SafeStride:IoT-Enhanced Safety for Women

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***Abstract*-Women's safety has been highlighted as one of the major concerns of any society where several women are dealing with safety issues like harassment, rape, molestation, and domestic violence due to different social or cultural reasons. Internet of Things (IoT) is becoming a promising technology to support day-to-day concerns and provide support in handling various affairs. This study presents a systematic literature review of research studies exhibiting the IoT devices for women's safety, the main features these devices offer as well as the wearable, sensors use, and the machine algorithms used. The results revealed that different types of sensors are used to capture state of women undergoing safety issues where the pulse rate and pressure sensors are commonly used sensors in these devices. In addition, the devices used different technology to transmit the alerts including global positioning system (GPS), global system for mobile communication (GSM) and Arduino. Lastly, this study emphasizes the use of combinations of sensors to get multiple types of input data that could lead to determining the possibility of threat with better accuracies and precisions.**

Keywords—IoT, Women's Safety, GPS, GSM, Arduino

1. INTRODUCTION

In today's world, women safety has become a major issue as they can't step out of their house at any given time due to

physical/sexual abuse and a fear of violence. Even in the 21st century where the technology is rapidly growing and new gadgets were developed but still women's and girls are facing problems. Women are adept at mobilizing diverse groups for a common reason. They often work across ethnic, religious, political, and cultural divides to promote liberty. We are all aware of importance of women safety, but we must analyze that they should be properly protected. Women are not as physically fit as men; in an emergency situation a helping hand would be assistance for them. The best way to cur tail your probability of becoming a dupe of violent crime (robbery, sexual assault, rape, domestic violence) is to recognize, defense and look up resources to help you out of hazardous situation. If you're in dilemma or get split from friends during a night out and don't know how to find back residence, this device with you will guard you and can reduce your risk and bring assistance when you need it.

EXISTING METHOD

The traditional strategy to resolving women's safety issues is mostly based on human interaction and has various drawbacks. Human patrolling is constrained by fatigue, human mistake, and a narrow field of vision. Furthermore, it frequently fails to respond quickly to distress situations since the need for aid is not always obvious. Furthermore, the typical technique lacks monitoring capabilities, making it difficult to accurately assess the situation and provide timely aid.

PROPOSED WORK

The women safety system is designed to prioritize the well-being of users through a combination of heartbeat monitoring and an emergency switch. The system interfaces with a heartbeat sensor and a switch, detecting both regular heartbeats and emergency situations. Upon detecting a sudden irregularity in heartbeats or the activation of the emergency switch, the system triggers a message transmission with the user's GPS location.

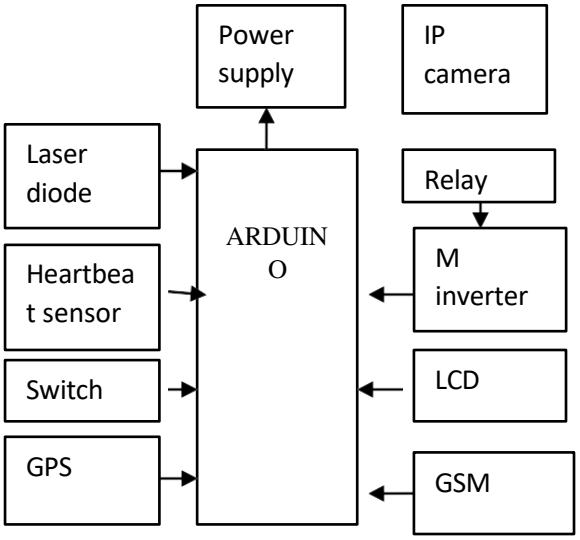


Fig: BLOCK DIAGRAM

- Implemented with a microcontroller, such as Arduino, the system processes the heartbeat data and switch input in real-time. A GSM module is incorporated to facilitate the sending of messages. When a change in heartbeat is detected, indicative of distress, the system initiates a message to notify the user with their current GPS coordinates.
- In case of emergency, when the dedicated switch is pressed, an immediate alert is sent, including the user's precise GPS location. This feature ensures a rapid response in critical situations, enhancing personal safety. The system is designed to be discreet and user-friendly, prioritizing the seamless integration of technology into daily life while providing a robust safety mechanism for women.

By combining heart rate monitoring, emergency switches, and GPS technology, this women safety system offers a comprehensive and responsive solution, ensuring that users can quickly and effectively communicate distress situations to predefined contacts. The incorporation of real-time health monitoring adds an extra layer of safety, making this project a holistic approach to women's well-being in various situations.

ARDUINO

Fig 1: ARDUINO

The Uno with Cable is a microcontroller board built around the ATmega328. It includes 14 digital input/output pins (6 of which can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It includes everything required to support the microcontroller; simply connect it to a computer via USB connection or power it with an AC-to-DC adapter or battery to begin

16*2 LCD:

Fig 2:16*2 LCD

LCD stands for liquid crystal display. It is a type of electronic display module that is used in a wide variety of applications, including circuits and devices such as mobile phones, calculators, computers, televisions, and so on. These displays are mostly used for multi-segment light emitting diodes with seven segments. The main advantages of adopting this module include its low cost, simplicity of programming, animations, and the lack of limits for displaying unique characters, special and even animations, and so on.

GPS

The Global Positioning System (GPS) employs satellites and ground stations to determine one's position on Earth. GPS is sometimes known as Navigation System with Time and Ranging (NAVSTAR GPS). For accurate results, the GPS receiver must receive data from at least four satellites. The GPS receiver does not send any information to the satellites. This GPS receiver is utilized in a variety of applications, including smartphones, taxicabs, and fleet management.

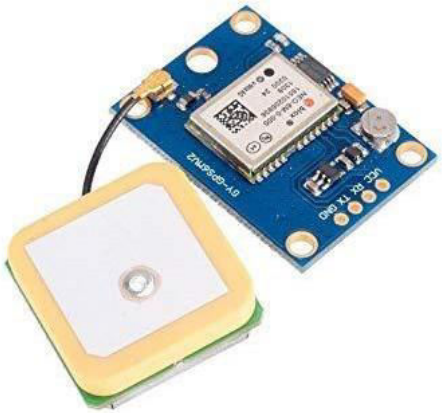


Fig 3:GPS

GSM

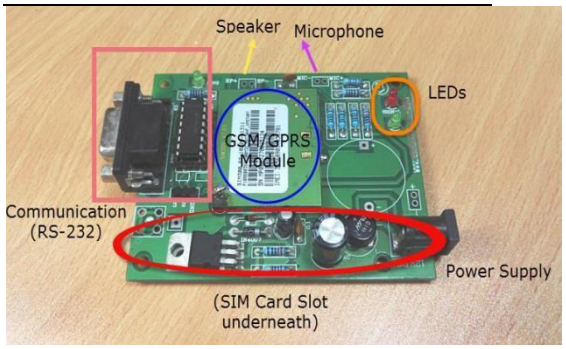


Fig 4: GSM

GSM is a mobile communication modem that stands for global system for mobile communication (GSM). In 1970, Bell Laboratories created the idea of GSM. It is a popular mobile communication method around the world. GSM is an open and digital cellular technology that transmits mobile voice and data services over the 850MHz, 900MHz, 1800MHz, and 1900MHz frequency bands.

BUZZER

Fig 5:BUZZER

A buzzer or beeper is an aural signaling device which can be mechanical, electromechanical, or piezoelectric Buzzers and beepers are commonly used as alarm devices, timers, and to validate human input such as a mouse click or keyboard. Buzzers are integrated structures made up of electronic transducers and a DC power supply that are commonly used in computers, printers, copiers, alarms, electronic toys, automobile electronic equipment, telephones, timers, and other sound-related electronics.

HEART BEAT SENSOR

Heartbeat Sensor is an electronic device that measures heart rate, or the pace of the heartbeat. Monitoring body temperature, heart rate, and blood pressure are the fundamental things we do to maintain our health. We use thermometers to assess body temperature and a sphygmomanometer to monitor arterial pressure (blood pressure). Heart rate can be checked in two ways: manually checking the pulse at the wrists or neck, and using a Heartbeat Sensor.

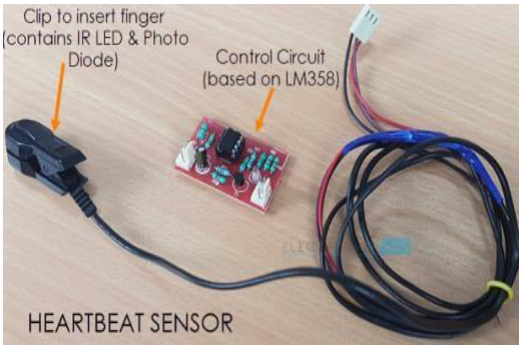


Fig 6: HEART BEAT SENSOR

LASER DIODE

Fig 7: LASER DIODE

A laser diode is a semiconductor that employs a p-n junction to generate coherent light of the same frequency and phase in either the visible or infrared spectrum. It is also known as an injection laser diode, and the technology is similar to that used in LEDs.

IP CAMERA

An IP camera is a video camera that is networked using a Fast Ethernet connection. An IP camera sends signals to the main server or computer screen via an Internet or network connection. It is most commonly used for IP surveillance, closed-circuit television (CCTV), and digital videography.

Fig 8: IP CAMERA

RELAY:

A relay is an electromechanical or solid-state device that allows a low-power circuit to control a high-power circuit. It acts as an electrically operated switch, enabling the control of one electrical circuit by opening or closing contacts in another circuit. Relays are widely used in various applications to provide isolation between different circuits, amplify signals, and control high-power devices.

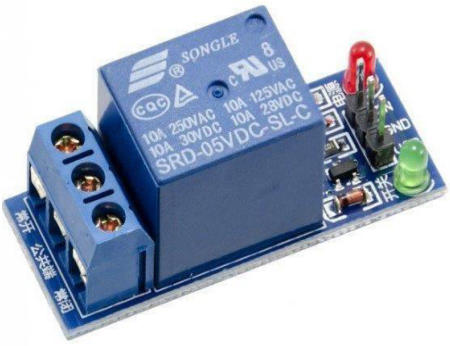


Fig 9: RELAY

SWITCH:

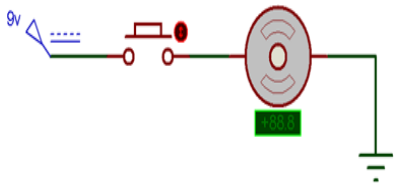


Fig 10: SWITCH

A push-button (sometimes spelled pushbutton), or simply button, is a simple switch mechanism that controls some component of a machine or process. Buttons are frequently composed of hard materials, such as plastic or metal.

INVERTER:

An inverter is a device that controls the

speed of an AC induction motor. It accomplishes this by changing the frequency of the AC power to the motor. An inverter also controls the voltage to the motor. This technique is carried out utilizing complicated electronic circuitry that manages six independent power devices. They turn on and off to provide a simulated three-phase AC electricity. This switching procedure is also known as inverting the DC bus voltage and current into the AC waveforms that drive the motors. This resulted in the name "inverter". For the remainder of this explanation, the word "inverter" will be used instead of changeable speed drive. PV systems need inverters to convert direct current (DC) power.

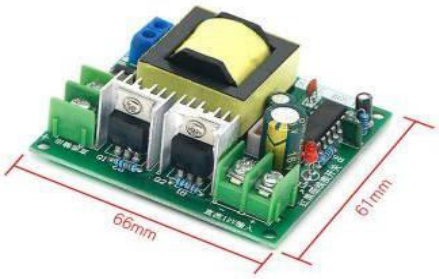
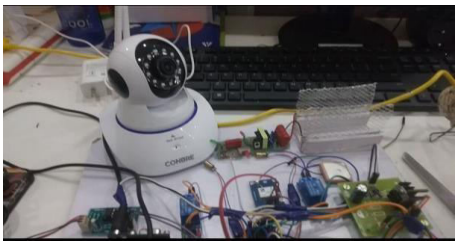


Fig 11: INVERTER

RESULTS:

This section presents the results of the experiments conducted on the hardware and the Android application. First, verify that the GSM module is connected and configured. After installing the GSM module, the device prompts the user to enter 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. The heartbeat sensor starts to indicate that emergency and the Ip camera starts capturing the current scenario and share the details to the all the emergency contacts with the latitude and longitude values received from the GPS module.



CONCLUSION

In this project an alternative approach for device switching which combines fingerprint identification technique with GSM and GPS functionalities has been proposed. The device switching from remote location removes the necessity of the person to be present near the device to operate it. This approach allows more than one person to control the device functionality and the authentication facility provided by the fingerprint sensor helps to reduce the fault correction time.

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