SafePulse – Real-time Human Tracking and Emergency Alert System

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Overview

Introduction

- SafePulse is a mobile safety app designed to provide real-time protection and emergency support for vulnerable individuals, including children, elderly, and those in high-risk situations.
- It integrates features like fall detection, geo-fencing, SOS alerts, SOS flashlight signal, and unauthorized access detection to ensure continuous safety monitoring.
- Utilizing Android technologies, Google Maps API, Firebase, and SMS services, SafePulse ensures quick responses and proactive safety alerts.

Applications

- Device Security Monitoring
- Medical Emergency Response
- Women's Safety in Public Spaces
- Travel Safety Monitoring
- Geo-Fencing for Dependents

Literature Review

Title	Methodology	Merits	Demerits
The European Emergency Number 112 Exploring The Potential Of Crowd Sourced Information For Emergency Management(2024)	• Datasource Analysis • Crowd Sourcing	• Realiable Dtasource • Realtime information • Improved decission making • Scalability	• Limited datasource • Lack of community Involvement

Literature Review

Title	Methodology	Merits	Demerits
Enhanced Security Fencing System With Geolocation Tracking(2024)	• Geolocation Tracking	• Improved Security • Proactive Monitoring • Inonative Solution	• high implementation cost • privacy concerns • maintenance challenges

Literature Review

Title	Methodology	Merits	Demerits
Security In Mobile Network: Issues, Challenges And Solutions (Unauthorized Access Detection)(2023)	• Unauthorized Access Detection • Realtime monitoring and alerts • Security Mechanisms	• Practical solution for security • Focus on user data privacy • Structured Approach	• Lack of detailed methodology and tools • limited focus on emerging threats

Literature Review

Title	Methodology	Merits	Demerits
Smart Device Fall Detection System For Real Time Monitoring And Emergency Response For Specially Abled Individuals.(2024)	• system design and sensors • fall detection • Testing and evaluation	• High accuracy • quick response time • Real time monitoring	• Limited focused on long term data • Lack of cost analysis • power efficency problem

Literature Review

Title	Methodology	Merits	Demerits
Fall Detector Device For Improved Safety For Independence.(2024)	• Device Design • sensor integration • real time alerts	• Accurate fall detection • User friendly Design • improved safety • scalable	• Device placement issues • no cost analysis • potential for false alarms

Case Study

- SafeTrack: SafeTrack is your quick-access safety companion. With a single tap, share your live location with emergency contacts and send instant SOS alerts.
- Panic Tap: Panic Tap is a minimal safety app that triggers an alert by tapping the power button 3 times. It instantly sends your location and a pre-set emergency message to your chosen contacts — fast, discreet, and reliable.
- SOS Buddy : SOS Buddy is built for simplicity. One big button to alert your emergency contacts with your location and a short message.

Problem Statement

- SafePulse is a real-time personal safety app featuring fall detection and livelocation sharing, SOS flash light alerts, geo-fencing, unauthorized access detection, and community-based emergency response.

Objectives

- **Fall Detection and Emergency Alerts:** A smart system that detects falls in real-time and instantly notifies emergency contacts or nearby responders to ensure timely assistance.
- **Geo-Fencing for Safety Zones:** The app monitors movements and sends alerts if the user does not return to a safe zone within a predefined timeframe.

Objectives

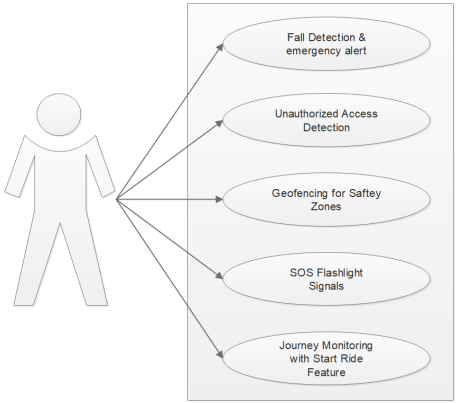
- **SOS flashlight signaling feature:** allowing users to visually signal distress in silent or critical situations.
- **Unauthorized Access Detection:** To enhance device security, the system activates the phone's camera when unauthorized access is attempted (e.g., four or more failed unlock attempts) and sends the captured photo along with location data to emergency contacts.

System Requirements

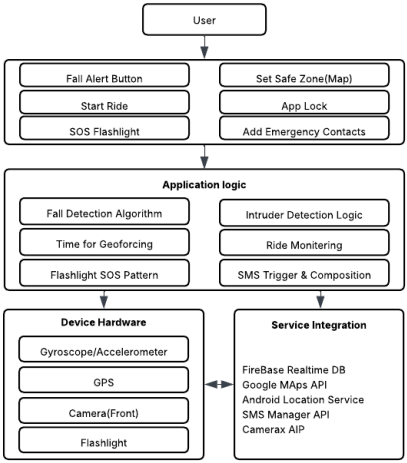
- Operating System: Android 8.0 or Higher
- Development Platform: Android Studio (latest version)
- Programming Language: Kotlin
- Backend: Firebase (Authentication, Realtime Database, Firestore)
- MapIntegration: Google Maps API
- SMSAndLocation: Android Location Services, SMS Manager API
- Camera Access: Android CameraX API

Design

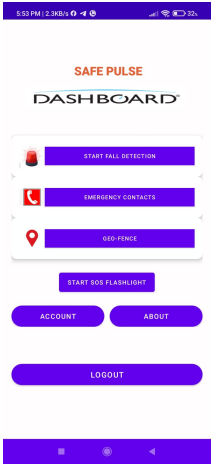
Use Case Diagram



System Architecture



Result

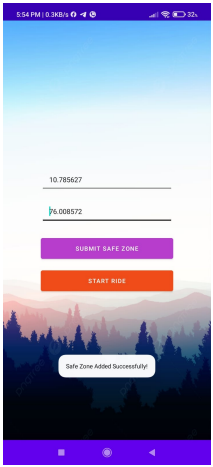


Homepage

Result

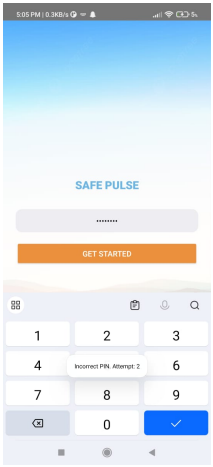
Fall detection

Result



Geofence

Result



Unauthorized Access detection

Conclusion

- Successfully completed the development of a robust and user-friendly mobile safety application—SafePulse—designed to enhance real-time personal protection and emergency response.
- Successfully completed the integration of fall detection, geo-fencing, SOS alerts with flashlight signals, and unauthorized access detection, ensuring comprehensive safety coverage in high-risk situations.
- Successfully completed a demonstration of how mobile solutions can effectively contribute to real-world safety challenges through innovation and accessible technology.

Future Scope

- Voice-Activated Emergency Triggers
- Integration with Wearable Devices
- AI-Based Movement and Behavior Prediction
- Real-time Video Streaming to Emergency Contacts
- SafeRouteRecommendation

Reference

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Thank You