# Walchand College Of Engineering, Sangli.

## (An Autonomous Institute)

**Department of**
**Computer Science and Engineering**

**Mini-Project Report**
on

## Emergency Safety Device

Submitted by

**Prathamesh Raje (2020BTECS00033)**
**Samrat Jadhav (2020BTECS00006)**
**Raj Dalvi (2020BTECS00027)**

Under the Guidance
of

**Prof. N. L. Gavankar**

**Dr. M. A. Shah**
HOD

Computer Sci. & Engg. Dept,

WCE, Sangli

2022-23

Walchand College of Engineering, Sangli
(An Autonomous Institute)

**DepartmentOf**
**Computer Science and Engineering**

## CERTIFICATE

This is to certify that the Project Report entitled, **"Emergency Safety Device"** submitted by Mr. Prathamesh Raje, Mr. Samrat Jadhav, Mr. Raj Dalvi , to Walchand College of Engineering ,Sangli, India, is a record of bonafide Project work of course *"5CS347" "Mini-Project-3"* carried out by them under my supervision and guidance and is worthy of consideration for the award of the degree of Bachelor of Technology in Computer Science & Engineering of the Institute.

**Prof. N. L.**
**Gavankar**

Guide

Computer Sci. & Engg.
Dept,
WCE, Sangli.

**Dr. M. A. Shah**

Head Of Department

Computer Sci. &
Engg.Dept,
WCE, Sangli

# Acknowledgement

Today on completion of this project report, the persons I would like to thank the most who have helped us throughout the making of this project and without whose help it would not have seen the light of the day. Primarily, I submit our gratitude and sincere thanks to my project guide Prof. N. L. Gavankar for his constant motivation and support during the course of the work in the last six months. I truly appreciate and value his esteemed guidance and encouragement from the beginning to the end of this work. I'm very thankful to our Head of Department Dr. M. A. Shah for their unwavering moral support and motivation during the entire work.

I would also like to thank our Director Dr. U. A. Dabade who encouraged us and created a healthy environment for all of us to learn in best possible way.

**Name: Mr. Prathamesh Raje**     **Name: Mr. Samrat Jadhav**     **Name: Mr. Raj Dalvi**

**PRN: 2020BTECS00033**     **PRN: 2020BTECS00006**     **PRN: 2020BTECS00027**

# Declaration

I hereby declare that work presented in this project report titled **"Emergency Safety Device"** submitted by us in the partial fulfillment of the requirement of the award of the degree of Bachelor of Technology (B.Tech) Submitted in the Department of Computer Science & Engineering, Walchand College of Engineering, Sangli, is an authentic record of my project work carried out under the guidance of Prof. N. L. Gavankar, Computer Sci. & Engg. Dept,WCE, Sangli.

Date :

Place :

(Signature)

(Mr. Prathamesh Raje)
PRN:2020BTECS00033

(Signature)

(Mr. Samrat Jadhav)
PRN:2020BTECS00006

(Signature)

(Mr. Raj Dalvi)
PRN:2020BTECS00027

# Table Of Contents

## List Of Figures

# 1. Project Title

Emergency Safety Device

# 2. Abstract

In recent years, ensuring the safety and security of women and children has become a critical concern worldwide. To address this issue, this project proposes an Internet of Things (IoT)-based safety device aimed at empowering women and protecting children in various settings. Leveraging the power of IoT technologies, the proposed solution integrates smart wearable devices and a centralized monitoring system to create a comprehensive safety network. To ensure seamless communication and quick response times, the IoT-based safety device leverages existing wireless communication technologies such as cellular networks, Wi-Fi, and Bluetooth.

The proposed IoT-based women and child safety device holds immense potential to revolutionize the way we address safety concerns in our society. By combining smart wearable technology, and real-time monitoring, it offers a proactive approach to preventing crimes, minimizing risks, and ensuring rapid response in critical situations. Ultimately, this project aims to create a safer environment for women and children, fostering a society where everyone can live with peace of mind.

# 3. Introduction and Related Work

## Introduction:

Ensuring the safety and security of women and children is a pressing issue that requires innovative solutions in today's digital age. The advancement of Internet of Things (IoT) technologies offers a promising avenue to address these concerns. This project proposes an IoT-based safety device designed to empower women and protect children. By combining real-time data transfer, wireless communication, this solution aims to create a comprehensive safety network that actively prevents risks and responds promptly to emergencies.

In recent years, there has been an increasing need for reliable and effective safety measures to combat gender-based violence and ensure the well-being of women and children. The emergence of IoT has opened up new possibilities for creating smart and interconnected devices that can significantly enhance safety and security.

The proposed women safety device harnesses the power of IoT to provide a proactive and responsive solution. By integrating advanced sensors, wireless communication capabilities this device helpful for a personal safety. With the ability to capture and process real-time data, the IoT-based safety device offers several innovative features. These include GPS tracking for accurate location monitoring, capturing location using the GSM and seamless integration with a centralized monitoring system. By leveraging the connectivity and intelligence of IoT, the device establishes a robust safety network that connects individuals with authorities, emergency services, or trusted contacts.

Through this project, we aim to contribute to the ongoing efforts to promote women's safety and protect children in vulnerable situations. By utilizing IoT technology, we strive to create a safer environment where women can confidently navigate their daily lives, knowing they have a reliable and proactive safety companion by their side. The convergence of IoT and women's safety represents a significant step towards building a more inclusive and secure society.

## Related Work:

Several existing technologies and research efforts have contributed to the development of IoT-based safety devices for women and children. Previous studies have explored the application of wearable sensors for personal safety, such as panic buttons and location trackers. These devices provide individuals with a means to call for help or notify their contacts in emergency situations.

Research efforts have also focused on designing the IOT devices which have been employed to identify potentially dangerous situations or deviations from normal behavior. These devices play a crucial role in the proposed safety device by enabling proactive risk detection and timely intervention.

Additionally, related work has explored the integration of wearable devices with GPS module to get the exact location and notify the close ones of user to configure personalized safety settings and receive alerts or notifications directly on their smartphones. This project aims to design a safety device for real-time data transfer, wireless communication.

## 4. Problem Statement:

In modern world, ensuring the safety and security of women and children is a pressing concern. Instances of gender-based violence and child safety risks necessitate the development of innovative solutions that can provide timely assistance and support. . IoT offers a promising avenue to tackle these challenges by integrating smart devices, sensors, and wireless communication to create a comprehensive safety network. Existing safety devices such as pepper sprays, personal alarms, or smartphone apps have limitations in terms of effectiveness, accessibility, and ease of use. A dedicated safety device designed specifically for women and children can overcome these limitations by providing a comprehensive solution that addresses their unique safety concerns. Such a device could incorporate features like GPS tracking, emergency communication capabilities, panic buttons, audio/video recording, and automatic alerts to designated contacts or authorities.

To design and develop an IoT-based safety device specifically catered to address the safety concerns of women and children during emergency situations. The device will leverage IoT technologies to provide real-time monitoring, immediate response capabilities, and seamless connectivity with emergency services and trusted contacts.

**To study, design and develop the safety device for people in emergency situations by using IOT.**

## 5. Objectives

o   To study domain of Internet of Things (IoT).
o   To design an electronic device using IoT.
o   To develop a safety device for emergency situations.
o   To implement GPS in device and to study the working of GSM.
o   To make device reliable and more functional

## 6. Methodology

- Hardware Specifications
    1) ESP 32 Module

ESP32 is a series of low-cost, low-power system on a chip microcontrollers with integrated Wi-Fi and dual-mode Bluetooth. The ESP32 series employs either a Tensilica Xtensa LX6 microprocessor in both dual-core and single-core variations, Xtensa LX7 dual-core microprocessor or a single-core RISC-V microprocessor and includes built-in antenna switches, RF balun, power amplifier, low-noise receive amplifier, filters, and power-management modules. ESP32 is created and developed by Espressif Systems, a Shanghai-based Chinese company, and is manufactured by TSMC using their 40 nm process. It is a successor to the ESP8266 microcontroller.

2)  GSM (Global System for Mobile Communication) module
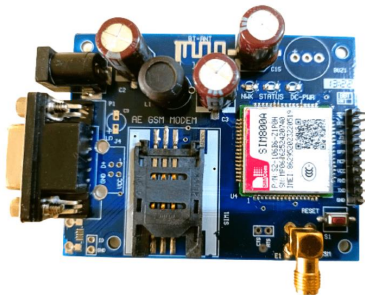


The SIM800A is a widely used module that provides GSM/GPRS communication capabilities. It is commonly used in applications requiring cellular connectivity, such as IoT devices, tracking systems, and remote monitoring solutions. The SIM800A module offers various features essential for cellular communication, including voice calls, SMS (Short Message Service), GPRS location transmission. The module supports a standard SIM card, which is essential for accessing cellular networks and authenticating the device. It contains UART interface support for ESP 32.

3) Jumper Wires



A jump wire (also known as jumper, jumper wire, DuPont wire) is an electrical wire, or group of them in a cable, with a connector or pin at each end (or sometimes without them – simply "tinned"), which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering.

4) Buzzer



Active Buzzer module produces a single-tone sound when trigger. To produce different tones, use the Passive Buzzer module. The Active Buzzer module consists of a piezoelectric buzzer with a built-in oscillator. It generates a sound of approximately 2.5 kHz when activated. Its operating voltage is 3.5V to 5.5V. It is low level trigger with resonance frequency between 2500Hz ± 300Hz.

5) Push Button

A Push Button is a type of switch work on a mechanism called "Push-to-make". Initially, it remains in off state or normally open state but when it is pressed, it allows the current to pass through it or we can say it makes the circuit when pressed.

Push Button structure has four legs, two on one side and other two on another side. So, we can operate two lines of the circuit by single Push Button.Two legs on both the sides are internally connected

- Hardware Specifications
  1) Arduino IDE

    The Arduino Integrated Development Environment - or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino hardware to upload programs and communicate with them.

## Techniques and Algorithms:

1. The IoT-based women and children safety system consists of seven units.
2. This prototype device consists of a power supply unit, a monitoring and control unit, Global system positioning module and Global System for Mobile Communication module, operation is controlled by a single microcontroller (monitoring and control unit) which is ESP32.
3. The power button is used to power ESP32 microcontroller (central unit of system) and also to active system.
4. The Global System for Mobile Communication (GSM) module can be used to collect and store co-ordinates of user.
5. The recorded co-ordinates are obtained into ESP32 and then microcontroller processes and send this so-ordinates to GSM module again.
6. In Global System for Mobile Communication (GSM) Module contains the sim card which contains emergency contacts.
7. The GSM module will send the messages including GPS co-ordinates to multiple

6

mobile numbers which are configured in the Arduino code.

8. The messaging services will be provided by telecommunication service providers via SIM card which will be present in system.

9. The Emergency contact will receive messages along with location of victim.

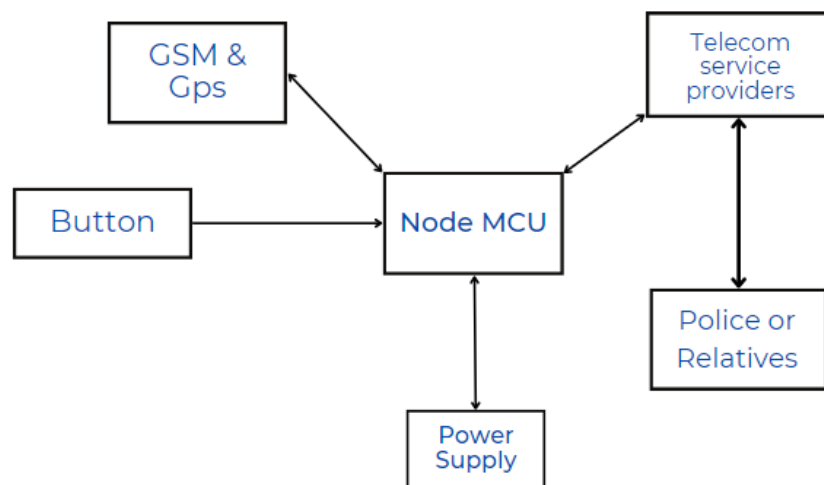10. The GSM module also capable of calling the victims close one.



Fig 1. Block Diagram

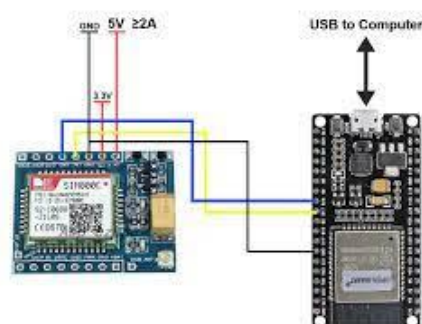## 7. Project diagrams

### 1) Connections between ESP32 and SIM 800A
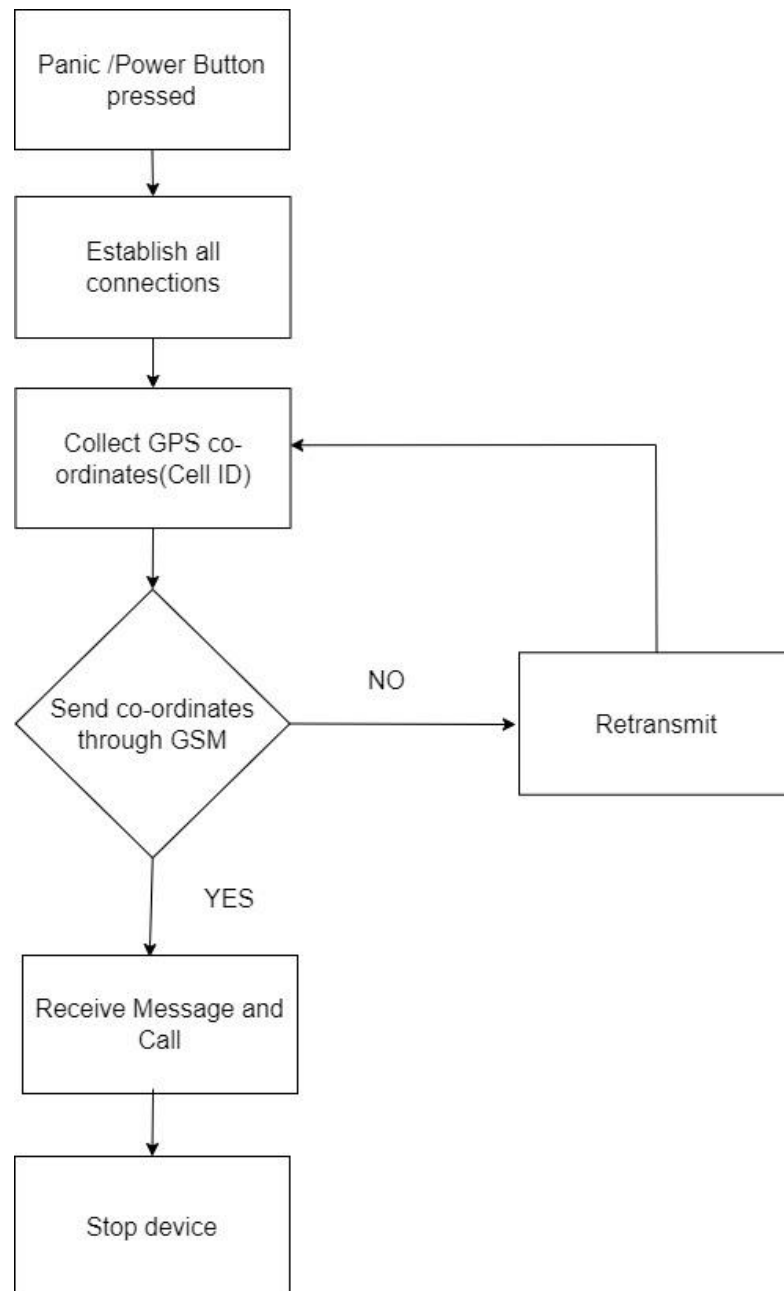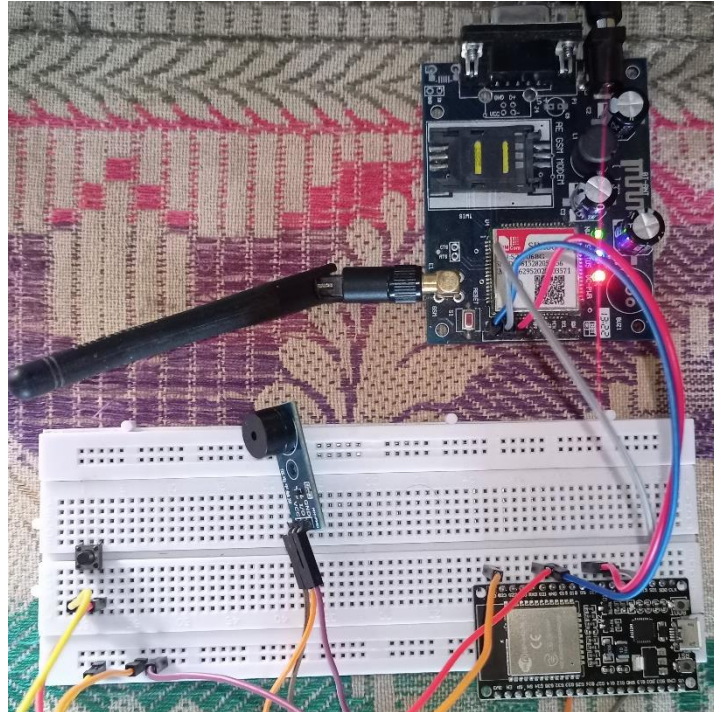


Fig 2. Connection between ESP32 and SIM800A

7

## 2) UML Diagram



Fig 3 . UML Diagram Emergency Safety Device

## 8. Testing

### 1) System Integration



### 2) Arduino IDE

3) Mobile Interface



## 9. Results and Conclusion

The development and implementation of the IoT-based safety device for women and children in emergency situations yielded promising results. The device successfully incorporated various IoT technologies and functionalities to enhance personal safety and provide swift response capabilities. The integration of GSM technology within the device provided near accurate location tracking. This feature proved to be invaluable in emergency situations, allowing emergency services to quickly identify the user's location and provide rapid intervention and support. Overall, the results demonstrated the effectiveness of the IoT-based safety device in improving personal safety and security for women and children.

In conclusion, the IoT-based safety device for women and children in emergency situations has demonstrated its effectiveness in enhancing personal safety and security. By leveraging IoT technologies, the device successfully addressed the unique safety concerns faced by women and children, providing a proactive and responsive solution. The project provides the enhanced safety for women and children with reliable safety companion. The devices immediate response capabilities make it more suitable for security and which significantly reduced response times and facilitated prompt assistance

during critical situations.

The integration of sensors and GPS technology enabled real time and accurate location tracking, enhancing overall safety and enabling quick intervention when needed. The project highlights the potential of IoT technologies in addressing societal challenges and creating a safer environment for vulnerable populations. Further research and refinement of the device can lead to wider adoption and greater impact in ensuring the well-being of women and children in emergency situations.

## 10. References

i. Tayal, Satyam, Harsh Pallav Govind Rao, Abhimat Gupta, and Aditya Choudhary. "Women Safety System Design and Hardware Implementation." In 2021 9th International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions) (ICRITO), pp. 1-3. IEEE, 2021.

ii. Bhardwaj, Nishant, and Nitish Aggarwal. "Design and development of "Suraksha"-a women safety device." International Journal of Information & Computational Technology 4, no. 8 (2014): 787-792.

iii. Gautam, Chandan, Abhishek Patil, Akanksha Podutwar, Maitreyee Agarwal, Pranali Patil, and Apurva Naik. "Wearable Women Safety Device." In 2022 IEEE Industrial Electronics and Applications Conference (IEACon), pp. 214-217. IEEE, 2022.

iv. http://iotgecko.com/

v. https://en.wikipedia.or/wiki/Internetofthings

vi. https://www.arduino.cc/