creating an intuitive and user-friendly application.

In the realm of ambulance services, our goal is to empower individuals to swiftly and effectively respond to emergencies, thereby saving lives and mitigating the impact of various crises. Natural disasters, medical emergencies, accidents, and incidents of crime all necessitate rapid and coordinated responses to minimize loss of life and property damage. However, existing ambulance service systems, both globally and particularly in Sri Lanka, encounter numerous challenges that hinder their effectiveness. These obstacles underscore the critical need for innovative solutions that can enhance the efficiency and responsiveness of ambulance services, ensuring timely assistance reaches those in need.

This mobile application will serve as a centralized hub for accessing emergency services, providing users with a seamless and efficient means of reporting emergencies, communicating with responders, and accessing critical information during crises. By leveraging features such as real-time location tracking, instant communication, and community alerts, our solution aims to overcome the limitations of traditional emergency response systems and provide a comprehensive tool for addressing a wide range of emergencies.

1.1 Background & Motivation

The background behind our project stems from the recognition of the inherent limitations and inefficiencies in traditional emergency response systems. Current methods often rely on phone calls to emergency services, which can lead to delays in communication and response, particularly during times of high call volume or network congestion. Additionally, accurately conveying one's location during an emergency can be challenging, further complicating response efforts.

Despite the existence of dedicated emergency services in many countries, traditional response systems often face limitations in reaching those in need swiftly and effectively. Communication barriers, logistical challenges, and gaps in awareness about available resources contribute to delays and inefficiencies in emergency response efforts. By harnessing the ubiquity of mobile devices and leveraging features such as geolocation services and push notifications.

This mobile application can enhance the efficiency and effectiveness of emergency response efforts. Moreover, the interactive nature of mobile applications allows for greater community engagement, enabling users to take proactive measures to prepare for and respond to emergencies.

1.2 Problem Statement

In traditional ambulance service response, reliance solely on phone calls to report emergencies presents significant challenges. One primary issue is the potential for delays due to communication barriers, language differences, or network congestion. Moreover, accurately conveying one's location to ambulance services can be problematic, particularly in chaotic or unfamiliar situations, exacerbating response time delays.

Furthermore, existing ambulance service systems often lack integration with modern technology, hindering the utilization of innovations such as real-time location tracking, instant communication, and community alerts. This deficiency results in inefficiencies in resource allocation and coordination within ambulance services, further prolonging response efforts and potentially compromising the effectiveness of rescue operations.

Problem Statement:

1. Reliance on Traditional Reporting Methods:

The current ambulance service system in Sri Lanka heavily relies on phone calls as the primary method for reporting emergencies. This approach can lead to delays in response times due to communication barriers, language differences, and network congestion.

2. Difficulty in Conveying Location Information:

Accurately conveying one's location to ambulance services is often challenging, especially in chaotic or unfamiliar situations. This difficulty further exacerbates response time delays and hampers the effectiveness of emergency interventions.

3. Lack of Integration with Modern Technology:

Existing ambulance service systems in Sri Lanka lack integration with modern technology, hindering the adoption of innovative solutions such as real-time location tracking, instant communication, and community alerts. This limitation results in inefficiencies in resource allocation and coordination, compromising the overall effectiveness of emergency response efforts.

4. Inefficiencies in Resource Allocation:

The absence of real-time data and communication capabilities within ambulance services leads to inefficiencies in resource allocation. This can result in delays in dispatching ambulances to critical situations, thereby prolonging response times and potentially jeopardizing patient outcomes.

5. Impact on Emergency Response Effectiveness:

The aforementioned challenges collectively impact the overall effectiveness of emergency response efforts in Sri Lanka. Without a comprehensive solution that addresses these issues, the ability to save lives and minimize the impact of emergencies is significantly compromised.

1.3 Aims and Objectives

The aim of this Emergency Response System Mobile Application project is to develop a comprehensive, user-friendly and quick response mobile application that enhances emergency response capabilities in Sri Lanka. This project aims to address the limitations and challenges faced by traditional emergency response systems by leveraging the power of mobile technology to streamline communication, improve situational awareness, and facilitate rapid coordination among stakeholders

1. To Make Real-time Communication: Implementing a system for users to report emergencies and communicate with emergency services in real-time.

2. To Track Accurate Geolocation Tracking: Integrating technologies for precise location sharing to expedite the dispatch of assistance to the user's exact location.

3. To Provide User Safety Features: Incorporating features such as first-aid guidance, emergency contact storage, and community alerts to enhance user safety and preparedness.

4. To Get Seamless Coordination: Facilitating coordination and collaboration between responders and individuals in distress to ensure swift and effective response to emergencies.

5. To Contact Multiple Emergency Department: Can send a message or notification to multiple emergency helpline departments. By accomplishing these objectives, this project seeks to address the shortcomings of existing emergency response systems and provide a comprehensive solution that enhances public safety and resilience in the face of emergencies.

6. To Get Safety guidelines and First-aid: We learn or follow the safety guidelines or the first-aid activity during the Emergency situations.

CHAPTER 2

2.1 Literature Survey

In Sri Lanka, emergency response mobile applications for ambulance services is emerging, reflecting a growing interest in leveraging technology to improve healthcare delivery. Studies have begun exploring the design and functionality of such applications tailored to the country's unique geographic and infrastructural challenges. Initial research focuses on features like GPS-based ambulance dispatching and real-time tracking to address the need for faster response times, especially in densely populated urban areas and remote regions with limited access to medical facilities.

Moreover, literature highlights the potential of these applications to bridge communication gaps between emergency responders and healthcare facilities, facilitating more efficient coordination during emergencies. Researchers in Sri Lanka have started investigating the impact of mobile ambulance services on patient outcomes and healthcare system performance, aiming to identify opportunities for further optimization and expansion. Additionally, attention is given to the socio-economic factors influencing the adoption and accessibility of these applications across different segments of the population, emphasizing the importance of inclusive design and equitable distribution strategies.

2.2 Study of Similar Applications

The "SOS app" in Sri Lanka investigated the effectiveness of a mobile emergency response application designed specifically for women's safety. Conducted by a local non-profit organization in collaboration with law enforcement agencies and community stakeholders, the study aimed to assess the impact of the application on enhancing safety and providing timely assistance to women facing emergencies, including incidents of harassment or violence. The application allowed users to trigger SOS alerts with their location information to designated contacts or emergency responders, enabling swift intervention in critical situations.

The view is employed a mixed-methods approach, combining quantitative analysis of usage data and response times with qualitative feedback from users through surveys and focus group discussions. Results indicated that the SOS app significantly improved women's sense of security and confidence in accessing help during emergencies. Furthermore, it facilitated more efficient coordination between users, law enforcement, and support services, leading to faster response times and better outcomes for victims of violence or harassment. The study underscored the importance of technology-driven solutions in addressing gender-based violence and promoting safer communities in Sri Lanka.

CHAPTER 3

3.1 Methods

The Waterfall Method
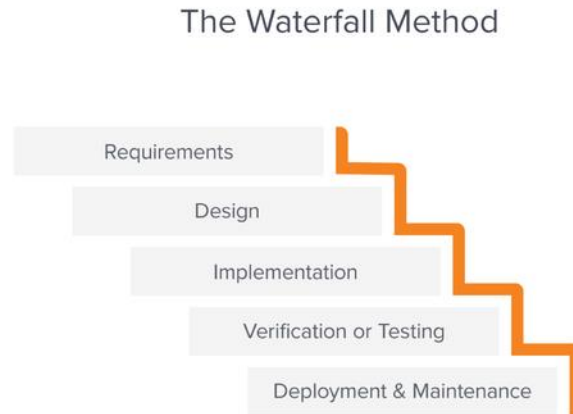
Figure 1:Waterfall-model

1. Requirement Analysis: The initial phase involves comprehensive gathering and analysis of requirements from stakeholders including emergency responders, healthcare providers, and potential users. This phase focuses on understanding the functionality, features, and user needs of the application, such as GPS-based location tracking, emergency contact integration, and real-time communication capabilities.

2.System Design: Once requirements are gathered, the system architecture and design are planned in detail. This phase involves creating system specifications, defining software and hardware requirements, and designing the user interface. Design decisions include selecting appropriate technologies for development, determining data flow, and outlining the overall system structure.

3.Implementation: In the implementation phase, development teams start coding the application based on the design specifications. This involves writing the source code, integrating various modules, and building the user interface according to the finalized design. The focus is on creating a functional prototype that aligns with the requirements identified in the earlier phases.

4.Testing: After the application is developed, rigorous testing is conducted to ensure its reliability, functionality, and usability. This includes various types of testing such as unit testing, integration testing, system testing, and user acceptance testing. Testing aims to identify and rectify any defects or issues in the application before deployment.

5. Deployment: Once testing is complete and the application is deemed stable, it is deployed for use by emergency responders and other stakeholders. Deployment involves installing the application on mobile devices, configuring servers and databases, and ensuring seamless integration with existing emergency response systems.

6.Maintenance: The final phase involves ongoing maintenance and support for the deployed application. This includes monitoring performance, addressing user feedback, and releasing updates or patches to improve functionality or address security vulnerabilities. Continuous maintenance ensures the application remains effective and reliable in supporting emergency response operations over time.

By following the waterfall method, each phase is completed sequentially, with thorough documentation and review before proceeding to the next stage. This approach provides a structured framework for developing the emergency response system mobile application, ensuring that requirements are met and quality standards are maintained throughout the development lifecycle.3.2 Technologies

3.2.1 Frontend Programming

- Java

- Kotlin

3.2.2 Backend Programming

- SQLite

CHAPTER 4

System Implementation

4.1 Introduction

System implementation is a pivotal stage in the development lifecycle of the emergency response system, marking the transition from planning and design to practical execution and operation. A well-executed implementation process is essential for realizing the system's intended benefits and ensuring its effectiveness in supporting emergency response efforts and safeguarding public safety

4.2 Hardware Requirement

Server requirement

- 2TB Hard disk space

- 8GB RAM

- Intel core i7 processor

Smartphone Requirements

- Dual core or More processor / Smartphone

- 040GB of hard disk space

- 2GB or More RAM

4.3 Software Requirement

Client Smartphone Requirements

- Android Version up to 7

- Support play store

4.4 Database initialization

- Connected with SQLite
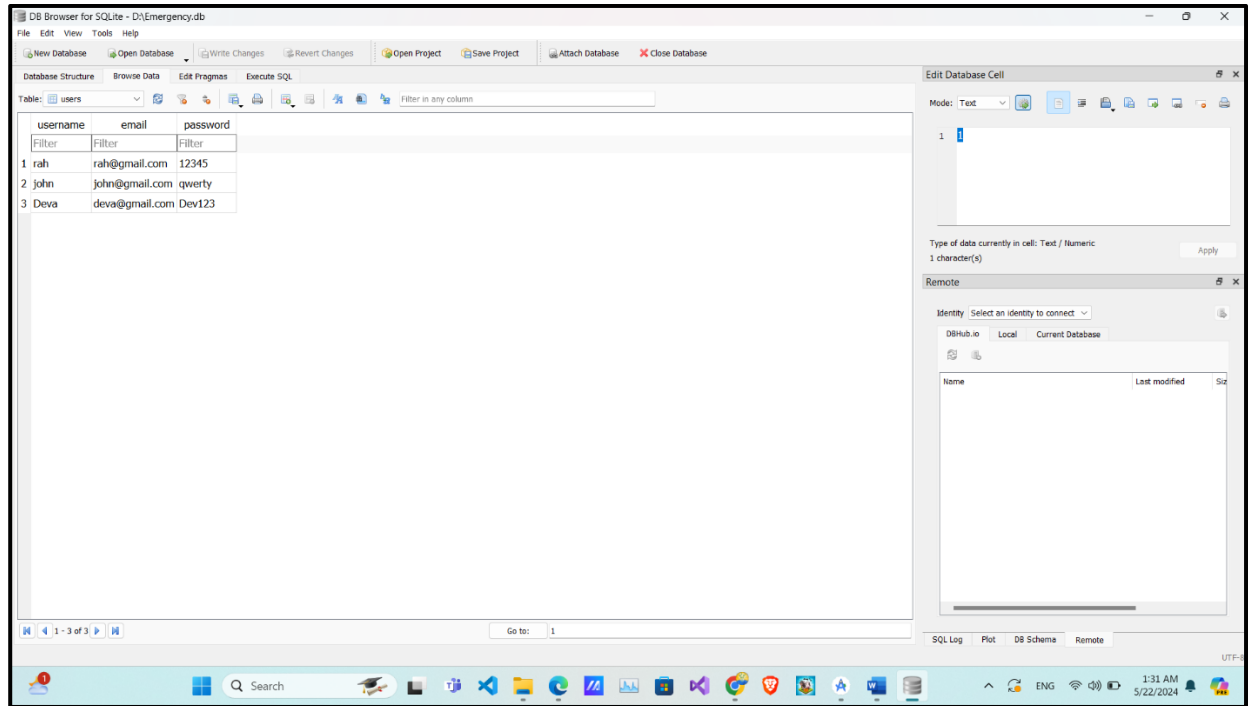
Figure 2:Database design

CHAPTER 5

System Design and Interfaces

5.1 Design of the application

This section contains diagrams and tools which was needed before developing the project such as architecture of the system, user interface design, database model etc. there're different tools used to define the design of the application. These diagrams used to identify the overview knowledge of the system before beginning the development process.

5.1.1 Use Case Diagram
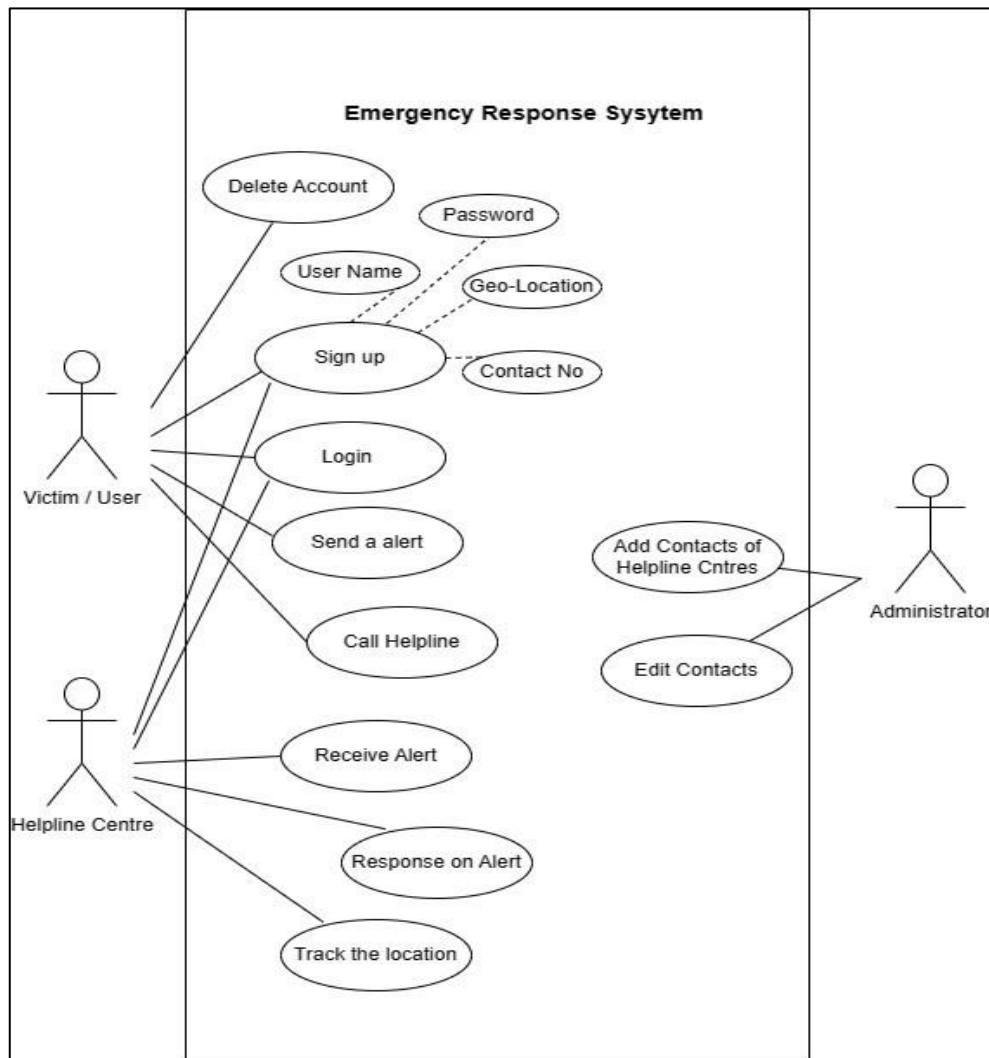
Figure 3:Use Case Diagram

5.1.2 Data Flow Diagram (0 Level)
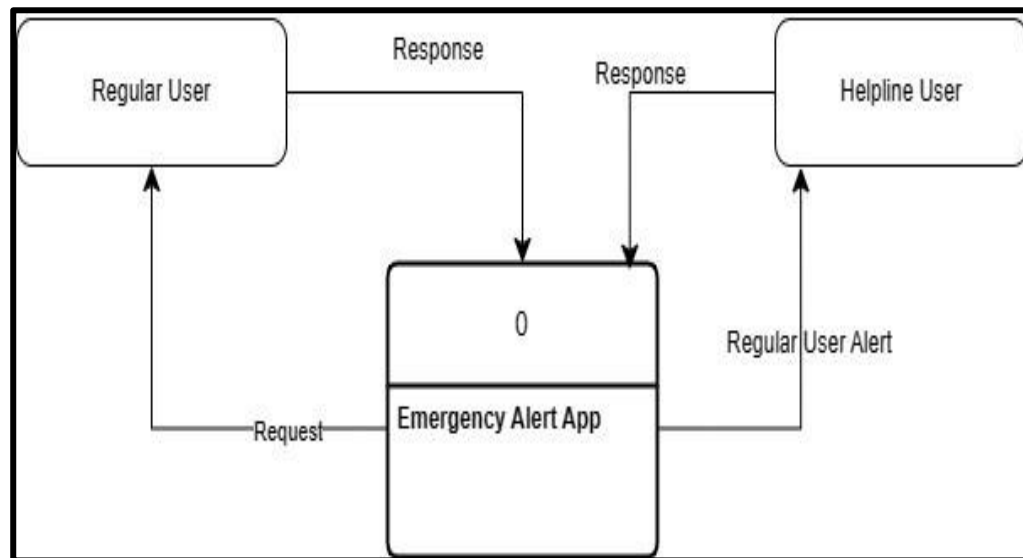
Figure 4:Data Flow Diagram

5.1.3 User Flow Diagram
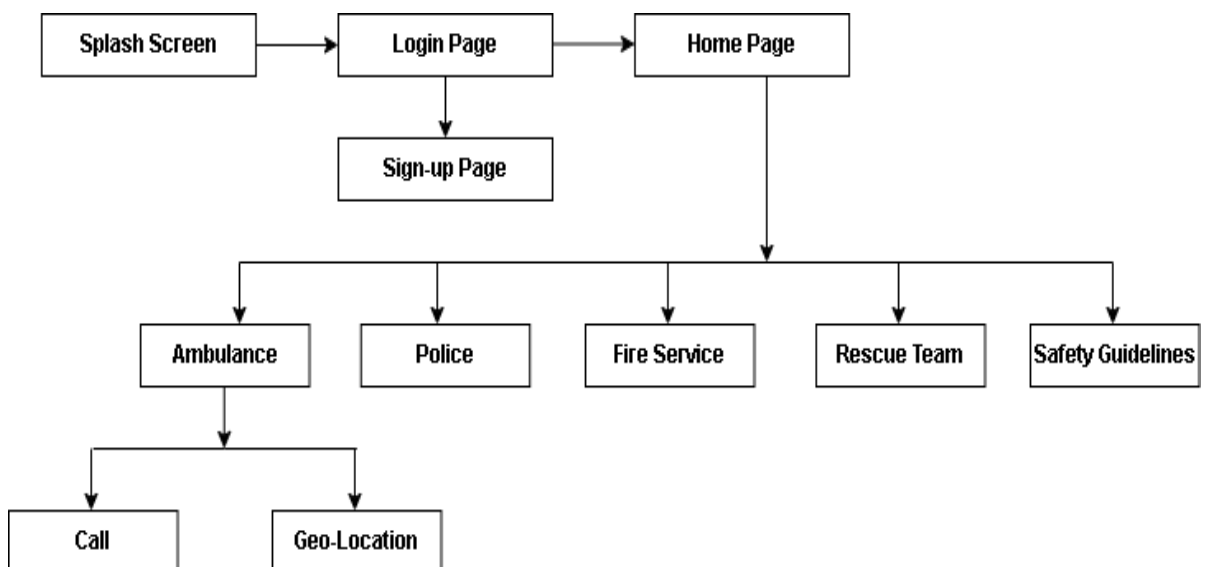
Figure 5:User Flow Diagram

5.2 Interfaces of the system

User Interface (UI) design plays a crucial role in this mobile application software applications, shaping the way users interact with digital systems. A well-designed interface can enhance user experience, improve productivity, and promote user satisfaction. This essay explores the significance of user interface design and its impact on the success of software applications.

5.2.1 Splash Screen
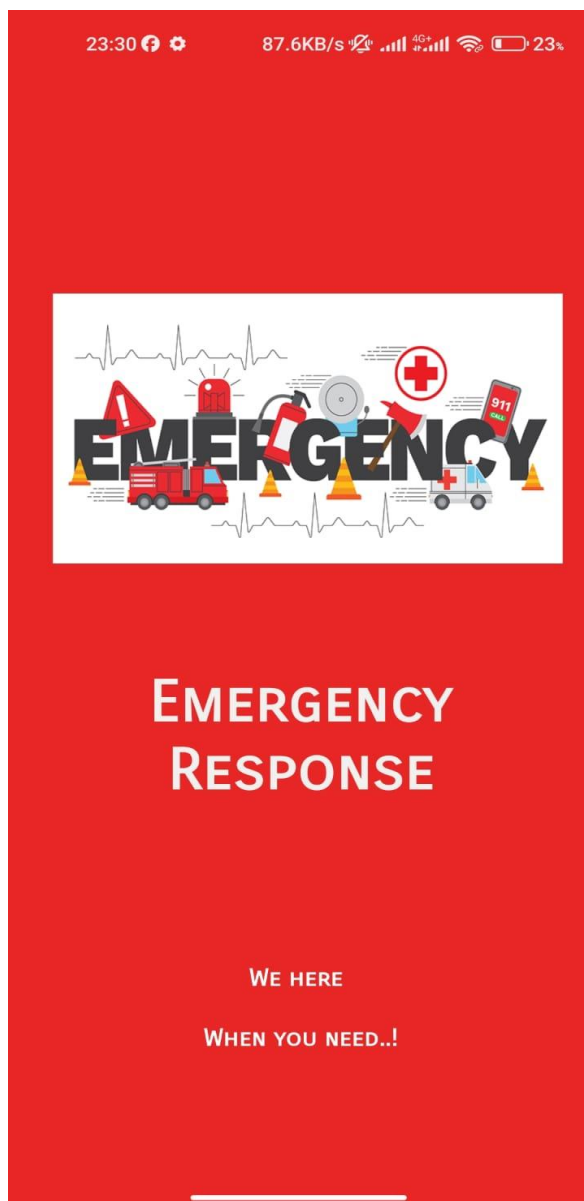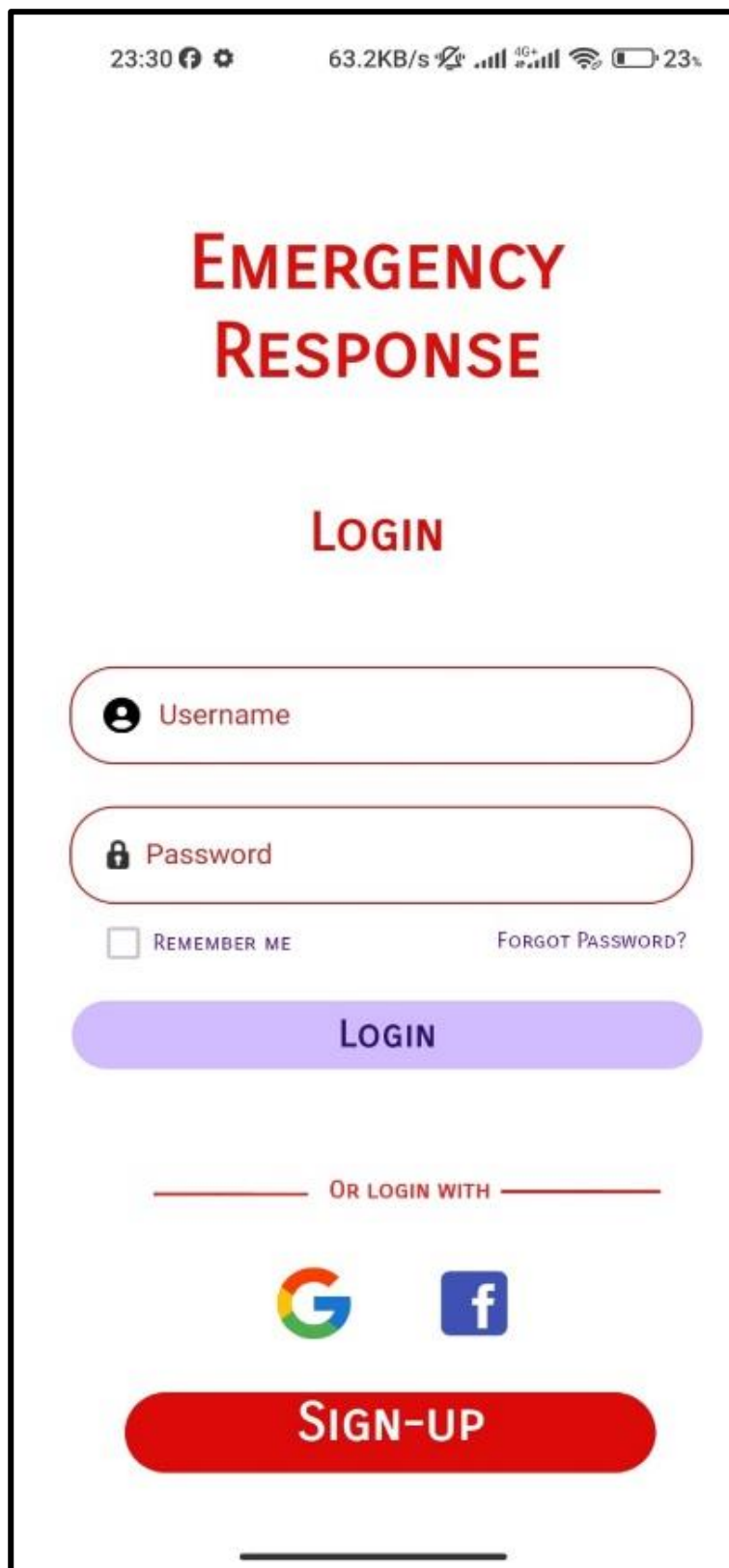
Figure 6:Splash Screen

5.2.2 Login Page

Figure 7:Login Page

5.2.3 Register page

Figure 8:Register Page

5.2.4 Home Page

Figure 9:Home Page
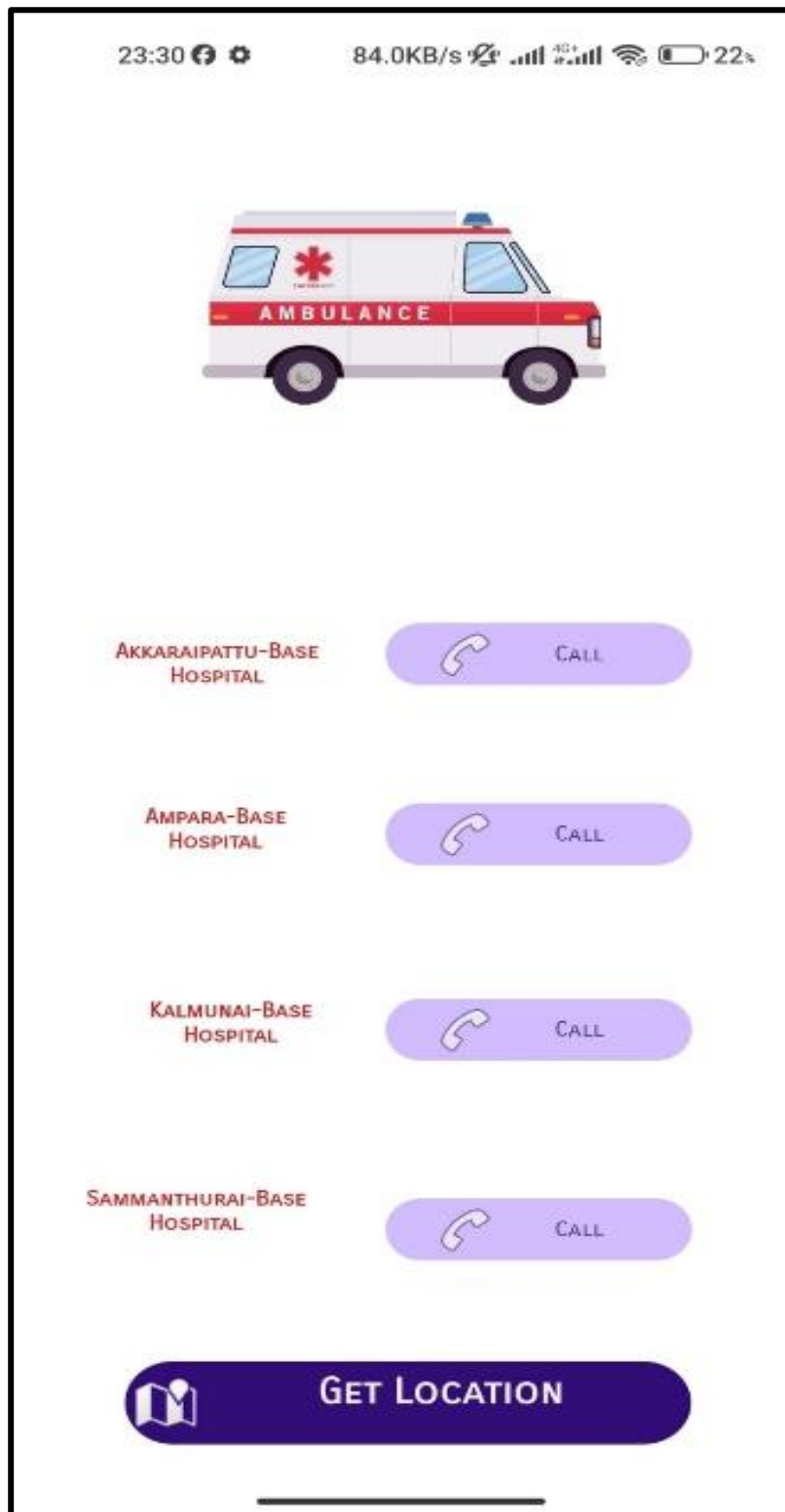
5.2.5 Ambulance Page

Figure 10:Ambulance booking Page
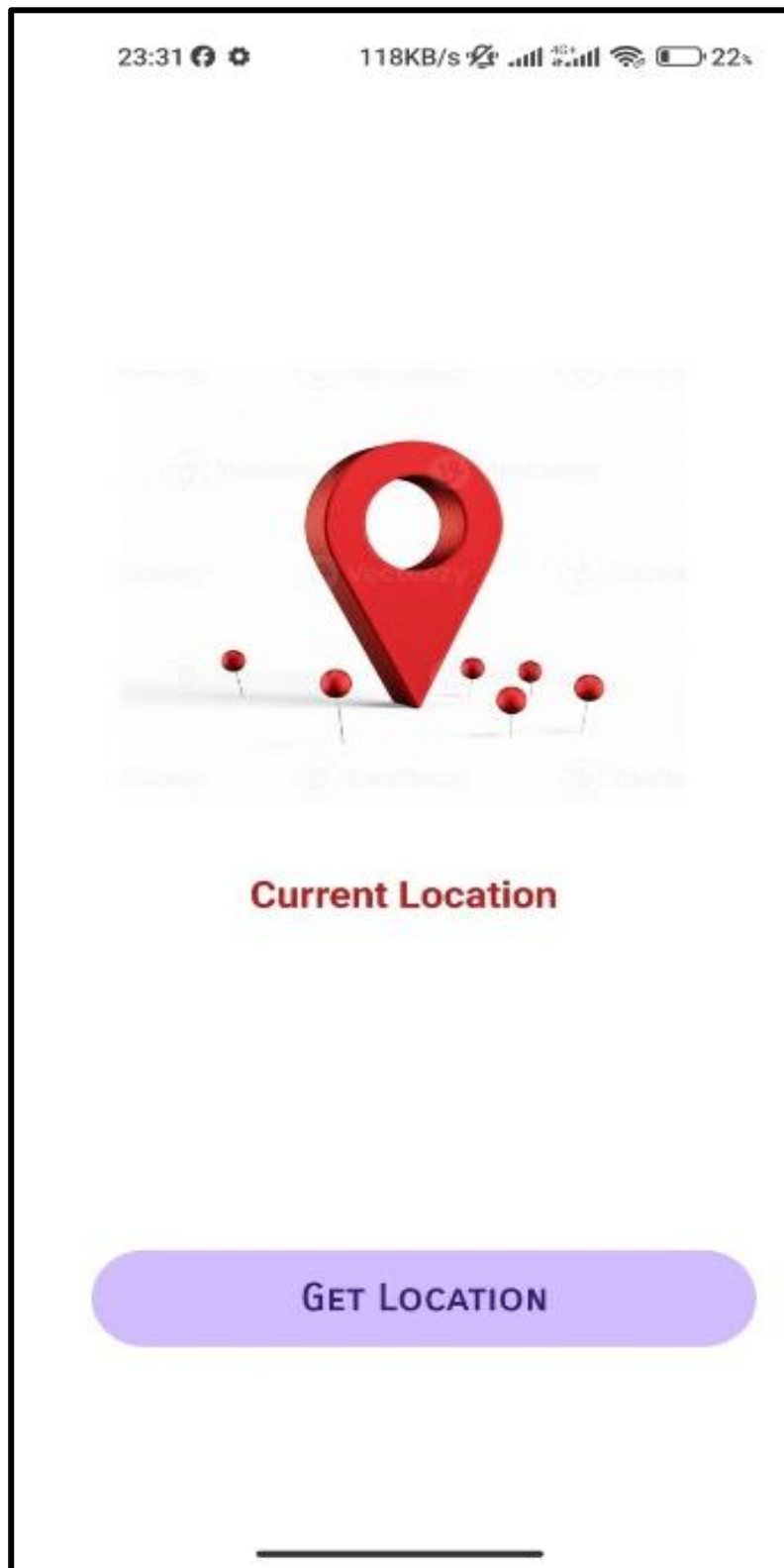
5.2.6 Geo-Location Page

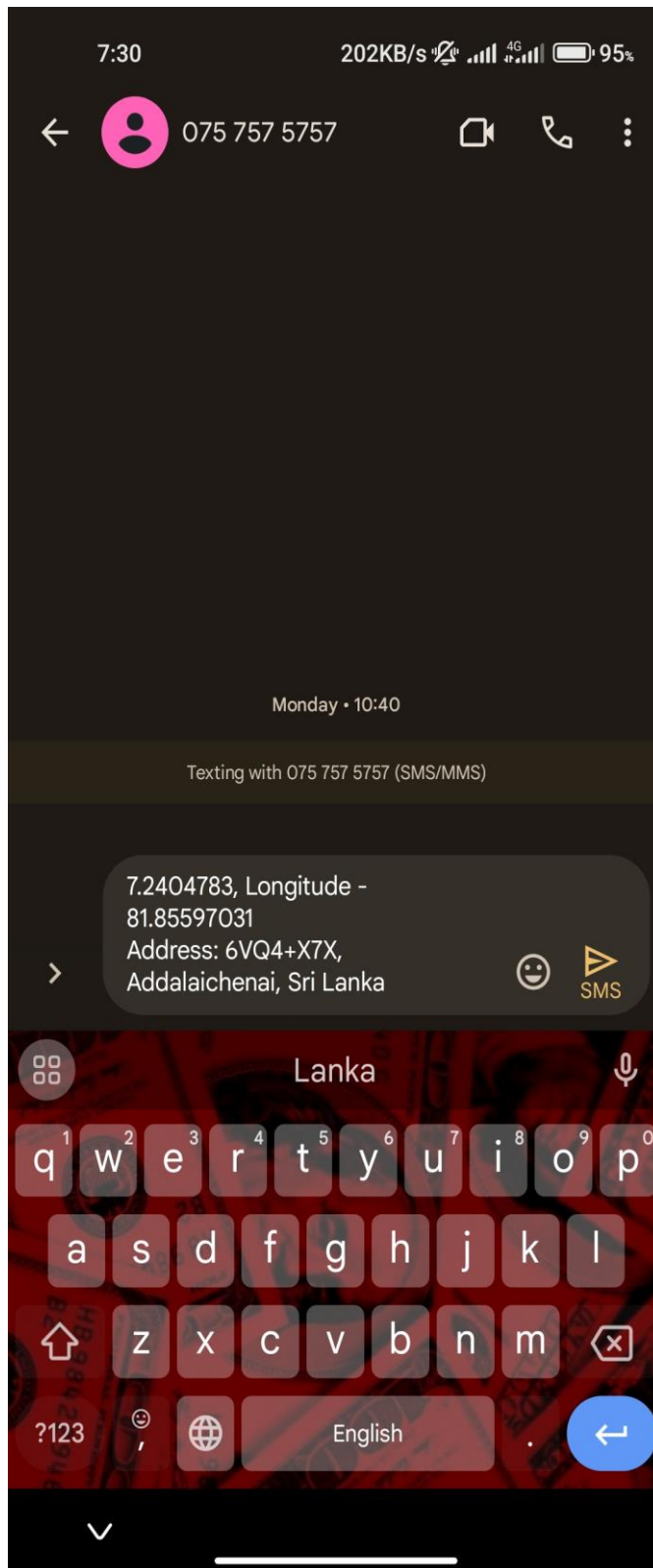*Figure 11:Location Tracking Page*

5.2.7 Geo-Location Page

Figure 12:Location send to normal number

5.2.8 Safety Guideline Page

Figure 13:Safety Giudeline Page

CHAPTER 6

Conclusion & Future Development

6.1 Conclusion & Future Development

The development of the Emergency Response System, specifically focusing on the Ambulance Service, marks a significant advancement in emergency healthcare. By integrating call options and geo-location features, the system ensures rapid and accurate dispatch of ambulances, enhancing response times and patient outcomes. This initial implementation demonstrates the potential for improved coordination and efficiency in emergency services, setting a strong foundation for expanding to other categories.

And Future developments will focus on integrating the Police, Fire Station, and Rescue Team services into the Emergency Response System. This expansion will create a comprehensive network, allowing for seamless coordination among various emergency responders. Enhancing interoperability and communication between these services will be crucial, ensuring that the system can handle multi-faceted emergencies effectively and provide a holistic response to various incidents.

Further advancements will include leveraging artificial intelligence and machine learning to predict emergency hotspots and optimize resource allocation. Additionally, improving user interfaces and incorporating multilingual support will make the system more accessible to diverse populations. Continuous updates and user feedback integration will ensure that the system evolves to meet changing needs, ultimately aiming to create a robust and adaptive emergency response network.

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