International Research Journal on Advanced Engineering Hub (IRJAEH)
e ISSN: 2584-2137
Vol. 02 Issue: 11 November 2025
Page No: 4148-4151
https://irjaeh.com
https://doi.org/10.47392/IRJAEH.2024.0608

Smart Wearable Devices for Health Tracking and Women's Health

Satheesh Kumar G[1], Tara V K[2], Varsha S[3], Keerthana B[4], Manoj Rugvedi M S[5]
[1,2]Assistant Professor, Computer Science and Engineering, City Engineering College, Bangalore, Karnataka, India.
[3,4,5]UG (IV Year), Computer Science and Engineering, City Engineering College, Bangalore, Karnataka, India.
Emails: *satheesh.kumar@cityengineeringcollege.ac.in[1], taravk@cityengineeringcollege.ac.in[2], varshasusheelendra01@gmail.com[3], keerthymudhaliyar26@gmail.com[4], manojrugvedi99@gmail.com[5]*

Abstract
Women's safety is a major issue and is a most important obligation of all people. There is no hope for the world's well-being unless women's conditions improve. Since antiquity, women have enjoyed the highest status in society, but every day and every minute, women of all walks of life (women, girls and children) are harassed, abused, assaulted and violated in different places around the world. This work is concerned with developing smart, wearable devices for women's security using IOT. It consists of a device that can be worn for everyday life. When the girl is in danger, a device is activated that sends GPS coordinates for monitoring to an android application that is designed to track her on a regular basis. It also has a camera module that records images and sends them to an app when a girl is in danger. The system also includes an SOS warning to attract the attention of nearby humans. The SMS alert will also be sent to family members and to the nearest police station if the girl is in any danger. This proposed wearable device may serve as a solution to the problems encountered by learning when disrupted.
Keywords: *IOT, GSM/GPRS, GPS, AI.*

1. Introduction
High Incidence of Violence: A significant percentage of women experience harassment and violence throughout their lives. Statistics from organizations like the World Health Organization (WHO) highlight the severity of the issue, with a substantial number of women facing physical and sexual assault. Limitations on Freedom and Participation: The fear of violence restricts women's mobility, access to education and employment, and participation in public life. This limitation impedes gender equality and women's empowerment. Need for Effective Intervention: Existing safety measures and societal responses are often inadequate to prevent or effectively respond to incidents of violence against women. There is a need for innovative solutions that can provide immediate assistance and deter potential harm. Technological Solutions as a Potential Countermeasure: The surveyed papers explore the potential of technology, specifically smart wearable devices, to address this problem by providing tools for: Emergency Response: Enabling women to quickly and discreetly call for help in dangerous situations. Real-time Tracking: Utilizing GPS to monitor and share location information during emergencies. Automated Assistance: Employing sensors and AI to automatically detect threats and trigger alerts, shown in Figure 1 [1-3].

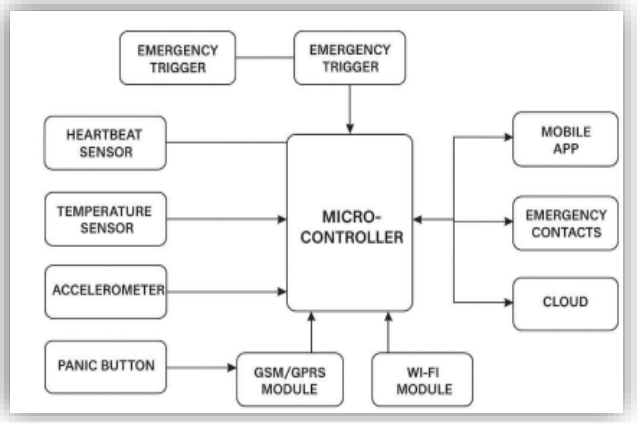

Figure 1: ***Block Diagram of this System***

2. Methodology
The proposed system involves a smart wearable

International Research Journal on Advanced Engineering Hub (IRJAEH)
e ISSN: 2584-2137
Vol. 02 Issue: 11 November 2025
Page No: 4148-4151
https://irjaeh.com
https://doi.org/10.47392/IRJAEH.2024.0608

device that addresses the above limitations through real-time, automated, and intelligent safety features:

Form Factor:

- Wearables such as smart bands, gloves, jackets, or watches.
- IoT for continuous data communication.
- GPS for real-time location tracking.
- GSM for SMS and mobile communication. Sensors to detect distress indicators (e.g., pulse rate, pressure, motion, temperature).
- Artificial Intelligence for pattern recognition and automated threat detection.

The system is designed to function autonomously or with minimal user input, enabling rapid response even in critical scenarios [4-5].

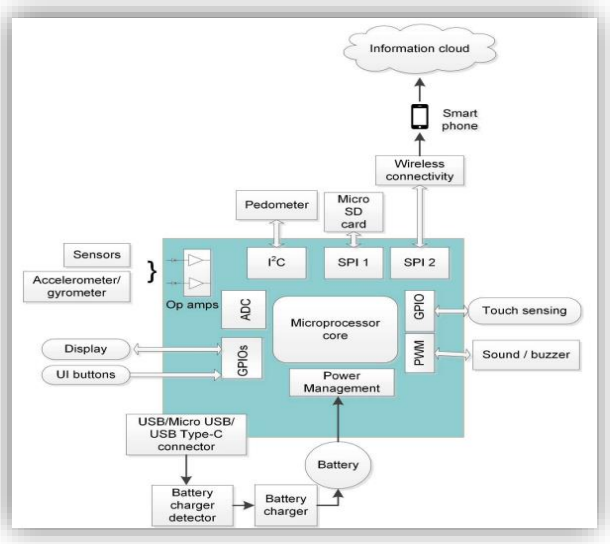

Figure 2: Block Diagram of Wearable Technologies

The smart wearable system offers several key benefits:

- Hands-Free Operation: Enables automated or voice-activated triggers without needing a phone.
- Real-Time Alerts: Sends immediate SMS or app-based notifications with location details to emergency contacts and authorities.
- Physiological Monitoring: Detects abnormal physical parameters (e.g., rapid heart rate, excessive pressure) to trigger alerts automatically.
- Discreetness: Wearable form allows users to silently request help without alerting the attacker.
- Portability and Comfort: Designed for daily use with lightweight, ergonomic, and discreet designs.
- 24/7 Monitoring: Ensures continuous surveillance without manual activation.
- Potential for AI Enhancement: Future iterations may include predictive analytics based on behavioral data, shown in Figure 2 & 3.

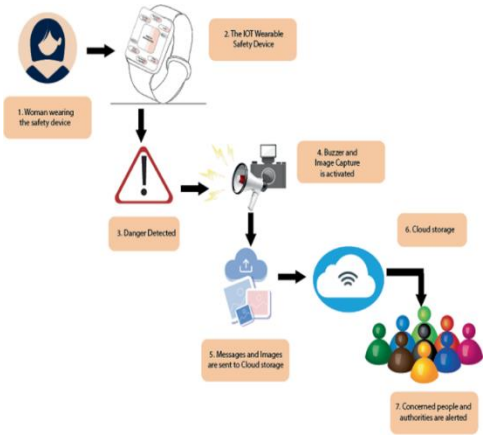

Figure 3: Women's Safety Wearables Design Using an IoT-Based Framework Technology.

The fear of walking alone at night or being subjected to assault restricts their freedom and hampers their ability to fully participate in public life. Women's safety has emerged as a highly sought-after research area in recent years. However, current solutions on wearable devices often rely on manual activation through buttons or physical intervention, such as buzzing devices, to alert others in times of danger. While these methods have provided some level of assistance, they often require the victim to take specific actions, which may not always be feasible or safe in high-risk situations. The key innovation lies in the seamless integration of these features, eliminating the need for manual intervention and ensuring timely responses to potential threats. This hands-free method establishes a new benchmark for safety solutions, offering women in potentially hazardous circumstances ease, assurance, and

International Research Journal on Advanced Engineering Hub (IRJAEH)
e ISSN: 2584-2137
Vol. 02 Issue: 11 November 2025
Page No: 4148-4151
https://irjaeh.com
https://doi.org/10.47392/IRJAEH.2024.0608

improved safety precautions. Our innovative technology creates a world where fear gives way to unwavering confidence and serenity in the face of challenges. By prioritizing women's safety, we are paving the way for empowerment and a profound sense of security.

3. Results and Discussion

3.1. Results

- Location Tracking: The GPS module acquires the current location coordinates.
- Alert Generation: The microcontroller sends an emergency alert via the GSM module, containing:
- User's name and ID
- Current location (with Google Maps link)
- Health parameters (if abnormal)
- Timestamp
- Contact Notification: Predefined emergency contacts (family, police, or guardians) receive an SMS.
- Cloud Logging: All event data is uploaded to a secure cloud platform for record-keeping and future analysis.

3.2. Discussion

The wearable is designed for comfort and daily usability, embedded into accessories like wristbands or gloves that do not hinder daily activities. In case of emergencies, the device is capable of sending distress signals automatically or through manual triggers to pre-registered emergency contacts, sharing both the user's location and relevant health indicators.

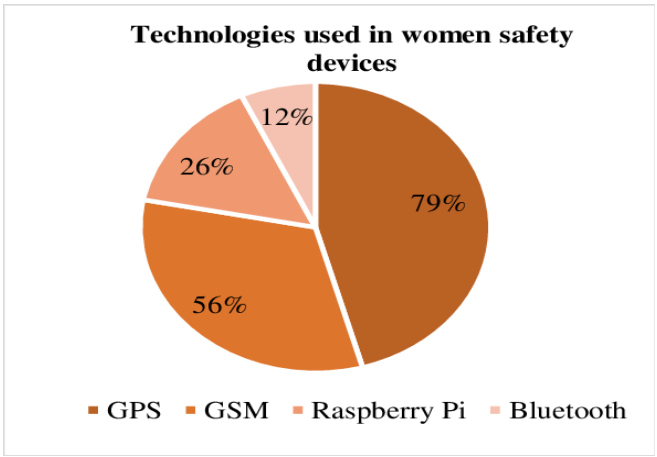

Figure 4: Technologies Used in Women Safety Devices.

The seamless combination of IoT, realtime data transmission, and discreet design ensures that users are empowered to act promptly and confidently in dangerous situations. Furthermore, the mobile application interface allows users to monitor their health data, manage emergency contact lists, and receive alerts, contributing to both safety and well-being. The system's low power consumption and continuous monitoring capabilities make it reliable for real-world deployment, shown in Figure 4 to 6.

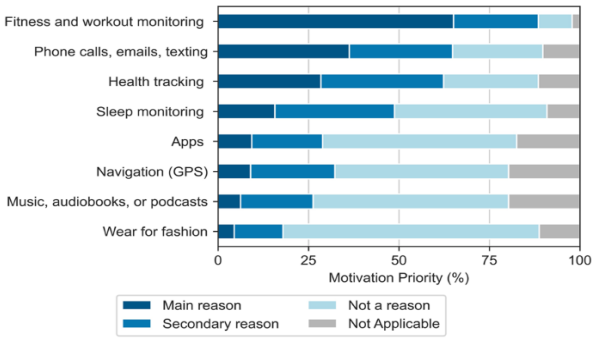

Figure 5: ***Accessibility of Digital Health Sharing***

Utilizing state-of-the-art IoT and embedded systems, our research paper presents an innovative and convenient solution that eliminates the need for manual intervention. By seamlessly detecting vital physiological changes, such as heart rate and stress levels, our technology automatically triggers a swift notification to both the individual's immediate family members and relevant authorities.

Figure 6: Smart Watch

International Research Journal on Advanced Engineering Hub (IRJAEH)
e ISSN: 2584-2137
Vol. 02 Issue: 11 November 2025
Page No: 4148-4151
https://irjaeh.com
https://doi.org/10.47392/IRJAEH.2024.0608

***Figure 7:* Fitness Band.**

In summary, this paper successfully demonstrates the feasibility and social impact of deploying smart wearable technology for personal safety and health awareness. It validates how thoughtful integration of accessible technologies can contribute to a safer environment for women in both public and private spaces, shown in Figure 7.

Conclusion

This project presents a detailed design and prototype of a smart wearable device tailored to enhance women's safety while simultaneously offering basic health tracking functionalities. The increasing incidence of violence against women has highlighted the urgent need for proactive safety mechanisms that go beyond conventional methods. Our device addresses this gap by integrating multiple technologies such as GPS for real-time location tracking, GSM for emergency communication, and various sensors for monitoring physiological parameters like heart rate, temperature, and movement.

- The mobile application interface allows users to monitor their health data, manage emergency contact lists, and receive alerts, contributing to both safety and well-being. The system's low power consumption and continuous monitoring capabilities make it reliable for real-world deployment.
- Demonstrates the feasibility and social impact of deploying smart wearable technology for personal safety and health awareness.
- The wearable is designed for comfort and daily usability, embedded into accessories like wristbands or gloves that do not hinder daily activities. In case of emergencies, the device is capable of sending distress signals automatically or through manual triggers to pre-registered emergency contacts, sharing both the user's location and relevant health indicators.
- The increasing incidence of violence against women has highlighted the urgent need for proactive safety mechanisms that go beyond conventional methods. Our device addresses this gap by integrating multiple technologies such as GPS for real-time location tracking, GSM for emergency communication, and various sensors for monitoring physiological parameters like heart rate, temperature, and movement.

References

[1]. B. Vijaylashmi1, Renuka.S2, Pooja Chennur3, Sharangowda.Patil4,"Self defence system for women safety with location tracking and SMS alerting through Gsm network.IJRET: International Journal of Research in Engineering and Technology ISSN: 2319-1163 ISSN: 2321-7308.

[2]. Niti shree "A Review on IOT Based Smart GPS Device for Child and Women Safety", IJERGS, May-June 2016.

[3]. Swapnali N.Gadhave1, Saloni D. Kale2, Sonali N. Shinde3, Prof. Amol C. Bhosale4, "Electronic Jacket for Women Safety", IRJET, May 2017.

[4]. Hung Nguyen, Karina Lebel, Sarah Bogard, Etienne Goubault, Patrick Boissy, and Christian Duval," Using Inertial Sensors to Automatically Detect and Segment Activities of Daily Living in People With Parkinson's Disease", Transactions On Neural Systems And Rehabilitation Engineering, Vol. 26, No. 1, January 2018 197.

[5]. Shubham Sharma1, Fasil Ayaz2, Rajan Sharma3, Divya Jain4, "IoT Based Women Safety Device using ARM7", IJESC, May 2017.