WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

SAFE PULSE

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ABSTRACT:

Women safety device that utilizes GSM and GPS technologies to provide an immediate response in emergency situations. The device is designed with a single-button activation mechanism that, when pressed, triggers a series of actions aimed at ensuring the user's safety. Upon activation, the device captures the user's GPS location and sends an alert message containing the location details to three pre-set emergency contacts, the nearest hospital, and the closest police station.The GSM module enables seamless communication by sending these alerts through SMS, ensuring that location data reaches recipients instantly, even in areas with limited internet connectivity. The GPS module provides accurate, real-time location tracking, which is crucial for a quick response by emergency contacts and law enforcement. The device also includes an automatic periodic update system, which sends location updates at regular intervals to keep responders informed in dynamic situations.This women safety device is intended to be compact, easy to operate, and efficient, allowing it to be discreetly carried or worn by users. By utilizing GSM and GPS technology, the device ensures a reliable communication channel in emergencies, empowering users with a tool for enhanced personal security. The proposed system is designed to contribute effectively to women's safety by enabling a quick, coordinated response from emergency contacts and local authorities

INTRODUCTION:

Women's safety remains a critical concern globally, prompting the need for innovative solutions to provide immediate assistance in emergencies. Personal safety devices can bridge the gap by offering accessible technology that quickly alerts trusted contacts and local responders. This paper introduces a wearable women's safety device that uses GSM and GPS modules to ensure a rapid and coordinated response during distress situations.The device, compact and easy to use, is equipped with a single-button activation system that allows for swift action with minimal user interaction. When the button is pressed, the device gathers the user's real-time GPS location and sends an alert message to three pre-defined contacts, the nearest hospital, and the closest police station. The GSM module facilitates this by delivering messages through SMS, ensuring reliable communication even in areas with limited internet connectivity.By sending periodic location updates, the device provides responders with realtime tracking, which is essential for prompt intervention in dynamic scenarios. Unlike smartphone apps that rely on internet connectivity, this device is tailored for reliability and low-power operation, making it an ideal tool for prolonged use and effectiveness in various environments.

I. LITERATURE SURVEY

2.1: GSM and GPS in Emergency Response Systems

Research has shown that GSM (Global System for Mobile Communication) and GPS (Global Positioning System) technologies are effective in providing reliable location tracking and communication in emergency devices. A study by M. Ramesh et al. (2017) demonstrated the use of GSM and GPS modules in a mobile alert device that allows the user to send their exact location to emergency contacts. This model emphasizes the effectiveness of SMS-based communication in scenarios with limited internet access, which is crucial for real-time emergency responses in remote or low-connectivity areas.

2.2: Single-Button Activation and User-Centered Design

In a study by P. Sethi and R. Sharma (2019), a single-button activation design was identified as a critical feature in wearable safety devices. Their research highlighted that simplicity in user interaction increases the device's usability, particularly in high-stress situations where complex operations may be challenging. They demonstrated that a single button could trigger multiple functions, such as location tracking and alert messages, which supports ease of use and quick response—essential features for women's safety applications.

2.3: Integration with Local Authorities and Emergency Contacts

Studies have underscored the importance of integrating safety devices with local emergency services. M. Gupta et al. (2020) proposed a model where GPS-based alerts were sent directly to nearby police stations and hospitals. This approach showed that a coordinated response, involving both personal contacts and local authorities, could significantly enhance intervention times. This research underlines the need for safety devices to automatically identify and alert nearby support facilities for a more effective response in emergencies.

II. SYSTEM DESIGN

Panic Button:

A single-press panic button activates the device, initiating all emergency functions. This button triggers the microcontroller to start the alert process and minimizes the need for complex user interaction during emergencies. **Microcontroller:**
The central processing unit of the device, responsible for managing the GPS and GSM modules, as well as controlling the overall alert process. The microcontroller reads the GPS coordinates, composes the alert message, and sends it via the GSM module.

GPS Module:

Used to track the real-time location of the device. Upon pressing the panic button, the GPS module gathers accurate location data, which is critical for emergency responders. This data is periodically updated to provide real-time tracking in dynamic situations.

GSM Module:

Facilitates communication by sending SMS messages with location information. This module sends alerts to three pre-set emergency contacts, the nearest hospital, and the closest police station. GSM-based messaging ensures connectivity even in areas with low or no internet availability.

Battery and Power Management:

Facilitates communication by sending SMS messages with location information. This module sends alerts to three pre-set emergency contacts, the nearest hospital, and the closest police station. GSM-based messaging ensures connectivity even in areas with low or no internet availability.

III. SYSTEM ARCHITECTURE

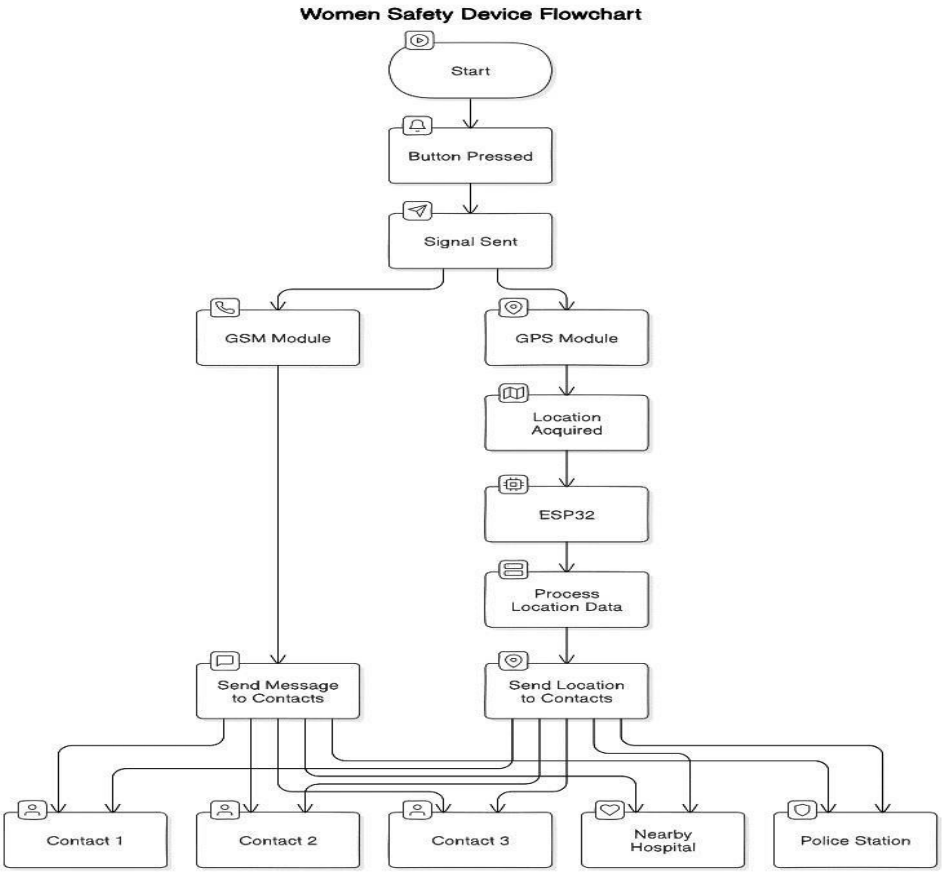

Fig.1.System Architecture

IV. RESULT AND DISCUSSION

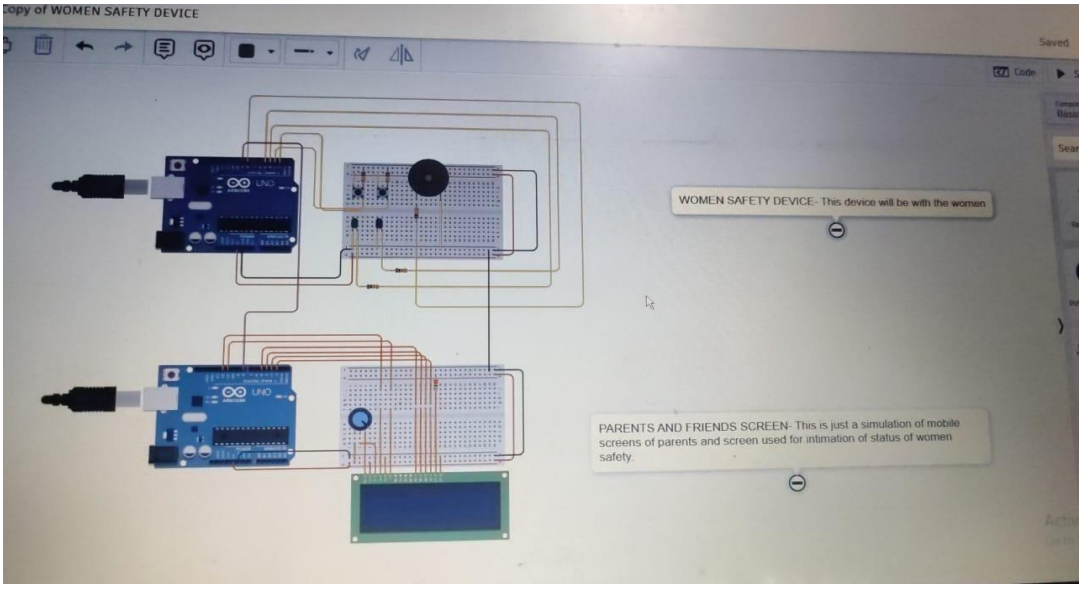

Fig.2. Stimulation

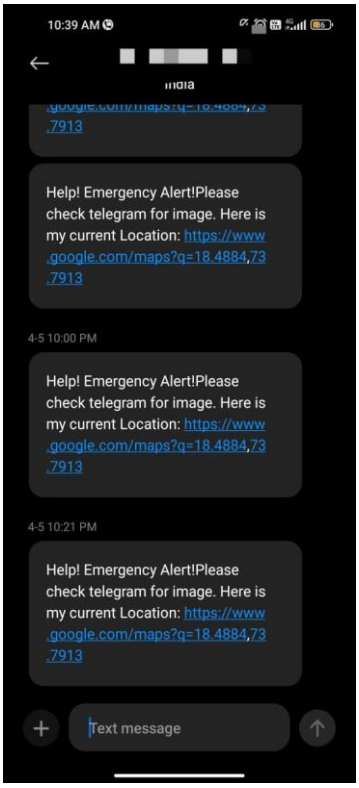

Fig.3. Message sent Through Safe Pulse

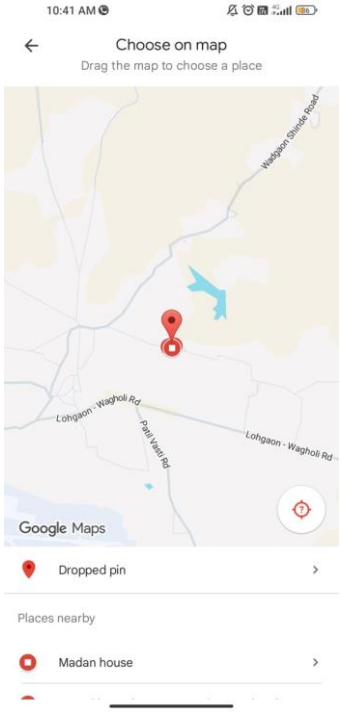

Fig.4. Fig4.4 Location by Safe Pulse

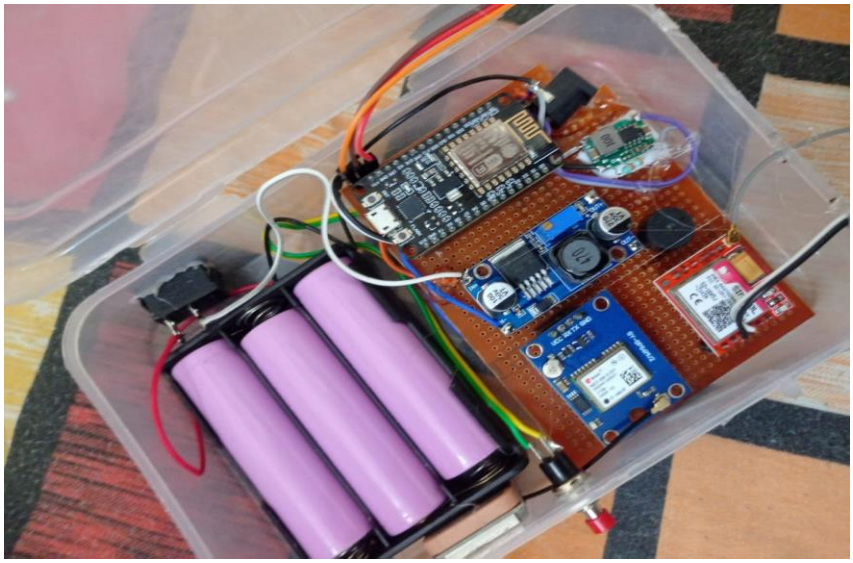

Fig .4.Hardware

V. FUTURE SCOPE

The proposed women safety device using GSM and GPS has a solid foundation, but further advancements could enhance its functionality, reliability, and usability. Here are some potential areas for future development:

1. Integration with IoT and Cloud Platforms

Future iterations could integrate IoT (Internet of Things) capabilities, allowing the device to connect with cloud-based platforms. This would enable real-time tracking and data storage, accessible to emergency responders or guardians via secure applications, providing a more efficient and continuous monitoring system.

2. Machine Learning for Risk Detection

By incorporating machine learning, the device could analyze the user's patterns, such as unusual movement or prolonged inactivity, and trigger an alert autonomously if these patterns indicate a potential risk. This would reduce the need for manual activation in situations where the user may be unable to press the panic button.

3. Battery Optimization with Energy Harvesting

Integrating solar panels or energy-harvesting components could extend battery life, making the device more reliable during extended usage. This would be particularly useful in situations where charging is not feasible, enhancing the device's dependability for outdoor use.

4. Advanced Communication Technologies

Future devices could leverage upcoming 5G networks or LoRa (Long Range) communication protocols to enhance data transmission speed and extend coverage.

This could provide faster, more reliable connectivity, especially in remote areas, allowing for quicker alert dispatch and response.

5. Audio and Video Capture with Live Streaming

Integrating a camera and microphone to capture real-time video and audio during an alert event could provide critical contextual information to emergency contacts and responders. In addition, live-streaming capabilities could allow contacts or authorities to monitor the situation as it unfolds. 6. **Advanced Encryption and Data Security** Ensuring robust data security and privacy is essential as the device handles sensitive information. Implementing advanced encryption techniques and secure communication protocols can protect user data and prevent unauthorized access, especially if the device integrates with cloud or IoT platforms.

VI. CONCLUSION

The development of a women safety device using GSM and GPS technologies presents a practical and effective solution for enhancing personal safety in emergency situations. The device, designed with a single-button activation mechanism, provides a quick and reliable way to alert pre-set contacts, nearby hospitals, and police stations. By leveraging GPS for real-time location tracking and GSM for SMS-based communication, the device ensures that emergency alerts reach responders promptly, even in areas with limited internet connectivity.This project emphasizes user-centered design, ease of use, and minimal power consumption, making it suitable for prolonged, day-to-day usage. The integration of periodic location updates further enhances the response accuracy, enabling emergency responders to act swiftly and effectively. While challenges such as battery life and GPS accuracy remain, the device provides a solid foundation for addressing women's safety concerns through accessible technology.With future advancements such as IoT integration, machine learning for risk detection, and hybrid positioning systems, this women safety device has the potential to become even more intelligent, responsive, and adaptive. Overall, this project represents a significant step toward empowering individuals with a reliable, wearable solution for personal safety, contributing to a safer and more secure environment for women.

VII. ACKNOWLEDGMENT

On the successful completion of this project, we would like to express our gratitude to every individual who helped us throughout the development of this project. We would especially thank our project guide and Head of Department, Dr. Varsha Kshirsagar for their timely help and guidance in completing this project successfully . his project is dedicated to supporting and empowering women, and we hope it can contribute in some meaningful way to creating safer environments for all.

VIII. REFERENCES

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