EMPOWERING WOMENS SAFETY WITH SMART IOT TECHNOLOGY

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Abstract: *Women's safety has emerged as one of the most pressing global issues, and nationwide rates of crime against women have sharply increased. Over the previous ten years, 67there has been a significant increase in the frequency of automobile theft and accidents. Because a human life is more valuable than everything else, it is more crucial to ask for help when you need it than to lend one. Maintaining their safety and self-defense presents everyday problems for women from all walks of life. In front of their roving gaze, in the company of callous men who routinely harass, assault, and violate women's dignity. Public transit has turned into a hunting field, especially in public places. For these atrocities that women endure in the modern world.An intelligent wearable safety device for girls that is fully dependent on the Internet of Things is being implemented.It has an ESP32 camera, an ESP32 devkit module, a buzzer, and a button to turn on the service.When assaulted, the victim just presses a butt on on this incredibly remote device to activate it, which records photos of the attacker using the Esp32 Ca m Module and retrieves the victim's present position.Both the location link and the recorded image will b e sent to the Telegram application.It keeps an eye on the victim's smartphone and keeps the gadget tiny by avoiding the need for additional hardware or modules.A camera streams live video, and a GPS module gives you the position data in real time. Systems for collision avoidance and detection are created in this article. A lot of initiatives are being put into place to try to save lives. The proposed research is to develop a security system based on the Internet of Things with a focus on women's safety.*

Introduction: Women's safety is under threat in today's globe, especially in India. Instead of declining, the number of crimes against women—such as rape, abduction, harassment, molestation, and eve-teasing—is rising alarmingly. The government has taken a number of proactive measures to curb these unruly actions, yet the increasing frequency of these offenses has not decreased. Every day, sexual harassment in the workplace is become more common. Any unwanted conduct by one person that makes another feel uncomfortable, offended, or distressed is referred to as sexual harassment in the workplace. Both men and women in senior roles within an organization are involved in the bulk of these instances. Every day, 17 dowry killings occur, and every 44 minutes, a woman is abducted and raped[1].Harassment of women may happen at home as well as in public, which is why it is feared. Because women are not as physically strong as men, they would greatly benefit from assistance when needed.

Literature Survey: R. A. Mahajan and Sayali A. Lavhate [1] designed a GPS and GSM-based women's security system with an emergency button to send alarm messages. Women's security has become a top issue across the world. This technique employs Global Positioning technique (GPS) technology to determine the position of women in peril. The device's information on the whereabouts of women may be examined on Google Maps via the Internet or specific software that is focused on the suggested model. The suggested approach may be utilized to address the issue of women's security through the usage of GPS and GSM-based tracking systems. In this case, the message can be sent in two ways.One is online and the other is offline. In online process, the voice message is recorded and then it will be sent to the registered contacts. During offline process the text message will be delivered to the register contacts.A.Santhiya and B.Hariprakash [2] concentrate on a women tracking system for all working women. This method provides information regarding women's safety to their individual families. This device contains a button and two receiver modules for retrieving information about the missing ladies. When you hit the button, the message will be sent over GSM. This arrangement comprises a microcontroller, a global positioning system (GPS), and a global arrangement for mobile communication (GSM), and the receiver module, which includes an Android mobile, has a monitoring database used to locate the victim.At first, it sends the alert "I AM IN TROUBLE, PLEASE HELP ME". Nowadays, women's safety is deteriorating. With the aid of this program, which was developed in Android and has a graphical user interface, it provides a degree of dependability, availability, and compatibility. Because Android is built on Java, it is a suitable language for this project due to all of these factors. The system's primary benefit over other systems is that it is Android-based, meaning that all of the data is kept in the app.

There are three ways to activate the device: switch, shock, and voice. The mechanism was created by Nitish Aggarwal and Nishant Bhardwaj so that it would lock while not in use to prevent needless signals from being sent. It can be unlocked with just a spoken command. The gadget will begin to function—that is, send its position to the police and a distress message to the registered mobile number via a GSM module—when it is thrown forcefully using its force sensor. If the user is not nearby, this functionality may also be obtained with a voice command.

When the switch is hit, a message is also sent via the GSM module to the other registered mobile phones and the police control center via the transmitter module [5]. IT firms are anticipating the security issue and need a system that can effectively assess the issue of women employees' security when they perform night shifts. This research focuses on a suggested strategy that employs GPS and GSM-based vehicle tracking to address the security issue of female employees [6]. The FM 1100 and the Android cellphone will be used to track the car. When the FM 1100 device is interrupted, it will trace the place where it was activated.

Gowri Predeba, B. Shyamala, N. proposes a novel technological solution to safeguard women. When the system is turned on, it functions similarly to this: it uses the Global Positioning System (GPS) to track the victim's location and the Global System for Mobile Communication (GSM) to send emergency messages to three emergency contacts and the police control center. In addition, the device has a screaming alarm that calls for assistance using the real-time clock and may also shock an assailant in self-defense. Take a chance and offer help when required. [7] The security system that is the subject of this study is intended to give women protection so that they never feel defenseless in the face of such societal issues.The easiest to use and portable

system that the women may carry with them would be the most ideal one for them. A jolt produced by the portable device will force the assailant to retreat. Following the shock, a message will be sent via the Global System for Mobile Communication (GSM) on the specific number that has been saved, and the Global Positioning System (GPS) will be used to track down the ladies. The system will call again until the message is verified by the specified number if it is not checked by that specific number [8].This thesis discusses the use of GSM in a one-touch alert system for women's protection. This system's primary benefit is that it does not require a smartphone from the user. This implies that we can easily track a person using a watch, even if they are not carrying a phone. The PIC microcontroller, GPS module, and GSM module make up the gadget. When turned on, the device, which looks like a regular watch, uses GPS (Global Positioning System) to track the whereabouts of the woman [9] and GSM (Global System for Mobile communication) to transmit emergency signals to the police control center and contacts.Unlike previous apps that have been created in the past, this system's primary benefit is that the user does not need a smartphone. The belt and smartphone will sync with each other.Shaik Mazhar Hussain's installation of an RFID and GSM women's security systemWith Shaik Jhani Bhasha [11], ladies are safeguarded. The ladies were shielded from harassment by wearing this watch or band, which can be kept. This watch or band has an inbuilt active RFID tag and an On/Off switch. When the switch is turned on, data is delivered to an RFID reader that connects to an 8051 microprocessor and sends a "help" message via GSM to four specified contacts—parents, friends, and the media.A smart band and an internet-connected smartphone are always in communication. The application has been designed and loaded with all the necessary information, which includes human behavior and responses to various emotions, such as fear, anxiety, and wrath. As a result, a signal is produced and sent to the smartphone. The software or application was implemented by C Harikiran and Karthik Menasinkai [13]. It has access to GPS and messaging services and is pre-programmed to send help requests and location coordinates to the closest police station, relatives, and other people who have the application within a certain radius whenever it receives an emergency signal.

By taking this step, the victim can receive immediate assistance from the police and other residents who can pinpoint their location with high precision. Nitin Swagand The Internet of Things-based tracking method from origin to destination was proposed by Ravindra P. Shelkikar [14]. IOT is the term used to describe how everyday devices connect and exchange information with one another via the internet. IoT is a major enabler that will provide a cloud computing platform for device connectivity, allowing multiple devices to connect to a single device. Sending a message to the specific individual is all that is required to initiate the system's location tracking, which then automatically resends the message with the latitude and longitude information. That's how they created a server. We can simply trace the location by inputting the IP address and viewing the location using that server.Bharat et.al [15] developed the GPS- based women's safety system with dual safety features is designed to address increasing crimes against women by offering a reliable and immediate alert mechanism. The system includes a manual emergency button for when a woman feels threatened, and automatic activation through impact sensors that detect unusual physical force, ensuring an alert is sent even if the victim is incapacitated. The GPS module tracks real-time. Location, providing precise coordinates to emergency contacts and authorities when activated. This system, with its efficient power management and communication modules, ensures quick response and increased safety, empowering women with the confidence to navigate their daily

lives without fear.

According to Hyndavi et al. [18], there has been a noticeable increase in crimes against women, and there are frequent reports of rape, eve-teasing, and molestation in public areas of society. These days, women's security is the top priority, therefore creating a safety device that may save lives and shield people from damage in an emergency is vital, especially for women. This study proposes a smart gadget for women's safety that uses temperature, pressure, and pulse-rate sensors to automate the emergency warning system and use outlier detection to automatically identify a potential atrocity. In an emergency, this technology finds the woman and uses her GPS information to send notifications to her loved ones without requiring her to respond. It instantly notifies the family members and the local police station of an emergency.According to a GFK survey that Ali et al. [19] discussed, over 81 percent of women have experienced harassment at some point in their lives. This shows the extent of the challenges women face in terms of their growth, confidence, and advancement in a society where the constant fear of an unsafe environment has stifled their potential for success and deprived them of freedom and equal rights with men. They are free to express themselves whenever they want without fearing for their health and safety or needing a chaperone to accompany them when they engage in certain activities in public.

In order to address this social issue, we have developed an Internet of Things (IOT)-based gadget while keeping these scenarios in mind. The main goal of this technology is to provide women with a tool that will allow them to feel secure and at ease while venturing out in public at any strange hour, rather than feeling vulnerable and wary. A number of components, including an Arduino UNO, GPS, GSM, LCD, pulse rate sensor, and emergency button, make up this gadget. Our study is on a self-defense system designed to protect women in a variety of worst-case situations, such as harassment and molestation or the potential for kidnapping by drivers in taxis, public transportation, or the streets.Women are leading and making significant contributions in a variety of professions, including business, education, and the health sector, to mention a few. However, if harassment and safety concerns hadn't prevented them from taking on their rightful responsibilities in society, there may have been a lot more women helping mankind. Women will therefore no longer need to be concerned about their safety in public if they utilize this gadget.
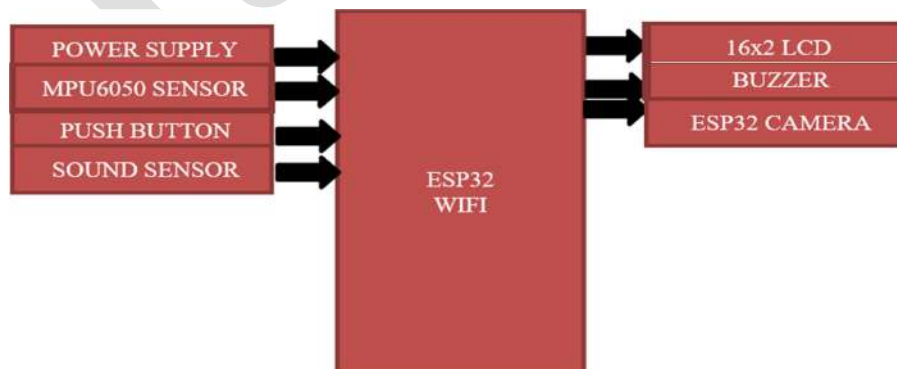
BLOCK DIAGRAM

Fig 1: Block diagram of ESP32 WiFi Module

The diagram about the block diagram of a wireless device. It shows the main components of the device and how they are connected .The following components are labeled in the diagram:

❖ Power Supply

❖ MPU6050 sensor

❖ Push Button

❖ Sound Sensor

❖ 16x2 LCD

❖ Buzzer

❖ ESP32 Camera

❖ ESP32

❖ Wifi

The arrows show how the components are connected. For example, the arrow from the power supply points to the ESP32, which means that the power supply provides power to the ESP32.

Here is a more detailed explanation of some of the components:

ESP32: This is the main processor of the device. It is a low-power, microcontroller with Wi-Fi and Bluetooth connectivity.

MPU6050 sensor: This is a sensor that can measure motion and orientation. It can be used to track the movement of the device.

Push button: This is a button that can be pressed by the user. When the button is pressed, it can trigger an event in the program that is running on the ESP32.

Sound sensor: This is a sensor that can detect sound. It can be used to make the device react to sound, such as by turning on a light or playing a sound.
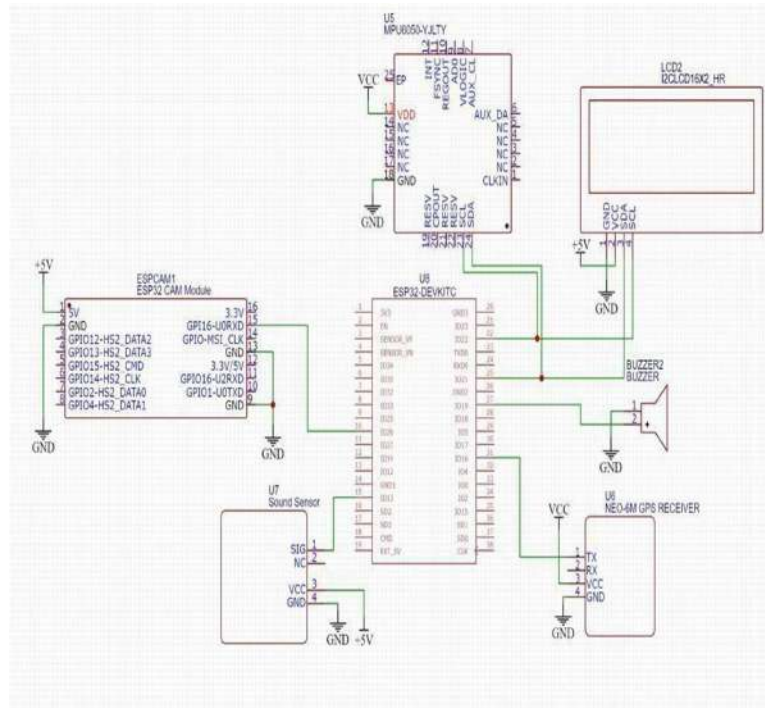
16x2 LCD: This is a liquid crystal display that can be used to show text and images.

Buzzer: This is a small speaker that can be used to make sounds.

ESP32 Camera: This is a camera that can be used to capture images and videos.

Wi-Fi: This allows the device to connect to a Wi-Fi network.

SCHEMATIC DIAGRAM:

Schematic diagram description:

The schematic you sent appears to be a circuit diagram for an Arduino development board controlling a loudspeaker. However, the specific components labeled don't exactly.

Power Supply:The schematic shows a +5V power supply which likely provides power to the entire circuit.

- **Microcontroller:** The central component labeled "ESP32-DEVKITC" and"ESP32 CAM Module" is likely a microcontroller, the brains of the circuit. It appears to be an ESP32 development module manufactured by Espressif Systems.
  - **Loudspeaker:** The component labeled "BUZZER2" is most likely a small speaker or buzzer.
- **LCD Screen:** The component labeled "LCD2" and "12CLCD16X2 HR" might be a 16x2 character LCD screen. This is a small display commonly used in Arduino projects to show text and simple graphics.
- **MPU6050 Sensor:** The component labeled "U5" and "MPU6050-YJLTY"might be an MPU6050 sensor. This is a sensor that can measure motion and orientation.The connections between the components are indicated by lines. Here's what I can glean from those connections:

The ESP32 microcontroller connects to the power supply and ground. The LCD screen connects to the ESP32 microcontroller.

The loudspeaker connects to the ESP32 microcontroller. I can't identify for sure what the "MPU6050-YJLTY" component connects to, but MPU6050 sensors typically use I2C communication protocol, so it likely connects tothe I2C pins of the ESP32.Without more context or a legend for the schematic it's difficult to fully explain what this circuit does. However, given the presence of an LCD screen and a speaker, it'spossible this circuit is

designed to display information and generate sound based onsensor input from the MPU6050 sensor.

BUZZER:

Magnetic Transducer

A vibrating diaphragm with a moveable iron piece, a permanent magnet , and an iron core with a wrapped coil and yoke plate make up the magnetic circuit of a magnetic transducer.

The magnet's magnetic field pulls the diaphragm slightly toward the top of the core. The excitation coil's current generates a fluctuating magnetic field when a positive AC signal is provided, which causes the diaphragm to move up and down and vibrate the air. Vibration is

amplified by resonance through a resonator made of a cavity and/or sound hole, producing a

loud sound.
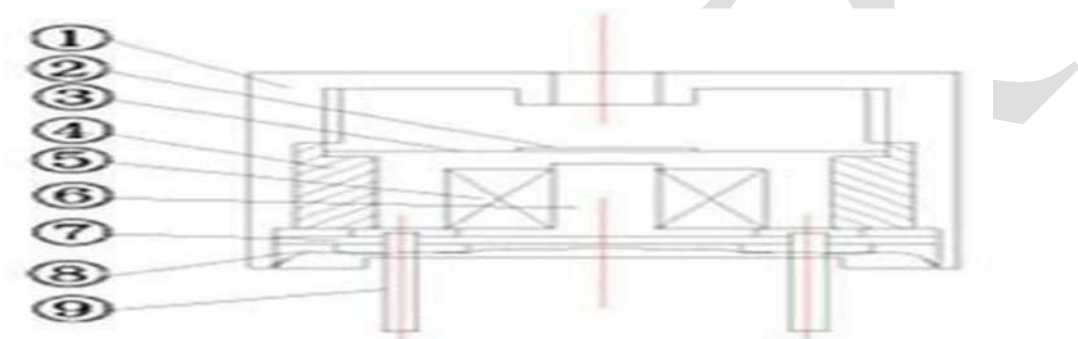
Magnetic Buzzer (Sounder)

Buzzers with integrated oscillating circuits are magnetic audible signal devices, such as those in the TMB series. A magnetic transducer, a driving coil, a detecting coil, and an oscillation circuit unit are all combined in this architecture. Sound generators can be powered by transistors, resistors, diodes, and other tiny components used in circuit designs.

Current flows to the primary side driving coil and the secondary side detecting coil when voltage is applied. Vibration is produced by the transistor and feedback circuit in the amplification circuit.
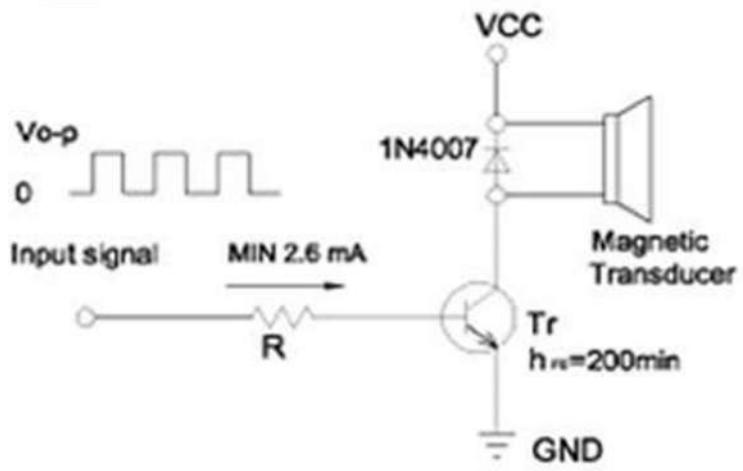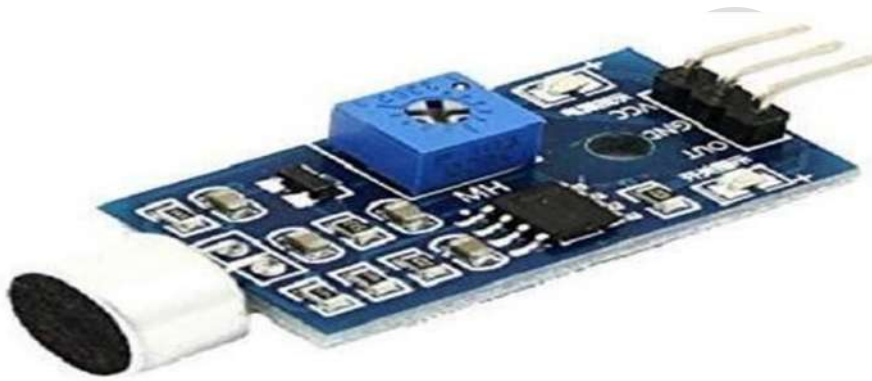
SOUND SENSOR:

One kind of module used to detect sound is the sound sensor. This module is often used to measure sound intensity. This module's primary uses are in monitoring, security, and switching. This sensor's accuracy may be adjusted for user convenience.

This sensor uses an amplifier, peak detector, buffer, and microphone as input.

Sound Sensor Pin Configuration

This sensor includes three pins which include the following.

Sound-Sensor-Module

- Pin1 (VCC): 3.3V DC to 5V DC .
- Pin2 (GND): This is aground pin .
- Pin3 (DO): This is an output pin.

RESULT:

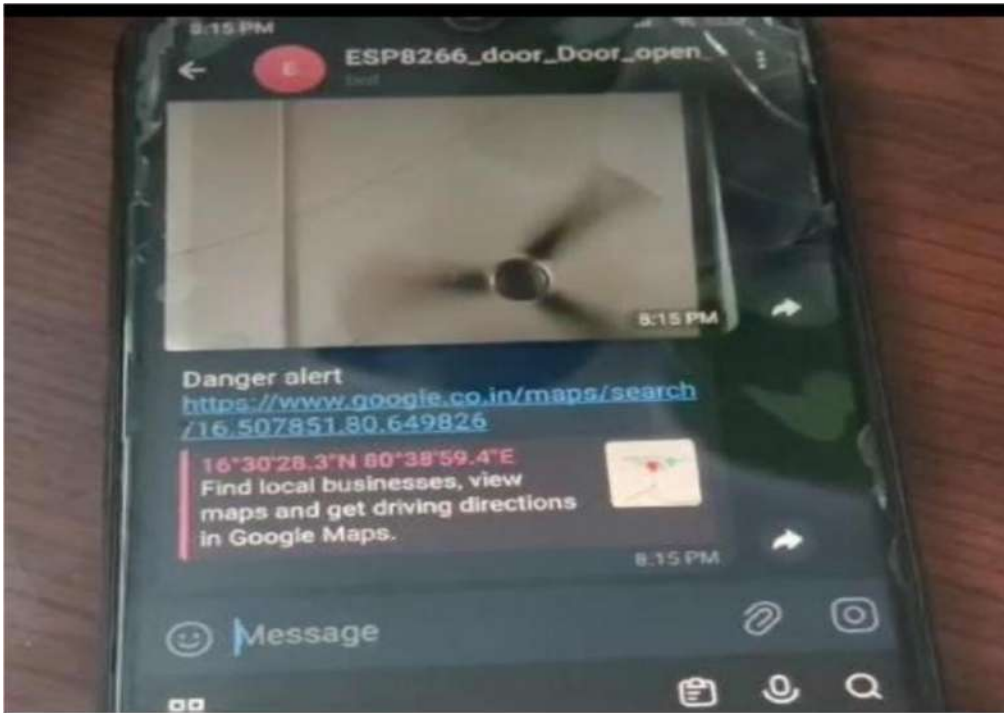Fig 3:Over all women safety emergency alert system

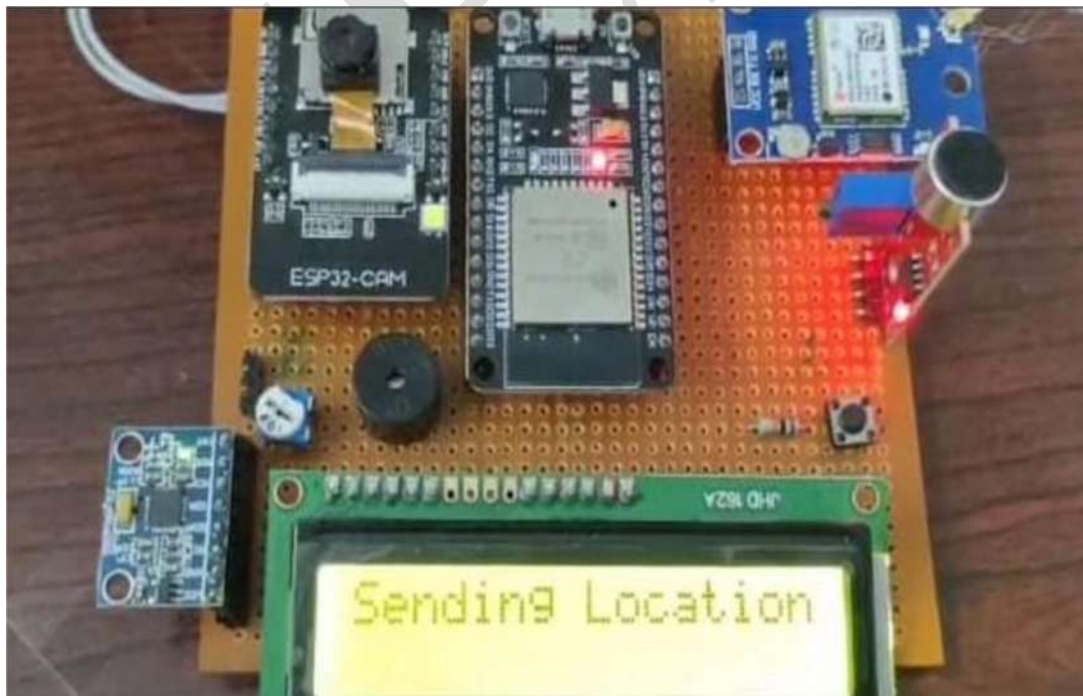Fig 4: Mobile view of danger alert

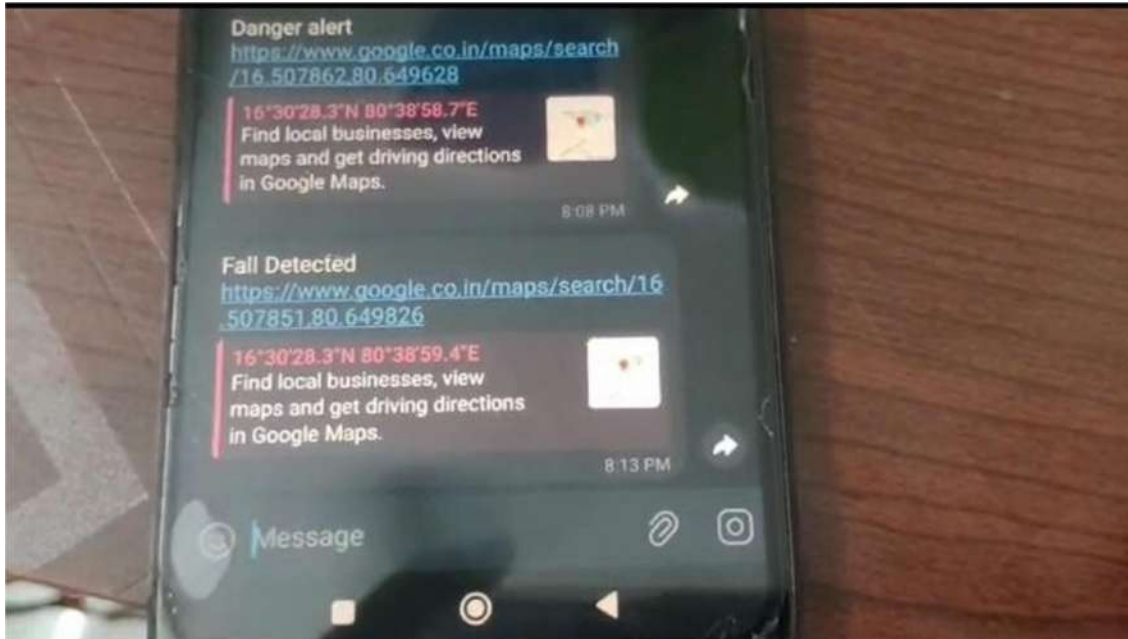Fig 5: Sending location to mobile

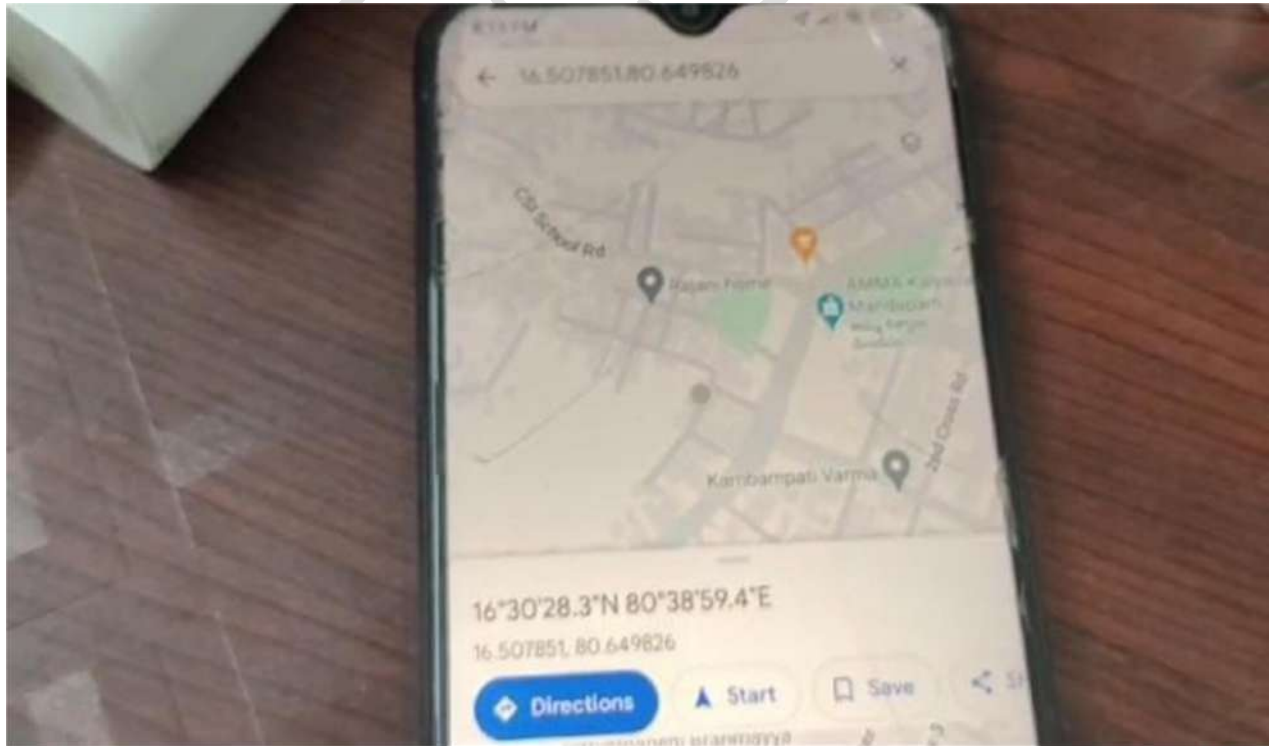Fig 6: fall Detected message in telegram application

Fig 7:Tracing Location

Conclusion:

The proposed study aims to develop an IoT-based security system that prioritizes protecting women by integrating modern technology to ensure their safety. By utilizing components like the ESP32 devkit module, ESP32 Camera, and GPS, the system offers a compact and effective solution for real-time monitoring and emergency response. The ability to capture images, retrieve location data, and stream live video to a connected smartphone via the Telegram application ensures that help can be summoned promptly and efficiently. This initiative not only empowers women to safeguard themselves but also represents a significant step toward leveraging technology to combat violence and ensure public safety.

Future Scope:

The proposed study aims to develop an IoT-based security system that prioritizes protecting women by integrating modern technology to ensure their safety. By utilizing components like the ESP32 devkit module, ESP32 Camera, and GPS, the system offers a compact and effective solution for real- time monitoring and emergency response. The ability to capture images, retrieve location data, and stream live video to a connected smartphone via the Telegram application ensures that help can be summoned promptly and efficiently. This initiative not only empowers women to safeguard themselves but also represents a significant step toward leveraging technology to combat violence and ensure public safety.

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