# SMART WRIST BAND FOR WOMEN SAFETY USING IOT

**N. Manasa, P. Lakshmi Nithya, V. Yamini, B .Harshitha**
#1#2#3#4 B.Tech with Specialization of Computer Science and Engineering in PBR Visvodaya Institute Of Technology and Science College, Kavali.

**Abstract:** This project presents the design and implementation of a smart wristband aimed at enhancing women's safety using IoT technology. The wristband integrates sensors for monitoring temperature and heart rate, alongside GSM and GPS modules for communication and location tracking, respectively. Through a combination of hardware components including an ESP8266 Node-MCU and Arduino Uno, as well as software development in Arduino IDE and integration with cloud platforms, the system detects potential emergencies and triggers alerts accordingly. User interaction is facilitated through a mobile application, providing real-time data visualization and enabling manual emergency signaling. The project addresses the critical need for personal safety solutions and demonstrates the potential of IoT in addressing societal challenges.

Keywords: Smart wristband, Women's safety, IoT, Sensors, GSM module, GPS module, Arduino Uno, ESP8266 Node-MCU, Emergency alerts

## I. Introduction

In today's world, ensuring personal safety, especially for women, is of utmost importance. However, traditional safety measures often fall short in providing timely assistance during emergencies. To address this challenge, innovative solutions leveraging technology are emerging, and one such solution is the smart wristband. Imagine a wearable device equipped with sensors and connectivity features designed specifically to monitor and respond to potential dangers. This smart wristband integrates seamlessly into everyday life, offering a sense of security and peace of mind to its users.

At its core, the smart wristband relies on the power of Internet of Things (IoT) technology. By harnessing IoT, this device can constantly monitor various aspects of the user's surroundings and well-being. Sensors embedded within the wristband can detect changes in temperature and heart rate, alerting the wearer to potential threats or emergencies. Additionally, with the inclusion of communication modules such as GSM and GPS, the wristband can swiftly connect with emergency services or loved ones when needed.

Unlike traditional safety tools like pepper sprays or alarms, the smart wristband provides proactive protection. It doesn't wait for an emergency to occur; instead, it actively monitors for signs of danger and takes preemptive action. For example, if the wearer's heart rate suddenly spikes or if they enter an unfamiliar or potentially risky location, the wristband can send out alerts and even share their precise location with trusted contacts.

In this paper, we introduce a simplified yet powerful smart wristband solution designed

to enhance women's safety. We delve into the technology behind the wristband, explaining how it works and the benefits it offers. Furthermore, we explore the potential impact of such a device on personal safety and discuss how it can empower individuals to navigate the world with greater confidence and security. Through this research, we aim to contribute to the ongoing efforts to create safer environments for all individuals, especially women.

## II. Existing System

Several research works have been conducted to address the issue of women's safety using IoT technology. Priya Biradar et al. (2020) proposed an IoT-based smart bracelet for women's security, focusing on real-time monitoring and alerting capabilities. Similarly, Mohamad zikriya et al. (2018) developed a smart gadget aimed at enhancing women's safety by leveraging IoT devices. A.Jesudoss et al. (2018) introduced a smart solution tailored to women's safety concerns, emphasizing the integration of IoT for proactive threat detection and response. Wasim Akram et al. (2019) designed a smart safety device utilizing IoT technology, aiming to empower women with tools for self-protection. Furthermore, D. G. Monisha et al. (2016) presented the FEMME system, a women's safety device and application, highlighting the importance of technological interventions in addressing safety challenges faced by women.

## III. Proposed System

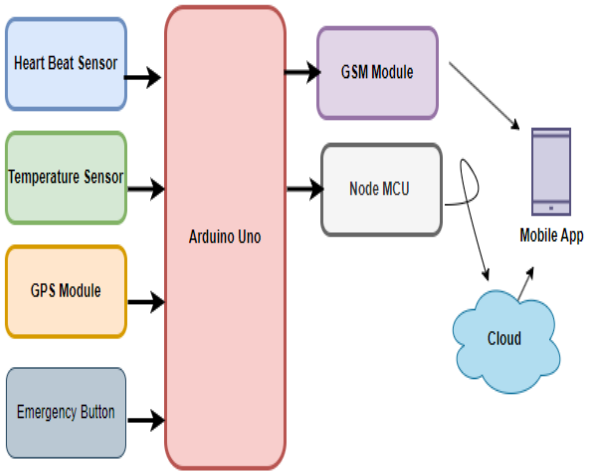


**Fig 1: Block diagram of the proposed system**

Building upon the existing research, our proposed system aims to further enhance women's safety through the integration of advanced IoT technology. Inspired by the concepts presented in the referenced works, our system will use a combination of sensors, communication modules, and data analytics to create a comprehensive solution. The proposed smart wristband will incorporate temperature and heart rate sensors for continuous monitoring of the user's health status. Additionally, GSM and GPS modules will enable real-time communication and location tracking, facilitating swift response in emergency situations. By integrating these components into a wearable device, our system aims to provide women with a reliable and effective means of ensuring their safety in various environments. Through rigorous testing and evaluation, we will assess the performance and usability of the proposed system, with the ultimate goal of empowering women to navigate the world with confidence and peace of mind.

## IV. Components used and description

**Temperature Sensor:** The temperature sensor is responsible for measuring the ambient temperature around the wearer. It helps in detecting sudden changes in temperature that may indicate potential threats or emergencies, such as fire or extreme weather conditions.

**Fig 2: Temperature Sensor**

**Heart Rate Sensor:** The heart rate sensor monitors the wearer's heart rate in real-time. Sudden spikes or irregularities in heart rate can be indicative of distress or panic, triggering alerts and emergency responses.

**Fig 3: Heart beat sensor**

**GSM Module:** The GSM module enables communication via mobile networks. It allows the smart wristband to send SMS alerts to predefined contacts in case of emergencies, providing a reliable means of seeking assistance even when Wi-Fi connectivity is unavailable.

**Fig 4: GSM module**

**GPS Module:** The GPS module provides accurate location tracking capabilities. It allows the smart wristband to determine the wearer's precise location and share it with trusted contacts or emergency services, facilitating swift response and assistance.

**Fig 5: GPS Module**

**ESP8266 Node-MCU (Wi-Fi Module):** The ESP8266 Node-MCU serves as the Wi-Fi module, enabling connectivity to local Wi-Fi networks. It allows the smart wristband to transmit data to cloud platforms or mobile applications for remote monitoring and management.

**Fig 6: NODE MCU WiFi Module**

**Arduino Uno:** The Arduino Uno serves as the main microcontroller unit in the system. It coordinates the operation of various sensors and modules, processes data, and controls communication between components.


**Fig 7: Arduino Uno**

## V. Working Algorithm

The working algorithm for the smart wristband's emergency alert system is as follows:

**Initialization:** Initialize the system, including setting up sensors, communication modules, and emergency protocols.Ensure all components are functioning correctly and are ready to detect and respond to emergencies.

**Continuous Monitoring:** Continuously monitor sensor data, including temperature and heart rate, to detect any anomalies or sudden changes.

If the sensor readings surpass predefined thresholds or exhibit abnormal patterns, flag them for further analysis.

**Emergency Button Activation:** Monitor the state of the emergency button. If pressed, immediately initiate the emergency alert process.

**Alert Generation:** Upon detecting an emergency condition or receiving a signal from the emergency button, generate an alert.

**Data Transmission:** Utilize communication modules (GSM or Wi-Fi) to transmit the alert message to predefined contacts or emergency services.

Include essential information such as the wearer's location (obtained from the GPS module) and the nature of the emergency.

## VI. Results

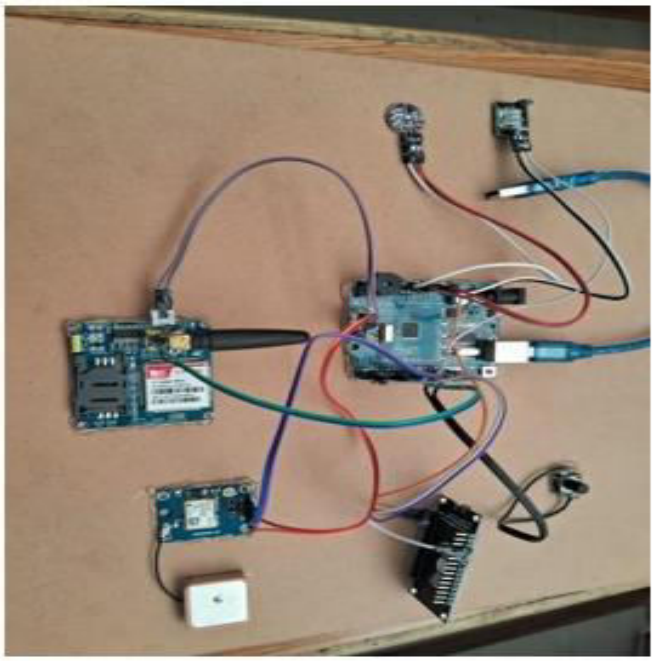

**Fig 8:** Showing the Hardware Prototype of the Proposed System

This figure 8 provides a visual representation of the physical implementation of the smart wristband prototype. It showcases the arrangement of components such as sensors, communication modules, microcontroller units, and power sources on the wristband's form factor. The image highlights the compact and wearable nature of the device, demonstrating its practicality for real-world deployment in ensuring women's safety.

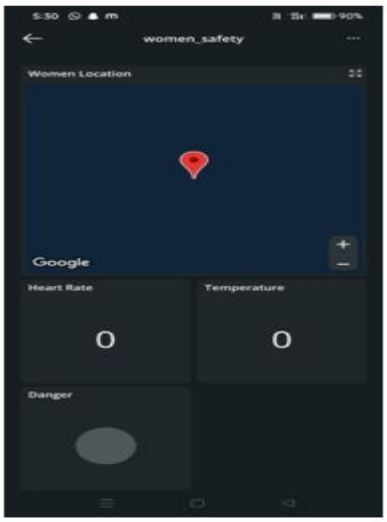


**Fig 9:** Showing the User Interface Built for Real-Time Values Monitoring

This figure 9 illustrates the user interface developed for monitoring real-time sensor data from the smart wristband. The interface may consist of a mobile application or web-based dashboard, allowing users to visualize temperature, heart rate, and other relevant metrics in real-time. Graphs, charts, or numerical displays may be included to provide intuitive insights into the wearer's health status and environmental conditions.

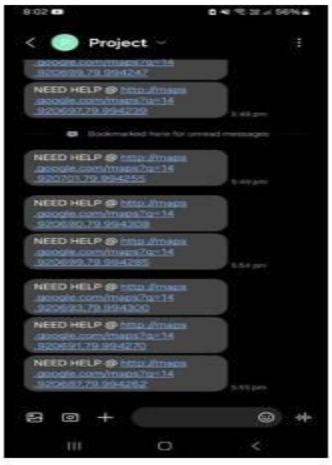


**Fig 10:** Showing the SMS Received During Emergency State with Map Link Latitude and Longitude

This figure 10 shows the SMS notification received by designated contacts or emergency services during an emergency situation. The SMS message contains crucial information, including a map link to the wearer's current location specified by latitude and longitude coordinates. By clicking on the map link, recipients can access precise location details, facilitating rapid response and assistance. The figure highlights the effectiveness of the smart wristband in promptly communicating vital information to relevant parties during critical moments.

## VII. Conclusion:

The IoT-based smart wristband designed for women's safety represents a significant step forward in leveraging technology to address personal security concerns. Through its integration of sensors, communication modules, and intuitive user interfaces, the device offers a comprehensive solution for real-time monitoring, detection of emergencies, and prompt response mechanisms. The hardware prototype demonstrates the feasibility and practicality of wearable devices in safeguarding individuals, particularly women, in various environments. With its ability to provide timely alerts and precise location information during emergencies, the smart wristband has the potential to empower users with greater confidence and peace of mind as they navigate their daily lives. Moving forward, continued refinement and optimization of the device's features and functionalities will be crucial in realizing its full potential as an effective tool for enhancing women's safety in today's dynamic world.

## References

[1] P. Biradar, P. Kolsure, S. Khodaskar, and K. B. Bhangale, "IoT Based Smart Bracelet for Women Security," International Journal for Research in Applied Science and Engineering Technology (IJRASET), vol. 8, no. 11, pp. [pages], ISSN: 2321-9653, Feb. 2020.

[2] M. Zikriya, P. M. G., S. R. Math, and S. Tankasali, "Smart Gadget for Women Safety Using IoT," International Journal of Engineering Research & Technology (IJERT)

[3] A. Jesudoss, Y. Nikhila, and T. S. Reddy, "Smart Solution for Women Safety Using IoT," International Journal of Pure and Applied Mathematics, vol. 119, ISSN: 1314-3395, Dec. 2018.

[4] W. Akram, M. Jain, C. Sweetlin, and H. Hemalatha, "Design of a Smart Safety Device for Women Using IoT," in International Conference on Recent Trends in Advanced Computing (ICRTAC), ISSN: 1877-0509

[5] D. G. Monisha, M. Monisha, G. Pavithra, and R. Subhashini, "Women Safety Device and Application - FEMME," Indian Journal of Science and Technology, vol. 9, ISSN: 0974-5645, Mar. 2016

**Author's Profiles**

**M. VIJAYA BHASKAR** working as Assistant Professor in Department of CSE, PBR Visvodaya Institute of Technology and Science, Kavali. He completed his MCA from Noble College Of Computer Sciences and completed his M.Tech in Computer Science from PBR Visvodaya Institute of Technology and Science. He has15 years of Teaching experience in various engineering colleges.

**N.Manasa** B.Tech with Specialization of Computer Science and Engineering in PBR Visvodaya Institute Of Technology and Science Engineering College, Kavali.

**P.Lakshmi nithya** B.Tech with Specialization of Computer Science and Engineering in PBR Visvodaya Institute Of Technology and Science Engineering College, Kavali.

**V.Yamini** B.Tech with Specialization of Computer Science and Engineering in PBR Visvodaya Institute Of Technology and Science Engineering College, Kavali.

**B. Harshitha** B.Tech with Specialization of Computer Science and Engineering in PBR Visvodaya Institute Of Technology and Science Engineering College, Kavali.