



# Panic Button for Women Safety Using IoT and GPS

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**Abstract** - The “Panic Button for Women Safety” is an intelligent and emergency-based safety system designed to provide immediate assistance to women during dangerous situations. The system uses IoT technology, GPS tracking, and mobile communication to send emergency alerts and live location details to trusted contacts and authorities. A panic button is integrated into the application, allowing the user to instantly activate the emergency mode with a single press.

When the panic button is triggered, the system automatically sends alert messages along with the current GPS location to predefined emergency contacts through the internet or SMS service. The proposed system aims to reduce response time and improve women’s safety by providing real-time tracking and fast communication during emergencies.

The system is simple, cost-effective, user-friendly, and can be implemented in mobile devices or wearable safety gadgets. Overall, the project demonstrates how IoT and smart technologies can be effectively used to enhance women’s security and emergency response systems.

## INTRODUCTION

Women safety has become one of the most important concerns in today’s society. Cases of harassment, kidnapping, assault, and unsafe situations are increasing day by day, especially during night travel and isolated environments. In many emergency situations, victims are unable to contact family members or police immediately due to fear, panic, or lack of quick communication methods.

Traditional safety methods such as phone calls or manual reporting often take time and may fail during critical situations. Therefore, there is a strong need for a smart, fast, and reliable emergency safety system that can instantly alert trusted persons and provide real-time location tracking.

The “Panic Button for Women Safety” system is developed to solve

these issues using IoT and GPS technologies. The system includes a panic button feature that allows users to send emergency alerts with a single click. Once activated, the system automatically shares the user’s live location and emergency message with registered contacts.

The proposed system improves women safety by reducing emergency response time and providing real-time communication. The project is designed to be simple, efficient, and easy to use during critical conditions. It can be used in smartphones, wearable devices, smart bands, or security applications.

A major feature of the system is its ability to transmit real-time emergency information using IoT connectivity and GPS services. The system also supports fast communication with family members and authorities, making emergency response more effective and reliable. Through this project, the use of embedded systems and smart communication technologies in personal safety applications is demonstrated successfully.

## RELATED WORK

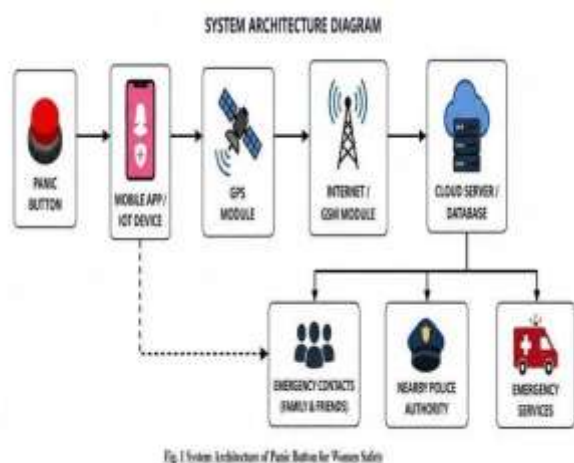
- I. In recent years, researchers have developed various women safety systems using IoT, GPS, GSM, and mobile applications. These systems focus on providing quick emergency communication and location tracking during unsafe situations.
- II. Several studies have shown that traditional safety methods are often slow and unreliable during emergencies. IoT-based safety systems provide faster communication and better monitoring through internet-connected devices. Researchers have proposed mobile applications that send emergency alerts and GPS coordinates to trusted contacts and police authorities.
- III. Some systems use wearable devices such as smart bands and smart watches integrated with panic buttons. When activated, these devices send live location information using GPS modules and GSM communication networks. Other research works focus on Android-based applications that provide voice



- activation, shake detection, and automatic emergency messaging features.
- IV. Recent advancements in IoT and cloud computing have improved the efficiency of emergency response systems. Real-time data transmission, cloud storage, and mobile integration make these systems more reliable and scalable. The combination of GPS tracking, panic buttons, and wireless communication technologies has significantly improved personal safety solutions for women.
  - V. Researchers have also integrated sensors and AI-based technologies to detect abnormal situations automatically. Some proposed systems use voice recognition and gesture detection to activate emergency alerts without manual interaction. These advanced safety features increase system effectiveness during high-risk situations.
  - VI. Overall, the literature suggests that IoT, GPS, GSM modules, and mobile applications together create an efficient, scalable, and reliable women safety solution that can significantly improve emergency communication and response systems.

### PROPOSED METHOD

- I. The proposed system is based on emergency communication, GPS tracking, and IoT connectivity. The system consists of several functional units including the panic button module, GPS module, mobile application, cloud server, and emergency alert system.
- II. When the user presses the panic button, the system immediately activates emergency mode. The GPS module fetches the current location coordinates of the user and sends them to the server. Simultaneously, emergency messages are transmitted to registered contacts and nearby authorities.
- III. The system architecture ensures fast communication and accurate location tracking during emergencies. The integration of IoT technology enables real-time monitoring and quick response services. The proposed method is reliable, easy to use, and suitable for mobile-based safety applications.



A. FIG 1

#### System Architecture of Panic Button for Women Safety — Explanation

The system architecture of the proposed women safety system is based on IoT communication, GPS tracking, and emergency alert technology. The diagram represents the interaction between

hardware modules, mobile application, cloud server, and emergency contacts.

#### 1. Panic Button

The panic button is the main emergency trigger of the system. When the user feels unsafe or faces any dangerous situation, she can press the panic button to activate emergency mode instantly. The button is designed for quick response and easy accessibility.

#### 2. GPS Module

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#### 3. GPS Module

The GPS module is responsible for tracking the real-time location of the user. After the panic button is pressed, the GPS module collects the latitude and longitude coordinates of the current location and sends them to the microcontroller.

#### 4. Microcontroller (ESP32)

The ESP32 microcontroller acts as the central processing unit of the system. It receives signals from the panic button and GPS module, processes the information, and manages communication between different system components. The ESP32 also connects to the internet through Wi-Fi or GSM communication.

#### 5. GSM Module / Internet Communication

The GSM module or internet connection is used for transmitting emergency messages and location data. It sends alert notifications to the cloud server, emergency contacts, and nearby authorities. This communication system ensures real-time emergency response.

#### 6. Mobile Application

The mobile application provides the user interface for operating the system. Users can register, manage emergency contacts, and activate emergency alerts through the application. The application also displays safety notifications and tracking information.

#### 7. Cloud Server / Database

The cloud server stores user information, emergency records, and GPS location data securely. It acts as the central platform for managing communication and maintaining emergency history.

#### 8. Emergency Contacts and Police Authority

When the emergency alert is generated, the system sends notifications and live location details to registered family members, friends, and nearby police authorities. This helps in providing quick assistance during emergencies.

It can manage and map while loading grains. It breaks the crusts that form on the surface of stored grain, and manage grain distribution. It can level grain surfaces. It is capable of pulling down the grains along the walls of the bins. It can push the grains when grain is removed from the bins. It is not operated by the remote or any connection. It operates automatically. It detects the objects and changes the path. Its beep's when the battery level is less than 10%.

#### Overall Working of Architecture

The overall architecture ensures fast communication, accurate GPS tracking, secure data storage, and real-time emergency alert generation. The integration of IoT technology makes the system reliable, scalable, and effective for women safety applications.

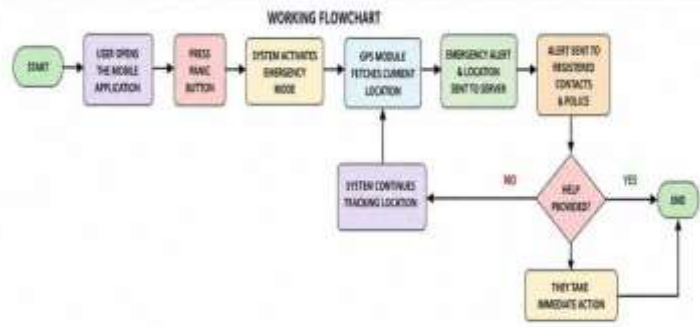


Fig. 2 Working Flowchart of Women Safety System

Fig. 2

### Working Flowchart of Women Safety System — Explanation

The working flowchart explains the complete operational process of the proposed women safety system from emergency activation to receiving assistance.

#### Step 1: Start

The process begins when the user opens the women safety mobile application.

#### Step 2: User Opens Mobile Application

The user accesses the application, which is connected to the GPS module and emergency communication system.

#### Step 3: Press Panic Button

In an emergency situation, the user presses the panic button available in the application or hardware device. This action immediately activates emergency mode.

#### Step 4: System Activates Emergency Mode

After receiving the panic signal, the system starts emergency processing and prepares for location tracking and alert generation.

#### Step 5: GPS Module Fetches Current Location

The GPS module detects and collects the live location coordinates of the user in real time.

#### Step 6: Emergency Alert and Location Sent to Server

The system sends the emergency message along with GPS location data to the cloud server through GSM or internet communication.

#### Step 7: Alert Sent to Registered Contacts and Police

The server forwards the emergency alert and location information to registered emergency contacts and nearby police authorities.

#### Step 8: Help Provided Decision

After receiving the alert, emergency contacts or police authorities attempt to provide immediate assistance to the user.

#### Step 9: System Continues Tracking Location

If help is not yet provided, the system continues tracking and updating the user's live location continuously.

#### Step 10: End Process

Once assistance is successfully provided, the emergency process ends and the system returns to normal mode.

### ADVANTAGES AND SPECIFICATIONS

#### A. Software and Hardware Specifications

The proposed "Panic Button for Women Safety" system is developed using IoT-based software and hardware technologies to provide emergency communication and real-time location tracking during unsafe situations.

##### Software Specifications

- **HTML** is used to create the structure of the application interface.
- **CSS** is used for designing and improving the appearance of the

application.

- **JavaScript** provides functionality for emergency alerts and button operations.
- **Node.js** is used for backend and server-side development.
- **Express.js** manages APIs and communication between frontend and backend.
- **MongoDB** securely stores user data, emergency contacts, and alert records.

##### Hardware Specifications

- **GPS Module** tracks the real-time live location of the user.
- **GSM/Internet Module** sends emergency alerts and location details.
- **ESP32 Microcontroller** controls communication between system components.
- **Panic Button** activates emergency mode instantly during unsafe situations.
- **Android Smartphone** is used to operate the application and emergency features.
- **Power Supply** provides electrical power to the hardware modules.

##### System Configuration

- The system works using IoT communication and cloud-based monitoring.
- The mobile application connects to the backend server through internet services.
- The ESP32 microcontroller processes emergency requests and GPS data.
- The backend is developed using Node.js and Express.js.
- MongoDB is used for secure cloud-based data storage.
- The frontend interface is designed to be simple and user-friendly.

##### Advantages of the System

- Fast emergency response
- Real-time location tracking
- Secure data management
- Reliable communication system
- Low-cost implementation
- Easy scalability for future improvements

Overall, the integration of software and hardware technologies makes the system efficient, portable, reliable, and suitable for real-world women safety applications.

### CONCLUSION

The "Panic Button for Women Safety" system is an effective and intelligent emergency response solution developed using IoT, GPS, and mobile communication technologies. The system is designed to provide immediate assistance to women during unsafe and critical situations through fast emergency alert generation and real-time location tracking.

The proposed system successfully reduces emergency response time by allowing users to activate emergency mode with a single press of the panic button. Once activated, the system automatically sends alert messages and live GPS location details to registered emergency contacts and nearby authorities. This improves communication efficiency and increases the possibility of receiving timely help during emergencies.

The integration of technologies such as GPS modules, GSM communication, cloud servers, and mobile applications makes the system reliable, user-friendly, and scalable. The use of Node.js,



Express.js, and MongoDB ensures secure data management and smooth backend operations.

The project demonstrates how modern IoT-based technologies can be effectively used for personal security and women safety applications. Overall, the proposed system provides a smart, low-cost, and practical solution for enhancing women safety and emergency response services in real-world environments.

### **FUTURE SCOPE**

Although the proposed “Panic Button for Women Safety” system works efficiently, several advanced features can be added in the future to improve its performance, reliability, and security. The future scope of the project focuses on integrating intelligent technologies and expanding emergency response capabilities.

#### **1. Artificial Intelligence Integration**

Artificial Intelligence (AI) can be integrated into the system for automatic danger detection and behaviour analysis. AI algorithms can identify unusual movements, voice stress, or emergency situations automatically without manual button activation.

#### **2. Voice Command Activation**

Future versions of the system can support voice-based emergency activation. Users may activate the panic alert by speaking predefined emergency keywords, which will be useful when physical access to the device is not possible.

#### **3. Smart Wearable Device Support**

The system can be integrated with wearable devices such as smart watches, smart bands, and IoT-based safety gadgets. This will improve portability and make emergency activation faster and easier.

#### **4. Direct Police Station Connectivity**

Future implementations may include direct connectivity with nearby police stations and emergency response centers. This will help authorities receive alerts instantly and reduce emergency response delay.

#### **5. Audio and Video Recording**

The application can automatically start audio and video recording during emergencies. These recordings may help authorities collect evidence and improve investigation processes.

#### **6. Cloud-Based Monitoring and Analytics**

Cloud computing and analytics tools can be added for monitoring emergency cases, generating reports, and analysing safety patterns. This will improve data management and decision-making processes.

#### **7. Facial Recognition and Biometric Security**

Biometric authentication and facial recognition systems can be integrated to improve user authentication and prevent unauthorized access to the application.

#### **8. Multi-Language Support**

The application can support multiple regional languages to make the system accessible and user-friendly for people from different regions and backgrounds.

### **1. Offline Emergency Alert System**

Future systems can include offline SMS-based emergency communication so that alerts can still be sent even when internet connectivity is unavailable.

### **2. Integration with Smart City Infrastructure**

The system may also be connected with smart city surveillance systems, CCTV networks, and emergency response units for better public safety management.

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