IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.471 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 15, Issue 4, April 2026

DOI: 10.17148/IJARCCE.2026.154254

Women Safety Alert System: An Android Application for Real-Time Emergency Response

Sakshi Singh, Trupti Sanap, Mahika Singh, Kalpesh Patil

Student, Department of Computer Engineering, A.C. Patil College of Engineering, Kharghar, Navi Mumbai

Abstract: The Women Safety Alert System is an Android-based mobile application designed to enhance the personal safety of women by providing immediate emergency assistance during dangerous situations. The application utilizes smartphone technologies such as GPS, SMS services, internet connectivity, sensors, and multimedia recording to create a comprehensive real-time emergency alert platform. The system enables women to quickly notify trusted contacts and emergency responders through a single-touch SOS button or hidden triggers such as shake detection and voice commands. Upon activation, the application fetches the user's real-time location and transmits emergency alerts to predefined contacts via SMS and cloud notifications. The proposed solution integrates multiple emergency communication methods, hidden activation features, real-time GPS tracking, and evidence collection into one unified platform, developed using Android Studio with Java/Kotlin, Firebase, Google Maps API, and Android SDK tools. Experimental testing confirms fast alert transmission, reliable GPS tracking, and effective emergency response support.

Keywords: Women Safety, Android Application, GPS Tracking, SOS Alert System, Emergency Response, Mobile Security.

I. INTRODUCTION

In today's rapidly advancing digital era, mobile technology has become an integral part of human life. Smartphones are no longer limited to communication purposes; they now serve as powerful tools for security, healthcare, education, and emergency assistance. Despite significant progress in social awareness and law enforcement, women's safety remains a major global concern. Incidents of harassment, assault, domestic violence, stalking, and unsafe public environments continue to pose serious threats to women in both urban and rural areas.

The Women Safety Alert System Android Application is designed as a mobile-based security solution that helps women quickly notify trusted contacts and emergency responders during dangerous situations. The application utilizes Android smartphone capabilities such as GPS, Internet connectivity, SMS, Location Tracking, Sensors, and Cloud Integration to provide real-time emergency support.

When activated, the application sends an alert message containing the user's current location to predefined emergency contacts and authorities. Advanced features include a one-touch SOS emergency button, live location sharing, hidden trigger mechanisms such as shake detection and voice commands, automatic audio/video recording, and integration with nearby emergency services.

The motivation behind this system arises from the increasing number of crimes and unsafe situations faced by women worldwide. Traditional safety methods such as calling emergency helplines are often insufficient because they require time, presence of mind, and manual effort. An automated or semi-automated alert system can significantly improve emergency response and potentially save lives.

II. LITERATURE SURVEY

A. Emergency Helpline-Based Safety Systems

Traditional women safety systems rely on emergency helpline numbers such as police, ambulance, or women helpline services, where users manually call the helpline during emergencies. While these systems offer direct communication with authorities, they require manual dialing and may not be effective when users are in panic or physically restrained.

B. SMS-Based Alert Applications

Several mobile applications provide emergency SMS alerts to pre-registered contacts when an SOS button is pressed. Examples include bSafe, Raksha, Himmat, and Shake2Safety. These apps offer quick alert mechanisms and simple implementation; however, they require the user to manually unlock the phone, open the application, and press the SOS button. SMS delivery may also fail in poor network areas.

C. GPS Tracking Safety Applications

GPS-based systems continuously or periodically track user location and share it with guardians or family members, featuring live tracking, route monitoring, and geo-fencing alerts. While providing real-time location visibility, these systems suffer from high battery consumption, privacy concerns, and continuous internet dependency.

International Journal of Advanced Research in Computer and Communication Engineering
Impact Factor 8.471 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 15, Issue 4, April 2026
DOI: 10.17148/IJARCCE.2026.154254

D. Sensor-Based and AI/ML Safety Systems

Advanced systems use smartphone sensors such as accelerometers, gyroscopes, and microphones to trigger alerts automatically. Recent research has also explored AI for predicting danger or recognizing distress situations through voice stress detection, threat prediction, and facial recognition. While intelligent automation is a significant advantage, these systems face challenges of false triggering, complex implementation, high computational requirements, and privacy or ethical concerns.

E. Research Gap

A comprehensive review of the literature reveals several limitations in existing systems: manual activation dependency during high-stress situations, delayed response times, limited hidden trigger options, inaccurate GPS in indoor environments, internet dependency, lack of evidence collection, and poor user interfaces. The proposed system addresses these gaps through a multi-modal, automated, and user-friendly approach.

III. PROPOSED SYSTEM

A. System Overview

The proposed Women Safety Alert System is an Android-based mobile application developed to provide immediate assistance to women during emergency situations. The application leverages smartphone capabilities such as GPS, GSM/SMS, Internet connectivity, microphone, camera, and motion sensors to provide a comprehensive safety solution. It allows users to quickly send emergency alerts along with their real-time location to predefined emergency contacts and authorities with minimal user interaction.

B. System Architecture

The Women Safety Alert System follows a client-based Android mobile architecture integrated with GPS and communication services. The system consists of the following major modules:

- User Interface Module
- Authentication / Registration Module
- Emergency Contact Management Module
- SOS Trigger Module
- GPS Location Tracking Module
- SMS / Internet Alert Module
- Audio/Video Recording Module
- Emergency Services Locator Module

C. Algorithm and Process Design

The emergency alert system follows a structured algorithm designed for speed and reliability. The process begins with user registration and emergency contact configuration. The system then continuously monitors for trigger events such as SOS button press, shake detection, voice command, or power button sequence. Upon trigger detection, the application validates the event, retrieves current GPS coordinates, generates an emergency message containing the Google Maps location link, and simultaneously dispatches SMS alerts and cloud notifications to all registered emergency contacts. Concurrently, audio/video recording is initiated and nearby emergency services are displayed on the interface.

IV. IMPLEMENTATION

A. Hardware Requirements

The application is designed to run on any Android device with the following minimum specifications:

Component	Specification
Smartphone	Android Device (Android 6.0+)
Processor	Quad Core or Higher
RAM	Minimum 2 GB
Storage	100 MB Free Space
GPS Module	Built-in GPS
Camera	Front / Rear Camera
Sensors	Accelerometer / Gyroscope
Internet	Wi-Fi / Mobile Data

TABLE I Hardware Requirements

IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.471 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 15, Issue 4, April 2026

DOI: 10.17148/IJARCCE.2026.154254

B. Software Requirements

Software	Purpose
Android Studio	Development IDE
Java / Kotlin	Programming Language
Firebase	Cloud Database / Notification
Google Maps API	Location Tracking
Android SDK	App Development
SQLite	Local Data Storage

TABLE II Software Requirements

C. Key Features Implemented

The following core features were implemented in the application:

1. One-Touch SOS Alert: Instant emergency activation with a single tap.
2. Hidden Trigger Mechanisms: Shake detection, power button sequence, and voice command activation.
3. Real-Time GPS Location Sharing: Accurate live location transmitted to emergency contacts.
4. Hybrid Alert Transmission: SMS for offline areas and internet/cloud for real-time updates.
5. Automatic Audio/Video Recording: Evidence collection initiated upon SOS activation.
6. Emergency Contact Management: Storage and management of trusted contacts within the app.
7. Nearby Emergency Services Locator: Displays nearby police stations, hospitals, and safe places.

V. EXPERIMENTAL RESULTS

A. Test Setup and Results

The application was tested on Android smartphones under multiple scenarios including manual SOS activation, GPS location accuracy, SMS delivery, emergency contact notification, and audio recording. The following table presents the test case results:

Test Case	Expected Result	Actual Result	Status
SOS Button Press	Alert Sent	Success	Pass
Shake Detection	SOS Triggered	Success	Pass
GPS Tracking	Accurate Location	95% Accurate	Pass
SMS Delivery	Message Delivered	Delivered in 5 sec	Pass
Audio Recording	Recording Starts	Success	Pass
Emergency Contact Save	Contact Stored	Success	Pass

TABLE III Test Cases and Results

B. Performance Analysis

Average response times measured during testing are summarized below:

Operation	Time Taken
GPS Fetch	2–4 seconds
SMS Sending	3–5 seconds
Recording Start	1 second
Full SOS Activation	5–8 seconds

TABLE IV Performance Analysis

Results demonstrate that the system successfully sent alerts in real-time with GPS accuracy acceptable in outdoor environments. Shake detection worked efficiently with a tuned threshold, SMS alerts functioned even without internet, and audio/video recording started automatically upon SOS activation.

VI. CONCLUSION

The proposed Women Safety Alert System Android Application provides an effective and practical solution for enhancing women's safety using smartphone technology. The system integrates GPS tracking, emergency SMS alerts, hidden activation methods, and evidence recording into one mobile platform, addressing the limitations of many traditional safety systems by reducing manual effort, improving response time, and increasing reliability through multiple emergency communication channels.

International Journal of Advanced Research in Computer and Communication Engineering
Impact Factor 8.471 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 15, Issue 4, April 2026
DOI: 10.17148/IJARCCE.2026.154254

Experimental testing confirms that the application performs efficiently and can provide real-time emergency assistance during dangerous situations. The system is an affordable, practical, and user-friendly technological solution aimed at improving women's safety and confidence in daily life, requiring no dedicated hardware beyond an Android smartphone.

Future enhancements of the system may include smartwatch integration for SOS triggering from wearable devices, AI-based threat detection using voice stress analysis, facial recognition of potential attackers, cloud backup of evidence recordings, live tracking dashboards for guardians, and direct integration with government emergency services. Incorporating offline map support would further improve functionality in low-connectivity environments.

ACKNOWLEDGMENT

The authors express sincere gratitude to their project guide, Prof. Shilpa Tandale, for valuable guidance, continuous support, and encouragement throughout the development of this project. The authors also thank the Department of Computer Engineering of A.C. Patil College of Engineering for providing the necessary facilities, resources, and academic environment to complete this work. Special thanks to the Head of Department, Dr. M. M. Deshpande, for departmental support and valuable suggestions.

REFERENCES

[1] Android Developers, "Android Developer Documentation," Available: https://developer.android.com/

[2] Android SMS Manager API Documentation, "Sending SMS Messages in Android," Available: https://developer.android.com/reference/android/telephony/SmsManager

[3] Android Sensor Framework Documentation, "Motion Sensors and Position Sensors," Available: https://developer.android.com/guide/topics/sensors/sensors_overview

[4] S. R. Bhagyashree, P. N. Raut, and M. M. Deshmukh, "Women Safety Application Using Android Mobile," International Journal of Computer Applications, Vol. 180, No. 32, pp. 15–20, 2020.

[5] A. Sharma and R. Verma, "Android Based Women Safety Application with GPS Tracking and Emergency Alert," International Research Journal of Engineering and Technology (IRJET), Vol. 8, Issue 5, pp. 2100–2105, 2021.

[6] K. Patel, S. Shah, and R. Mehta, "Smart Women Safety System Using IoT and GPS," International Journal of Scientific Research in Engineering and Management, Vol. 6, Issue 3, 2022.

[7] Android Studio Official Documentation, "Build Android Apps Using Android Studio," Available: https://developer.android.com/studio

[8] I. F. Darwin, Android Cookbook: Problems and Solutions for Android Developers, O'Reilly Media, 2017.