

# Smart Device for Women's Safety using IoT

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## Abstract—

Would it be unfair if I said that even today in 2023, women can not live freely in our society? There is a lot of news every day about physical violence, abuse and violence against women, and the numbers are growing, particularly in big towns. The presence of CCTV turned into very beneficial however the accused could not be recognized on the time of the attack. The intention of this text is to reduce violence against girls and ladies in India via empowering women to use generation to come to be self enough. developing a smart protection device for girls use of IoT with the A9G board involves developing an answer that integrates diverse technologies to beautify ladies' protection. Here is an abstract outlining the key components and features of such a device. Ensuring the safety of women has become a critical concern in today's society. This paper presents the design and implementation of a Smart Safety Device leveraging Internet of Things (IoT) technology, specifically utilizing the A9G board. The proposed system aims to provide women with a reliable and intelligent safety companion, empowering them to navigate public spaces with confidence. The proposed Smart Safety Device offers a comprehensive solution to address the safety concerns faced by women. By leveraging the A9G board's IoT capabilities, the system provides real-time tracking, instant alerts, and multimedia recording to enhance the overall security and peace of mind for users in various environments. This innovation represents a significant step towards leveraging technology for the betterment of societal safety. This exercise gives effective green, portable products that may assist women stay secure, impartial lives. The reason of IoT is SIM 800 GSM Modules, pressure touchy Resistors, surprise Sensors, Bluetooth Modules, LCDs, Resistors, Transistors, Diodes, LEDs, Arduino UNO, Bee Integration of Buzzers etc. to connect everything we create and use.

**Keywords—** Women Safety Device; IoT; Beat sensor, A9G board, Ladies Security, GPS module, GSM module, Drive resistive sensor.

## I. INTRODUCTION

In recent years, technology has played a pivotal role in addressing societal challenges, and one such pressing issue is the safety of women. The alarming increase in incidents of harassment and violence against women has led to a growing need for innovative solutions that prioritize personal safety. In response to this, we present a groundbreaking initiative - the creation of a Smart Safety Device for Women using Internet of Things (IoT) technology. The Smart Safety Device is not just a gadget; it's a comprehensive system designed to empower women by providing them with a reliable and efficient means to ensure their safety in various situations. Leveraging the capabilities of IoT, this device integrates seamlessly with the digital world, offering real-time monitoring, communication, and emergency response features.

In a world where safety is paramount, technological innovations continue to play a pivotal role in addressing

societal concerns. One such concern that demands immediate attention is the safety of women. Recognizing this need, we embark on a journey to create a revolutionary solution — a Smart Safety Device for Women, utilizing the advanced capabilities of the A9G development board within the Internet of Things (IoT) framework. The A9G board, equipped with powerful features such as GPS, GSM, and various sensors, serves as the cornerstone for our smart safety device. This amalgamation of hardware prowess and IoT functionality opens up a realm of possibilities to design a comprehensive safety solution tailored specifically for women.

## II. LITERATURE REVIEW

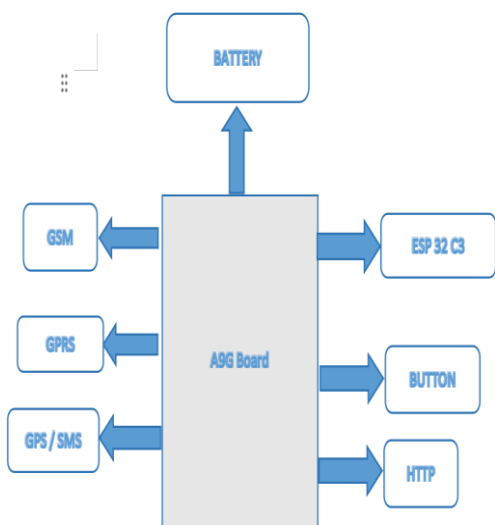
Suraksha[2] is a personal property that can arise from sound, change and impact/force. Voice is a sacrifice. The device will recognize it and send a message. The author's proposed tool (FEMME) [4] has robotic applications. Its predominant undertaking is to ship suspicious messages and document audio and video of all incidents as proof. It also has a module for detecting hidden cameras the use of an RF receiver that collects/detects the radio waves emitted by spy cameras. The switch is a simple on/off indicator and pressure; once activated, the tool starts operating the usage of energy sensors and transmits the victim's area data to the victim's own family. [5] Using the ATmega 328 microcontroller, he developed a security device that does not require an Android application and allows it to operate independently. It provides information about the woman's modern-day place the usage of GPS and GSM modules to track the vicinity and ship it to family and buddies. Security[7], get The because of this change. The victim's vicinity will be communicated to personnel. Additionally, the device will use audio circuits for pre-recorded notes to alert the environment. Kumar et al. [3] is a portable tool that ensures the safety of girls.

Raspberry Pi 0 includes hardware additives inclusive of the Raspberry Pi digicam, ringer, and a button to open the program. The victim pressed the button to open the door. while pressed, the sufferer's location is back and the digicam captures an photo of the attacker, that is fast dispatched from the sufferer's telephone to the police or hotline. We present a tool that works with the idea of geofencing, which is a digital boundary that applies while human beings are in a sure place. There are two ways to contact the sufferer's own family or pals. The tool additionally lets in ladies to beep whilst the ultimate message is obtained, even if the tool is in silent mode. The clever motion device[1] can be activated with the aid

tool is thrown, the power sensor activates and sends the sufferer's contemporary vicinity. The piezoelectric buzzer can even prompt. the 2 metal dots at the pinnacle of the display emit electric

powered cutting-edge and can cause electric shock. almost all cutting-edge protection devices for ladies require human intervention, consisting of pressing a button to activate the device or preserving the tool after listening to a legitimate threat. however, the proposed device is based on arms as hand connection.

**I. ARCHITECTURE :**

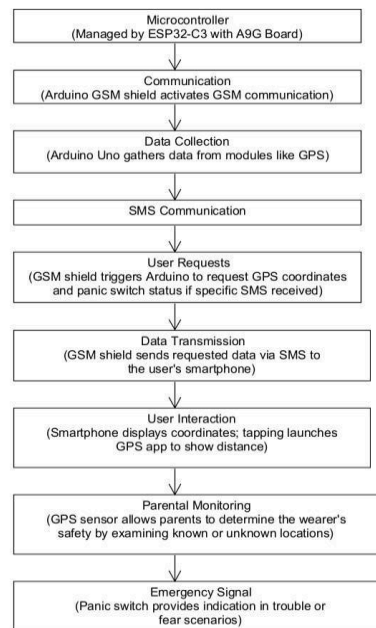


**Fig. System Architecture**

**II. PROPOSED METHODOLOGY :**

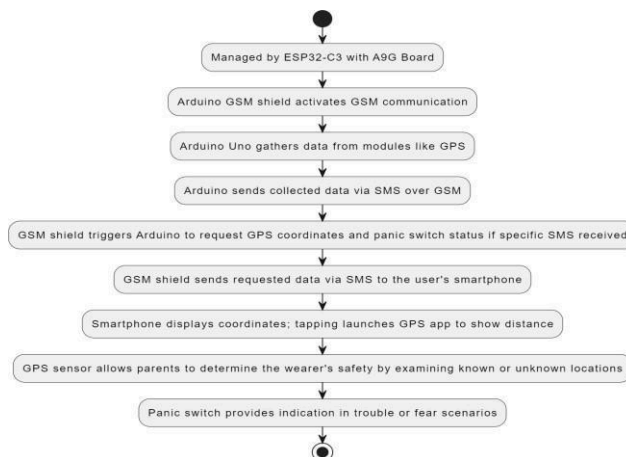
- Step 1 :** Start
- Step 2 :** Registration
- Step 3 :** Press switch Button
- Step 5 :** Send the Location to registered number.
- Step 4 :** Real time location is send.
- Step 7 :** End

**III. DATA FLOW DIAGRAM :**



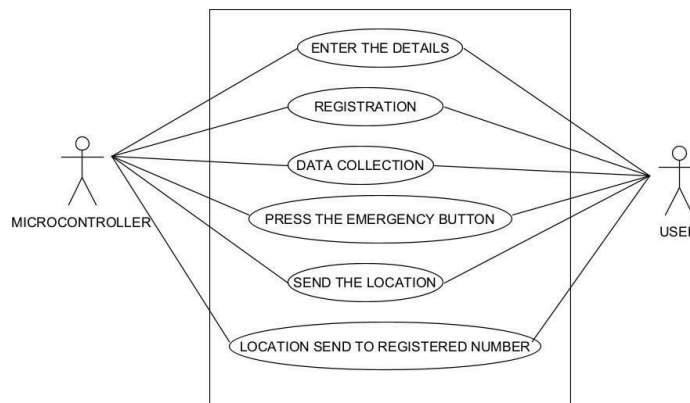
**Fig. DATAFLOW DIAGRAM**

**IV. Activity Diagram**



**Fig Activity Diagram**

**V. Use Case Diagram**



**Fig. Use Case Diagram**

**VI. Sequence Diagram**

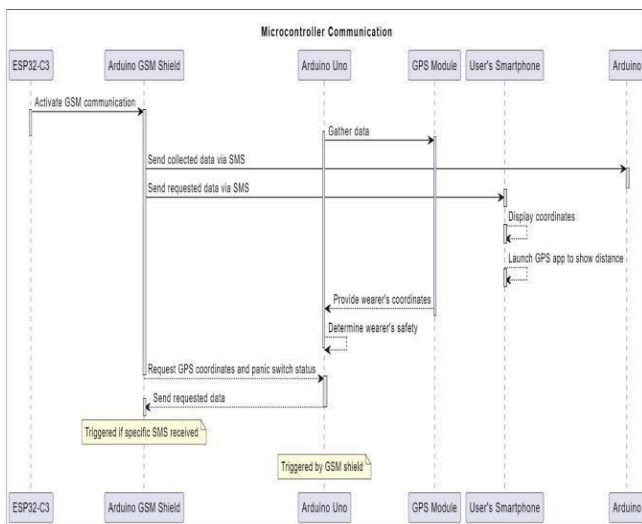


Fig. Sequence Diagram

## VII. PROPOSED LAYOUT FOR WOMEN SAFETY TOOL

The mentioned women's safety equipment aims to help women who may experience negative problems. The device is ready for any situation that may arise against the woman's will. Figure 1 shows the hardware configuration of the security device. It uses the Atmega 328 microcontroller. The design includes GSM (Global System for Mobile Communications) to send alerts, a ringtone to alert the surroundings, and shock absorbers for self-defense.

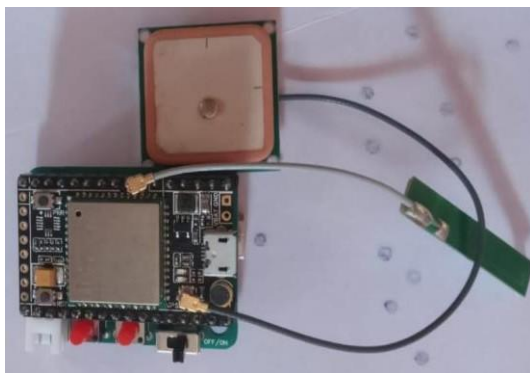


Fig. Proposed Hardware Design for Women Safety

Working of the device is as follows:

1. Define the Project Requirements: Clearly define the functionalities you want your device to have, such as an SOS button, GPS tracking, sending alerts, etc.
2. Assemble the Hardware: Gather the necessary hardware components, including the ESP32-C3 microcontroller, GPS module, buttons, battery, and other sensors or peripherals you need.
3. Set Up the Development Environment: set up the important software equipment and libraries, together with the Arduino IDE with ESP32-C3 assist.
4. Design the Circuit: Create a circuit diagram for your hardware setup. Connect the ESP32-C3, GPS module, SOS button, and other components according to your design.
5. Write Firmware/Software: Write the firmware for your ESP32-C3. This involves programming the microcontroller

to handle button presses, interact with the GPS module, and send SOS alerts. Implement power management to ensure efficient battery usage.

6. SOS Button Functionality: Implement the SOS button functionality. When pressed, it should trigger an alert, which could include sending a distress message and/or activating a loud alarm.

7. GPS Tracking: Integrate the GPS module to obtain location information. You can use the NMEA sentences provided by the GPS module to get latitude and longitude data.

8. SOS Alerting Mechanism: Decide how you want to send SOS alerts. You can use Wi-Fi, mobile networks, or both. Implement protocols like MQTT or HTTP for communication.

9. Server-Side Backend: Create a server-side backend to receive and process SOS alerts from the device. This could be a cloud-based server or a self-hosted server.

10. Alert Notifications: Set up a system to notify designated contacts when an SOS alert is received, such as sending text messages, emails, or push notifications.

11. Power Management: Optimize power consumption to prolong the device's battery life. This may involve putting the ESP32-C3 into sleep mode when not in use.

12. Testing and Debugging: Thoroughly check the tool to make certain that each one functionalities work as predicted. Debug and quality-tune the code as needed.

13. Enclosure Design: Design or select an appropriate enclosure for the device to make it portable and durable.

14. User Interface: Create a user-friendly interface for configuring the device, setting emergency contacts, and checking the status of the device.

15. Compliance and Certification:

Depending on your region, you may need to meet regulatory requirements for safety and wireless communication.

16. Deployment and Distribution: Prepare your device for deployment, whether it's a commercial product or a personal project. The circuit includes 3 main tiers

- Power supply
- The oscillator
- Voltage amplifier

when the battery is completely charged, voltage is carried out to the oscillator stage. The transformer increases the oscillation frequency and acts like an inverter. The transformer's output is then transferred to the capacitor, in which current is stored and used to surprise the attacker.

indicates Android interface for ladies' protection. The layout also encompasses an android utility that gives a further safety functions as indexed.

1. Use this app to send group messages from the device to the victim's mobile phone.
2. The recorded data can be utilized by the victim's evidence towards the culprit.



3. The safe place of the sufferer's present day location could be displayed at the map via the cell application, allowing ladies to reach the secure area from their present day vicinity.

Figures display the individuality of the layout in solving women's sensitive protection-associated problems; because other devices are based on women pressing certain buttons or performing certain movements of the vehicle. But he failed because he didn't have time to respond. With this button method, if a woman is attacked from behind, she will also inform the neighbors and the police because the idea here is; If our devices use IoT authentication for one minute, it will automatically notify neighbors. and police. In addition to sending notifications, the Android app can easily list victims and suggest nearby safe places.

## I. RESULTS AND DISCUSSIONS

It will Shows the results of an initiative the hardware and the Android application. First, verify that the GSM module is connected and configured. After installing the GSM module, the device activates the user to click button; so access the device and verify the credentials. When the user turns on the device with the button, continuous monitoring begins and the sensor is constantly checked for inputs. If the finger is not lifted, an audible warning will sound after one minute. When the bell starts ringing, the GSM module sends a message to all Emergency (ICE) numbers with the latitude and longitude values obtained from the GPS module. It additionally makes the Android app. display the victim's safe place as shown within the image.

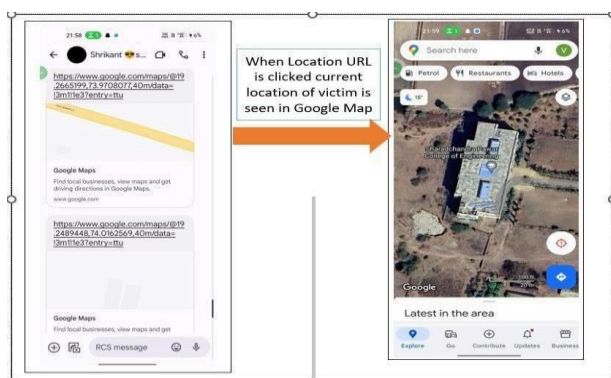


Fig. OUTPUT

## II. CONCLUSION AND DESTINY WORK

The safety equipment recommended for women is designed to provide complete safety to women in the current situation. The Button is used as a completely unique identifier for the user to make certain that no person can create false facts and that indicators are handiest issued while there is pressure. as a way to ensure complete security, a buzzer has been brought to the layout to alert all acquaintances to the error that has happened. Sending messages to ensure next of kin and police are informed of the victim's current location. If the woman feels the need to defend herself, she can use an electric shock to temporarily incapacitate the offender. An Android application has also been created that will provide additional security features

based on the hardware, which includes sending organization messages, recording audio, identifying close by safe places at the map. This article presents a model of smart equipment for women's safety, which should be further evaluated with performance indicators to prove its effectiveness.

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