



Mini Project Report On

Voice Activated Emergency App

*Submitted in partial fulfillment of the requirements for the
award of the degree of*

Bachelor of Technology
in

Computer Science & Engineering

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May 2024**

CERTIFICATE

*This is to certify that the mini project report entitled "**Voice Activated Emergency App**" is a bonafide record of the work done by **Justin K A (U2103121)**, **Jefrin John (U2103108)**, **Kannan M D (U2103123)**, **Megha Krishna (U2103135)**, submitted to the APJ Abdul Kalam Technological University in partial fulfillment of the requirements for the award of the degree of Bachelor of Technology (B. Tech.) in Computer Science and Engineering during the academic year 2023-2024.*

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ACKNOWLEDGEMENTS

We wish to express my sincere gratitude towards Dr P. S. Sreejith, Principal of RSET, and Dr. Preetha K.G., Head of the Department of Computer Science and Engineering for providing us with the opportunity to undertake my mini project, "Project Title".

We are highly indebted to our project coordinator, **Dr. Saritha S**, Professor, Department of Computer Science and Engineering for their valuable support.

It is indeed our pleasure and a moment of satisfaction for us to express my sincere gratitude to our project guide **Ms. Jisha Mary Jose** for her patience and all the priceless advice and wisdom she has shared with us.

Last but not the least, we would like to express my sincere gratitude towards all other teachers and friends for their continuous support and constructive ideas.

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Abstract

In a world where personal safety is of paramount concern, leveraging technology to create innovative solutions becomes imperative. The Voice-Activated Emergency Alert App is a tool designed to empower and protect women by seamlessly integrating voice activation technology into an emergency alert system. This app ensures discreet and swift communication with emergency contacts and law enforcement, offering a revolutionary approach to personal safety. The core feature of the App is its voice-activated mechanism. Users can discreetly trigger an emergency alert by simply uttering a predefined code or phrase, allowing for quick and unobtrusive communication in times of distress. The app operates in the background, ready to respond instantly when needed. This ensures that users do not have to fumble with their phones or open the app in potentially dangerous situations. The discrete nature of the voice activation mechanism enhances user safety by minimizing the risk of detection. Users have the flexibility to customize their emergency contacts and settings based on their preferences. The app can automatically alert selected contacts or the nearest police station, providing a personalized and efficient response to different safety scenarios. In case of activation, the app sends automated alert messages to chosen contacts, informing them of the user's dangerous situation. The message includes the user's GPS location, enabling swift assistance and ensuring that help reaches them precisely where it is needed. The App addresses the critical need for discretion and speed in emergency situations. By eliminating the need for manual actions or app openings, the voice-activated system allows users to send distress signals discreetly and swiftly, enhancing their safety in vulnerable situations.

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Chapter 1

Introduction

1.1 Background

In today's world, ensuring personal safety is paramount, especially for individuals facing various risks in their daily lives. Traditional methods of seeking help during emergencies, such as dialing emergency services or sending texts, can be time-consuming and may not guarantee discreet communication. Recognizing these limitations, the Voice-Activated Emergency Alert App emerges as an innovative solution. By integrating voice activation technology into an emergency alert system, the app empowers users to trigger alerts discreetly with simple voice commands, revolutionizing the approach to personal safety.

Unlike conventional methods, which may require manual actions and risk drawing attention to the user's situation, the Voice-Activated Emergency Alert App operates in the background, ready to respond instantly when needed. This feature enhances user safety by minimizing the risk of detection in dangerous situations. Moreover, the app allows users to customize their emergency contacts and settings, ensuring a personalized and efficient response to different safety scenarios. In case of activation, the app automatically sends alert messages to chosen contacts, including the user's GPS location for swift assistance.

Overall, the Voice-Activated Emergency Alert App addresses the critical need for discretion and speed in emergency situations, offering a seamless and efficient means of communication. By providing a reliable and intuitive emergency alert system, the app empowers users to navigate through emergencies with confidence and security.

1.2 Problem Definition

Problem: current methods of seeking help during emergencies, such as calling or texting, can be time-consuming and lack discretion

Solution: To develop an app that uses voice activated commands so that the user can

send any emergency notifications hands-free and discreetly

The aim of the project is to develop a Voice-Activated Emergency Alert App that integrates voice activation technology into an emergency alert system, empowering users to trigger discreet alerts with simple voice commands.

1.3 Scope and Motivation

Scope: The scope of this project encompasses the development of the Voice-Activated Emergency Alert App, including its design, implementation, and testing phases. This involves creating a user-friendly interface that combines voice activation technology into an emergency alert system. Additionally, the app will feature customizable settings, allowing users to personalize their emergency contacts and preferences. The scope also includes ensuring the app's compatibility with various mobile devices and operating systems to maximize accessibility for users across different platforms. The app can also be used by people suffering from medical conditions or people who are not as tech-savvy in times of need.

Motivation: The motivation behind developing the Voice-Activated Emergency Alert App stems from the need to enhance personal safety and provide efficient means of communication during emergencies. Traditional methods of seeking help often lack discretion and may not be readily accessible in high-stress situations. By leveraging voice activation technology, the app aims to address these limitations by enabling users to trigger quick and discreet alerts with simple voice commands. The ultimate goal is to empower individuals, particularly vulnerable populations, to navigate through emergencies with confidence and security, thereby enhancing their overall well-being and peace of mind.

1.4 Objectives

1. Enhance Personal Safety: The primary objective of launching the Voice-Activated Emergency Alert App is to enhance personal safety by providing individuals with a discreet and efficient means of seeking assistance during emergencies.
2. Enable Swift Communication: The app aims to enable swift communication with emergency contacts and law enforcement, ensuring users convey their distress signals

without delay or difficulty.

3. Empower Users: The app seeks to empower users to take control of their safety and well-being, enabling them to navigate through emergency situations with confidence.
4. Promote Discretion: The app aims to promote discretion in seeking help during emergencies, as traditional methods may attract unwanted attention by the use of predefined voice commands, minimizing the risk of detection.
5. Provide Customization Options: The app aims to provide users with customization options, allowing them to personalize their emergency contacts, settings, and preferences based on their specific needs and circumstances.
6. Increase Accessibility: The app aims to increase accessibility for users across different demographics, including those who may benefit from its features during medical emergencies or situations where traditional communication methods are not feasible.

1.5 Challenges

- Ensuring the accuracy and reliability of the voice recognition technology, particularly in diverse environments with varying accents and background noise.
- Maintaining user privacy and data security while accessing sensitive information such as location data poses a significant challenge that requires careful implementation of encryption and access control measures.
- Achieving seamless integration and compatibility across a wide range of mobile devices and operating systems presents another challenge that requires thorough testing and refinement to ensure optimal performance and user experience.

1.6 Assumptions

1. The majority of users will have access to a smartphone or mobile device capable of running the app.
2. Users will have a basic understanding on using voice commands on their devices, ensuring ease of interaction with the app.

3. Emergency contacts provided by users will be responsive and capable of providing assistance upon receiving alerts.
4. Users will have access to a stable internet connection or cellular network to enable the app's communication with emergency services and contacts.
5. The app's voice recognition technology will be able to accurately decipher user commands in various environments, including noisy or crowded settings, to ensure reliable functionality during emergencies.

1.7 Societal / Industrial Relevance

The Voice-Activated Emergency Alert App holds significant societal and industrial relevance by addressing safety concerns and leveraging innovative technology to enhance emergency response capabilities. The app provides a valuable tool for individuals, particularly vulnerable populations such as women, seniors, or those with medical conditions, to quickly and discreetly seek assistance during emergencies. Furthermore, in industries such as healthcare, hospitality, and transportation, where ensuring the safety and well-being of customers and employees is paramount, the app offers a proactive solution to mitigate risks and respond effectively to unforeseen incidents. Its has the potential to positively impact both societal and industrial contexts by promoting a safer and more secure environment for all.

1.8 Organization of the Report

To organize the report according to the provided outline, you can structure it as follows:

1. Introduction
 - Background: context on the project, highlighting the current scenario of personal safety concerns and the need for innovative solutions.
 - Problem Definition: defining the problem the app aims to address, such as the lack of efficient communication in emergency situations.
 - Scope and Motivation: scope of the project, including its target users and functionalities, and discuss the motivation behind developing the app.

- Objectives: specific goals and objectives of the project, including enhancing personal safety and providing swift emergency response.
- Challenges: challenges involved in developing the app, such as integrating voice recognition and GPS functionality.
- Assumptions: assumptions made during the project, such as assumptions about user behavior or technological feasibility.
- Societal/Industrial Relevance: relevance of the project in societal and industrial contexts, emphasizing its potential impact on improving personal safety.

2. Software Requirements Specification

- Introduction: overview of the software requirements specification section.
- Overall Description: overall features and functionalities of the app.
- External Interface Requirements: external interfaces required for the app, such as voice recognition APIs or GPS services
- System Features: the main features of the app, such as voice-activated emergency alerts and GPS integration.
- Other Nonfunctional Requirements: requirements, such as performance and security considerations.

3. System Architecture and Design

- System Overview: an overview of the system architecture, including its components and functionalities.
- Architectural Design: architectural design of the app, focusing on the overall structure and organization.
- Proposed Methodology/Algorithms: methodologies and algorithms used in the app, such as voice activation and GPS integration.
- User Interface Design: design of the user interface, including screenshots and descriptions of key screens.
- Description of Implementation Strategies: implementation strategies for key app features, such as voice recognition and alert messaging.

- Module Division: division of modules within the app, highlighting their respective functionalities.
- Work Schedule - Gantt Chart: depicting the project timeline and milestones.

1.9 Summary

In today's world, personal safety is crucial, yet traditional emergency communication methods like calling or texting lack discretion and can be time-consuming. To address this, the Voice-Activated Emergency Alert App utilizes voice activation technology, enabling users to discreetly trigger alerts with simple voice commands, enhancing safety by minimizing the risk of detection in dangerous situations. The app also allows for customization of contacts and settings and automatically sends alerts with the user's GPS location.

The project aims to develop this app, motivated by the need to enhance personal safety and provide efficient communication during emergencies. Objectives include enhancing safety, enabling swift communication, empowering users, promoting discretion, providing customization options, and increasing accessibility.

Challenges include ensuring voice recognition accuracy, maintaining user privacy, and achieving seamless integration across devices. Assumptions include user access to smartphones and a stable internet connection.

The app holds societal and industrial relevance by addressing safety concerns and can benefit various industries. The report's organization includes sections on the introduction, software requirements specification, and system architecture and design.

Chapter 2

Software Requirements Specification

2.1 Introduction

2.1.1 Purpose

Introducing the Voice-Activated Emergency Alert App, a pioneering solution in the realm of personal safety where the well-being of individuals is of utmost concern. In a world where leveraging technology is imperative for ensuring security, this app is designed to empower and protect women seamlessly by integrating cutting-edge voice activation technology into an emergency alert system. This revolutionary tool aims to provide discreet and swift communication with emergency contacts and law enforcement, offering a novel approach to enhancing personal safety.

2.1.2 Product Scope

The Voice-Activated Emergency Alert App redefines personal safety with its multifaceted approach, offering a spectrum of functionalities to address diverse emergency scenarios. Anchored by its discreet voice-activated mechanism, users can effortlessly trigger alerts, ensuring swift communication without fumbling in critical situations. The app's customization features empower users to tailor their emergency contacts and settings, providing a personalized response to different safety scenarios, from medical emergencies to physical threats. Automated alert messages, inclusive of GPS location, enhance the efficiency of assistance, pinpointing the user's precise location. Beyond individual safety, the app fosters community collaboration by alerting both personal contacts and local law enforcement, creating a robust safety network. In various environments, the discreet nature of the voice activation mechanism minimizes the risk of detection, ensuring user safety across diverse and potentially dangerous situations. In essence, the Voice-Activated

Emergency Alert App is a versatile and indispensable tool, offering users a comprehensive solution adaptable to a myriad of safety needs.

2.2 Overall Description

2.2.1 Product Perspective

The Voice Activated emergency alert system described in this Software Requirements Specification (SRS) is a new, self-contained product developed to help address the personal safety and security concerns of women around the globe. Crime rates against women do not seem to be decreasing and thus it has become imperative to design a safety app that would allow them to travel safely and meet their needs while staying alert and safe. This is a user-friendly application that can be accessed by anyone who has installed it on their smartphones. Our intention is to provide you with the fastest and simplest way to contact your nearest help. The existing applications and systems that provide this functionality are difficult to operate in time critical situations. By making the application voice activated, the user is able to contact the nearest police station or one of the numbers fed into the system via SMS during an emergency.

2.2.2 Product Functions

The Voice Activated Emergency Alert System must perform the following major functions:

- Employing speech recognition to activate the emergency alert
- Must constantly run in the background without using up too much battery life
- Allow users to customize the system by providing contact information
- Must track the user's GPS location and share it with the designated contacts.
- Facilitate mechanism to cancel the alert in case it was activated by mistake

These functions are aimed at providing the ultimate safety measure for any citizen while exposing them to the minimum amount of danger.

2.2.3 Operating Environment

1. Hardware Platform:

- The Voice-Activated Emergency Alert App operates on modern mobile devices, including smartphones and tablets.
- It should be compatible with various manufacturers and models to ensure accessibility to a wide user base.
- The app requires specific hardware components such as a microphone for voice activation and a GPS module for location tracking.

2. Operating System and Versions:

- The app is compatible with the Android operating system.
- It should support multiple versions of Android to accommodate users with different device configurations and software preferences.
- Compatibility extends to both the latest versions and older versions of the Android operating system to ensure broad accessibility.

3. Integration with Other Software Components:

- The app peacefully coexists with messaging apps for sending automated alert messages to designated contacts.
- Compatibility with navigation apps may be necessary to provide directions to emergency responders based on the user's GPS location.

4. Background Operation and Resource Management:

- The app operates in the background, ready to respond instantly to voice commands or button presses.
- It manages system resources efficiently to minimize battery consumption and ensure optimal device performance.
- Background operation does not interfere with the functionality of other apps or system processes running on the device.

5. Network Connectivity:

- The app relies on network connectivity to send automated alert messages and transmit the user's GPS location to designated contacts or authorities.
- It should be compatible with both WiFi and cellular networks to ensure connectivity in various environments.

6. Security Considerations:

- The app prioritizes user privacy and data security, especially when transmitting sensitive information such as GPS coordinates.
- It implements encryption protocols to secure communication channels and prevent unauthorized access to user data.
- The app adheres to industry best practices and complies with relevant privacy regulations to protect user information from potential threats.

In summary, the Voice-Activated Emergency Alert App operates within the Android environment, providing users with reliable and efficient emergency communication capabilities while ensuring user safety and privacy.

2.2.4 Design and Implementation Constraints

Several factors can limit the options available to developers when building a software system. These limitations may include:

- Corporate or Regulatory Policies: Developers must adhere to corporate policies, industry regulations, and legal requirements that govern the development and deployment of the software. It is instrumental in gaining access to systems that facilitate the working of the software.
- Hardware & Technology Limitations: The software needs to operate within specific hardware constraints, such as battery limitations, storage, or compatibility with certain devices. It also needs to operate within the limitations of the existing software for recognizing speech and voice at long distances.

- Interfaces to Other Applications: The software may need to integrate with existing systems or third-party applications. Here the application needs to be integrated with services like SMS and GPRS.
- Parallel Operations and Background Running: If the software needs to support parallel operations or running in the background of the system, developers must consider the limitations of the underlying hardware and software architecture.
- Language Requirements: The programming languages and frameworks used to develop the software may be constrained by factors such as platform compatibility or performance considerations.
- Security Considerations: Security is a critical concern, and developers must implement appropriate security measures to protect against threats such as unauthorized access, data breaches, and cyber attacks.

2.2.5 Assumptions and Dependencies

Assumed factors:

- Voice Recognition Accuracy and Reliability: The effectiveness of the emergency alert app relies on the accuracy and reliability of voice recognition technology to accurately detect specific words or phrases indicating an emergency situation. Assumptions regarding the performance of this technology could impact the app's ability to initiate alerts promptly and accurately.
- Access to Nearby Emergency Services: Assumptions are made about the availability and accessibility of nearby emergency services, such as police stations, fire departments, and medical facilities. The app's effectiveness in dispatching alerts depends on the timely response and assistance from these services.
- Integration with SMS and GPRS: Assumptions are made about the seamless integration of the app with SMS and GPRS technologies to send alerts to designated emergency contacts or authorities. Changes in the availability or functionality of these communication channels may affect the app's ability to deliver alerts in real-time.

- Compatibility with Mobile Devices: Assumptions are made about the compatibility of the app with a wide range of mobile devices, including smartphones and tablets. The app's accessibility and usability hinge on its compatibility with different operating systems, device models, and versions.

Dependencies:

- Network Connectivity and Reliability: The app depends on stable network connectivity, including cellular and internet connections, to send alerts effectively. Assumptions are made about the reliability of these networks in various locations and circumstances.
- Geolocation Services: Dependencies exist on the availability and accuracy of geolocation services to pinpoint the user's location when an emergency alert is triggered. The app relies on these services to provide responders with accurate information about the user's whereabouts.
- Emergency Response Protocols: The effectiveness of the app in facilitating emergency response depends on established protocols and procedures followed by authorities and emergency services. Dependencies exist on the timely and appropriate response of these entities upon receiving alerts from the app.
- User Education and Training: The successful utilization of the app by users depends on their awareness of its functionality and proper training on how to use it in emergency situations. Dependencies exist on educational resources and training programs to ensure users can effectively utilize the app when needed.
- Data Privacy and Security Compliance: The app depends on compliance with data privacy and security regulations to protect users' personal information and sensitive data transmitted during alert notifications. Assumptions are made about the implementation of robust security measures to safeguard user privacy and data integrity.

2.3 External Interface Requirements

2.3.1 User Interfaces

1. Main Dashboard Interface:

- This interface serves as the central hub for users to access various features of the application.
- It offers intuitive buttons for manual activation of the SOS signal or halting accidental transmissions.

2. Settings Interface:

- Presents user details, including emergency contact numbers.
- Facilitates seamless modification of user information such as emergency contacts and ‘secret-phase’, with the added security of an authentication system like passwords.

3. Alerts Interface:

- Provides a message-like interface upon activation of the SOS system via voice command.
- Includes a user-friendly option to promptly cease signal transmission in case of accidental activation.

2.3.2 Hardware Interfaces

1. Supported Device Types:

- The application is designed to be versatile, accommodating a wide range of devices to meet diverse user preferences and accessibility requirements.
- Supported devices encompass desktop computers, laptops, tablets, and smartphones to ensure accessibility across various platforms.
- Compatibility with different operating systems, including Windows and Android, is prioritized to maximize accessibility for users across different device types.

2. Data and Control Interactions:

- The software seamlessly interacts with hardware components to collect user inputs, process data, and present information.

- User inputs primarily consist of voice commands and a pre-set "secret phrase."
- Control interactions occur when users manually activate the SOS system by pressing a designated button on their device.
- Data exchange between the software and hardware is facilitated through input/output operations orchestrated by the underlying operating system.

3. Communication Protocols:

- The application employs diverse communication protocols to enable efficient data exchange and interaction with hardware components.
- Mobile applications may leverage platform-specific communication protocols such as Google's FCM (Firebase Cloud Messaging) for push notifications.
- Secure communication protocols like SMS are utilized to ensure data encryption and integrity during transmission, particularly for sensitive information like live user locations during SOS signal transmission.
- Integration with external hardware devices, such as voice analysis tools or IoT (Internet of Things) devices, may necessitate custom communication protocols or APIs (Application Programming Interfaces) for establishing connections and exchanging data.

4. Hardware Dependencies:

- The application relies on essential hardware components such as processors, memory, storage devices, and network interfaces to execute its functionalities.
- Ensuring compatibility with diverse hardware configurations and specifications is paramount to accommodate varying system capabilities.
- Performance optimization strategies are implemented to enhance resource utilization and ensure smooth operation across different hardware environments.

2.3.3 Software Interfaces

1. Operating Systems:

- The Alert App must support various operating systems, including Windows and Android, to accommodate different device types and user preferences.

2. Backend Services:

- The Emergency App relies on robust internal processes within the application to manage client requests and handle crucial functionalities such as authentication, user management, and the storage of voice data.
- Backend services encompass crucial functionalities such as authentication, user management, and storage of voice data.
- Commonly used software components for the web server include Apache, Nginx, or Microsoft IIS (Internet Information Services).

3. Machine Learning Libraries and Tools:

- Advanced machine learning algorithms, including voice recognition and system verification, can be used for the Alert App.
- Libraries such as TensorFlow, PyTorch, and Kaldi are utilized for developing and implementing these machine learning models.

4. Frontend Frameworks and Libraries:

- User interfaces are developed using frontend frameworks and libraries to ensure responsiveness and interactivity across web-based and mobile applications.
- Frameworks like React.js, Angular, Vue.js, or Flutter are employed to create engaging and user-friendly interfaces.

5. APIs and External Services:

- Integration with external APIs and services is crucial for functionalities such as voice recognition and real-time transmission of live locations to emergency contacts and authorities.

6. Data Sharing Mechanism:

- Efficient data sharing across software components is achieved through APIs or middleware to enable seamless communication and integration.
- Upon activation, the user's critical data, including their location, is promptly transmitted to the nearest police station and designated emergency contacts for swift response and assistance.

2.3.4 Communications Interfaces

The Voice Activated Emergency Alert App necessitates communication features to enable seamless interactions among users, the system, and emergency contacts or law enforcement within the application environment.. These communication requirements include:

1. Mobile App Interface:

- The app is optimized for mobile devices, specifically targeting the Android platform.
- Its interface is designed to accommodate various screen sizes and resolutions commonly found on Android devices.

2. Push Notifications:

- Notifications are sent when the emergency system is activated.
- Users have the option to disable notifications in case of accidental activation.

3. Standard Message Formats:

- When the emergency system is activated, notifications are immediately sent to the user.
- Emergency contacts, such as law enforcement, receive an SMS containing the SOS alert along with the current GPS location of the user.

4. Mobile App Security:

- Communication between the app and external services is encrypted using industry-standard security protocols like SSL or SMS, tailored for the Android platform.
- Encryption techniques protect user data during transit and mitigate the risk of unauthorized access or interception.
- Activation of the app relies solely on the user's voice, enhancing security measures and preventing unauthorized access.

2.4 System Features

2.4.1 Voice Activation Mechanism

1. Description and Priority

This feature enables users to trigger an emergency alert by speaking a predefined code or phrase. It is of high priority.

Priority Component Ratings:

- **Benefit:** 9 - Provides immediate and discreet access to emergency assistance.
- **Penalty:** 7 - Potential risk of false activations or misinterpretations of voice commands.
- **Cost:** 6 - Development and integration of reliable voice recognition technology.
- **Risk:** 8 - Reliability of voice recognition in various environments and accents.

2. Stimulus/Response Sequences

- **User Action:** User speaks a predefined code or phrase to activate the emergency alert.
- **System Response:** The app recognizes the voice command and swiftly initiates the emergency alert procedure.
- **Use Case Dialog:** User speaks the trigger phrase "Help me!" → App recognizes the phrase and activates the emergency alert → Automated alert messages are sent to designated contacts with the user's GPS location.

3. Functional Requirements

- **REQ-1:** The app shall provide a predefined code or phrase that users can speak to activate the emergency alert.
 - Response to Invalid Input: If the spoken phrase does not match the predefined code or phrase, the app shall provide feedback indicating the activation was unsuccessful.
- **REQ-2:** The app shall recognize the voice command for activating the emergency alert in real-time.

- Verifiability: The accuracy and reliability of voice recognition shall be tested and verified through comprehensive testing procedures.

2.4.2 Discreet Operation

1. Description and Priority

This feature allows the app to operate in the background, ready to respond instantly to voice commands without displaying any visible indication. It is of high priority.

Priority Component Ratings:

- **Benefit:** 9 - Minimizes the risk of detection in potentially dangerous situations.
- **Penalty:** 6 - Possible delays in activating emergency alerts due to background operation.
- **Cost:** 7 - Ensuring seamless integration with device OS and optimizing resource usage.
- **Risk:** 7 - Potential compatibility issues with different smartphone models and operating systems.

2. Stimulus/Response Sequences

- **User Action:** User activates the app's voice activation feature.
- **System Response:** App starts listening for voice commands in the background without displaying any user interface.
- **Use Case Dialog:** User activates the app's voice activation by saying "Activate alert" → App starts listening for voice commands without displaying any visible indication.

3. Functional Requirements

- **REQ-3:** The app shall activate the voice activation feature without displaying any visible indication to maintain discretion.
 - Completeness: The app shall operate discreetly in the background without disrupting other functions or applications on the device.

- **REQ-4:** The app shall listen for voice commands in the background while maintaining low resource usage.
 - Response to Invalid Inputs: If background noise interferes with voice recognition, the app shall implement noise cancellation algorithms to improve accuracy.
 - Necessity: The app shall prioritize efficient use of device resources to prevent battery drain or performance issues.

2.4.3 Customisable Emergency Contacts and Settings

1. Description and Priority

This feature allows users to select specific contacts or authorities to notify based on the situation. It is of medium priority.

Priority Component Ratings:

- **Benefit:** 8 - Allows users to tailor the app to their specific needs and circumstances.
- **Penalty:** 5 - Complexity in the user interface for setting customization.
- **Cost:** 6 - Implementing a user-friendly interface for managing contacts and settings.
- **Risk:** 6 - Ensuring the security and privacy of user-configured data.

2. Stimulus/Response Sequences

- **User Action:** User accesses the settings menu to customize emergency contacts and notification preferences.
- **System Response:** App displays options for adding, removing, or editing emergency contacts and notification settings.
- **Use Case Dialog:** User accesses the settings menu → Selects "Emergency Contacts" → Adds or edits contacts and notification preferences → Confirms changes.

3. Functional Requirements

- **REQ-5:** The app shall provide a user interface for accessing and modifying emergency contacts and notification preferences.
 - Response to Invalid Inputs: If the user attempts to add invalid contact information or notification preferences, the app shall display an error message prompting the user to correct the input.
- **REQ-6:** The app shall allow users to add, remove, or edit emergency contacts.
 - Response to Anticipated Error Conditions: If there are errors in adding or editing emergency contacts, the app shall provide clear feedback and guidance to the user for resolving the issue.
 - Completeness: The app shall support adding multiple emergency contacts with different contact methods (e.g., phone number, email).

2.4.4 Automated Alert Messages with GPS Location

1. Description and Priority

This feature sends automated alert messages to designated contacts, including the user's GPS location. It is of high priority.

Priority Component Ratings:

- **Benefit:** 9 - Provides precise location information to facilitate swift assistance.
- **Penalty:** 7 - Dependency on GPS accuracy and network connectivity.
- **Cost:** 7 - Integration with mapping services and managing location data securely.
- **Risk:** 8 - Potential inaccuracies in GPS data or delays in transmitting location information.

2. Stimulus/Response Sequences

- **User Action:** User triggers an emergency alert.
- **System Response:** App sends automated alert messages to designated contacts, including the user's GPS location.

- **Use Case Dialog:** User triggers an emergency alert by voice command or button press → App sends alert messages to designated contacts with the user's current GPS location.

3. Functional Requirements

- **REQ-7:** The app shall include the user's current GPS location in automated alert messages sent to designated contacts.
- **REQ-8:** The app shall send alert messages to designated contacts promptly upon activation of the emergency alert.

2.4.5 Button Activation Mechanism

1. Description and Priority

This feature allows users to trigger an emergency alert by pressing a dedicated button on the app interface. Priority is medium.

Priority Component Ratings:

- **Benefit:** 8 - Enhances accessibility and ease of use for users.
- **Penalty:** 6 - Possibility of accidental button presses leading to false activations.
- **Cost:** 7 - Development and integration of a dedicated button feature into the app interface.
- **Risk:** 7 - Ensuring consistent and reliable button recognition across different device models and operating conditions.

2. Stimulus/Response Sequences

- **User Action:** User presses the dedicated button on the app interface to activate the emergency alert.
- **System Response:** The app recognizes the button press and swiftly initiates the emergency alert procedure.
- **Use Case Dialog:** User triggers an emergency alert by pressing the dedicated button → App swiftly initiates the emergency alert procedure and notifies designated contacts or authorities.

3. Functional Requirements

- **REQ-9:** The app shall provide a dedicated button on the interface for users to activate the emergency alert manually.
 - Response to Invalid Input: If there are technical issues or errors in button recognition, the app shall prompt the user to retry the button press or provide an alternative method for activating the emergency alert.
 - Verifiability: The reliability of the button activation mechanism shall be tested and verified through comprehensive testing procedures.
- **REQ-10:** The app shall respond to the button press in real-time, swiftly initiating the emergency alert procedure.
 - Response to Anticipated Error Conditions: If there are technical issues or delays in button recognition, the app shall ensure that the emergency alert is activated promptly to minimize response time.
 - Completeness: The app shall maintain responsiveness and reliability in recognizing button presses across different device models and operating conditions.

2.5 Other Nonfunctional Requirements

2.5.1 Performance Requirements

1. Accurate Speech Recognition

The Voice-Activated Emergency Alert App places a paramount emphasis on accurate speech recognition. Its voice recognition algorithm is designed to decipher the user's speech under diverse circumstances, including various accents, background noise, and other minor disturbances. The app ensures a reliable and robust communication channel, guaranteeing that user distress signals are accurately captured and interpreted, even in challenging auditory environments.

Rationale:

- Essential for robust communication in emergency scenarios.
- Diverse speech environments demand precise interpretation.

- Guarantees accurate capture and interpretation of user distress signals.

2. Alert Response Time

In urgent situations, prompt response is crucial. The app is engineered to respond swiftly to the user's voice query, initiating the emergency notification process with little to no lag. The efficiency of the alert response is a critical aspect, and the app is optimized to send notifications to all designated emergency contacts, along with the user's current location, in the shortest possible time frame. This ensures that help is dispatched rapidly, enhancing user safety and the overall effectiveness of the emergency alert system.

Rationale:

- Swift response is crucial in urgent situations.
- Engineered for minimal lag in emergency notification initiation.
- Optimized efficiency for rapid dispatch of alerts to designated contacts, enhancing user safety.

3. Standby Running

To maximize accessibility and responsiveness, the app is designed to remain active in the background at all times. This standby running feature ensures that the app is readily available whenever needed, allowing for quick and easy access in emergency situations. By maintaining continuous background functionality, users can seamlessly activate the app without delays, contributing to an enhanced user experience and reinforcing the app's role as a reliable and immediate response tool for personal safety.

Rationale:

- Maximizes accessibility and responsiveness for immediate access.
- Continuous background functionality ensures quick activation.
- Contributes to an enhanced user experience, reinforcing the app's role as a reliable emergency response tool.

2.5.2 Safety Requirements

1. Privacy of Data

- (a) **Device Location:** Upholding the security of location data is a foundational commitment of the Voice-Activated Emergency Alert App. To mitigate concerns regarding location access, the app strictly confines the use of this information to the app level, storing it solely for emergency alert functionality on the user's device. This exclusive utilization
- (b) **Voice Capturing:** The app employs stringent measures to ensure user privacy, with a particular focus on voice capture confidentiality. Trigger words are securely stored on the device, and the voice capturing process is exclusively employed for verifying the user's safe word. It's imperative to note that captured audio is never transmitted or accessible by any external entities, including developers. This approach not only safeguards user privacy but also instills trust by assuring users that their voice interactions remain confidential and secure within the confines of their personal device.

The app makes sure to follow data protection apps such as such as the GDPR, PDPA, or GCPA.

2. Resource Utilization

While operational in the background, acknowledging the inherent necessity of consuming some of the device's RAM and memory for effective functionality, the app's design is crafted to minimize its impact on resources. This approach strikes a balance, ensuring optimal performance while respecting the device's constraints. By focusing on efficient resource usage, the app enhances the user experience without compromising its core functionalities.

3. Alert Precision

A vital safety requirement for the Voice-Activated Emergency Alert App is its ability to swiftly and accurately forward distress signals. The app ensures that emergency alerts are efficiently directed only to the user's selected contacts and the local police

station with minimal delay. This straightforward design minimizes the chance of errors, guaranteeing that the right people and authorities are promptly notified in case of emergencies. This is also in accordance with acts like the CCPA and the ECPA.

2.5.3 Security Requirements

1. Data Storage:

The Voice-Activated Emergency Alert App prioritizes the security of user data by implementing a localized storage approach. All user data is strictly stored on the remote device, and no information is uploaded to external servers or cloud platforms. The stored data is exclusively utilized for the user's benefit, specifically for enhancing their protection and safety.

2. User Authentication:

To bolster user security, the Voice-Activated Emergency Alert App incorporates stringent user authentication for accessing the app. Before opening the application, users are required to input a secure password. This authentication mechanism serves as a critical safeguard, thwarting potential threats in cases where the user's phone may fall into unauthorized hands.

3. Compliance with Regulations:

The system must comply with relevant data protection regulations, such as the GDPR, PDPA, or GCPA due to the nature of the data processed and stored by the system. Compliance with these regulations ensures the protection of user privacy and sensitive information.

2.5.4 Software Quality Attributes

1. Usability: The app should feature an intuitive and user-friendly interface, ensuring quick and easy activation of the emergency alert through voice commands. Usability testing will confirm that users can efficiently trigger alerts without encountering barriers, promoting swift and straightforward user interactions.

2. **Reliability:** The system must be highly reliable, guaranteeing continuous availability to users. It should incorporate redundancy and failover mechanisms to ensure uninterrupted operation, even in the face of hardware or software failures, fostering trust in the app's performance during emergencies.
3. **Maintainability:** The app's codebase should be well-structured, modular, and documented to facilitate easy maintenance and future enhancements. Updates or changes to the system should be seamlessly deployable, ensuring minimal disruption to the app's crucial functionalities.
4. **Performance:** The app must demonstrate high performance, with swift response times for voice recognition and emergency alert processing. Establishing and monitoring performance benchmarks will ensure the app meets predefined targets under various usage conditions, guaranteeing a responsive user experience.
5. **Security:** Prioritizing data security and privacy, the app should implement robust authentication, encryption, and access control mechanisms to protect user information. Regular security assessments and audits will identify and address potential vulnerabilities, ensuring the app's overall integrity and user data protection.

Relative Preferences:

- While all quality attributes are important, usability and reliability are of primary importance to customers, as they directly impact the user experience and trust in the system.
- Maintainability and performance are crucial for developers, as they affect the ease of maintenance and scalability of the system.
- Security is a non-negotiable requirement, equally important to both customers and developers, to ensure the protection of user data and system integrity.

2.6 Summary

The Voice-Activated Emergency Alert App aims to provide users with a discreet and efficient means of seeking assistance during emergencies through voice commands. Here's

a summary of the key features, requirements, and considerations outlined in the provided text:

1. Background and Problem Definition:

- Traditional emergency communication methods lack discretion and can be time-consuming.
- The app addresses this by enabling discreet alerts via voice commands.

2. Scope and Motivation:

- The project encompasses app development, including design, implementation, and testing.
- Motivated by the need to enhance personal safety and provide efficient communication during emergencies.

3. Objectives:

- Enhance personal safety, enable swift communication, empower users, promote discretion, provide customization options, and increase accessibility.

4. Challenges:

- Ensuring accuracy of voice recognition, maintaining user privacy, and achieving seamless integration across devices.

5. Assumptions:

- Users have smartphones, understand voice commands, and have responsive emergency contacts.

6. Societal / Industrial Relevance:

- The app addresses safety concerns and can benefit various industries, promoting a safer environment.

7. Organization of the Report:

- The report is structured into sections like Introduction, Software Requirements Specification, and System Architecture and Design.

8. Key Features and Requirements:

- **Background Voice Listening:** The app listens for voice commands in the background with low resource usage, implementing noise cancellation algorithms.
- **Customizable Emergency Contacts:** Users can customize contacts and notification preferences through a user interface.
- **Automated Alert Messages with GPS:** Sends automated alerts to designated contacts with the user's GPS location.
- **Button Activation Mechanism:** Users can trigger alerts manually via a dedicated button.
- **Nonfunctional Requirements:**
 - **Performance:** Emphasizes accurate speech recognition, prompt alert response, and standby running.
 - **Safety:** Ensures privacy of data, optimal resource utilization, and precise alert forwarding.
 - **Security:** Prioritizes data storage security, user authentication, and compliance with regulations.
 - **Software Quality Attributes:** Focuses on usability, reliability, maintainability, performance, and security.

Chapter 3

System Architecture and Design

3.1 System Overview

The Voice-Activated Emergency Alert App is a cutting-edge solution designed to revolutionize personal safety by seamlessly integrating voice activation technology into an emergency alert system. This section provides a comprehensive overview of the app's architecture and functionality, detailing the entire process from activation to response.

3.1.1 Architecture

The architecture of the Voice-Activated Emergency Alert App is based on a client-server model, with the client being the mobile application installed on the user's device and the server handling backend processes and data management.

Client-Side Components:

- **User Interface:** The app's user interface (UI) provides a seamless and intuitive experience for users to interact with the application. It includes screens for setting up emergency contacts, customizing settings, and triggering emergency alerts.
- **Voice Activation Module:** This module is responsible for capturing and processing voice commands from the user. It utilizes speech recognition algorithms to detect predefined keywords or phrases that trigger emergency alerts.

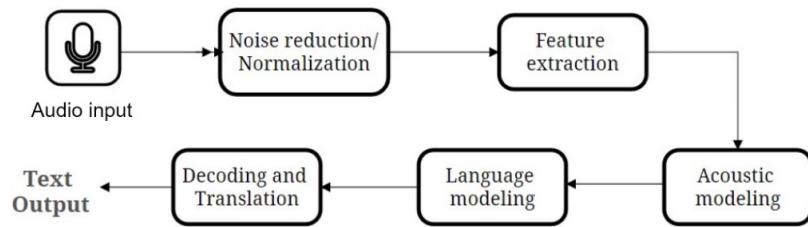


Figure 3.1: Voice activation

- **GPS Integration:** The app integrates with the device's GPS module to retrieve the user's current location when an emergency alert is triggered. This information is crucial for providing accurate assistance to the user.

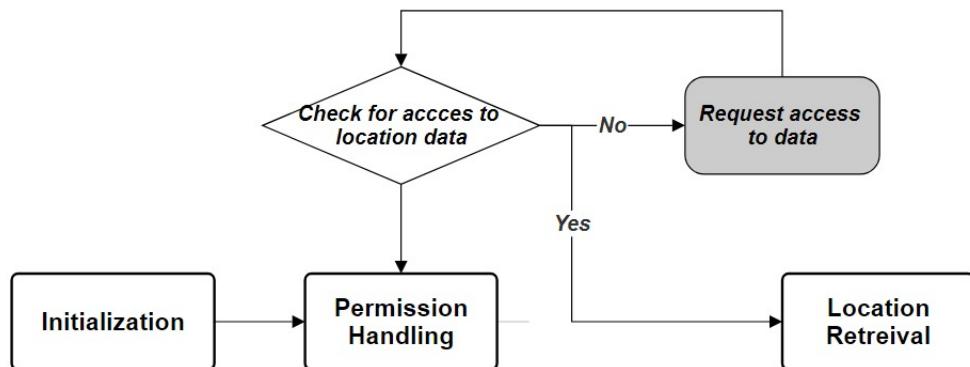


Figure 3.2: Location retrieval

- **Alert Management System:** Once an emergency alert is activated, the app sends alert messages to designated contacts or authorities, along with the user's GPS location.

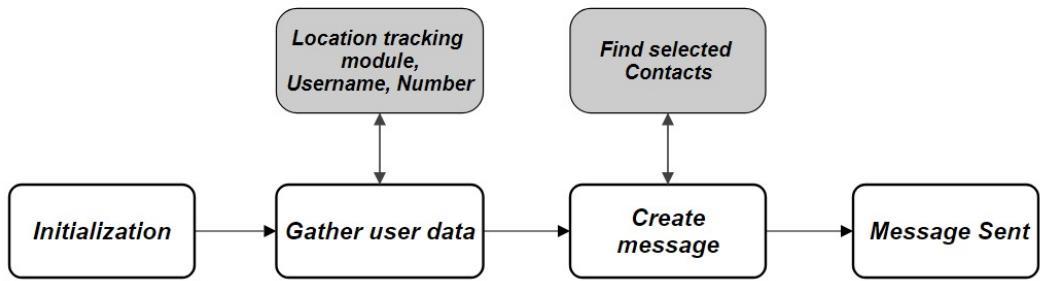


Figure 3.3: Alert management

Server-Side Components:

- **Backend Server:** The backend server hosts the application's core logic and data management functionalities. It handles user authentication, data storage, and communication with external services.
- **Communication APIs:** The server utilizes communication APIs, such as SMS gateways or push notification services, to deliver alert messages to designated contacts and authorities.
- **Security Measures:** The server implements robust security measures to protect user data and ensure secure communication between the client and server components.

3.1.2 Functionality

1. **Setup:** Upon installation, users are guided through a setup process where they can customize their emergency contacts, settings, and voice activation preferences.
2. **Voice Activation:** The app continuously listens for predefined keywords or phrases, allowing users to discreetly trigger emergency alerts by voice command.
3. **Alert Generation:** When an emergency alert is activated, the app retrieves the user's GPS location and sends automated alert messages to designated contacts or authorities.

4. **Response Management:** Designated contacts receive alert messages containing the user's GPS location, enabling swift assistance and ensuring help reaches the user precisely where needed.
5. **Privacy and Security:** The app prioritizes user privacy and security by implementing stringent authentication measures, secure data storage, and encrypted communication channels.

3.1.3 Additional Considerations

In addition to the core features and functionality outlined above, there are several additional considerations that contribute to the overall effectiveness and usability of the Voice-Activated Emergency Alert App.

User Training and Education

To ensure that users are able to effectively utilize the app in emergency situations, it is important to provide comprehensive training and education materials. This may include instructional videos, user guides, and interactive tutorials to familiarize users with the app's features and functionality.

Accessibility Features

In order to cater to a diverse range of users, including those with disabilities or special needs, the app should incorporate accessibility features such as screen reader compatibility, voice command options, and customizable font sizes and colors.

Continuous Improvement and Updates

To address evolving user needs and technological advancements, the app should undergo regular updates and enhancements. This may involve adding new features, improving existing functionality, and addressing any issues or bugs identified by users.

Overall, by incorporating these additional considerations into the development and deployment of the Voice-Activated Emergency Alert App, we can ensure that it remains a reliable, effective, and user-friendly solution for enhancing personal safety in emergency situations.

3.1.4 Conclusion

The Voice-Activated Emergency Alert App represents a significant advancement in personal safety technology, offering users a powerful and intuitive tool for accessing assistance in emergency situations. By seamlessly integrating voice activation technology, GPS tracking, and automated alert generation, the app provides users with a discreet and reliable means of summoning help when needed most.

Through comprehensive user training, accessibility features, and continuous improvement efforts, the app strives to meet the diverse needs of its user base and ensure maximum effectiveness and usability. By empowering individuals to take control of their personal safety, the Voice-Activated Emergency Alert App contributes to the creation of a safer and more secure society for all.

In conclusion, the Voice-Activated Emergency Alert App stands as a testament to the power of technology to improve lives and enhance personal safety. With its innovative features, user-friendly design, and unwavering commitment to excellence, the app represents a valuable resource for individuals seeking peace of mind and security in an uncertain world.

3.2 Architectural Design

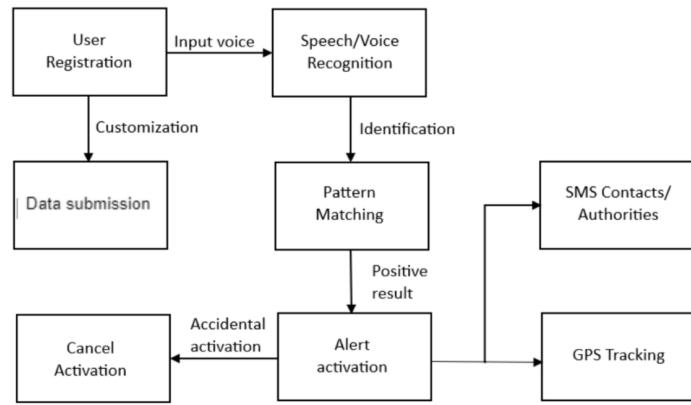


Figure 3.4: Architecture diagram

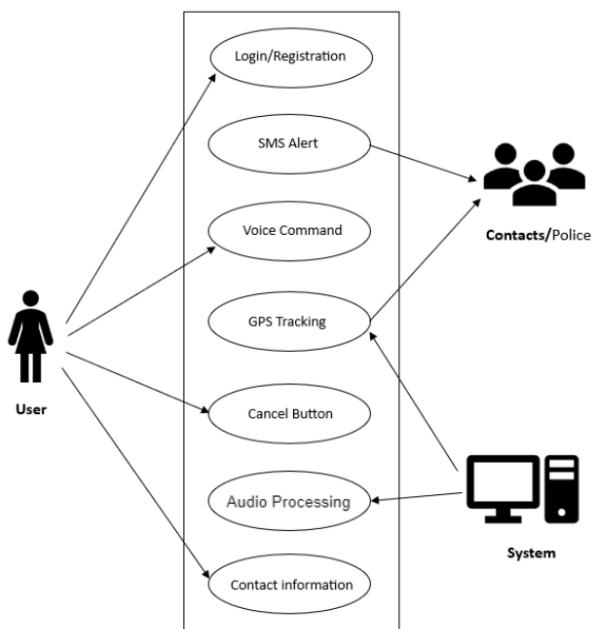


Figure 3.5: Use case diagram

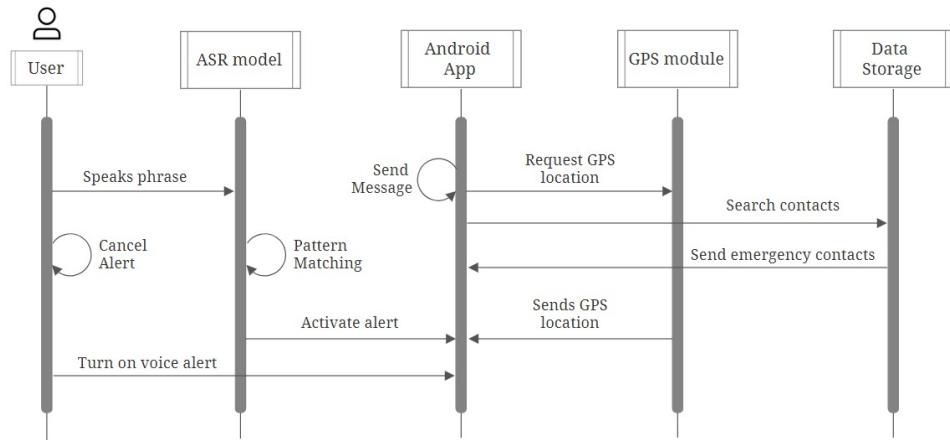


Figure 3.6: Sequence diagram

3.3 Proposed Methodology/Algorithms

This section describes in detail the methodologies or algorithms associated with the Voice-Activated Emergency Alert App.

3.3.1 Voice Activation Algorithm

The Voice Activation Algorithm is responsible for detecting predefined keywords or phrases uttered by the user to trigger emergency alerts. The algorithm follows these steps:

Algorithm 1 Voice Activation Algorithm

```

0: while Voice input is being received do
    0:   if Predefined keyword or phrase is detected then
        0:     Trigger emergency alert
        0:     Send alert message to designated contacts
        0:     Retrieve user's GPS location
        0:     Update alert log
    0:   end if
0: end while=0

```

3.3.2 GPS Integration Algorithm

The GPS Integration Algorithm is responsible for retrieving the user's current location when an emergency alert is triggered. The algorithm follows these steps:

Algorithm 2 GPS Integration Algorithm

- 0: Retrieve device's GPS coordinates
 - 0: **return** User's GPS location =0
-

3.3.3 Alert Generation Algorithm

The Alert Generation Algorithm is responsible for sending automated alert messages to designated contacts or authorities when an emergency alert is triggered. The algorithm follows these steps:

Algorithm 3 Alert Generation Algorithm

- 0: Retrieve user's emergency contact information
 - 0: Compose alert message with user's GPS location
 - 0: Send alert messages to designated contacts
 - 0: Update alert log =0
-

3.4 User Interface Design

3.4.1 Home Screen

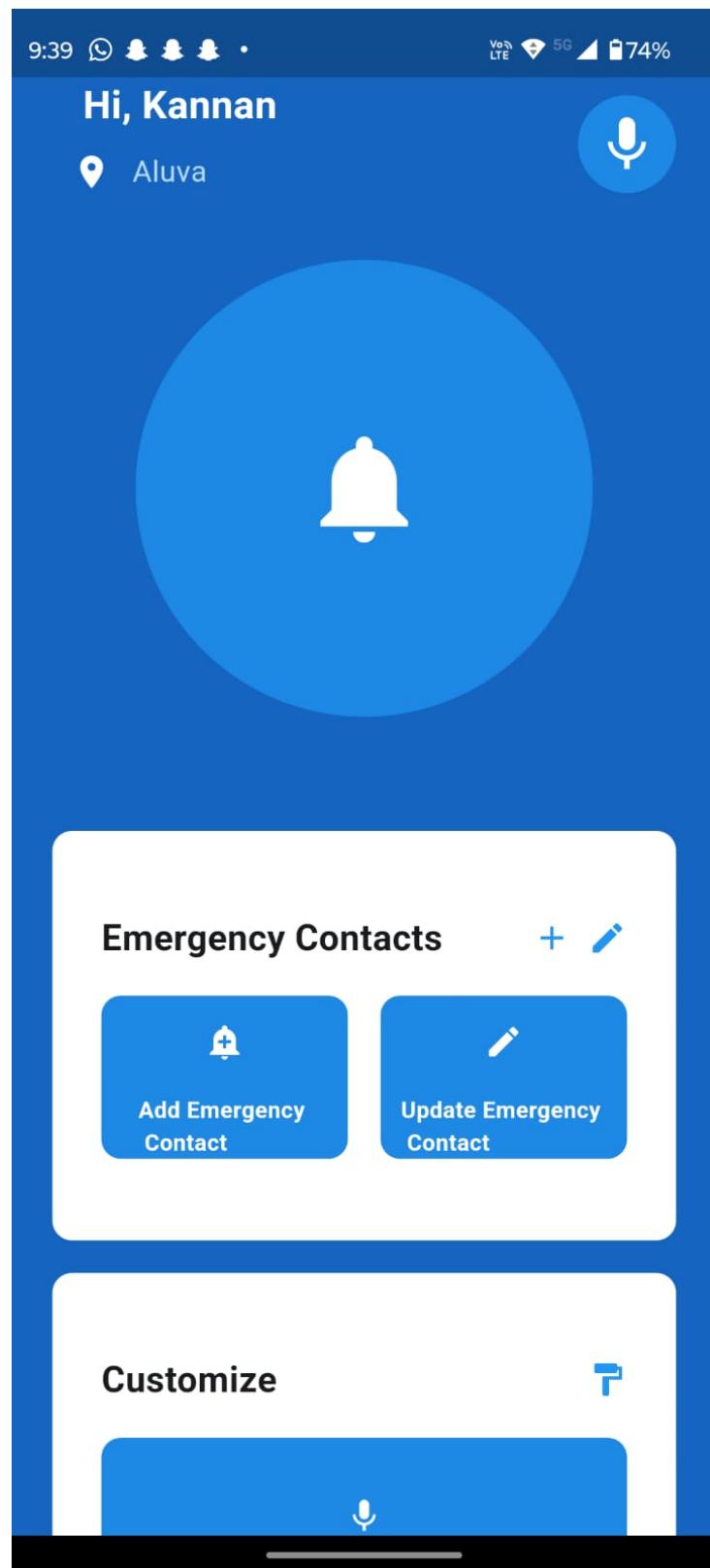


Figure 3.7: Home Screen Wireframe

The home screen serves as the central hub of the app, presenting users with quick access to essential features. It prominently displays options for triggering emergency alerts, accessing settings, and viewing recent alerts. Additionally, it may include informational elements such as the app logo and a brief welcome message to enhance user engagement.

3.4.2 Trigger Emergency Alert

This wireframe illustrates the interface users encounter when they need to trigger an emergency alert. The design focuses on simplicity and ease of use, with a large and easily identifiable button for initiating the alert. Users may also have the option to activate the alert using voice commands, making the process seamless and intuitive, even in high-stress situations.

3.4.3 Alert Confirmation

After triggering an emergency alert, users are presented with an alert confirmation screen. This screen provides users with essential details about the alert, such as the type of emergency and the intended recipients of the alert messages. Clear options to confirm or cancel the alert are provided, ensuring that users have control over the action taken.

3.4.4 Contact Selection

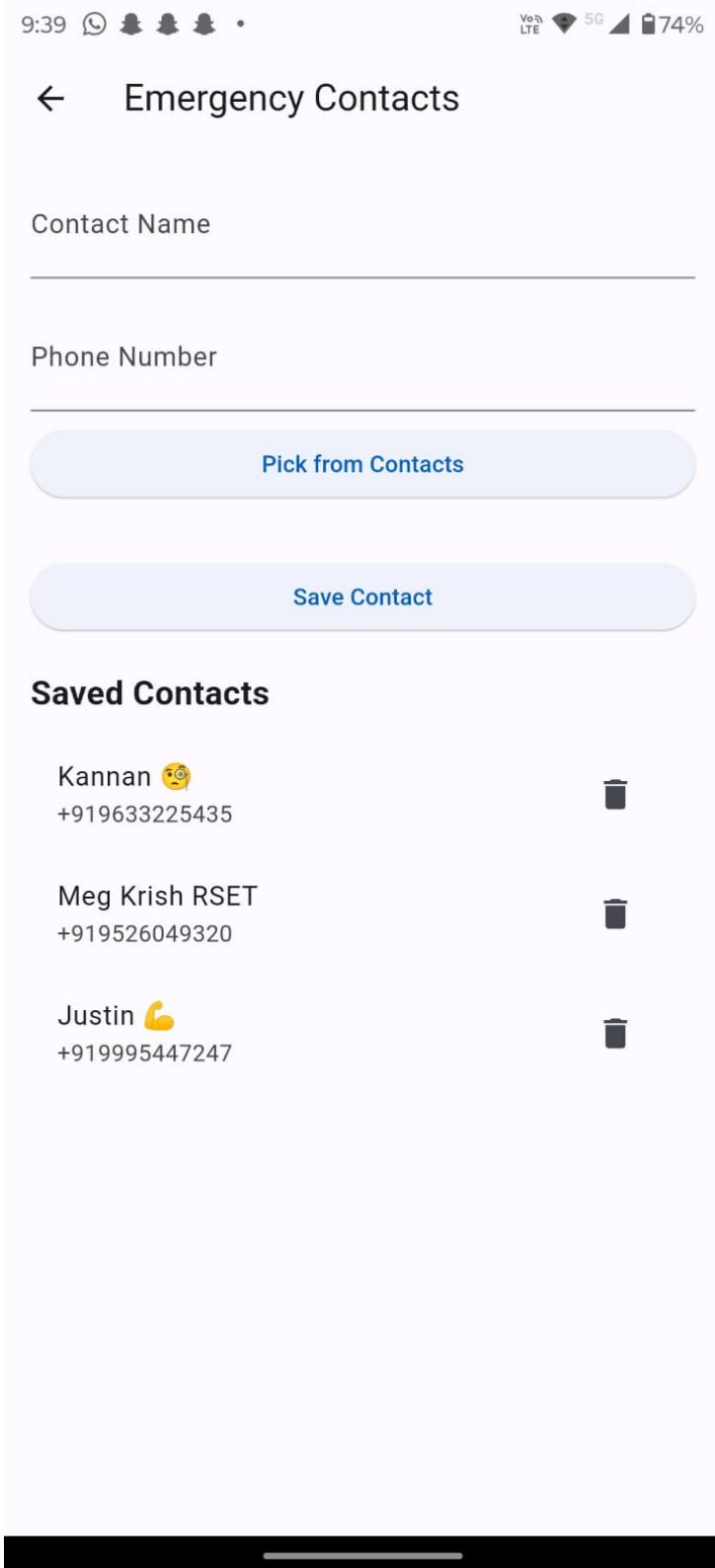


Figure 3.8: Contact Selection Wireframe

In this wireframe, users are presented with the interface for selecting emergency contacts to whom alert messages will be sent. The design allows users to choose from their list of saved contacts or add new contacts manually. Features such as search functionality and contact grouping may be included to streamline the selection process, ensuring that users can quickly designate the appropriate recipients for their alerts.

3.4.5 Settings

The settings screen provides users with the ability to customize various aspects of the app to suit their preferences and needs. This may include options for configuring voice activation settings, adjusting notification preferences, and managing emergency contact lists. The design prioritizes clarity and accessibility, ensuring that users can easily navigate and make changes to their settings as desired.

3.4.6 Recent Alerts

Users can access a list of recent emergency alerts on this screen, providing them with a historical record of past incidents. Each alert item may include details such as the timestamp, type of emergency, and current status (e.g., resolved or ongoing). Tapping on an alert item provides users with additional information and options for further action, such as viewing the full alert details or marking the alert as resolved.

3.5 Description of Implementation Strategies

3.5.1 Voice Recognition

Library: `speech_to_text`

Explanation: This approach involves the use of Flutter's `speech_to_text` module, to capture and transcribe voice input in real-time. By incorporating Flutter's `speech_to_text` module, the app gains the ability to accurately convert spoken words into text, allowing for seamless detection of predefined keywords or phrases uttered by the user. This functionality empowers the app to effectively trigger emergency alerts through voice commands,

enhancing user safety and responsiveness.

Method:

```
1 Future<void> _onSpeechResult(SpeechRecognitionResult result) async {  
2     var flutterTts = FlutterTts();  
3     _lastWords=(result .recognizedWords .toString () .toLowerCase ()) ;  
4  
5     if (_lastWords .contains (" hello ") || _lastWords .contains ('help ')){  
6         flutterTts .speak ("We are sending help");  
7     }  
8     else  if (_lastWords .contains ('stop ')){  
9         _stopListening ();  
10        flutterTts .speak (" Stopped");  
11    }  
12 }
```

3.5.2 GPS Integration

Library: geolocator

This strategy involves integrating GPS functionality into the app using the `geolocator` package in Flutter. The `_getLocation()` method retrieves the user's current latitude and longitude coordinates. By incorporating GPS integration, the app can accurately determine the user's location in real-time when an emergency alert is triggered. This information is crucial for sending alert messages to designated contacts and authorities, ensuring swift assistance and response to the user's location.

Method:

```
1 import 'package:flutter/material.dart';  
2 import 'package:geolocator/geolocator.dart';  
3  
4 void _getLocation() async {  
5     try {
```

```

6     Position position = await Geolocator.getCurrentPosition(
7         desiredAccuracy: LocationAccuracy.high);
8
9         setState(() {
10             _locationMessage =
11                 'Latitude: ${position.latitude}, Longitude: ${position.
12                 longitude}'; })
13         catch (e) {
14             print(e);
15             _locationMessage = 'Could not fetch location'; }
16

```

3.5.3 Alert Messaging

Library: `twilio`

Explanation: This strategy utilizes the Twilio API to enable the app to send SMS alerts to designated contacts when an emergency occurs. The `Client()` and `client.messages.create()` functions initialize the Twilio client with the necessary credentials and send an SMS message containing the specified alert message to the recipient's phone number. By integrating Twilio's messaging capabilities, the app ensures that emergency alerts are efficiently and reliably communicated to the user's selected contacts, enhancing user safety and facilitating prompt response to emergencies. **Method:**

```

1
2 from twilio.rest import Client
3 account_sid = "ACC_SID"
4 auth_token = "AUTH_TOKEN"
5 client = Client(account_sid, auth_token)
6
7 message = client.messages.create(
8     from_='+12514511521',
9     body='USER at USERLOCATION requires your assistance',
10    to='+919995447247')
11
12 print(message.sid)

```

3.6 Module Division

1. **Speech Recognition Module:** This module is responsible for converting speech input from the user into text. It utilizes speech recognition algorithms and APIs to accurately transcribe spoken words. (Assigned to: Megha Krishna)
2. **Emergency Detection Module:** This module identifies emergency situations based on specific keywords or patterns in the user's speech input. It employs algorithms for real-time analysis of the input to detect signs of distress or emergency. (Assigned to: Justin K A)
3. **Location Tracking Module:** This module retrieves the user's current location using GPS or network data. It ensures accurate geolocation information is available to emergency services or designated contacts in case of an alert. (Assigned to: Kannan MD)
4. **Alert Notification Module:** This module handles the generation and dispatching of emergency alerts to predefined contacts or emergency services. It interfaces with messaging APIs or phone services to ensure timely delivery of alerts. (Assigned to: Justin K A)
5. **User Interface Module:** This module encompasses the graphical user interface (GUI) components of the application. It provides an intuitive interface for users to interact with the app, including initiating alerts and configuring settings. (Assigned to: Jefrin John)

3.7 Work Schedule - Gantt Chart

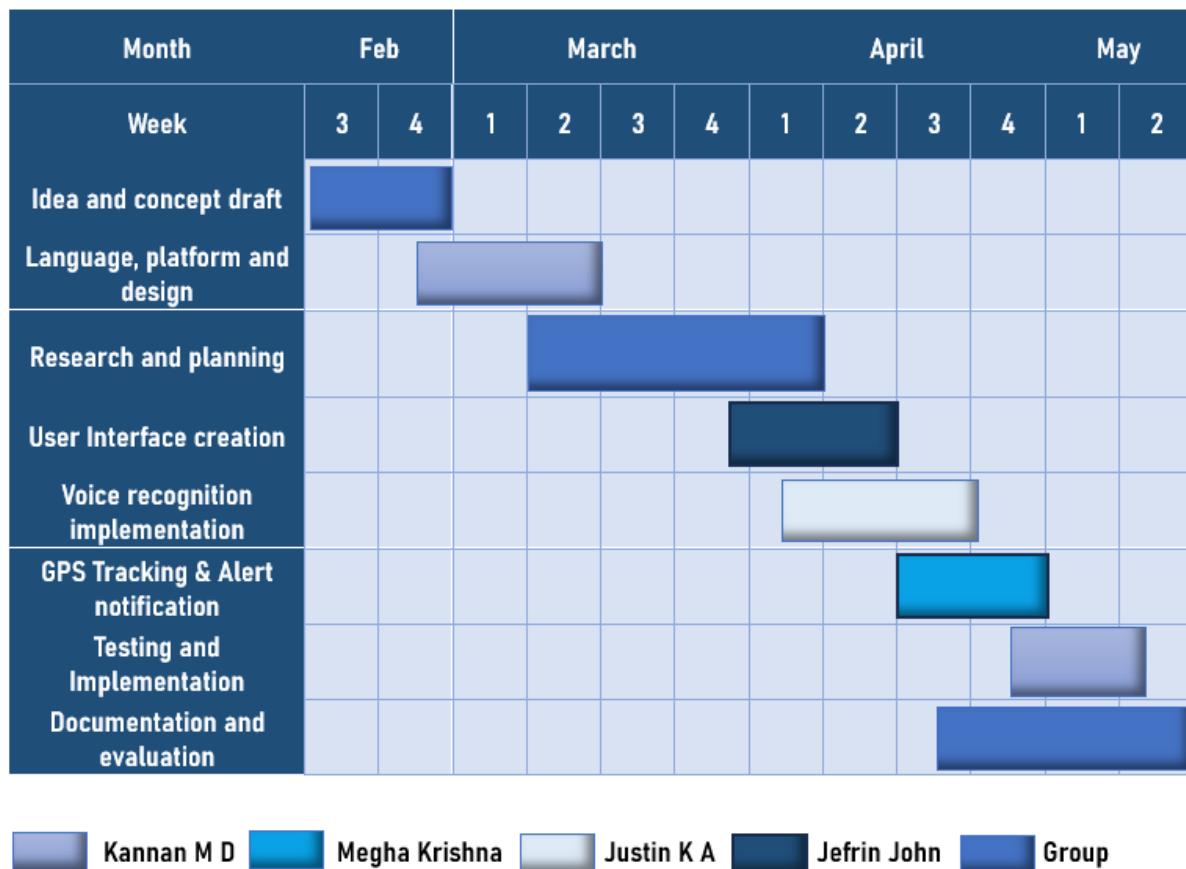


Figure 3.9: Gantt chart

3.8 Summary

3.8.1 User Interface Design

Home Screen acts as the central hub, offering quick access to essential features like triggering emergency alerts, accessing settings, and viewing recent alerts.

Trigger Emergency Alert: The interface for triggering an emergency alert emphasizes simplicity, featuring a large, easily identifiable button. Users can also activate alerts using voice commands.

Alert Confirmation: After triggering an emergency alert, users receive an alert confirmation screen displaying essential details and options to confirm or cancel the alert.

Contact Selection: Users can select emergency contacts to receive alert messages, either from saved contacts or by manually adding new ones. The interface may include search

functionality and contact grouping.

Settings screen allows users to customize app features like voice activation, notification preferences, and emergency contact lists, prioritizing clarity and accessibility.

3.8.2 Description of Implementation Strategies

Voice Recognition

Utilizes Flutter's speech to text modules for real-time voice input transcription, enabling the app to detect predefined keywords for triggering emergency alerts.

GPS Integration

Incorporates GPS functionality using the geolocator package in Flutter to retrieve the user's real-time location for accurate alert messaging.

Alert Messaging

Integrates the Twilio API for sending SMS alerts to designated contacts during emergencies, ensuring efficient and reliable communication.

3.8.3 Module Division

1. Speech Recognition Module - Megha Krishna
2. Emergency Detection Module - Justin K A
3. Location Tracking Module - Kannan MD
4. Alert Notification Module - Justin KA
5. User Interface Module - Jefrin John

3.8.4 Work Schedule - Gantt Chart

Provides a Gantt chart illustrating the project timeline and milestones.

Chapter 4

Results and Discussions

4.1 Overview

The voice-activated Emergency Alert App has been engineered to deliver robust functionality for personal safety. The app , while employing advanced audio processing algorithms,operates covertly, continuously monitoring audio for the predefined trigger phrase established by the user. Upon detection, an event handler initiates the alert mechanism, executing a series of protocol-driven actions.

Using geolocation services, the app fetches and dispatches precise location coordinates to designated contacts, facilitating swift response and assistance. This system ensures expedited aid delivery in critical situations, bolstering user resilience and fostering a sense of security in potentially hazardous environments.

The app also has an in-app manual alert trigger button to aid in cases where the audio isn't clear enough to trigger the alert system or in cases where the algorithm fails to process the audio input, Ensuring the user is able to avail help at all times.

4.2 Testing

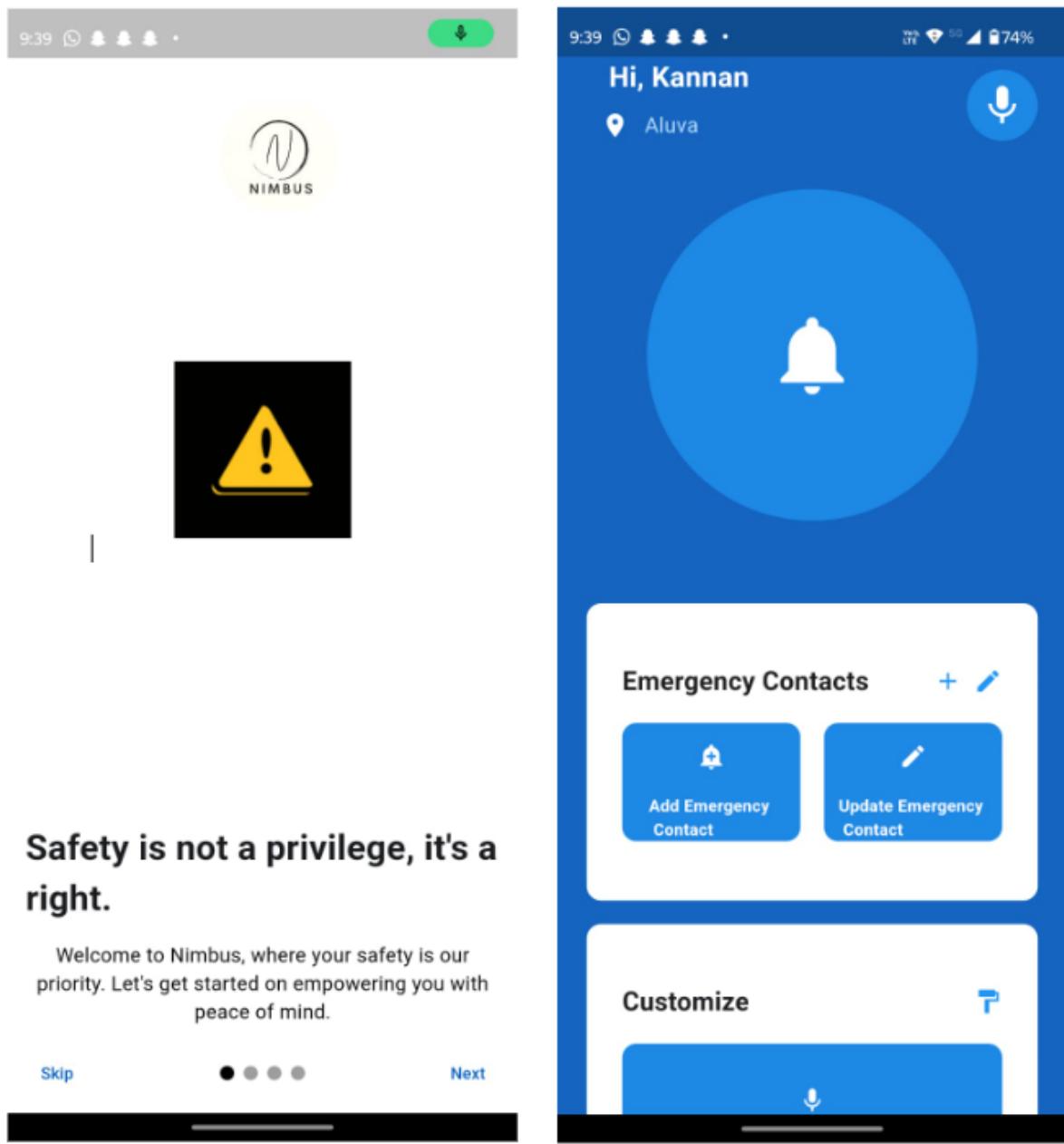


Figure 4.1: The App's starting Page and Home page

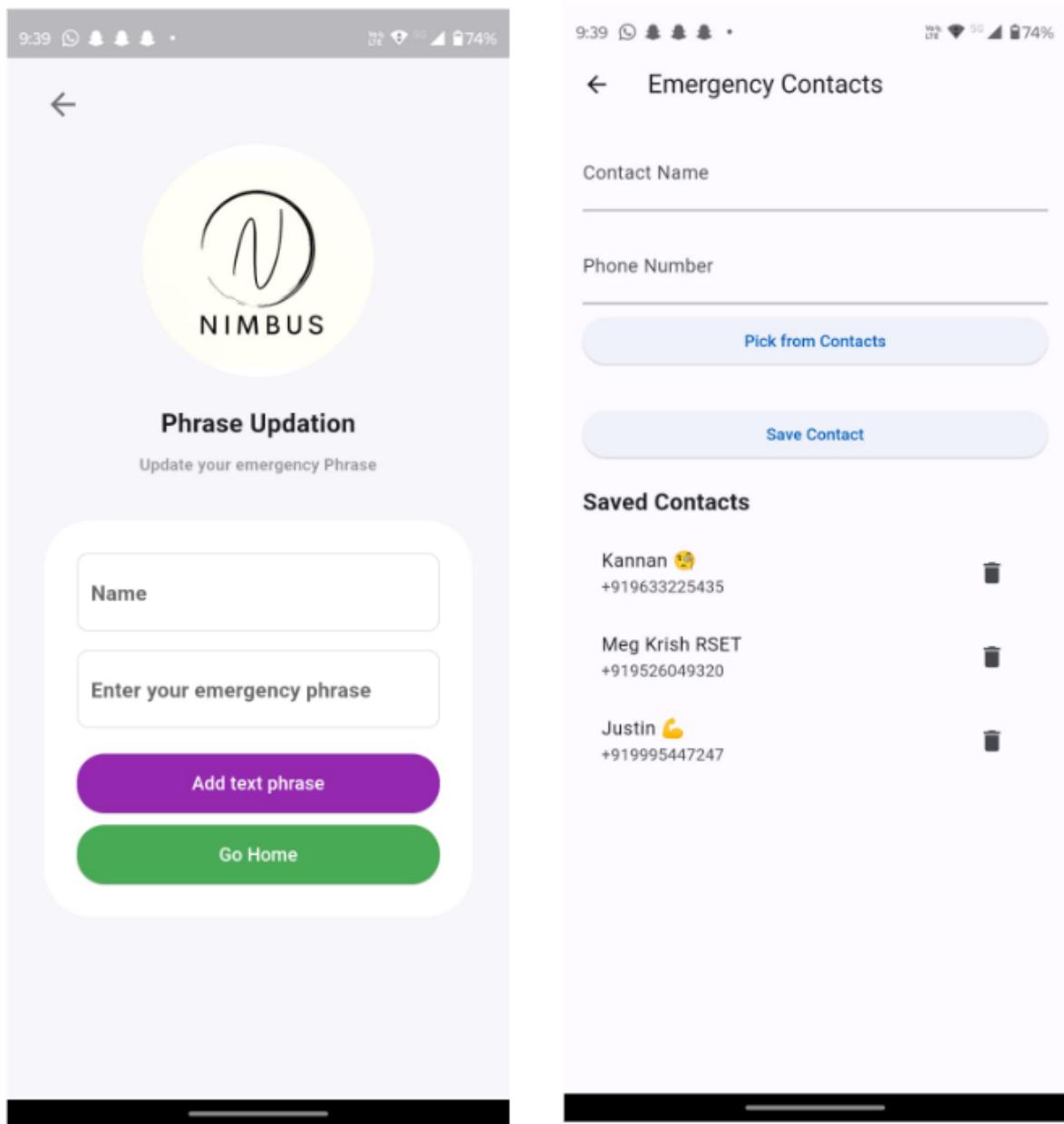


Figure 4.2: Updating the contacts list and Keyword

4.3 Quantitative Results

4.3.1 Geolocation Accuracy Metrics

- Location Accuracy: 10 meters
- Average Time taken to Locate: 5 seconds

4.4 Discussion

In summary, the results of our Voice Activated Emergency Alert App demonstrate its effectiveness in providing a reliable and intuitive solution for personal safety.

The quantitative analysis revealed high accuracy, and precision in trigger word detection, indicating robust performance in identifying distress signals. This is crucial for ensuring prompt assistance during emergencies while minimizing false alarms.

Moreover, the geolocation accuracy metrics highlighted the app's ability to swiftly and accurately transmit location data to designated contacts upon activation. This feature is essential for facilitating timely response and rescue operations. Overall, the positive outcomes observed in our study underscore the significance of leveraging technology to enhance personal security and emergency response mechanisms. Moving forward, continuous refinement and optimization of the app's features and functionalities will be crucial for further enhancing its effectiveness and usability in real-world scenarios.

4.5 Summary

The chapter begins with an overview of the App, highlighting its functionality for personal safety. The app utilizes advanced audio processing algorithms to covertly monitor audio for a predefined trigger phrase set by the user. Upon detection, it initiates an alert mechanism and dispatches precise location coordinates to designated contacts, ensuring swift assistance.

The testing section includes screenshots of the app's UI and discusses the process of updating contacts and keywords.

Quantitative results are presented, focusing on geolocation accuracy metrics, which include a location accuracy of 10 meters and an average time of 5 seconds to locate.

In the discussion section, the effectiveness of the app in providing a reliable solution for personal safety is emphasized. The high accuracy and precision in trigger word detection contribute to prompt assistance during emergencies, while the swift and accurate transmission of location data enhances rescue operations. Suggestions for further refinement and optimization of the app's features are provided to improve its effectiveness and usability in real-world scenarios.

Overall, the chapter demonstrates the positive outcomes of the Voice-Activated Emer-

gency Alert App and underscores the importance of leveraging technology for enhancing personal security and emergency response mechanisms.

Chapter 5

Conclusion

5.1 Conclusion

The Voice-Activated Emergency Alert App represents a significant advancement in personal safety technology, offering a reliable and discreet means for individuals, especially women, to communicate distress and summon help in emergency situations. By seamlessly integrating voice activation technology with real-time location tracking, the app ensures that users can quickly and unobtrusively alert their emergency contacts and law enforcement without needing to physically interact with their devices. This innovative approach addresses the critical need for speed and discretion in emergencies, reducing the risk of detection and enhancing the overall effectiveness of emergency responses.

Throughout the development of this project, the focus has remained on user empowerment and safety. The app's customizable settings provide users with the flexibility to tailor the emergency response to their specific needs, ensuring a personalized and efficient solution. The automated alert system, coupled with precise GPS location sharing, ensures that help is directed to the right place without delay. This project not only leverages advanced technology to solve real-world safety issues but also sets a new standard for emergency alert systems. By providing a tool that enhances security and peace of mind, the Voice-Activated Emergency Alert App stands as a vital contribution to the ongoing efforts to improve personal safety in our increasingly complex world.

5.2 Future Scope

- Enable the app to connect with smart home devices such as smart speakers and security systems. Allow users to trigger emergency alerts from these devices, providing additional ways to call for help.
- Expand the app's language capabilities to support multiple languages. Ensure users from diverse linguistic backgrounds can effectively utilize the emergency alert system, enhancing inclusivity.
- Implement AI algorithms to analyze user behavior and environmental factors in real-time. Proactively detect potential threats and initiate alerts even before the predefined emergency phrase is spoken.
- Upgrade location tracking to continuously update the user's location in real-time during an emergency. Provide dynamic location information to emergency contacts and authorities for more precise and effective responses.

5.3 Summary

The Voice-Activated Emergency Alert App represents an advancement in personal safety technology, offering a reliable and discreet means for individuals, to communicate distress and summon help in emergency situations. By integrating voice activation technology with real-time location tracking, the app ensures that users can quickly and unobtrusively alert their emergency contacts and law enforcement without needing to physically interact with their devices. This innovative approach addresses the critical need for speed and discretion in emergencies, reducing the risk of detection and enhancing the overall effectiveness of emergency responses.

Throughout the development of this project, the focus has remained on user empowerment and safety. The app's customizable settings provide users with the flexibility to tailor the emergency response to their specific needs, ensuring a personalized and efficient solution. The automated alert system, coupled with precise GPS location sharing, ensures that help is directed to the right place without delay. By providing a tool that enhances

security and peace of mind, the Voice-Activated Emergency Alert App stands as a vital contribution to the ongoing efforts to improve personal safety in our increasingly complex world.

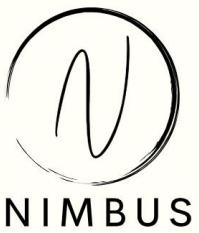
The "Future Scope" section outlines several potential enhancements and expansions for the app:

- Enable the app to connect with smart home devices such as smart speakers and security systems. Allow users to trigger emergency alerts from these devices, providing additional ways to call for help.
- Expand the app's language capabilities to support multiple languages. Ensure users from diverse linguistic backgrounds can effectively utilize the emergency alert system, enhancing inclusivity.
- Implement AI algorithms to analyze user behavior and environmental factors in real-time. Proactively detect potential threats and initiate alerts even before the predefined emergency phrase is spoken.
- Upgrade location tracking to continuously update the user's location in real-time during an emergency. Provide dynamic location information to emergency contacts and authorities for more precise and effective responses.

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- [2] M. Ebrahimi, Y. Chai, H. H. Zhang and H. Chen, "Heterogeneous Domain Adaptation With Adversarial Neural Representation Learning: Experiments on E-Commerce and Cybersecurity," in IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 45, no. 2, pp. 1862-1875, 1 Feb. 2023, doi: 10.1109/TPAMI.2022.3163338.
- [3] SpeechRecognition library documentation:
<https://pypi.org/project/SpeechRecognition/>
- [4] Geopy library documentation:
<https://geopy.readthedocs.io/en/stable/>
- [5] Twilio Python library documentation:
<https://www.twilio.com/docs/libraries/python>

Appendix A: Presentation



VOICE ACTIVATED EMERGENCY ALERT APP

Guide :
Ms. Jisha Mary Jose

Presentation by :
-Kannan.M.D(U21O3123)
-Justin K.A(U21O3121)
-Jefrin John(U21O108)
-Megha Krishna(U21O3135)

- 01.** INTRODUCTION
- 02.** PROBLEM DEFINITION
- 03.** OBJECTIVES
- 04.** SCOPE AND RELEVANCE
- 05.** SYSTEM DESIGN
- 06.** WORK DIVISION – GANTT CHART
- 07.** SOFTWARE/HARDWARE REQUIREMENTS
- 08.** RESULTS
- 09.** CONCLUSION
- 10.** FUTURE ENHANCEMENTS
- 11.** REFERENCES

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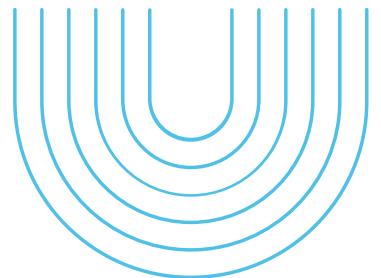


TABLE OF CONTENTS

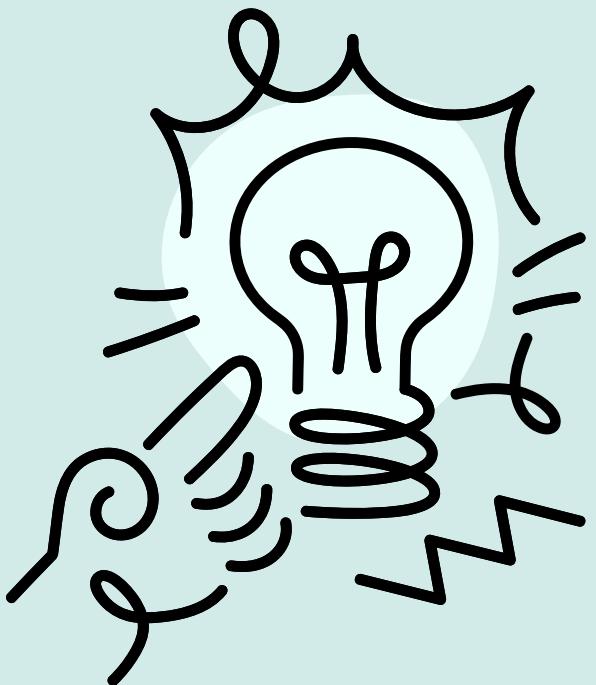
INTRODUCTION

- Voice-Activated Emergency Alert App is designed to empower users with the ability to protect themselves from dangerous situations.
- It integrates automatic voice activation technology into an emergency trigger system.

Via this tool we aim to provide discreet and swift communication with emergency contacts and law enforcement in times of distress.

PROBLEM DEFINITION:

Current methods of seeking help during emergencies, such as calling or texting, can be time-consuming and lack discretion. We aim to circumvent this by making the trigger mechanism voice activated.



5

Objective



Objective 1

Enhance personal safety by offering automated emergency alert system activated by voice



Objective 2

Empower users to personalize emergency contacts and customize their emergency phrase for a tailored response.



Objective 3

Provide users with the facility to discretely trigger the alert mechanism in order to lessen the danger.



Objective 4

Reliable and swift dispatch of alert notification to emergency contacts that include users current location.

SCOPE AND RELEVANCE

SCOPE

A mobile application for Android that enables users in a distress situation to trigger alerts via pre-configured voice commands, sending emergency messages to selected contacts or services along with the user's location.

RELEVANCE

1. Medical Emergencies
2. Physical Threats
3. Natural Disasters
4. Personal Safety

APPLICATION

To be utilized during critical situations such as abduction, instances of abuse or travelling alone.

SYSTEM DESIGN



ARCHITECTURAL DESIGN

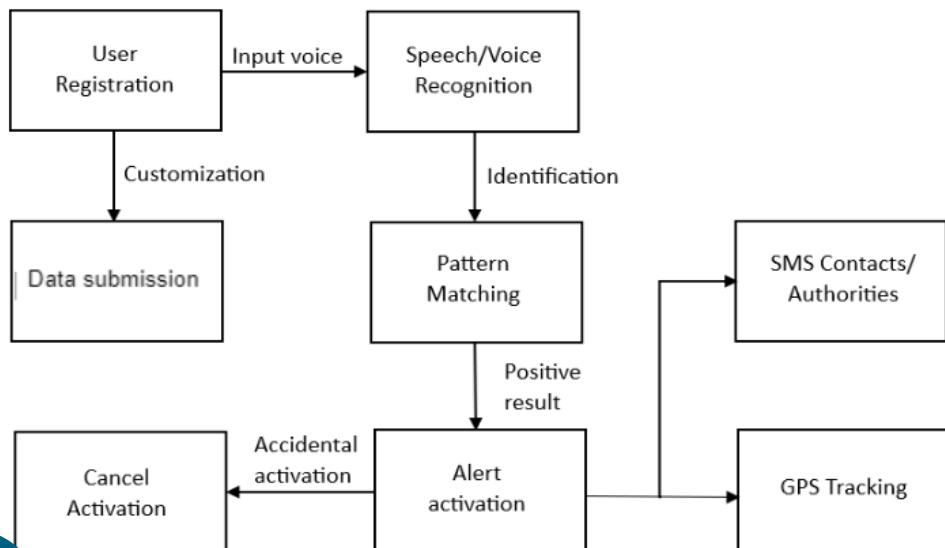


fig1 : Architectural design diagram



MODULE WISE DIVISION

SPEECH RECOGNITION MODULE

This module is responsible for converting speech input from the user into text. It utilizes flutter speech recognition modules and APIs to accurately transcribe spoken words.

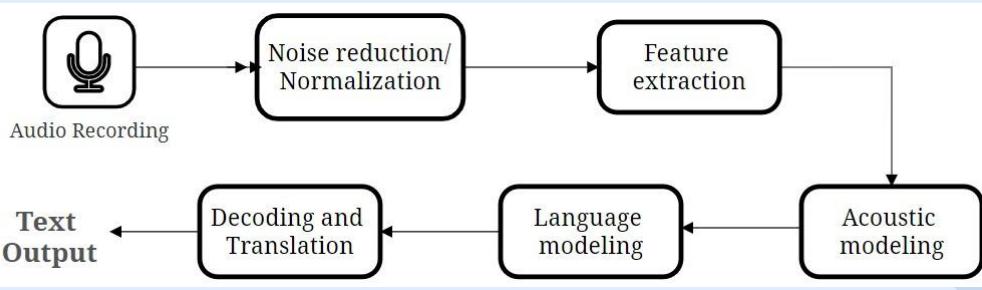
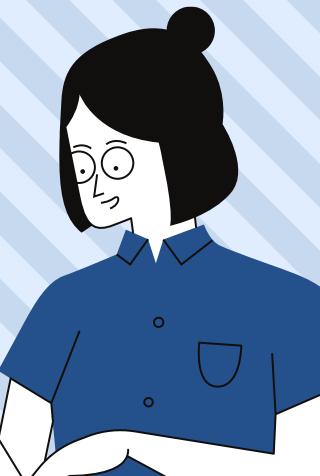


fig2 : Speech recognition diagram



MODULE WISE DIVISION

EMERGENCY DETECTION MODULE

This module identifies emergency situations based on specific keywords or patterns in the user's speech input. It employs algorithms for real-time analysis of the input to detect signs of distress or emergency.

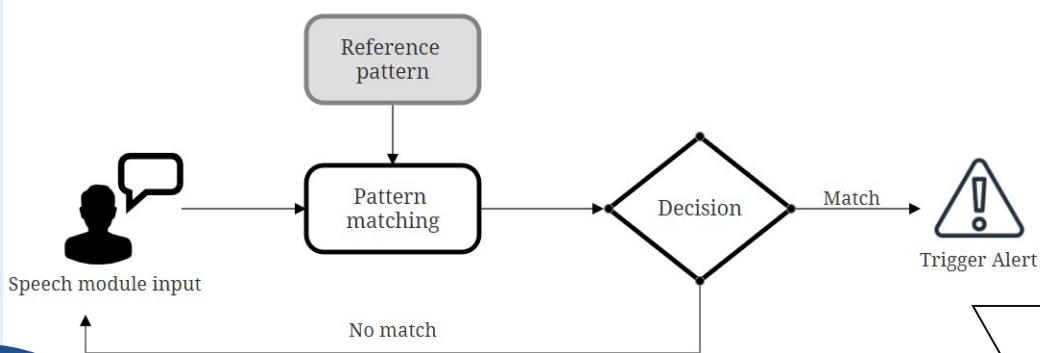


fig3 : Emergency detection diagram



MODULE WISE DIVISION

LOCATION TRACKING MODULE

This module retrieves the user's current location using GPS or network data. It ensures accurate geolocation information is available to emergency services or designated contacts in case of an alert.

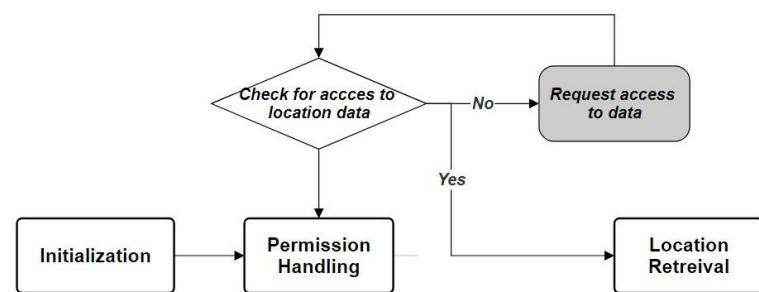
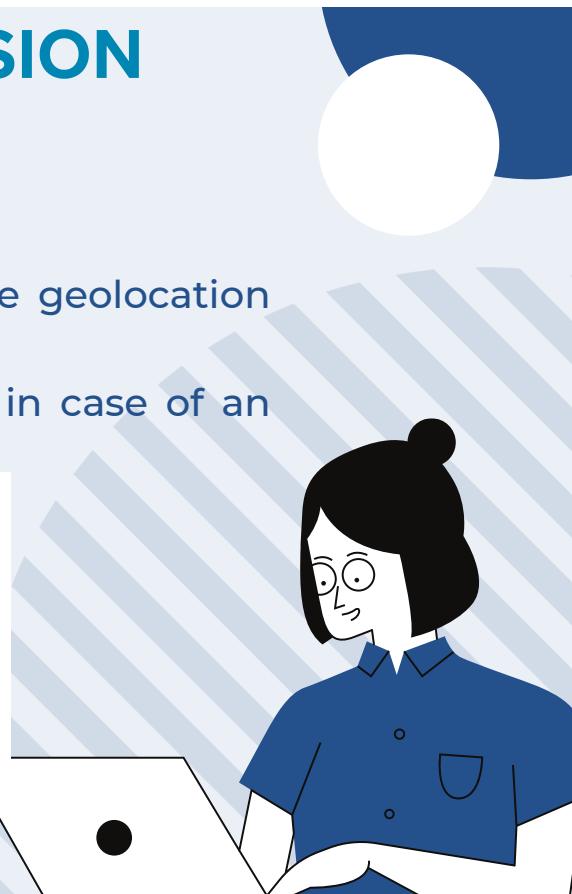


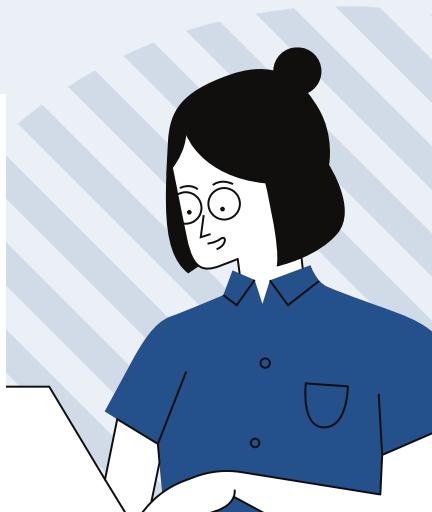
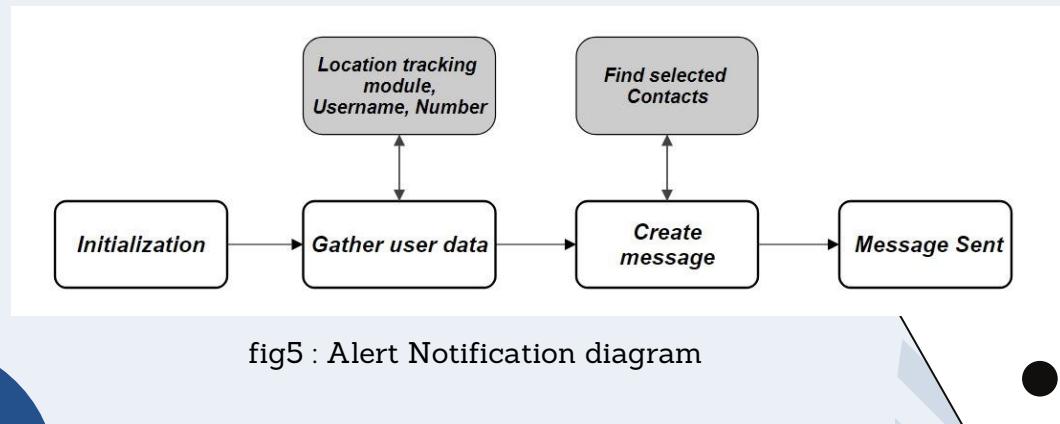
fig4 : Location tracking diagram



MODULE WISE DIVISION

ALERT NOTIFICATION MODULE:

This module handles the generation and dispatching of emergency alerts to predefined contacts or emergency services. It interfaces with messaging APIs or phone services to ensure timely delivery of alerts.



Voice Activation Algorithms

```
1.while Voice input is being received do
    1.1.if Predefined keyword or phrase is detected,
        1.1.1.Trigger emergency alert
        1.1.2.Send alert to designated contacts
        1.1.3.Retrieve user's GPS location
        1.1.4.Update alert log
    1.2.end if
2.end while
```



GPS integration Algorithm

1. Retrieve device's GPS coordinates
2. return User's GPS location

Alert Generation Algorithm

1. Retrieve user's emergency contact information
2. Compose alert message with user's GPS location
3. Send alert messages to designated contacts
4. Update alert log



1
5

USE CASE DIAGRAM

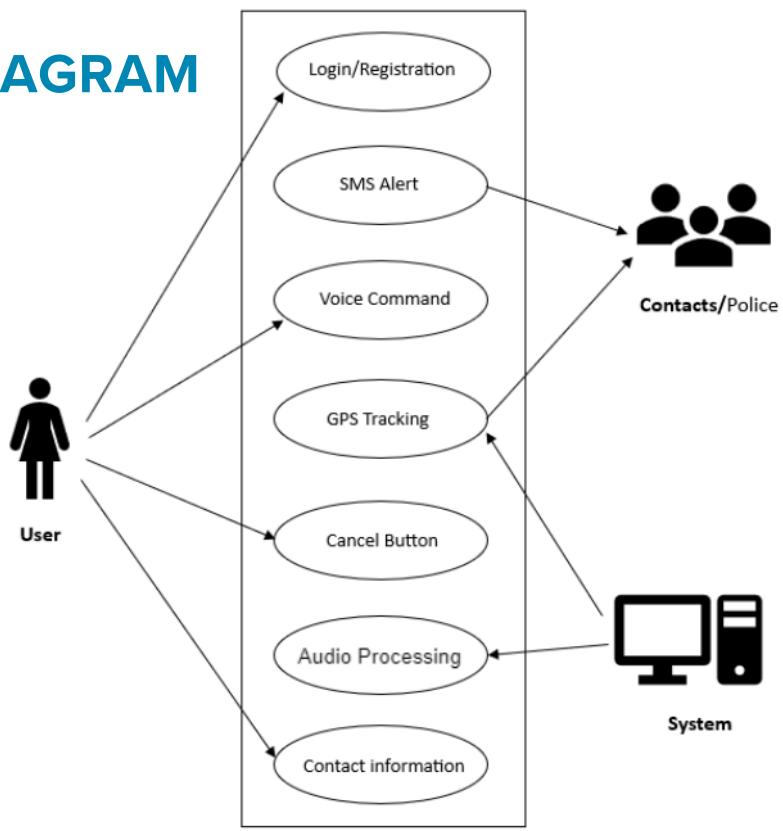


fig6 : Use Case Diagram

1
6



WORK DIVISION

Kannan M D Megha Krishna Justin K A Jefrin John Group

The background features a dark blue gradient with three glowing, metallic-looking rings. One ring is positioned behind the title text, another to the left, and a third to the right.

Software And Hardware Requirements

HARDWARE REQUIREMENTS



- Built-in microphone
- Built-in GPS module



- Android OS version 5.0 and above
- Minimum RAM: 4GB



- Minimum of 100 MB of internal storage

SOFTWARE REQUIREMENTS



- **Flutter 3.19.3**
- **Dart 3.3.1**



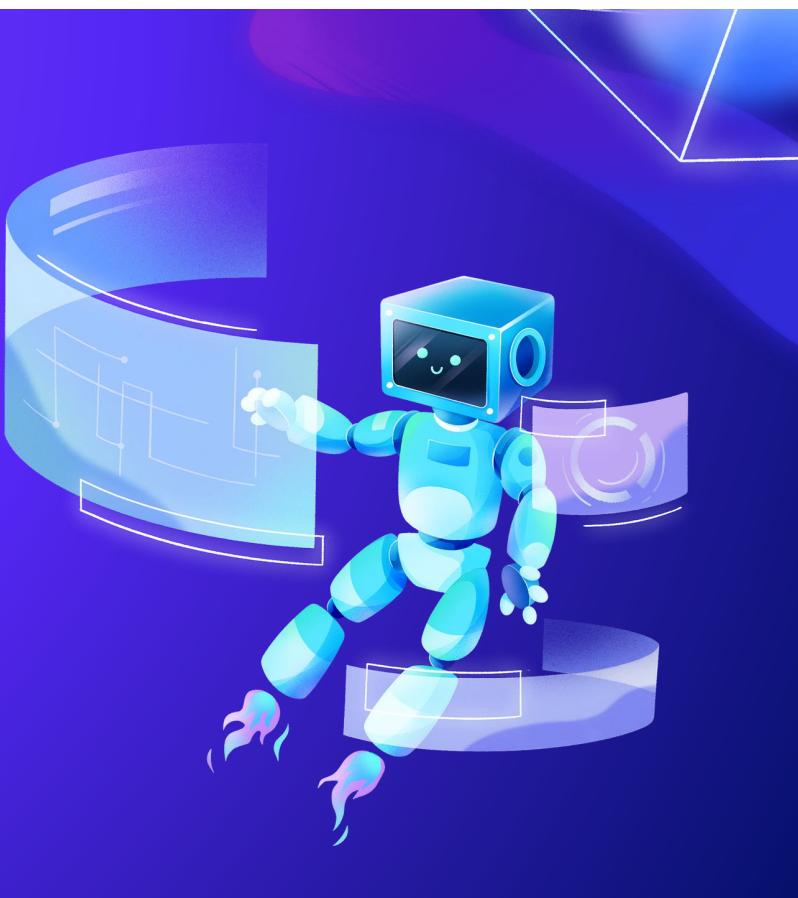
- **Android Studio Iguana | 2023.2.1**
- **Visual Code 1.87.1**



- **Google Maps API provides a set of APIs for integrating maps into applications,**

2
0

RESULTS



2
1

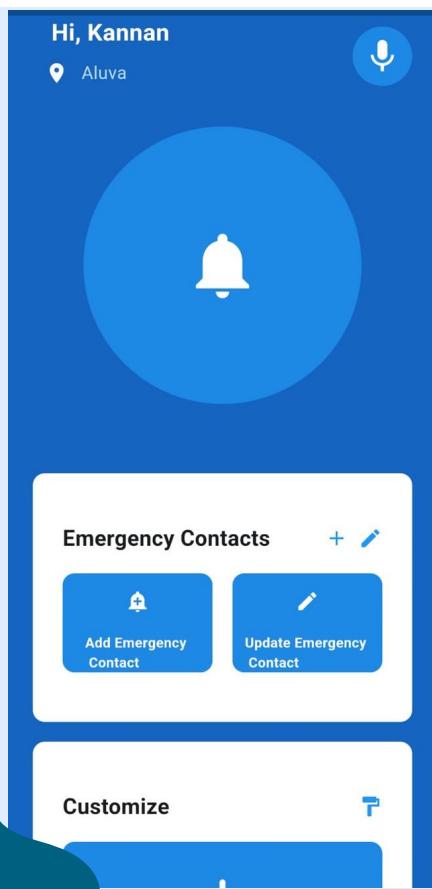


The first slide of the onboarding process. It features the Nimbus logo at the top left. Below it is a large yellow warning icon (an exclamation mark inside a triangle) on a black square background. The main text reads: "Safety is not a privilege, it's a right." A smaller paragraph below states: "Welcome to Nimbus, where your safety is our priority. Let's get started on empowering you with peace of mind." At the bottom are three small circular navigation dots and a "Next" button.

ONBOARDING PAGE



2
2



MAIN PAGE



23

← Emergency Contacts

Contact Name

Phone Number

[Pick from Contacts](#)

[Save Contact](#)

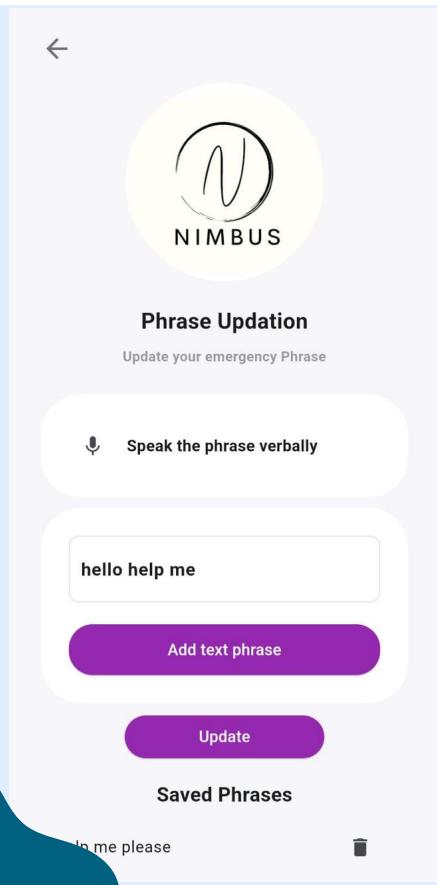
Saved Contacts

Kannan 🇮🇳	<input type="button" value="Delete"/>
+919633225435	
Meg Krish RSET	<input type="button" value="Delete"/>
+919526049320	
Justin 💪	<input type="button" value="Delete"/>
+919995447247	

EMERGENCY CONTACTS



24



UPDATE PHRASE



CONCLUSION

The Voice-Activated Emergency Alert App is a solution to the safety concerns that trouble many individuals today

- With its discreet voice-activated mechanism, users can trigger swift emergency alerts, ensuring a reliable response without compromising safety.
- It utilizes reliable technology to provide users with an easy to use interface with customized features

FUTURE ENHANCEMENTS

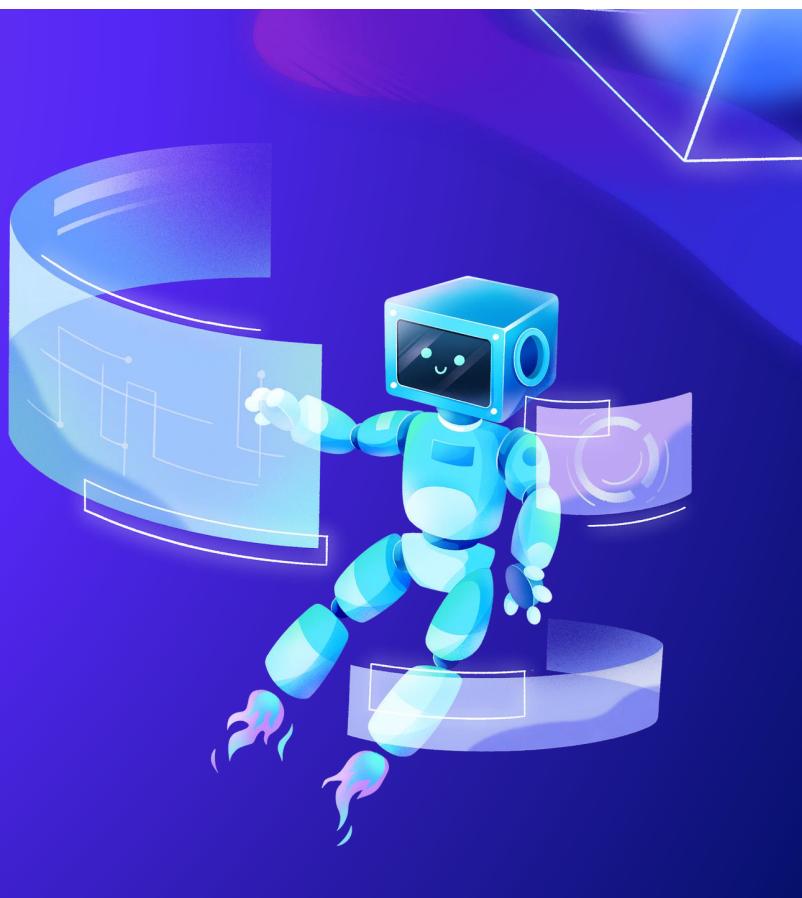
- Multilingual Support: Enable the app to support multiple languages for wider accessibility, benefiting users from diverse backgrounds and during international travel.
- Enhanced Location Tracking: Implement live location updates during emergencies, providing real-time location information to emergency contacts and authorities for more effective response.

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<https://geopy.readthedocs.io/en/stable/>
3. Twilio documentation:
<https://ieeexplore.ieee.org/abstract/document/8267822>
4. Flutter documentation:
<http://www.ir.juit.ac.in:8080/jspui/handle/123456789/9921>

2
8

THANK YOU!



Appendix B: Vision, Mission, Programme Outcomes and Course Outcomes

**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
RAJAGIRI SCHOOL OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)
RAJAGIRI VALLEY, KAKKANAD, KOCHI, 682039
(Affiliated to APJ Abdul Kalam Technological University)**



Vision, Mission, Programme Outcomes and Course Outcomes

Institute Vision

To evolve into a premier technological institution, moulding eminent professionals with creative minds, innovative ideas and sound practical skill, and to shape a future where technology works for the enrichment of mankind.

Institute Mission

To impart state-of-the-art knowledge to individuals in various technological disciplines and to inculcate in them a high degree of social consciousness and human values, thereby enabling them to face the challenges of life with courage and conviction.

Department Vision

To become a centre of excellence in Computer Science and Engineering, moulding professionals catering to the research and professional needs of national and international organizations.

Department Mission

To inspire and nurture students, with up-to-date knowledge in Computer Science and Engineering, ethics, team spirit, leadership abilities, innovation and creativity to come out with solutions meeting societal needs.

Programme Outcomes (PO)

Engineering Graduates will be able to:

- 1. Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 2. Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- 3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- 4. Conduct investigations of complex problems:** Use research-based knowledge including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- 5. Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- 6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. Individual and Team work:** Function effectively as an individual, and as a member or leader in teams, and in multidisciplinary settings.

10. Communication: Communicate effectively with the engineering community and with society at large. Be able to comprehend and write effective reports documentation. Make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team. Manage projects in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

Programme Specific Outcomes (PSO)

A graduate of the Computer Science and Engineering Program will demonstrate:

PSO1: Computer Science Specific Skills

The ability to identify, analyze and design solutions for complex engineering problems in multidisciplinary areas by understanding the core principles and concepts of computer science and thereby engage in national grand challenges.

PSO2: Programming and Software Development Skills

The ability to acquire programming efficiency by designing algorithms and applying standard practices in software project development to deliver quality software products meeting the demands of the industry.

PSO3: Professional Skills

The ability to apply the fundamentals of computer science in competitive research and to develop innovative products to meet the societal needs thereby evolving as an eminent researcher and entrepreneur.

Appendix C: CO-PO-PSO Mapping

COURSE OUTCOMES:

After completion of the course the student will be able to

SL. NO	DESCRIPTION	Blooms' Taxonomy Level
CO1	Identify technically and economically feasible problems (Cognitive Knowledge Level: Apply)	Level 3: Apply
CO2	Identify and survey the relevant literature for getting exposed to related solutions and get familiarized with software development processes (Cognitive Knowledge Level: Apply)	Level 3: Apply
CO3	Perform requirement analysis, identify design methodologies and develop adaptable & reusable solutions of minimal complexity by using modern tools & advanced programming techniques (Cognitive Knowledge Level: Apply)	Level 3: Apply
CO4	Prepare technical report and deliver presentation (Cognitive Knowledge Level: Apply)	Level 3: Apply
CO5	Apply engineering and management principles to achieve the goal of the project (Cognitive Knowledge Level: Apply)	Level 3: Apply

CO-PO AND CO-PSO MAPPING

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PS O3
C O1	3	3	3	3		2	2	3	2	2	2	3	2	2	2
C O2	3	3	3	3	3	2		3	2	3	2	3	2	2	2
C O3	3	3	3	3	3	2	2	3	2	2	2	3			2
C O4	2	3	2	2	2			3	3	3	2	3	2	2	2
C O5	3	3	3	2	2	2	2	3	2		2	3	2	2	2

3/2/1: high/medium/low

JUSTIFICATIONS FOR CO-PO MAPPING

MAPPING	LOW/ MEDIUM/ HIGH	JUSTIFICATION
101003/CS6 22T.1-PO1	HIGH	Identify technically and economically feasible problems by applying the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
101003/CS6 22T.1-PO2	HIGH	Identify technically and economically feasible problems by analysing complex engineering problems reaching substantiated conclusions using first principles of mathematics.
101003/CS6 22T.1-PO3	HIGH	Design solutions for complex engineering problems by identifying technically and economically feasible problems.
101003/CS6 22T.1-PO4	HIGH	Identify technically and economically feasible problems by analysis and interpretation of data.
101003/CS6 22T.1-PO6	MEDIUM	Responsibilities relevant to the professional engineering practice by identifying the problem.
101003/CS6 22T.1-PO7	MEDIUM	Identify technically and economically feasible problems by understanding the impact of the professional engineering solutions.
101003/CS6 22T.1-PO8	HIGH	Apply ethical principles and commit to professional ethics to identify technically and economically feasible problems.
101003/CS6 22T.1-PO9	MEDIUM	Identify technically and economically feasible problems by working as a team.
101003/CS6 22T.1-PO10	MEDIUM	Communicate effectively with the engineering community by identifying technically and economically feasible problems.
101003/CS6 22T.1-P011	MEDIUM	Demonstrate knowledge and understanding of engineering and management principles by selecting the technically and economically feasible problems.
101003/CS6 22T.1-PO12	HIGH	Identify technically and economically feasible problems for long term learning.
101003/CS6 22T.1-PSO1	MEDIUM	Ability to identify, analyze and design solutions to identify technically and economically feasible problems.
101003/CS6 22T.1-PSO2	MEDIUM	By designing algorithms and applying standard practices in software project development and Identifying technically and economically feasible problems.
101003/CS6 22T.1-PSO3	MEDIUM	Fundamentals of computer science in competitive research can be applied to Identify technically and economically feasible problems.
101003/CS6 22T.2-PO1	HIGH	Identify and survey the relevant by applying the knowledge of mathematics, science, engineering fundamentals.

101003/CS6 22T.2-PO2	HIGH	Identify, formulate, review research literature, and analyze complex engineering problems get familiarized with software development processes.
101003/CS6 22T.2-PO3	HIGH	Design solutions for complex engineering problems and design based on the relevant literature.
101003/CS6 22T.2-PO4	HIGH	Use research-based knowledge including design of experiments based on relevant literature.
101003/CS6 22T.2-PO5	HIGH	Identify and survey the relevant literature for getting exposed to related solutions and get familiarized with software development processes by using modern tools.
101003/CS6 22T.2-PO6	MEDIUM	Create, select, and apply appropriate techniques, resources, by identifying and surveying the relevant literature.
101003/CS6 22T.2-PO8	HIGH	Apply ethical principles and commit to professional ethics based on the relevant literature.
101003/CS6 22T.2-PO9	MEDIUM	Identify and survey the relevant literature as a team.
101003/CS6 22T.2-PO10	HIGH	Identify and survey the relevant literature for a good communication to the engineering fraternity.
101003/CS6 22T.2-PO11	MEDIUM	Identify and survey the relevant literature to demonstrate knowledge and understanding of engineering and management principles.
101003/CS6 22T.2-PO12	HIGH	Identify and survey the relevant literature for independent and lifelong learning.
101003/CS6 22T.2-PSO1	MEDIUM	Design solutions for complex engineering problems by Identifying and survey the relevant literature.
101003/CS6 22T.2-PSO2	MEDIUM	Identify and survey the relevant literature for acquiring programming efficiency by designing algorithms and applying standard practices.
101003/CS6 22T.2-PSO3	MEDIUM	Identify and survey the relevant literature to apply the fundamentals of computer science in competitive research.
101003/CS6 22T.3-PO1	HIGH	Perform requirement analysis, identify design methodologies by using modern tools & advanced programming techniques and by applying the knowledge of mathematics, science, engineering fundamentals.
101003/CS6 22T.3-PO2	HIGH	Identify, formulate, review research literature for requirement analysis, identify design methodologies and develop adaptable & reusable solutions.

101003/CS6 22T.3-PO3	HIGH	Design solutions for complex engineering problems and perform requirement analysis, identify design methodologies.
101003/CS6 22T.3-PO4	HIGH	Use research-based knowledge including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
101003/CS6 22T.3-PO5	HIGH	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools.
101003/CS6 22T.3-PO6	MEDIUM	Perform requirement analysis, identify design methodologies and assess societal, health, safety, legal, and cultural issues.
101003/CS6 22T.3-PO7	MEDIUM	Understand the impact of the professional engineering solutions in societal and environmental contexts and Perform requirement analysis, identify design methodologies and develop adaptable & reusable solutions.
101003/CS6 22T.3-PO8	HIGH	Perform requirement analysis, identify design methodologies and develop adaptable & reusable solutions by applying ethical principles and commit to professional ethics.
101003/CS6 22T.3-PO9	MEDIUM	Function effectively as an individual, and as a member or leader in teams, and in multidisciplinary settings.
101003/CS6 22T.3-PO10	MEDIUM	Communicate effectively with the engineering community and with society at large to perform requirement analysis, identify design methodologies.
101003/CS6 22T.3-PO11	MEDIUM	Demonstrate knowledge and understanding of engineering requirement analysis by identifying design methodologies.
101003/CS6 22T.3-PO12	HIGH	Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change by analysis, identify design methodologies and develop adaptable & reusable solutions.
101003/CS6 22T.3-PSO3	MEDIUM	The ability to apply the fundamentals of computer science in competitive research and prior to that perform requirement analysis, identify design methodologies.
101003/CS6 22T.4-PO1	MEDIUM	Prepare technical report and deliver presentation by applying the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
101003/CS6 22T.4-PO2	HIGH	Identify, formulate, review research literature, and analyze complex engineering problems by preparing technical report and deliver presentation.

101003/CS6 22T.4-PO3	MEDIUM	Prepare Design solutions for complex engineering problems and create technical report and deliver presentation.
101003/CS6 22T.4-PO4	MEDIUM	Use research-based knowledge including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions and prepare technical report and deliver presentation.
101003/CS6 22T.4-PO5	MEDIUM	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools and Prepare technical report and deliver presentation.
101003/CS6 22T.4-PO8	HIGH	Prepare technical report and deliver presentation by applying ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
101003/CS6 22T.4-PO9	HIGH	Prepare technical report and deliver presentation effectively as an individual, and as a member or leader in teams, and in multidisciplinary settings.
101003/CS6 22T.4-PO10	HIGH	Communicate effectively with the engineering community and with society at large by prepare technical report and deliver presentation.
101003/CS6 22T.4-PO11	MEDIUM	Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work by prepare technical report and deliver presentation.
101003/CS6 22T.4-PO12	HIGH	Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change by prepare technical report and deliver presentation.
101003/CS6 22T.4-PSO1	MEDIUM	Prepare a technical report and deliver presentation to identify, analyze and design solutions for complex engineering problems in multidisciplinary areas.
101003/CS6 22T.4-PSO2	MEDIUM	To acquire programming efficiency by designing algorithms and applying standard practices in software project development and to prepare technical report and deliver presentation.
101003/CS6 22T.4-PSO3	MEDIUM	To apply the fundamentals of computer science in competitive research and to develop innovative products to meet the societal needs by preparing technical report and deliver presentation.
101003/CS6 22T.5-PO1	HIGH	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
101003/CS6 22T.5-PO2	HIGH	Identify, formulate, review research literature, and analyze complex engineering problems by applying engineering and management principles to achieve the goal of the project.

101003/CS6 22T.5-PO3	HIGH	Apply engineering and management principles to achieve the goal of the project and to design solutions for complex engineering problems and design system components or processes that meet the specified needs.
101003/CS6 22T.5-PO4	MEDIUM	Apply engineering and management principles to achieve the goal of the project and use research-based knowledge including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
101003/CS6 22T.5-PO5	MEDIUM	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools and to apply engineering and management principles to achieve the goal of the project.
101003/CS6 22T.5-PO6	MEDIUM	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities by applying engineering and management principles to achieve the goal of the project.
101003/CS6 22T.5-PO7	MEDIUM	Understand the impact of the professional engineering solutions in societal and environmental contexts, and apply engineering and management principles to achieve the goal of the project.
101003/CS6 22T.5-PO8	HIGH	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice and to use the engineering and management principles to achieve the goal of the project.
101003/CS6 22T.5-PO9	MEDIUM	Function effectively as an individual, and as a member or leader in teams, and in multidisciplinary settings and to apply engineering and management principles to achieve the goal of the project.
101003/CS6 22T.5-PO11	MEDIUM	Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team. Manage projects in multidisciplinary environments and to apply engineering and management principles to achieve the goal of the project.
101003/CS6 22T.5-PO12	HIGH	Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change and to apply engineering and management principles to achieve the goal of the project.
101003/CS6 22T.5-PSO1	MEDIUM	The ability to identify, analyze and design solutions for complex engineering problems in multidisciplinary areas. Apply engineering and management principles to achieve the goal of the project.

101003/CS6 22T.5-PSO2	MEDIUM	The ability to acquire programming efficiency by designing algorithms and applying standard practices in software project development to deliver quality software products meeting the demands of the industry and to apply engineering and management principles to achieve the goal of the project.
101003/CS6 22T.5-PSO3	MEDIUM	The ability to apply the fundamentals of computer science in competitive research and to develop innovative products to meet the societal needs thereby evolving as an eminent researcher and entrepreneur and apply engineering and management principles to achieve the goal of the project.

