

WOMEN DEFENSIVE DEVICE USING IoT

Submitted in partial fulfillment of the requirements for the award of
Bachelor of Engineering degree in Electronics and Communication Engineering

by

DEEPTHI A (39130107)



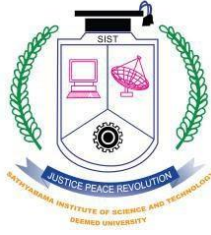
**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
SCHOOL OF ELECTRICAL AND ELECTRONICS**

SATHYABAMA

**INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)**

**Accredited with Grade "A" by NAAC
JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI-600 119**

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DEPARTMENT OF ELECTRONICS AND COMMUNICAITON ENGINEERING

BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **DEEPTHI A (39130107)** who carried out the project entitled "**WOMEN DEFENSIVE DEVICE USING IoT**" under our supervision from November 2022 to April 2023.

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Submitted for Viva voce Examination held on 27.04.23



Internal Examiner



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DECLARATION

I **DEEPTHI A (39130107)** hereby declare that the Project Report entitled **“WOMEN DEFENSIVE DEVICE USING IoT”** done by me under the guidance of **Dr.S.BARANI** is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering degree in Electronics and Communication Engineering.

DATE: 27.04.23



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SIGNATURE OF THE CANDIDATE

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I wish to express our thanks to all Teaching and Non-teaching staff members of the Department of Electronics and Communication Engineering who were helpful in many ways for the completion of the project.

ABSTRACT

The target is to design and implement a cost-effective and simplified device capable of sending telegram messages along with a photo and location information. To achieve this, the team opted to use the ESP32-CAM and GPS module for capturing photos and acquiring location, respectively, while also utilizing the ESP8266 to reduce the cost compared to a previously made project that used an Arduino Uno. The device then sends this information to a designated recipient via a telegram message. The successful implementation of the device is demonstrated by its ability to accurately capture photos and location information, and transmit them through telegram messaging. The device's potential for use in various applications where cost and simplicity are critical factors is highlighted, such as in remote monitoring systems, wildlife tracking, or home security. Overall, this work emphasizes the importance of developing cost-effective and efficient technologies to create practical solutions in the field of communication and location-based services. The use of the ESP32-CAM and GPS module, along with the ESP8266, provides a feasible solution to achieve this goal, enabling the development of low-cost and reliable devices that can help improve various aspects of everyday life.

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CHAPTER 1

INTRODUCTION

The current social landscape emphasizes the importance of equality and fair treatment for all individuals, regardless of gender. This has led to a shift in women's work schedules, with more women being assigned to jobs that require working late hours or odd shifts. However, women's safety remains a concern, particularly when traveling alone, especially at night [1]. To address this issue, the proposed work presents a smart wearable gadget system that incorporates a panic button switch. The wearer can press the button when they find themselves in a sticky situation, and the system's integrated GPS module locates the user's position, which is then sent to the emergency contact and police.

The system is designed to be user-friendly and easy to operate, with the aim of providing women with a sense of security while traveling alone. Additionally, the system includes an ESP cam 2 that captures a picture of the user's surroundings, which is sent to the emergency contact along with an alarm message using telegram. This feature allows the emergency contact to assess the situation quickly and take appropriate action, if necessary.

The proposed system's potential to enhance women's safety and well-being cannot be overstated. It provides an effective means of addressing the concerns associated with traveling alone at night or in potentially dangerous situations. Additionally, the system's user-friendly design ensures that it can be easily incorporated into a person's daily routine. Overall, the proposed system highlights the importance of using technological advancements to improve the lives of individuals and promote equality in society.

CHAPTER 2

LITERATURE SURVEY

Dhiraj Sunehra, V.Sai Sreshta ,V.Shanshank , B.Uday Kumar Goud(2020) et.al infers that women, kids, and even seniors, security has grown to be a fundamental issue in every aspect of their lives. Women are being attacked and molested, kids are being kidnapped, and elderly people are also dealing with many issues like robberies. This study uses the Raspberry Pi 3 to develop a smart wearable device system for improving the safety and security of women and children. Both a security system and an alert mechanism are employed. People who are close to the user receive a buzzer alert from it (wearing the smart device). The technology uses the Global Positioning System (GPS) to find the user and uses the Global System for Mobile (GSM) to relay the user's location through SMS to the emergency contact and police. When the user presses the panic button on the smart wearable device system, the device also uses a USB web camera that is interfaced to it to capture an image of the assault and the surroundings of the user or victim and sends it as an email alert to the emergency contact.[7]

Md. Imtiaz Hanif , Shakil Ahmed , Wahiduzzaman Akanda , Shohag Barman(2020) et.al says that the whole population, particularly women and children, experience a lot of harassment in today's countries. Eve-teasing and sexual assault are frequently reported, and there has been a considerable increase in the illegal behaviors against women and children. In addition, numerous instances were unresolved because to brief pieces of proof. In Bangladesh's most recent data show Sexual assaults and other types of criminal activity are on the rise. In order to acknowledge these issues, this paper, which an embedded IoT (Internet of Things)-based device that can Dial "999" to contact

the law enforcement agency.(A Bangladeshi Emergency Telephone Number) upon request. The gadget includes an Arduino Pro-Mini Microcontroller, Global System for Mobile Communications component and can send SMS (short messaging service) of the victim's present region through GPRS to family members and to the police for GeneralPacket Radio. The shape of the proposed gadget the item is too small to carry out conveniently at any time or place. The functionality of the device is "Plug & Play," which means the device is controlled by a single button. Additionally, the device is reasonably priced, making it accessible to people of all income levels.[6]

Purushottam R. Hantode, Govardhan S Sambhare, Akash S. Golde, Reeta G. Ingle, Prof. Amit P.Joshi (2018) et.al refers to the rise in crimes against women in recent years, women's safety is a crucial problem. We recommend a GPS-based women's safety system with a dual security feature to help resolve this problem. This device includes a system that ensures two alarms in the event that a woman becomes anxious or believes she is in danger. In the event that a woman even suspects she might be in difficulty, she can activate this system. It is helpful since a woman may or may not have the opportunity to push the emergency button once an incident involving a woman occurs. If a lady is struck on the head from behind while using a button push alerting system, she might not have the opportunity to press the panic button and no one would be aware of it.[9]

R. Abhipriya , S. Aysha, K. Gayathri, K.Kathiravan (2017) et.al infers to create and execute a dependable system to safeguard women from harassment by supplying last-mile connection even in circumstances where there is no cellular coverage for mobile phones. There is a prototype for women's

safety using GSM/CDMA mobile, radio identification-based cognitive radio the global positioning system and communication(GPS). The device will use GPS to locate the location when a woman activates either by clicking or pressing a button on her mobile phone for a brief she sends a message just before she outrages any occurrence it includes a locating URL for the registered contacts as well as a message left on the first registered caller's voicemail to assist the ladies in perilous circumstances. The distinctive quality of this system where messages are sent regularly, for every two minutes, until the programme has terminated. Details about the ongoing location tracking,via SMS aids in speedy victim identification and rescue and theirsecurity. With NS2, extensive simulation work is carried out. The Simulator which verifythe system's performance.[3]

Devi.D, Pavithra.M, Monalisha.K, Krithana.T.S, Pooja.S (2002) et.al says that the Women's safety is a prevalent worry in today's environment, and it is everyone's responsibility to solve it. The "GPS and GSM Circuit based ladies security framework with an alarm and a shock generating device" and the "GPS and GSM Circuit based ladies security framework with an alarm and a shock generating system" are both described in this paper. This provides a range of GPS gadgets, most of which are used to track a location. The device will also transmit alerts, electric shocks, and crisis capture triggers. This paper's major objective is to demonstrate a conservative device that plays a desirable covert role. This platform's key characteristic is that it forbids the use of smart phones. It differs from other already accessible programmes in that it works on a smart

phone. The tool is simple to use and complements the suggested apparatus. weather- resistant in all conditions.[8]

J.Sunil Kumar, D.Sreelakshmi, G.Sindhuja Bhargavi (2018) et.al refers to the increase in crimes against women, women's protection is now of the utmost importance. We suggest a GPS-based women's safety system with dual security features to aid in resolving this problem. The suggested system uses a buzzer and a message transmitted through GSM for dual alerts. In the event that a woman even suspects she might be in difficulty, she can activate this system. In this project, a GPS and GSM modem-based system for detecting women's safety is shown. The technology can inform the neighbours by connecting to an alarm system. A GPS receiver, which receives location data in the form of latitude and longitude from satellites, is a component of this detection and messaging system. The user receives the information from GSM after it has been processed by the Microcontroller and sent to it. The MCU is interfaced with a GSM modem. The predetermined mobile number receives an SMS from the GSM modem. A woman can use the switch that is designated for her when she is in danger and needs to defend herself. By pressing the switch, the complete system is enabled, and an SMS containing the concerned person's location and GSM and GPS data is sent right away.[10]

S.Pradeep, Kanikannan, M.Meedunganesh, A.Anny Leema (2020) et.al infers that in the modern world, men and women are equally responsible for their labour and are in competition with one another in every profession. In the majority

of nations, safety has become a serious problem and women encounter difficulties at work. Sexual harassment is one of the regular offences that is on the rise, and the notion that plagues women's minds is how to walk freely in the streets at odd hours. We raised the notion of leveraging the Internet of Things (IoT) for Women Safety in such dire circumstances to assist women. The Internet of Things (IoT) connects billions of devices and exchanges relevant information, which is essential for the protection of women. This paper provides a summary of the different safety precautions that are available to women, and it falls under the category of careful security. It is suggested to use an Arduino-based new viewpoint on women's security warning systems that can send SMS alerts to the victims' loved ones, allowing women to go with their daily activities without fear. Additionally, our framework includes an Arduino robber alert that detects and notifies the authorised individual of any unauthorised entrance. Thus, the suggested system's dependability, affordability, and user-friendliness assist women in overcoming their fear in challenging circumstances.[11]

Suma K.V, V.Simran Parveen Sucheta, Kavya Jadav M, Sanjana M (2019) et.al infers in Women today face a variety of challenging circumstances and are constantly required to prove their worth under pressure. Here, we're focusing on a scenario in which a woman who is out on her own in a deserted area gets attacked from the front or the back, during the day or at night. As a result, we created a system with a quick response mechanism to assist women in need. The suggested system functions more like an emergency safety system. This kind of concept contributes significantly to automatically ensuring women's

safety in the quickest manner. Through the wearer's pulse rate and other mechanisms to activate reactions like alarming nearby individuals and emergency contacts, smart wearable gadgets can be used to screen physical symptoms of fear and anxiety. These IoT-based smart security solutions for women can guarantee speedy reactions to crises and shield women from potentially upsetting situations.[12]

A. Helen, M. Fathima Fathila R. Rijwana. Kalaiselvi .V.K.G (2017) et.al says that women were currently confronting several difficulties in the contemporary global environment. More often than not, we hear about the harassment of women. For women's security on mobile devices, there are numerous programmes and gadgets already available. Even if the number of smart phones has rapidly expanded, we can't always have it in our hands to make calls or click on things, therefore we've launched a new strategy via smart watches. When a woman or child wearing this "watch me" is exposed to sexual or vulnerable attack, the sensor in it detects the person's heart rate, which will be high at the time due to the secretion of epinephrine hormone from the hpa axis, and activates, not only providing a warning sound to the attention of nearby people, but also automatically making a call to our registered contact and detecting the nearby police station through GPS/GSM.[13]

A.Jesudoss,(Assistant Professor), Y. Nikhila (Student), T. Sahithi Reddy,(Student) et.al infers to Women's safety is a major concern in both urban and rural areas. In recent years, there has been a growing interest in developing

smart solutions for women's safety using IoT. This literature review aims to provide an overview of the existing research on smart solutions for women's safety using IoT. One proposed solution is a smart safety device for women using IoT. This device aims to overcome the shortcomings of existing devices and provide a more effective solution for women's safety. Another study presents a survey on women's safety devices using IoT. The study highlights the importance of women's safety and provides an overview of the existing devices and their features. A smart wearable device for women's safety using IoT is proposed in. This device automates the emergency alert system using pressure sensors, pulse-rate sensors, and temperature sensors. A literature review of the development of various safety measures for women using different technologies and systems is presented in. The review provides an overview of the different technologies and systems used to provide security and decrease violence against women. Finally, a wearable safety device for women using Arduino is presented in. The device aims to safeguard women in the event of an emergency. Overall, the literature suggests that smart solutions for women's safety using IoT have the potential to provide effective solution for women's safety. However, further research is needed to develop more advanced and effective solutions [14].

Mohamad Zikriya, Parmeshwar M G, Shanmukayya R Math, Shraddha Tankasali, Dr. Jayashree D Mallapur (2018) et.al refers as far as we are aware that men and women now have equal rights and share equal responsibility in all spheres of endeavor. Women are therefore assigned to work

on both the even and odd shift, where they compete equally with males in all fields. Women and young girls from all areas of life are abused, molested, and raped every single day. Particularly, the streets, public transportation, and open areas have turned into the hunters' domain. Women are unable to leave their homes for various causes. Every woman's only persistent idea is the day when they will be allowed to walk around freely, even at strange hours, without having to worry about their safety. It consists of a wearable smart device that communicates constantly with a smart phone that has internet access. This device combines various devices. The entire device additionally guarantees to offer a self-defense application that aids woman in escaping dangerous circumstances. Bus stops, train stations, workplaces, sidewalks, markets, and other locations can all use this system. The smart device's implementation is essentially divided into two pieces. The first step guarantees that the gadget is activated when there is a suspected motion in front of the camera. The device then captures the culprit's image and sends it as an attachment to the relevant email address along with the victim's location. The photograph that was obtained is used as a reliable piece of evidence against the criminal. The second segment covers defense tactics because we focus more on teaching women in peril how to defend themselves. Making self-defense our first priority allows us to ensure that critical situations never arise. The self-defense feature is capable of functioning in any situation, including when connected to the internet as a Smart Pendant with LED flash that alerts the family and close relatives via the cloud and also shines the LED flash on the offender's eyes to blur their vision when the attacker is closer. In contrast, self-defense without the internet uses electric

shock gloves to deliver electric shocks that divert the offender's attention and lessen his desire to commit a crime against a woman. These two elements combine to generate a self-defense tactic that aids the victim in fleeing the threat.[15]

Rahul Paknikar, Shrey Shah, Dr. Prachi Gharpure (2019) et.al infers that Women still feel hesitant to leave their houses late at night in the modern day due to the threat of sexual harassment. When one turns their attention away from urban regions and toward rural areas and interiors of villages, where there is irregular access to electricity and weak cellular network connectivity, the issue is exacerbated. Although there are several smartphone-based solutions, the cellular network and smartphone availability in rural areas are inconsistent. This study suggests a mechanism for informing the relevant authorities to stop any accidents by establishing a wireless network utilising IoT technologies and a portable device. A beacon device with a help button will be given to women. In the event of an emergency, the beacon information will reach the central stations, and prominent locations across the community will sound an alarm. Based on her closeness to the closest access point, one can determine the victim's location.[16]

G C Harikiran, Karthik Menasinkai, Suhas Shirol (2016) et.al says that the recent rise in concerns involving women's harassment and the current state of the world, the main question on every girl's mind is: primarily for her security and safety. The only idea is to when they will be able to move haunts every

female, easily and worry-free on the streets even at unusual hours relating to their safety. This study offers a fresh perspective on how to use technology to protect women. We offer a suggestion that modifies the way everyone thinks on the safety of women. It's a success when media outlets highlight women's accomplishments more frequently than instances of harassment. Our proposal in this paper is that there is a need for a gadget that automatically detects and rescues the victim because we (humans) cannot react appropriately in urgent situations. We suggest having a device that combines a number of gadgets; the hardware consists of a wearable "Smart band" that constantly communicates with a smart phone that has internet connection. The application has been created and loaded with all the necessary information, including data on human behaviour and responses to various circumstances, such as rage, fear, and worry. As a result, a signal is produced and sent to the smartphone. The software or application has access to GPS and Messaging services, and it is pre-programmed to send an assistance request and location coordinates to the closest police station, family, and other app users in the area once it receives an emergency signal. This step permits immediate assistance from the police as well as members of the public in the area who can precisely locate the sufferer.[17]

Navya R Sogi, Priya Chatterjee, Nethra U, Suma V (2018) et.al refers that every woman, including young girls, moms, and women from all walks of life, fights every day to stay safe and defend themselves from the roving eyes of the appallingly callous men who regularly assault, molest, and violate the dignity of women. Hunting has taken over the streets, public transportation, and other

areas in particular. Due to these crimes against women now occurring, a smart security wearable for women based on the Internet of Things is proposed. The system is implemented as a smart ring called SMARISA and includes a Raspberry Pi Zero, a Raspberry Pi camera, a buzzer, and a button to activate the services. This device is quite portable, and the victim only needs to press a button to activate it after being attacked. This will retrieve the victim's current location and use a Raspberry Pi camera to take a picture of the assaulter. By eliminating the need for additional hardware/modules and making the device smaller, the victim's smart phone will be used to send the victim's position and the link of the image that was captured to predefined emergency contact numbers or the police.[18]

Muskan, Teena Khandelwal, Manisha Khandelwal, Purnendu Shekhar Pandey (2018) infers that due to the increase in crimes against women in recent years, women's safety is a crucial problem. There is currently no viable solution to this issue. The current software and hardware are not very efficient because they require a lot of human input to function. These currently available technologies use a human's temperature and heartbeat to trigger an alarm in an emergency. Every person may have a different body temperature and heartbeat pattern when they are running, so using a fixed threshold to determine an emergency situation and then sounding an alarm is not the right course of action. This is why the current devices do not function properly to sound an alarm in an emergency. In this study, the gadget is tailored to discover each user's unique pattern of temperature and heartbeat before determining the warning threshold.

Thus, the goal of this research is to develop a wearable safety device for women that can detect patterns in data such as body temperature and heart rate when jogging. It will automatically make a phone and send message to several people with the location if readings are greater than the regular readings so that appropriate action can be taken. We have employed temperature and pulse sensors to identify the woman's activities. The sensor data will be transmitted to the cloud, where a machine learning algorithm will be utilised to analyse the data. Sensors first gather the data in safe environments to train the algorithm, and then we test it to see how accurate it is and how closely it resembles our training data. The emergency alarm will be present on emergency contacts the more accurately the threat is identified. This essay also addresses third-party internet-free settings. ZigBee mesh network was utilised to solve the internet issue, enabling the device to communicate data over multiple hop distances.

CHAPTER 3

AIM AND SCOPE

The aim of the project titled "Women's Defensive Safety Device" is to provide a safety device for women that can be used to alert others in case of an emergency or threat to their safety. The device is designed to be easy to carry and use, and it includes several components to enable it to function effectively.

The project scope includes the development of a wearable safety device that includes an ESP32 camera module, an ESP8266 microcontroller, and a GPS module. When the user presses a button on the device, the camera takes a picture and sends a message to a designated contact via Telegram. The message includes the location of the device, which is obtained using the GPS module.

The primary goal of this project is to provide women with a reliable safety device that can be used in case of an emergency, particularly in situations where they feel threatened or unsafe. The device's components are selected to ensure that it is small, portable, and easy to use. The project's secondary objective is to empower women by providing them with a tool that can help them feel more secure and confident when they are alone or in potentially unsafe situations.

CHAPTER 4

OBJECTIVE

- The purpose of this device is to safeguard women in the event they might face any danger. The device uses wireless sensor network to communicate and to send alerts to them.
- The ESP cam module is used to develop this application. A panic button that makes up the smart wearable gadget system described here.
- The panic button which helps the GPS and GSM are used to share the used to share the user's location directly to the relevant authorities and saved contacts and the LED gets "ON" as an indication that message has sent.

CHAPTER 5

EXISTING AND PROPOSED METHODOLOGY

5.1 EXISTING METHODOLOGY:

The existing methodology involves the use of an Arduino Uno board, which is a microcontroller-based development board used for building electronic projects. The board has a complex structure that includes a microcontroller, digital and analog inputs and outputs, and various other components to help with programming and interfacing with external hardware.

The system incorporates a push button, an LED, and a buzzer. When the push button is pressed, it activates the buzzer and causes the LED to blink. At the same time, the system uses a GPS module to acquire the user's location, which is then sent to a selected email contact. This process is achieved by programming the Arduino board to execute specific instructions based on input from the push button and GPS module.

Overall, this methodology provides a basic solution for emergency situations, but it has limitations in terms of functionality and ease of use. The system requires a physical connection to a computer for programming and configuration, making it less portable and accessible in comparison to more modern and user-friendly devices. Additionally, the system lacks features such as wireless communication and image capturing, which may be critical for emergency situations.

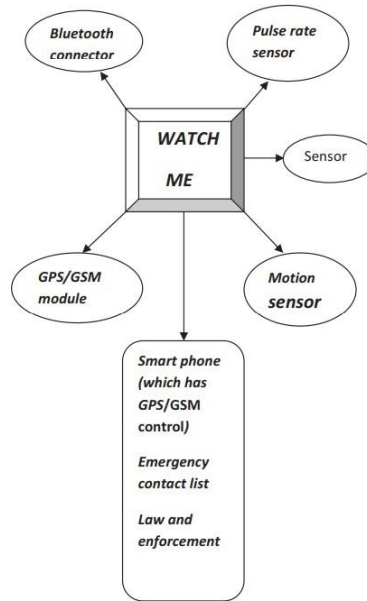


Fig : 5.1.1 Existing block diagram

5.2 PROPOSED METHODOLOGY:

The device consists of an ESP32 camera, which is capable of capturing high-quality photos. This feature is essential in providing visual evidence of the location and situation of the individual in need of assistance. The device also includes a vibration sensor module, which is activated when the push button is pressed. The output from the vibration sensor serves as a confirmation that the button has been pressed, ensuring that the device is functioning properly. The GPS module of the device is responsible for determining the location of the individual. This information is then sent along with the photo captured by the ESP32 camera to the designated contact via WhatsApp. The ESP32 camera module of the device is used for sending the photo and location information to the designated contact. The push button is the primary means of activating the device, and is placed in a location that is easily accessible to the individual. The

power source of the device is a battery that can be charged and provides a sufficient amount of power to operate the device for an extended period of time.

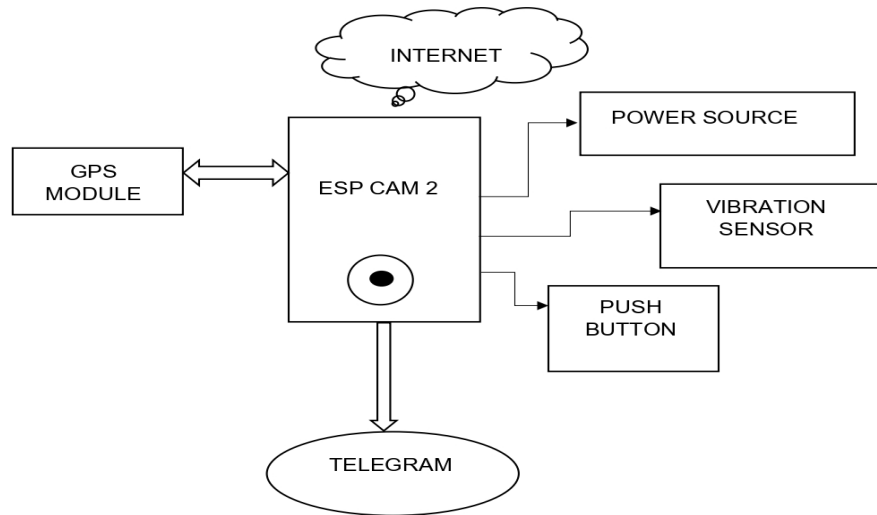


Fig 5.2.2 : Proposed block diagram

CHAPTER 6

IMPLEMENTATION AND DESIGN

6.1 DEVELOPMENT AND DEPLOYMENT SETUP:

The ESP32 camera is connected to the device, and the software is programmed to capture a photo when the push button is pressed. The vibration sensor module is also connected to the device, and the software is programmed to generate a vibration output when the push button is pressed. The GPS module is connected to the device, and the software is programmed to determine the location of the individual. The software is programmed to send the photo and location information to the designated contact via Telegram. The device consists of an ESP32 camera, which is capable of capturing high-quality photos. This feature is essential in providing visual evidence of the location and situation of the individual in need of assistance. The device also includes a vibration sensor module, which is activated when the push button is pressed. The output from the vibration sensor serves as a confirmation that the button has been pressed, ensuring that the device is functioning properly. The GPS module of the device is responsible for determining the location of the individual. This information is then sent along with the photo captured by the ESP32 camera to the designated contact via WhatsApp. The ESP32 camera module of the device is used for sending the photo and location information to the designated contact. The push button is the primary means of activating the device, and is placed in a location that is easily accessible to the individual. The power source of the device is a battery that can be charged and provides a sufficient amount of power to operate the device for an extended period of time.

6.2 ALGORITHM:

1. Initialize the ESP32 camera module, ESP8266 module, and GPS module.
2. Set up a connection to the Telegram API using the ESP8266 module.
3. Enter an infinite loop that waits for the push button to be pressed.
4. When the push button is pressed, trigger the camera module to take a picture and save it.
5. Get the location from the GPS module.
6. Send a message to Telegram using the ESP8266 module that includes the picture and location information.
7. Wait for a period of time before checking for another button press.

Here's a more detailed breakdown of the algorithm:

1. Initialize the ESP32 camera module, ESP8266 module, and GPS module. Set up the ESP32 camera module to capture an image when triggered by a signal.
2. Set up the ESP8266 module to connect to the internet and send messages to the Telegram API.
3. Set up the GPS module to receive location information.
4. Set up a connection to the Telegram API using the ESP8266 module, Register for a Telegram API token and create a bot.
5. Set up the ESP8266 module to connect to the Telegram API using the token and bot information.
6. Enter an infinite loop that waits for the push button to be pressed. Wait for a signal from the push button.
7. If the button is pressed, continue with the next steps:

8. When the push button is pressed, trigger the camera module to take a picture and save it. Send a signal to the camera module to take a picture.
9. Save the picture to a storage location.
10. Get the location from the GPS module. Retrieve the location information from the GPS module.
11. Save the location information to a variable.
12. Send a message to Telegram using the ESP8266 module that includes the picture and location information. Create a message that includes the picture and location information.
13. Send the message to the Telegram API using the ESP8266 module.
14. Wait for a period of time before checking for another button press. Wait for a set period of time before checking for another button press.
15. Return to step 3 to wait for the button press again.

6.3: TESTING

1. Hardware Testing:

- Ensure that all the components are properly connected and wired.
- Check that all components are powered up and working properly.
- Verify that the ESP32 camera module can capture pictures.
- Verify that the ESP8266 and GPS module can retrieve and transmit location data.

2. Software Testing:

- Check that the code for capturing pictures and sending messages is working correctly.

- Verify that the Telegram API is working properly and the messages are being delivered.
- Check that the GPS module is sending accurate location data.

3. Functional Testing:

- ❖ Test the push button to ensure that it triggers the device.
- ❖ Verify that the device captures a picture when the button is pressed.
- ❖ Verify that the device sends a message to Telegram along with the captured picture and location
- ❖ data.
- ❖ Verify that the location data sent is accurate.

4. Usability Testing:

- ★ Test the device with users to ensure that it is easy to use and understand.
- ★ Gather feedback from users on how the device can be improved for better usability.
- ★ Conduct stress testing to ensure that the device can be used effectively in a stressful situation.

Overall, the testing process should ensure that the device is functioning properly, and that it can be easily used in a stressful situation to increase women's safety.

CHAPTER 7

CONCERNS

Designing smart gadgets has benefited from the advancement of cutting-edge technology for MEMS-based devices and notable achievements in wireless communication. Smart clothing is becoming increasingly fashionable. IoT technology can then be used for monitoring and maintaining a safe work environment, especially through effective record keeping. In this particular case, records of compliance training are reviewed and management makes sure all employees have had adequate training, especially in safety etiquette. Here instead of vibration sensor we use LED as an alerts the suspect. In other device it send messages to selected contacts but here it sends messages to the contacts through telegram .IoT poses significant impacts on public safety cybersecurity governance as these devices increase the potential attack surface – both physical and virtual – of a network, and the complexity of user authentication and identity management.

CHAPTER 8

STANDARDS

BLUETOOTH - Bluetooth is a short-range wireless technology that uses short-wavelength, ultrahigh-frequency radio waves. It had most commonly been used for audio streaming, but it has also become a significant enabler of wireless and connected devices. As a result, this low-power, low-range connectivity option is a go-to for both personal area networks and IoT deployments. Another option is Bluetooth Low Energy, known as either Bluetooth LE or BLE, which is a new version optimized for IoT connections. True to its name, BLE consumes less power than standard Bluetooth, which makes it particularly appealing in many use cases, such as health and fitness trackers and smart home devices on the consumer side and for in-store navigation on the commercial side.

IEEE802.11ah – These standards are concerned with the Wifi connectivity that runs on low power. In the internet of things, the devices preferably work with low power consumption mechanism involvement. Though Wifi doesn't fall under the low power consumption part, this standard is concerned with the lower power consumption of devices. This standard has been considered as the most effective one as the availability of wifi is very common.

WIFI - Given its pervasiveness in home, commercial and industrial buildings, Wi-Fi is a frequently used IoT protocol. It offers fast data transfer and is capable of processing large amounts of data. Wi-Fi is particularly well suited within LAN environments, with short- to medium-range distances. Moreover, Wi-Fi's multiple standards -- the most common in homes and some businesses being 802.11n -- give technologists options for deployment.

CHAPTER 9

RESULT

There are various ways to design and implement a women's defensive device using IoT components like ESP cam, GPS, vibration sensor, power source, and push button. One possible approach could be as ESP Cam can be used to capture images or videos of the surroundings when the device is triggered. The ESP cam can be programmed to capture and store images or videos and send them to the telegram. The GPS component can be used to track the location of the device and the user. It can be programmed to send location updates to the user's phone or emergency contacts in case of an emergency. The device can be powered by a rechargeable battery or a power bank. The power source should be reliable and long-lasting to ensure the device can be used in case of an emergency.

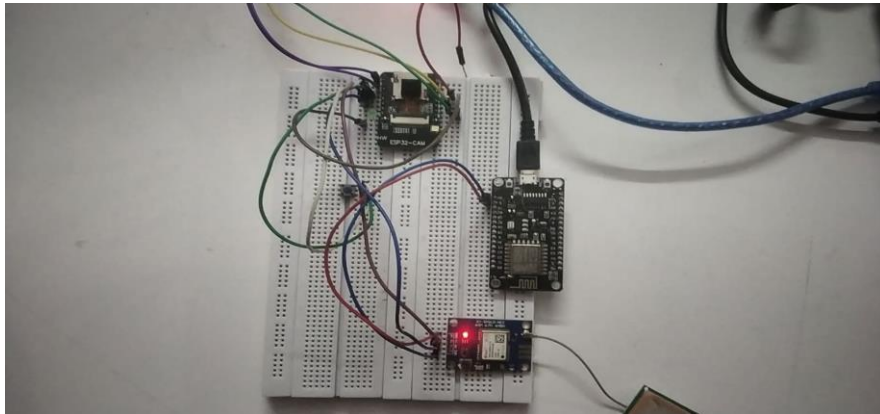


Fig 7.1: Final Output of the Project.

The push button can be used as a manual trigger to activate the device's alarm or send an alert to the user's phone or emergency contacts. Once these components are assembled, the device can be programmed to perform the following actions when triggered, activate the ESP cam to capture images or videos of the surroundings. Send location updates to the user's phone or emergency contacts using GPS. Activate the vibration sensor to detect

movement or shaking. Sound an alarm or send an alert to the user's phone or emergency contacts using the push button. Overall, this women's defensive device using IoT components can provide an added layer of safety and security for women in potentially dangerous situations. It's important to note that the device should be tested thoroughly before use and proper safety precautions should be taken to ensure the user's safety.

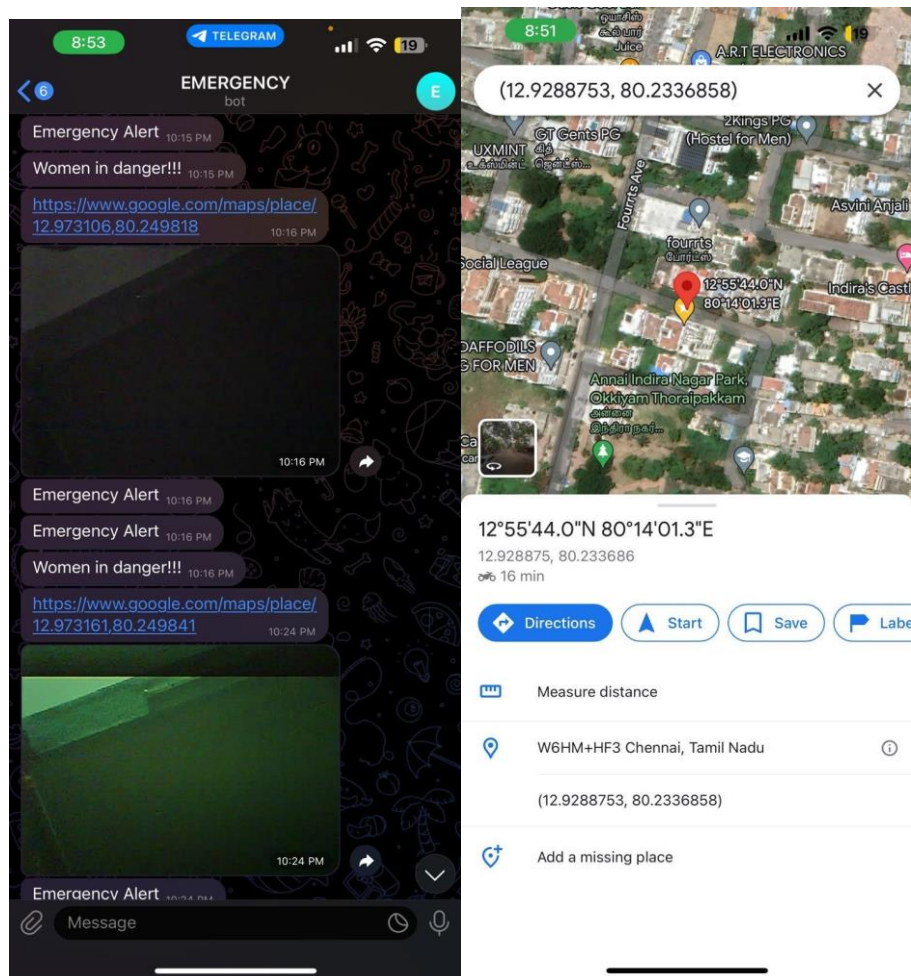


Fig 7.2: Tested in various Locations

CHAPTER 10

CONCLUSION

The women's safety device is an innovative solution to the problem of women's safety. The combination of the ESP32 camera, vibration sensor module, GPS, push button, and power source provides a comprehensive solution to this issue. The device is designed to be simple to use, and provides a quick and reliable means of alerting designated contacts in the event of an emergency. The device has the potential to provide peace of mind and increase the safety of women in various situations. The GPS is used to share the user's location directly to the relevant authorities and saved contacts. Does not comprise of complicated circuits. Easy to use Cost efficient Instead of Arduino or Raspberry pi , we have used ESP32 which is smaller in size .

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APPENDIX

A. SOURCE CODE

```
#include <WiFi.h>
#include <WiFiClientSecure.h>
#include <TinyGPSPlus.h>
#include <hardwareSerial.h>
#include "soc/soc.h"
#include "soc/rtc_cntl_reg.h"
#include "esp_camera.h"
#include <UniversalTelegramBot.h>
#include "config.h"

TinyGPSPlus gps;

WiFiClientSecure client_tcp;
UniversalTelegramBot bot(token, client_tcp);

TimerHandle_t progTimer1;

int lastState = LOW; // the previous state from the input pin
int currentState;    // the current reading from the input pin

//void gpsRead( void *pvParameters );

const int buttonPin = 13;
const int ledPin = 4;
```

```

bool flashState = LOW;
int buttonState = 0;

int botRequestDelay = 1000;
unsigned long lastTimeBotRan;

TimerHandle_t xGPSTimer = NULL;

unsigned long start_time;
unsigned long timed_event;
unsigned long current_time;

void setup()
{

    WRITE_PERI_REG(RTC_CNTL_BROWN_OUT_REG, 0);

    Serial.begin(9600);
    Serial1.begin(9600, SERIAL_8N1, 15, 14);
    pinMode(buttonPin, INPUT_PULLUP);
    pinMode(ledPin, OUTPUT);
    digitalWrite(ledPin, flashState);
    wifiEnable();
    configInitCamera();
    //sendCapturedImage2Telegram(token, chat_id);

    delay(2000);
    start_time = current_time;

```

```
}
```

```
String sendCapturedImage2Telegram(String token, String chat_id) {  
    const char* myDomain = "api.telegram.org";  
    String getAll = "", getBody = "";  
  
    camera_fb_t * fb = NULL;  
    fb = esp_camera_fb_get();  
    if (!fb) {  
        Serial.println("Camera capture failed");  
        delay(1000);  
        ESP.restart();  
        return "Camera capture failed";  
    }  
}
```

```
Serial.println("Sending image Connect to " + String(myDomain));  
client_tcp.setInsecure(); //run version 1.0.5 or above
```

```
if (client_tcp.connect(myDomain, 443)) {  
    Serial.println("Connection successful");
```

```
    String head = "\r\nContent-Disposition: form-data;  
name=\"chat_id\"; \r\n\r\n" + chat_id + "\r\n\r\nContent-Disposition:  
form-data; name=\"photo\"; filename=\"esp32-cam.jpg\"\r\nContent-  
Type: image/jpeg\r\n\r\n";  
    String tail = "\r\n--Taiwan--\r\n";
```

```

uint16_t imageLen = fb->len;
uint16_t extraLen = head.length() + tail.length();
uint16_t totalLen = imageLen + extraLen;

client_tcp.println("POST /bot" + token + "/sendPhoto HTTP/1.1");
client_tcp.println("Host: " + String(myDomain));
client_tcp.println("Content-Length: " + String(totalLen));
client_tcp.println("Content-Type: multipart/form-data;
boundary=Taiwan");
client_tcp.println();
client_tcp.print(head);

uint8_t *fbBuf = fb->buf;
size_t fbLen = fb->len;
for (size_t n = 0; n < fbLen; n = n + 1024) {
    if (n + 1024 < fbLen) {
        client_tcp.write(fbBuf, 1024);
        fbBuf += 1024;
    }
    else if (fbLen % 1024 > 0) {
        size_t remainder = fbLen % 1024;
        client_tcp.write(fbBuf, remainder);
    }
}

client_tcp.print(tail);
esp_camera_fb_return(fb);
int waitTime = 10000; // timeout 10 seconds

```

```

long startTime = millis();
boolean state = false;

while ((startTime + waitTime) > millis())
{
    Serial.print(".");
    delay(100);
    while (client_tcp.available())
    {
        char c = client_tcp.read();
        if (state == true) getBody += String(c);
        if (c == '\n')
        {
            if (getAll.length() == 0) state = true;
            getAll = "";
        }
        else if (c != '\r')
            getAll += String(c);
        startTime = millis();
    }
    if (getBody.length() > 0) break;
}
client_tcp.stop();
Serial.println(getBody);
}
else {
    getBody = "Connected to api.telegram.org failed.";
    Serial.println("image failed Connected to api.telegram.org failed.");
}

```

```

    }
    client_tcp.stop();
    return getBody;
}

```

String sendMessage2Telegram(String token, String chat_id, String text)

```

{
    const char* myDomain = "api.telegram.org";
    String getAll = "", getBody = "";

    Serial.println("Connect to " + String(myDomain));
    WiFiClientSecure client_tcp;
    client_tcp.setInsecure(); //run version 1.0.5 or above

    if (client_tcp.connect(myDomain, 443)) {
        Serial.println("Connection successful");

        String message = "chat_id=" + chat_id + "&text=" + text;
        client_tcp.println("POST /bot" + token + "/sendMessage
HTTP/1.1");
        client_tcp.println("Host: " + String(myDomain));
        client_tcp.println("Content-Length: " + String(message.length()));
        client_tcp.println("Content-Type: application/x-www-form-
urlencoded");
        client_tcp.println();
        client_tcp.print(message);
    }
}

```

```

int waitTime = 10000; // timeout 10 seconds
long startTime = millis();
boolean state = false;

while ((startTime + waitTime) > millis())
{
    Serial.print(".");
    delay(100);
    while (client_tcp.available())
    {
        char c = client_tcp.read();
        if (state == true) getBody += String(c);
        if (c == '\n')
        {
            if (getAll.length() == 0) state = true;
            getAll = "";
        }
        else if (c != '\r')
            getAll += String(c);
        startTime = millis();
    }
    if (getBody.length() > 0) break;
}
client_tcp.stop();
Serial.println(getBody);
}
else {

```

```

    getBody = "Connected to api.telegram.org failed.";
    Serial.printf("send gps \n Connected to api.telegram.org failed.\n");
}
client_tcp.stop();
return getBody;
}

```

```

void loop()
{
    gpsTimerTrigger();
    currentState = digitalRead(buttonPin);
    if (lastState == HIGH && currentState == LOW)
    {
        Serial.println("The button is pressed");
        String message = "https://www.google.com/maps/place/";
        message += String(gps.location.lat(), 6) + ",";
        message += String(gps.location.lng(), 6) + """;
        sendMessage2Telegram(token, chat_id, message) ;
        sendPhotoTelegram();
        bot.sendMessage(chat_id, "Emergency Alert", "");
        bot.sendMessage(chat_id, "Women in danger!!!", "");
        digitalWrite(ledPin, HIGH);
    }
    else if (lastState == LOW && currentState == HIGH)
    {
        Serial.println("The button is released");
        digitalWrite(ledPin, LOW);
    }
}

```

```
lastState = currentState;
delay(10);
}
```

```
void displayInfo()
{
  if (gps.location.isValid()) {
    Serial.println("Latitude and langitude: ");
    Serial.print(" https://www.google.com/maps/@");
    Serial.print(gps.location.lat(), 6);
    Serial.print(F(",");
    Serial.print(gps.location.lng(), 6);
    Serial.print(",14z");
    Serial.println();
  }
  else
  {
    Serial.print(F("INVALID"));
  }
}
```

```
void wifiEnable()
{
  WiFi.mode(WIFI_STA);
  Serial.println("");
  Serial.print("Connecting to ");
  Serial.println(ssid);
}
```

```
WiFi.begin(ssid, password);
```

```
long int StartTime = millis();  
while (WiFi.status() != WL_CONNECTED)  
{  
    delay(500);  
    if ((StartTime + 10000) < millis()) break;  
}
```

```
Serial.println("STAIP address: ");  
Serial.println(WiFi.localIP());
```

```
Serial.println("");  
if (WiFi.status() != WL_CONNECTED)  
{  
    Serial.println("Reset");  
    ledcAttachPin(4, 3);  
    ledcSetup(3, 5000, 8);  
    ledcWrite(3, 10);  
    delay(200);  
    ledcWrite(3, 0);  
    delay(200);  
    ledcDetachPin(3);  
  
    delay(1000);  
    ESP.restart();  
}  
else
```

```

{
  ledcAttachPin(4, 3);
  ledcSetup(3, 5000, 8);
  for (int i = 0; i < 5; i++)
  {
    ledcWrite(3, 10);
    delay(200);
    ledcWrite(3, 0);
    delay(200);
  }
  ledcDetachPin(3);
}
}

```

```

void gpsRead(TimerHandle_t pxTimer) // This is a task.

```

```

{
  //Serial.println("GPS READ FUNCTION");
  while (Serial1.available() > 0)
    if (gps.encode(Serial1.read()))
      displayInfo();
  delay(10);
}

```

```

void gpsTimerTrigger()

```

```

{
  current_time = millis();
  if (current_time - start_time >= 2000)

```

```

{
  while (Serial1.available() > 0)
    if (gps.encode(Serial1.read()))
      //displayInfo();
      start_time = current_time;
      //Serial.println("Timer reset");
}
}

```

```

String sendPhotoTelegram() {
  const char* myDomain = "api.telegram.org";
  String getAll = "";
  String getBody = "";

```

```

  camera_fb_t * fb = NULL;
  fb = esp_camera_fb_get();
  if (!fb) {
    Serial.println("Camera capture failed");
    delay(1000);
    ESP.restart();
    return "Camera capture failed";
  }

```

```

  Serial.println("Connect to " + String(myDomain));
  client_tcp.setInsecure();

```

```

if (client_tcp.connect(myDomain, 443)) {
    Serial.println("Connection successful");

    String head = "--RandomNerdTutorials\r\nContent-Disposition:
form-data; name=\"chat_id\"; \r\n\r\n" + chat_id + "\r\n--
RandomNerdTutorials\r\nContent-Disposition: form-data;
name=\"photo\"; filename=\"esp32-cam.jpg\"\r\nContent-Type:
image/jpeg\r\n\r\n";
    String tail = "\r\n--RandomNerdTutorials--\r\n";

    uint16_t imageLen = fb->len;
    uint16_t extraLen = head.length() + tail.length();
    uint16_t totalLen = imageLen + extraLen;

    client_tcp.println("POST /bot" + token + "/sendPhoto HTTP/1.1");
    client_tcp.println("Host: " + String(myDomain));
    client_tcp.println("Content-Length: " + String(totalLen));
    client_tcp.println("Content-Type: multipart/form-data;
boundary=RandomNerdTutorials");
    client_tcp.println();
    client_tcp.print(head);

    uint8_t *fbBuf = fb->buf;
    size_t fbLen = fb->len;
    for (size_t n = 0; n < fbLen; n = n + 1024) {
        if (n + 1024 < fbLen) {
            client_tcp.write(fbBuf, 1024);
            fbBuf += 1024;
        }
    }
}

```

```

    }
    else if (fbLen % 1024 > 0) {
        size_t remainder = fbLen % 1024;
        client_tcp.write(fbBuf, remainder);
    }
}

client_tcp.print(tail);

esp_camera_fb_return(fb);

int waitTime = 10000; // timeout 10 seconds
long startTimer = millis();
boolean state = false;

while ((startTimer + waitTime) > millis()) {
    Serial.print(".");
    delay(100);
    while (client_tcp.available()) {
        char c = client_tcp.read();
        if (state == true) getBody += String(c);
        if (c == '\n') {
            if (getAll.length() == 0) state = true;
            getAll = "";
        }
        else if (c != '\r')
            getAll += String(c);
        startTimer = millis();
    }
}

```

```
    }  
    if (getBody.length() > 0) break;  
    }  
    client_tcp.stop();  
    Serial.println(getBody);  
}  
else {  
    getBody = "Connected to api.telegram.org failed.";  
    Serial.println("Connected to api.telegram.org failed.");  
}  
return getBody;/////////  
}
```

ACCEPTANCE LETTER

Dear author,

Greetings!!!!

Your paper ID IS **OP 8207** which has been submitted for ICMSMT 2023 has been ACCEPTED by the Technical Program Committee (TPC) for "ORAL PRESENTATION ONLY" category in 2023 Fifth International Conference on Materials Science and Manufacturing Technology (ICMSMT 2023) scheduled during 13 - 14, April 2023 at Akshaya College of Engineering and Technology, Coimbatore, Tamil Nadu, India. That means you are invited to present your paper at ICMSMT 2023 either in Physical or Online mode according to your convenience. **Your paper will be published in the conference proceedings of ICMSMT 2023 with ISBN number and will not be published online (any of the listed online publications) since the scope of your paper is not under the scope of online publications.**

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