Wearable Women Safety Device

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Abstract
It is crucial to defend women in today's world. In times of crisis, the IoT-based women's safety device described in this study is designed to provide real-time assistance and emergency reaction. Among the many safety features of the gadget are an automatic SMS warning system that alerts pre-saved contacts, a buzzer that alerts anybody around, and an auto-dial feature that allows the victim to speak hands-free with a designated contact. A shockwave generator included inside the gadget can render an attacker momentarily incapacitated, allowing the victim to escape. The hardware includes a Li-ion battery (3.7V, 2200mAh) with a TP4056 charger module for portability and prolonged usage, an Arduino Nano, a GPS Neo 6M module for real-time position tracking, a GSM SIM800L module for communication, and a 5V step-up power module. The 1000 KV step-up power module activates the self-defense shockwave capabilities. Combining these technologies, the proposed device provides a portable, reliable, and efficient solution for women's safety, offering immediate emergency assistance and deterrence.
Index terms - Women safety, IoT-based security, real-time tracking and self-defense technology.

Keywords: smart security device, GPS, GSM, women's safety, IoT, emergency alert.

Introduction

Given the prevalence of crimes against women in today's culture, protecting women's safety is of utmost importance. The emergence of the Internet of Things (IoT) has opened the door for creative solutions that can offer emergency response and real-time help to people in need.
This paper summarizes the creation of women safety device using Internet of Things (IoT) technology, marrying self-defense with pre-emptive alarm systems to improve individual security.
The gear proposed combines different elements to offer prompt help in case of an emergency. The system has an automated SMS notification system intended to offer instant location details to preregistered emergency contacts. In addition, It has an auto-dial system whereby the victim is able to call without necessarily using their hands and, in the process, utilize a buzzer to summon help from the people around them and a pre-stored number. The unique feature of this device is the shockwave generator, which gives the user an opportunity for self-defense by incapacitating an attacker for a while.
This research utilizes an Arduino Nano as its primary microcontroller, complemented by a GPS Neo6M module for tracking location and a GSM SIM800L module for communication. The power of the device is regulated by a TP4056 charging module for the 3.7V, 2200mAh Li-ion battery, ensuring long-lasting performance and portability. For ensuring stable voltage levels, a 5V step-up power module is used, while a 1000KV step-up power module is used to power the shockwave generator. Other components, such as an 8 Ohm, 0.5W speaker for voice alerts, complement the overall performance of the device.
The proposed IoT-based women's safety device integrates multiple advanced technologies as a compact, reliable, and effective personal security augmentation tool. In addition to its emergency calling feature, the device includes a deterrence mechanism and real-time location tracking. This paper explores the design, development, and efficacy of the safety device

DOI: https://doi.org/10.5281/zenodo.15552442

and its potential to greatly enhance women's security in dangerous situations. The research underscores the value of autonomous safety systems, the necessity of proactive self-protection functionalities in wearable security systems, and the way in which IoT can enhance response times. Using modern electrical components and advanced programming techniques, this concept aims to bridge the gap between traditional self-protection devices and modern safety devices.

This initiative also emphasizes how crucial it is to use technology to empower people, particularly when it comes to improving personal safety. These technologies can open the door for more intelligent and responsive security systems thanks to developments in IoT, AI, and real-t

I. Main Text

An Overview In today's world, protecting women has become a top priority. Technology-based solutions provide a pro active means of improving personal security in light of the increase in harassment and violent occurrences. The IoT- based women's safety device shown in this study combines location monitoring and real-time communication to offer prompt aid in an emergency.

II. Components and System Design

The architecture of the suggested safety device is depicted in Figure1 an included the following essential elements: The Arduino Uno microcontroller serves as the main processing unit.

GSM Module (SIM800L/SIM900A): Enables emergency communication through automated calls and notifications. The Neo-6M GPS module allows for real-time position tracking.

Buzzer: To get attention, it emits an auditory alarm. Pressing the push button initiates emergency response. Figure1: Women's Safety Device System Architecture

III. Mechanism

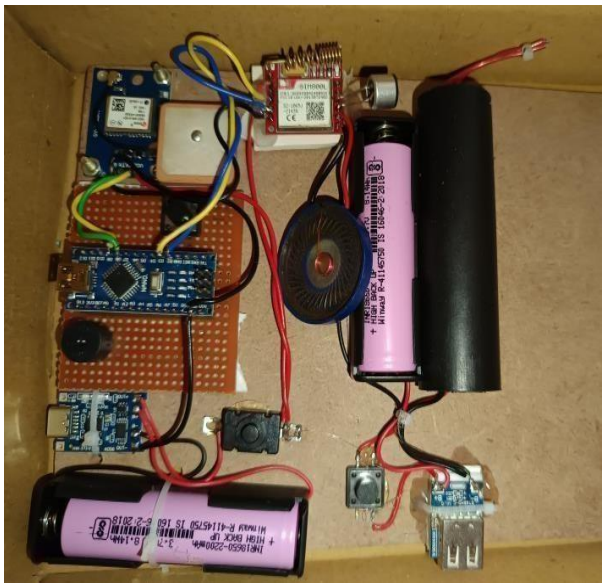
When the button is pressed, the system does the following actions:

- **Buzzer Activation**: To notify those in the vicinity, the buzzer sounds after three seconds.
- **Location Alert via SMS**: A pre-designated emergency contact receives an SMS with the device's coordinates, which are retrieved by the GPS module.
- **Automatic Call**: To guarantee prompt action, the GSM module calls the emergency contact number.
- **Real-Time Monitoring**: Cloud connectivity for ongoing tracking may be one of the future improvements.

Table 1 Functional Components of the device

Component	Function
Arduino Uno	Controls all operations of the device
GSM Module	Sends SMS alerts and makes emergency calls
GPS Module	Provides real-time location tracking
Buzzer	Sounds an alert to attract attention
Push Button	Activates emergency response when pressed

IV. Figures



V. Execution and Evaluation

The Arduino IDE's embedded C programming was used to create the gadget. To guarantee dependability in many settings, including urban and rural ones, extensive testing was carried

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out. The outcomes show that the gadget may make calls and transmit warnings in a matter of seconds, guaranteeing prompt emergency response.

VI. Conclusion

Enhancing personal security, the IoT-based Women Safety Device is a portable and affordable option. The system offers quick emergency help by combining GPS and GSM technology. To further enhance security measures, future developments may include AI-driven threat identification and integration with law enforcement networks.

It is appropriate for women of all ages due to its small size and simplicity of usage. This system minimizes dependence on human intervention by leveraging the Internet of Things' capabilities to facilitate a quick and automatic response to emergency conditions.

In order to enhance the device's responsiveness and accuracy, subsequent releases can consider the use of machine learning algorithms for triggering voice commands as well as anomaly detection. Further, collaborations with government agencies and non-governmental organizations can enhance the reach and influence of the device, thereby placing women's safety as a common social responsibility.

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And Support Throughout This Research. Her InsightsAndExpertiseHaveBeen InstrumentalIn Shaping This Study and Enhancing the Overall quality of our work Govt. of India, Ministry of Women and Child Development, “Crime Statistics and Safety Measures for Women in India,” 2023. [Online]
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Acknowledgements

we would like to express our heartfelt gratitude to Nidhi Sharma Ma’am for her invaluable guidance.