
System Requirements Specification

for Emergency Response System

Version 1.0

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REVISION HISTORY

| Name | Date | Reason For Changes | Version |
|------------------|------------|--------------------|---------|
| DHEEN MOHAMED | 08.04.2024 | Initial | 1.0 |

1. INTRODUCTION

Purpose

The purpose of this software requirements specification document is to provide a detailed description of the functionalities of the Emergency Response system. The Emergency Response 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.

Document Conventions

This document follows standard conventions for documenting software requirements, including naming conventions, formatting guidelines, and terminology. And every requirement in the document has its own priority.

Intended Audience and Reading Suggestions

This document is primarily intended for users, stakeholders and the developing teams. The following sections of this documentation cover a detailed description of the software, a discussion of interfaces used in the development, functional and non-functional requirements, features and the design description of the software. This documentation is written from general to specific sections, users are required to read the first two sections to get a complete overview of the application. Further sections contain more technical descriptions and designs of the project concerned for technical readers.

Project Scope

The Project scope is development of a user-centric mobile application that leverages the power of modern technology to streamline emergency response efforts. The application will feature an intuitive interface designed to facilitate rapid reporting of emergencies and seamless communication with emergency services. Users will be able to easily convey their location using GPS technology, allowing responders to dispatch assistance to the precise location of the incident.

Additionally, the application will include features such as first-aid guidance, emergency contact storage, and community alerts to provide users with essential information, and multiple helpline departments support during emergencies. Furthermore, the application will support seamless coordination and collaboration between responders and individuals in distress, enabling swift and effective response to emergencies.

And this Application represents a significant step towards enhancing our country's emergency preparedness and response capabilities. By harnessing the power of mobile technology, we can create a more resilient and responsive society, better equipped to mitigate the impact of emergencies and safeguard the well-being of our citizens. Through collaboration with stakeholders and the deployment of cutting-edge technology, we aim to create a safer and more secure future for all.

1.5 References

2. OVERALL DESCRIPTION

Product Perspective

The Emergency Response 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.

Product Features

2.2 Product Features

- **Real-time Communication:** Implementing a system for users to report emergencies and communicate with emergency services in real-time.
- **Accurate Geolocation Tracking:** Integrating technologies for precise location sharing to expedite the dispatch of assistance to the user's exact location.
- **User Safety Features:** Incorporating features such as first-aid guidance, emergency contact storage, and community alerts to enhance user safety and preparedness.
- **Seamless Coordination:** Facilitating coordination and collaboration between responders and individuals in distress to ensure swift and effective response to emergencies.
- **Multiple Emergency Department:** Can send a message or notification to multiple emergency helpline departments.

2.3 User Classes and Characteristics

Emergency response systems typically cater to various user classes and their respective characteristics to ensure effective and efficient assistance during emergencies. Here's a breakdown of some common user classes and their characteristics in an emergency response system.

1. Victim or citizen in emergency :

- **Characteristics:** These users are typically individuals or groups directly affected by an emergency situation, such as medical emergencies, natural disasters, or accidents.
- **Characteristics include** varying levels of urgency, potential injuries, and emotional distress.
- They may require immediate medical assistance, rescue, or evacuation.

2. First responders :

- Characteristics: Trained personnel such as paramedics, police officers, and other emergency service providers.
- They possess specialized skills and equipment to assess, mitigate, and respond to various emergencies.
- First responders need access to real-time information, including incident details, maps, and directions, to reach the scene quickly and provide effective assistance.

3. Admin :

The administrator exclusively interacts with this application for managing the overall system. He update the contacts and other details.

Operating Environment

1. Hardware Requirement

- This will be an android mobile application and will run on android devices running android 10 or above. It is dependent on Google Play services as Google Maps API will be used to capture the user's location.
- And the administrators should have Desktop or Laptop Computers to managing this application which is compatible with computers running Windows 11 operating systems.

2. Software Requirement

- For User or Victim: Mobile Application: The platform's mobile application requires installation on compatible devices.
- For Administrators: Desktop Application: The platform's desktop application requires installation on compatible desktop or laptop computers.

Design and Implementation Constraints

1. Real-Time Communication:

- The system must facilitate real-time communication between various stakeholders including emergency operators, first responders, and other relevant authorities.
- Constraints may include network latency, bandwidth limitations, and ensuring communication redundancy in case of network failures.

2. Scalability and Reliability:

- The system should be designed to handle sudden spikes in usage during emergencies and be scalable enough to accommodate future growth.
- Redundancy and failover mechanisms should be in place to ensure system reliability, especially during high-demand situations.

3. Usability and Accessibility:

- The user interface of the system should be intuitive and easy to use for operators, responders, and the public.
- Accessibility considerations, such as support for screen readers and alternative input methods, should be addressed to ensure inclusivity for users with disabilities.

4. Resource Constraints:

- Limited funding, personnel, and technological resources may constrain the design and implementation of the system.
- Optimization strategies, such as efficient use of computational resources and prioritization of critical functionalities, are essential to overcome resource

User Documentation

Comprehensive user documentation will be provided, including user manuals, training materials, and help guides to assist users in navigating and using the system effectively.

Assumptions and Dependencies

- **Third-party APIs and Services:** The platform may depend on third-party APIs for functionalities such as mapping and geolocation services.
- **External Databases:** The platform may integrate with external databases for storing and retrieving data, such as User profiles, Departments contacts.

3. SYSTEM FEATURES

User Account and Account setup

➤ **Description and Priority**

This allows the user to create their account and provide basic information to the helpline feature of the application. It is of high importance and risk is high as if this feature doesn't work perfectly then the application would not be able to function properly.

➤ **Response Sequences**

The user must do this in order to use this application as it requires their personal information which is necessary. The user enters their credentials and creates an account and as a basic requirement of account setup they have to provide some contacts other than emergency contacts.

➤ **Functional Requirement**

- The system shall allow the user to sign up using their phone number ,User location and password
- The system shall allow user to select personal contacts once sign up succeeds

Emergency Alert

➤ **Description and Priority**

This feature allows users to alert the authorities about the current situation of the user. This will send the location of the mobile to the emergency contacts. This is the first priority of this application and high risk feature. It is the main feature that this application provides and it will be the main benefit of it.

➤ **Response Sequences**

This feature is enabled when the user triggers the emergency switch on the device. It will do all the actions allowed automatically and the user doesn't have to do anything. It sends the essential information through whatever channel available to the contacts provided.

➤ **Functional Requirement**

- The system shall allow the user to send a quick alert containing their current location, and helpline type (e.g. police, rangers, rescue) to which alert is directed

Known an Emergency

➤ Description and Priority

This feature allows the concerned authorities to know about an event that requires their attention. They will be able to hear voice recordings, see videos and locations of a user and take action accordingly. This is also a high priority feature and likewise risk is also high. Apart from in-app alerts, emergency calls will be sent to contacts provided.

➤ Response Sequences

This feature is triggered as a response to the emergency alert feature of this application. The emergency alert is received and processed and sent to the concerned authorities. The authorities can consume the media provided and mark it as processed and take further action. And the user in emergency knows that the alert has been received.

➤ Functional Requirement

- The system shall allow helpline users to view the alerts directed to their helpline type (e.g. police, rangers, rescue).
- The system shall allow helpline users to view location of the alert sender user, read its text message if any.

Share your experience

➤ Description and Priority

This feature allows the user to post about any incident or their experience. The benefit of this feature is that it will help spread social awareness. It is of medium importance and low risk.

➤ Response Sequences

The Sequences Whenever a user experiences something, they can post about it. The user writes about the event and post and after it is approved it appears on the feed of others.

➤ Functional Requirement

- The system shall allow helpline users to view the alerts directed to their helpline type (e.g. police, rangers, rescue).
- The system shall allow helpline users to view location of the alert sender user, read its text message if any.

4. EXTERNAL INTERFACE REQUIREMENTS

User Interfaces

- Intuitive and responsive web interface
- Support for desktop and mobile devices
- Consistent design and navigation



Figure 2



Figure 4



Figure 1

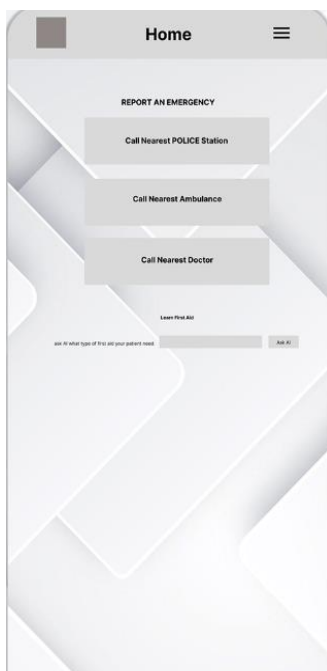


Figure 5

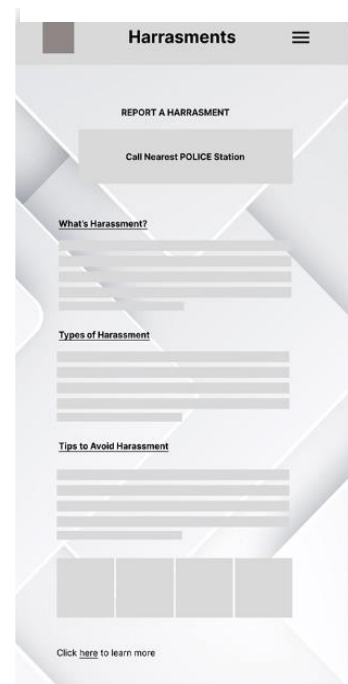


Figure 3

Hardware Interfaces

1. Mobile Devices: Users access the system via smartphones and tablets, utilizing touchscreens, cameras, GPS, and network connections.
2. Desktop Computers/Laptops: Administrators and carpenters access the system's web portal using keyboards, mice, monitors, and network connections.
3. Server Infrastructure: Backend components and databases are hosted on servers, communicating via network and database interfaces, with storage devices for data

Software Interfaces

- 4.3.1 Operating Systems: Desktop/Laptop: Windows, Linux. Mobile: Android
- 4.3.2 Backend Frameworks: Node.js, Django, Spring Boot for backend development.
- 4.3.3 Mobile Application Development: Android Studio, Kotlin
- 4.3.4 Database Management Systems: MySQL, PostgreSQL for backend data storage.
- 4.3.5 APIs and External Services: Integration with external APIs for functionalities such as mapping and messaging.

Communications Interfaces

1. Emergency Call Handling Interface:

- This interface allows individuals to initiate emergency calls to alert authorities about incidents requiring immediate assistance.
- It includes features such as call routing, call queuing, and call prioritization to ensure efficient handling of emergency calls.
- Integration with public safety answering points (PSAPs), dispatch centers, and emergency response teams is essential for seamless call handling and dispatching of resources.

2. Dispatch and Command Center Interface:

- This interface is used by dispatchers and command center personnel to receive, process, and manage incoming emergency calls and incidents.
- It provides functionalities for incident triage, resource allocation, and coordination of response activities.
- Features such as incident tracking, mapping, and status updates enable real-time situational awareness and decision-making.

3. Responder Mobile Interface:

- Responder mobile interfaces are utilized by first responders and field personnel to receive dispatch notifications, access incident details, and update their status and location.
- These interfaces often include mobile applications installed on smartphones or tablets, providing access to critical information and communication channels on the go.
- Features may include navigation assistance, messaging, and incident reporting capabilities to support responders in carrying out their tasks effectively.

5. OTHER NONFUNCTIONAL REQUIREMENTS

Performance Requirements

Reliability:

The system should operate reliably under all conditions, ensuring minimal downtime and uninterrupted availability during emergencies.

It should have mechanisms in place to handle failures gracefully and recover quickly from disruptions.

Performance quick Response:

The system should be responsive and able to handle a high volume of concurrent users and emergency incidents.

Response times for critical functions, such as receiving emergency calls, dispatching responders, and updating incident statuses, should meet predefined benchmarks.

Scalability:

The system should be able to scale up or down based on demand, especially during peak periods or large-scale emergencies.

Scalability should be achieved without sacrificing performance or reliability.

Security:

Data transmission and storage should be secured to prevent unauthorized access, tampering, or data breaches.

Authentication mechanisms, access controls, encryption, and secure communication protocols should be implemented to protect sensitive information.

Privacy:

Personal information collected during emergencies should be handled in compliance with relevant privacy regulations.

User consent for data collection and processing should be obtained where applicable, and mechanisms for data anonymization and pseudonymization should be implemented.

Usability:

The user interface should be intuitive, easy to navigate, and accessible to users with varying levels of technical expertise.

Clear and concise error messages, prompts, and instructions should facilitate effective use of the system, especially during stressful situations.

Safety Requirements

- Data encryption and secure storage of sensitive information
- Backup and recovery procedures to prevent data loss
- The system shall allow the user to edit the list of contacts in order to remove any contact selected by mistake or to add a new contact to the list of contacts.
- The system shall store the user's list of personal contacts locally on the user's device, and not on its server so as not to endanger the user's contacts' privacy.

Security Requirements

- The system shall ensure that the user password matches strict criteria, i.e. length ≥ 6 and a combination of numbers, characters and symbols.
- Users must authenticate themselves using unique usernames and passwords to access the system.
- The system shall request the user for permission to access location, and contacts, and attend & make calls upon startup.

- The system shall not attempt to get the user's location without getting their prior permission.
- The system shall not attempt to make a call without getting the user's prior permission.
- The system shall not record the user's location other than when the regular user presses the "Send Quick Alert" Button or "Send Custom Alert" button

Software Quality Attributes

- Reliability, availability, and maintainability of the system
- Compliance with coding standards and best practices

6. OTHER REQUIREMENTS

APPENDIX A: ANALYSIS MODELS

Use case diagram

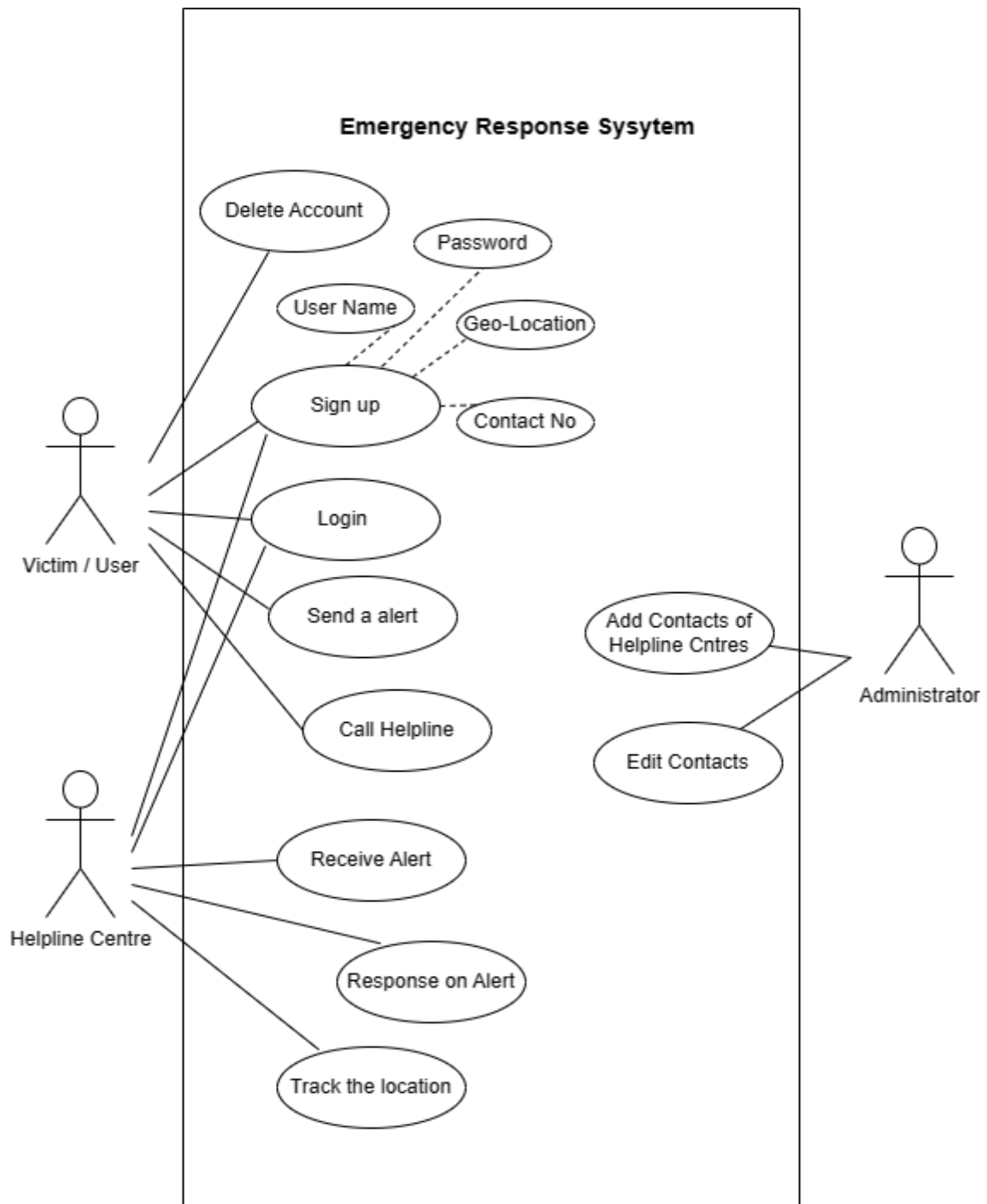


Figure 6:use case diagram

User Flow

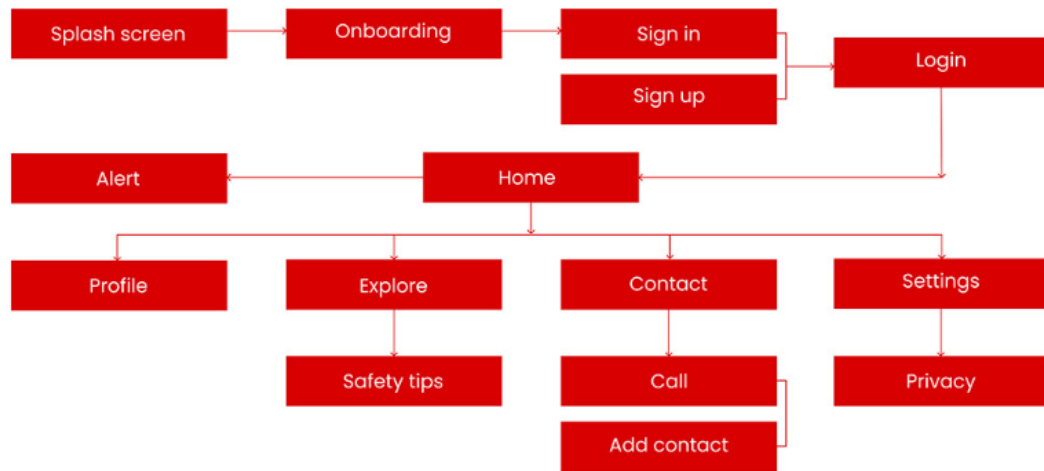


Figure 7: User Flow

Data flow Diagram (0 level)

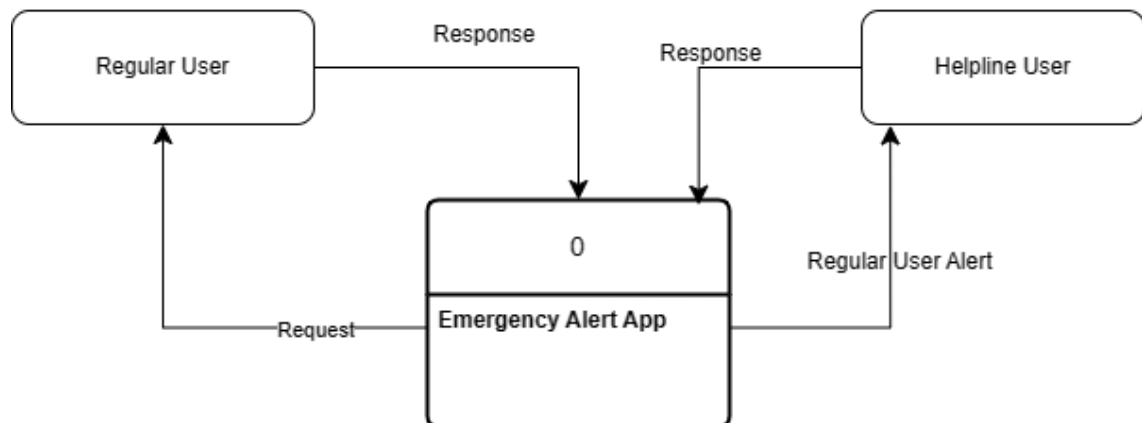


Figure 8: Data flow Diagram

APPENDIX B: ISSUES LIST

This system mainly focus on health service so this app handles very sensitive information and secure.

This system takes long term to complete but customer requested to complete within 4 months.

Therefore, it complicated for developing whatever duration or cost.