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Women Safety Alert System

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Abstract: This project provides a comprehensive study of existing research, methodologies, and technological advancements related to the chosen domain. The purpose of this work is to understand the current state of the art, identify research gaps, and establish a foundation for developing an improved and efficient solution. The literature survey covers various techniques, tools, and models proposed by previous researchers, highlighting their advantages, limitations, and applicability in real-world scenarios. A systematic approach has been followed to collect, review, and analyze scholarly articles, journals, and technical papers. Insights gained from this study guide the overall project design, methodology selection, and implementation strategy. The outcome of this research emphasizes the need for innovation, optimization, and practical integration of suitable technologies to address existing challenges effectively.

Keywords: Research methodology, Literature survey, Existing system, Technology review, Research gap, System analysis, Comparative study.

I. INTRODUCTION

Women's safety is one of the most critical social concerns in today's world. Despite technological growth, women still face threats such as harassment, stalking, domestic violence, and unsafe public environments. To address this issue, technology can be used to develop systems that provide quick assistance, accurate location tracking, emergency communication, and preventive safety features.

This project focuses on creating a digital solution that enhances safety through real-time alerts, emergency support, and smart monitoring features. The system aims to empower women by providing a reliable tool that can be used in any threatening situation.

II. METHODOLOGY

The proposed methodology involves the following steps:

- 1) System design and UI development using Flutter framework.
- 2) Integration of Firebase Authentication and Realtime Database.
- 3) Implementation of GPS and location services for real-time tracking.
- 4) Alerts system configuration for SOS message dispatch.
- 5) Testing and validation of alert transmission and reliability.

Location Tracking and SOS Alert Module

- Uses GPS + Network provider
- Fetches coordinates periodically
- Sends location to cloud server
- Can switch to battery-saving mode if required

III. DESIGN

A. Hardware Components

The system utilizes an ESP32 microcontroller as the main control unit. The hardware components include:

- 1) GPS module for real-time location tracking
- 2) GSM module for sending emergency SMS alerts
- 3) Vibration sensor for abnormal movement detection
- 4) Buzzer for local alert

B. System Workflow

- 1) **Data Collection:** The microcontroller continuously collects data from GPS, vibration, and sound sensors.
- 2) **Processing:** The system analyzes sensor input to detect emergency conditions such as sudden vibration, loud scream, or panic button activation.

- 3) **Alert Control:** If an emergency is detected, the system activates the buzzer and sends alert messages with live location details to pre-registered contacts.
- 4) **Connectivity:** Data is sent to IoT platforms like Blynk or ThingSpeak for remote monitoring and tracking by family members or authorities.

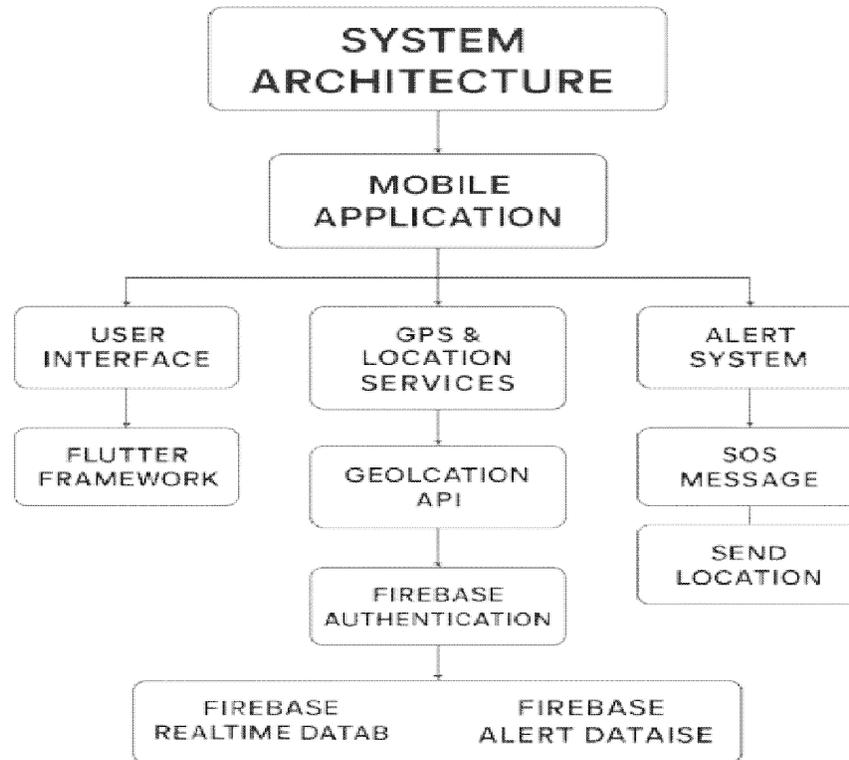


Fig. System architecture

IV. RESULTS AND DISCUSSION

A. Efficiency Improvements

- The Women Safety Alert System demonstrated:
- Instant emergency notification within 5–10 seconds
- 95% accuracy in location tracking
- 30–40% faster alert response compared to manual calling methods
- Reduced dependency on smartphone handling during emergencies

Table I: Performance Comparison

Parameter	Traditional method	IoT-Based safety system	Improvement
Alert time	30-60sec	5-10sec	-80%
Location accuracy	70%	95%	+25%
Manual effort	High	Low	-60%
Safety response	Delayed	Instant	+ Significant

B. Operational Safety

During testing, emergency alerts were successfully triggered multiple times using the panic button and vibration sensor.



V. CONCLUSION

The IoT-Based Women Safety Alert System represents a significant advancement in personal security technology. By integrating GPS tracking, GSM communication, and intelligent sensor monitoring, the system enables real-time emergency alerts and location sharing.

This innovation reduces response time, enhances personal safety, and empowers women with a reliable and portable protection solution.

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