LIST OF FIGURES

LIST OF ABBREVIATIONS

LCD	Liquid Crystal Display
GPS	Global Positioning System
GSM	Global System for mobile communication
IDE	Integrated Development Environment
IOT	Internet Of Things
SMS	Short Message Service
GPRS	General Packet Radio Service

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

In contemporary times, ensuring the safety and security of women has become an imperative aspect of societal progress. The Women Safety Pendant Device project is an innovative initiative aimed at leveraging technology, specifically the Internet of Things (IOT), to address the pressing concerns surrounding women's safety. This project envisions a wearable device that not only empowers women but also revolutionizes the way personal safety is approached in today's dynamic environment.

The fundamental premise of the Women Safety Pendant Device is to provide immediate assistance in times of distress with a single click. By swiftly transmitting the wearer's location and a distress message to law enforcement authorities and pre-set contacts, the device aims to prevent unfortunate incidents and furnish real-time evidence for subsequent legal action against perpetrators of crimes against women.

Furthermore, the potential for miniaturization and integration into mobile phones presents an opportunity to enhance accessibility and convenience. By embedding this technology into everyday devices, such as mobile phones, the device becomes readily available and easily deployable, amplifying its effectiveness in safeguarding women's safety. This innovative approach not only aids in reducing crimes against women but also provides law enforcement agencies with valuable evidence to facilitate the tracing and prosecution of offenders, thereby contributing to a safer and more secure society.

The Women Safety Pendant, enriched with IoT capabilities, is not just a wearable device; it is a holistic safety solution tailored to the modern lifestyle. By amalgamating technology, connectivity, and user-centric design, this device aims to empower women, providing them with a sense of security and confidence in their daily lives. As we navigate the future, the Women Safety Pendant stands at the forefront, exemplifying the potential of IoT to create meaningful solutions for societal challenges.

By leveraging the potency of information technology, this device not only aims to provide immediate assistance during critical situations but also endeavors to empower women, fostering a sense of security in their daily lives. In this era of connectivity, the Women's Safety Device emerges as a beacon of progress, illustrating the potential of technology to contribute significantly to the advancement of societal well-being.

1.2 EXISTING SYSTEM

Current solutions for women's safety often rely on conventional methods, such as pepper sprays, self-defense training, or emergency hotline.

In the existing Systems, The absence of dedicated monitoring systems for girls in existing frameworks poses significant challenges and vulnerabilities, leaving them susceptible to various forms of misconduct and endangerment.

Without robust safety mechanisms in place, girls lack the necessary protection from potential threats and instances of misbehavior. Moreover, the reliance on manual intervention for alerting authorities or seeking assistance further compounds the inadequacies of the current systems, often resulting in delayed responses and increased risks to the safety and well-being of girls.

As such, there is a pressing need for the implementation of comprehensive monitoring and alert mechanisms specifically tailored to address the unique safety concerns faced by girls, thereby fostering a more secure environment and ensuring their protection against potential harm.
While these solutions have their merits, they may not offer the real-time, connected, and multifaceted approach necessary for comprehensive safety. Moreover, the existing solutions may lack the seamless integration with technology needed to provide instant assistance and support in critical situations. The limitations of these traditional methods underscore the need for a more sophisticated and technologically advanced safety solution.

1.3 PROBLEM STATEMENT

Despite various advancements in technology, ensuring the safety of women, especially when they are alone or in unfamiliar surroundings, remains a significant concern.
Women often face the risk of harassment, assault, or other forms of violence, and there is a pressing need for innovative solutions to address these safety challenges effectively.

Traditional safety measures such as pepper sprays or alarms may not always be readily accessible or may fail to provide timely assistance. Therefore, there is a need for a smart and discreet safety device that women can easily carry with them to alert authorities or trusted contacts in case of emergencies.

1.4 OBJECTIVES:

Providing a sense of security to women: Women safety apps aim to provide a sense of security to women when traveling alone or in unsafe areas.

Sending emergency alerts: Many women safety apps include features to send emergency alerts to pre-set contacts, such as friends, family, or authorities, in case of an unsafe situation.

Providing safety information: Women safety apps may provide safety information about a specific area, such as crime rates or safe routes.

Offering self-defense techniques: Some women safety apps may include self-defense techniques and tips to help women protect themselves in dangerous situations.

Encouraging women to report incidents: Women safety apps may also include features to report incidents of harassment, assault, or other crimes against women to the authorities.

Enhancing women's safety during transportation: Some women safety apps may focus on enhancing women's safety during transportation by providing real-time location tracking and monitoring.

1.5 DEMERITS OF EXISTING SYSTEM

While existing smart devices designed for women's safety have their merits, there are also some potential demerits to consider:

Dependency on Technology: Relying solely on a smart device for safety may create a false sense of security, leading individuals to neglect other important safety measures and situational awareness.

Limited Effectiveness in Certain Situations: Smart devices may not always be effective in emergency situations, especially if they rely on an internet connection or if the user's phone battery is dead.

Privacy Concerns: Some users may be uncomfortable with the level of personal data collected and stored by smart safety devices, raising concerns about privacy and potential misuse of information.

Accessibility Issues: Not all women may have access to or be comfortable using smart devices due to socioeconomic factors, technological literacy, or disabilities.

Reliability and Technical Issues: Like any technology, smart safety devices are susceptible to technical glitches, malfunctions, or hacking, which could compromise their effectiveness in critical situations.

Cost: Smart safety devices can be expensive, making them inaccessible to individuals with limited financial resources.

Social Stigma: Carrying or using a safety device may inadvertently stigmatize women, reinforcing the idea that they are inherently vulnerable and in need of constant protection.

False Alarms: Smart devices may trigger false alarms, leading to unnecessary panic or emergency responses.

Dependency on Batteries: Most smart devices rely on batteries, which need to be charged regularly. Forgetting to charge the device could leave the user vulnerable in an emergency.

Cultural and Societal Factors: In some cultures or societies, the use of smart safety devices may not be widely accepted or may even be discouraged, limiting their effectiveness in those contexts.

1.6 PROPOSED SYSTEM

The Women Safety Pendant Device proposes a paradigm shift by introducing a state-of-the- art wearable gadget that harnesses the capabilities of IOT. This device aims to bridge the gaps in existing safety measures by offering a holistic and user-eccentric solution. Key features of the proposed solution include:

i. Panic Button
ii. GPS Tracking
iii. Alarm/Siren
iv. Safety App
v. Camera Access
vi. Video monitoring

Machine Learning for Threat Detection:

Implementing machine learning algorithms enables the analysis of user behavior to detect potential threats, enhancing safety measures. Through continuous learning, these algorithms improve accuracy over time by adapting to new data and scenarios. This proactive approach enables the system to identify abnormal behaviors indicative of potential risks, facilitating swift detection and response

Community Safety Network:

Create a community-based safety network where users can alert others in the vicinity about potential dangers.

Encourage user participation in reporting and sharing safety information.

Emergency Services Integration:

Direct integration with local emergency services for quick response.
Automatic sharing of location and relevant information with authorities.

Offline Mode:

Ensure functionality even in areas with poor or no network connectivity.
Store critical data locally and synchronize when a connection is available.

Regular Updates and Upgrades:

Regularly update the device's firmware and the accompanying app to address security vulnerabilities and add new features.

IOT Connectivity:

The Women Safety Pendant is equipped with IoT connectivity, enabling it to communicate seamlessly with other devices and platforms. This connectivity ensures rapid response times and the ability to transmit critical data in emergency situations.

GPS Tracking and Location Services:

Leveraging GPS technology, the pendant allows users to share their real-time location with trusted contacts or emergency services. This feature is invaluable in swiftly locating individuals in distress and coordinating timely assistance.

Smart Panic Button:

A discreet yet easily accessible panic button on the pendant empowers users to trigger emergency alerts with a single press. This action sets off a chain of responses, including notifying predefined contacts and relevant authorities through the IoT network.

Biometric Security:

The device incorporates biometric authentication to ensure authorized access. This additional layer of security prevents unauthorized use and enhances the overall safety of the user.

1.7 MERITS OF PROPOSED SYSTEM OVER EXISTING SYSTEM

Enhanced Accuracy and Reliability: The proposed system may incorporate advanced technology or sensors to improve the accuracy and reliability of detecting emergencies or unsafe situations, reducing false alarms and ensuring prompt assistance when needed.

Real-time Tracking and Monitoring: The proposed system could offer real-time tracking and monitoring features, allowing authorities or designated contacts to locate and assist the user more effectively in emergencies.

Integration with Emergency Services: The proposed system might have better integration with emergency services, enabling faster response times and providing responders with crucial information such as the user's location and medical history.

Customizable Alerting Mechanisms: Users may have more flexibility in customizing alerting mechanisms according to their specific needs and preferences, ensuring that the system adapts to various situations and user profiles.

Privacy Protection and Data Security: The proposed system might prioritize privacy protection and data security, implementing robust encryption and anonymization measures to safeguard user information and prevent unauthorized access.

Community and Social Integration: The proposed system could include features that foster community engagement and social support networks, empowering users to connect with nearby allies or support groups in times of need.

Affordability and Accessibility: If the proposed system is more cost-effective and accessible than existing solutions, it could reach a broader user base, including individuals from marginalized communities or low-income backgrounds.

Continuous Improvement and Updates: The proposed system may offer regular updates and improvements based on user feedback and technological advancements, ensuring that it remains effective and relevant in addressing evolving safety concerns.

Empowerment and Education: The proposed system might prioritize user empowerment and education, providing resources and training on personal safety strategies, self-defense techniques, and navigating emergency situations effectively.

1.8 REQUIREMENT SPECIFICATION

1.8.1 HARDWARE REQUIREMENTS:

- Micro-controller (Arduino)
- GPS
- LCD
- Emergency Button
- ESP32 Camera
- GSM
- Buzzer

1.8.2 SOFTWARE REQUIREMENTS:

- Arduino(IDE)
- Embedded – C

CHAPTER 2

LITERATURE REVIEW

[1] Standalone Device with ATmega 328 Microcontroller a standalone device without an Android application.

The "Heartrate Monitoring System (HMS)" is a pioneering solution devised to combat the prevalent threat of ischemic heart disease, a leading cause of mortality worldwide. Grounded on the ATmega328P microcontroller, this innovative system is intricately designed to synchronize with an Android application, ensuring seamless operability with smartphones running Android 8.0 or later versions. Central to its functionality are two pivotal segments: the "Heartrate Acquisition Bluetooth Segment (HABS)" and the "Heartrate Monitoring App Segment (HMAS)." HABS serves as the primary data acquisition unit, proficiently capturing heart rate data with utmost accuracy and reliability. This data is then swiftly relayed to the user's smartphone through Bluetooth connectivity. On the other hand, HMAS acts as the analytical core, processing the incoming heart rate data and employing predefined parameters to discern whether the situation necessitates the involvement of emergency services. Should an emergency be identified, HMAS promptly initiates distress messages to preconfigured contacts, furnishing them with comprehensive information crucial for paramedic intervention.

The efficacy and dependability of the HMS have been rigorously evaluated through a series of meticulously designed experiments. These experiments encompassed a wide array of criteria, including accuracy, data transfer efficiency, SMS transmission reliability, location pinpointing precision, storage capacity, latency, battery longevity, and device portability. Employing a mixed methodology approach, which incorporated experimental case studies, one-shot case studies, and surveys, the researchers endeavored to comprehensively assess the system's performance across various dimensions. Among the noteworthy findings was the confirmation of HABS's remarkable accuracy in recording heart rate data, with no instances of missing or erroneous data observed during the experiments. Furthermore, the system exhibited an impressive mean latency of 29 milliseconds, signifying its rapid responsiveness in processing data and triggering appropriate actions.

In addition to its technical prowess, the HMS also garnered considerable acclaim for its practicality and user acceptance. Survey responses from fifty-five participants revealed a vote of confidence in the system's portability, with a substantial majority rating it favorably in this regard. Moreover, the system's ability to function seamlessly and reliably in real-world scenarios was underscored by its successful demonstration of essential functionalities, including data display, location tracking, and distress message transmission.

[2] Smart Band Safety Device Safety device in the form of a smart band.
Activated by tapping it twice.

In response to the escalating pace of urban life and the heightened concerns surrounding the safety of children during their daily commutes to school or college, a smart wearable device emerges as a beacon of assurance for parents.

This device operates on the premise of periodic tracking, ensuring continuous monitoring of the student's whereabouts and well-being. In the event of any untoward incident or emergency, parents receive immediate notifications via SMS, empowering them to take swift action.

Leveraging the capabilities of the Firebase cloud database, the device maintains a real-time repository of crucial parameters, facilitating seamless communication and data retrieval.

Through simple SMS commands, parents can access vital information about their child's heartbeat, body temperature, ambient conditions, and approximate location, thereby fostering a sense of security and peace of mind.

Furthermore, the device integrates essential safety features such as an alarm buzzer and an SOS light, serving as visible signals to solicit assistance from bystanders in times of distress. By harnessing technology to address the evolving needs of modern-day parenting, this smart wearable device not only safeguards the physical well-being of children but also provides a robust mechanism for parental oversight and intervention, thereby instilling confidence in families navigating the complexities of urban life.
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[3] Self-Defense System with Location Alert Button Utilizes a button as a self-defense system.

When triggered, it sends the victim's location to her family members.
Alerts the surroundings with a prerecorded message.

The primary aim of this project is to enhance the safety and security of individuals, particularly women and children, through the utilization of advanced electronics.

Recognizing the prevalent threat of physical harassment faced by women in public spaces, our solution entails discreetly embedding a sophisticated system within footwear.

This system comprises GPS (Global Positioning System) and GSM modules, enabling real-time tracking of the wearer's geographical location.

In the event of an emergency, a designated button triggers the microcontroller to transmit latitude and longitude coordinates via GSM to authorized individuals, including law enforcement and family members. This swift dissemination of location information facilitates prompt assistance and rescue efforts, bolstering the safety and well-being of individuals facing precarious situations.

[4] FEMME Android Application. An Android application called FEMME.
Features include sending SOS messages, recording audio and video, and detecting hidden cameras. Intended to provide evidence through audio and video recordings.

In a country marked by economic prowess and technological advancement, the persistence of crimes against women underscores the urgent need for comprehensive solutions to ensure their safety and well-being.

Addressing this pressing concern, the innovative product "FEMME" emerges as a beacon of hope in combating atrocities against women. Engineered as a dedicated security system, FEMME is meticulously designed to cater to the specific needs of women in distress.

Leveraging the efficiency and low power consumption of ARM controller technology, FEMME integrates a range of cutting-edge features aimed at empowering women to navigate public spaces with confidence and peace of mind.

Utilizing a radio frequency signal detector, FEMME offers a proactive defense against the invasion of privacy through hidden cameras, filling a critical gap in existing security apparatuses. Unlike conventional solutions that require users to carry multiple devices for various security functions, FEMME consolidates all essential features into a single, user-friendly device, streamlining the user experience and enhancing accessibility.

Through seamless synchronization with an accompanying Android application via Bluetooth connectivity, FEMME ensures real-time communication and coordination between the device and the user's smartphone.

Notably, the device boasts advanced capabilities such as audio recording for forensic purposes and automated alert systems that promptly notify pre-set contacts with the wearer's precise location at regular intervals.
Moreover, FEMME's integrated hidden camera detector serves as a distinctive safeguard, enabling users to maintain their privacy and security in a rapidly evolving digital landscape.

By offering unparalleled functionality and convenience in a single, compact solution, FEMME heralds a new era of empowerment and protection for women, signaling a decisive step towards eradicating gender-based violence and fostering a society where every individual can thrive without fear or intimidation..

[5] Portable Safety Device "SMARISA". A portable safety device activated by tapping a button.
Captures the image of the attacker using a camera and sends it, along with the current location, to the police and pre-defined emergency contact numbers via a smartphone.

In today's society, despite strides towards gender equality, women still face numerous challenges when it comes to personal safety and freedom. Constrained by societal expectations and safety concerns, women often find themselves unable to fully embrace their passions and pursue their ambitions without fear.

To address this pressing need, a women's security system leveraging IoT technology emerges as a beacon of empowerment and protection.
By harnessing the capabilities of IoT, this innovative system facilitates seamless communication between physical devices over the internet, transcending geographical barriers and ensuring real-time response to emergencies.

Comprising essential components such as Raspberry Pi Zero board, a camera, buzzer, and push button, this portable and secure system is designed to send alert messages to both relatives and nearby police stations in times of distress.

An intuitive Android application complements the hardware setup, allowing users to easily configure emergency contact lists and activate the system with a simple push of a button. When activated, the Raspberry Pi captures an image of the crime scene and promptly transmits an emergency signal to a cloud-based database.
Simultaneously, the Android application retrieves the user's GPS location and dispatches it to the cloud, ensuring accurate tracking of the user's whereabouts. Additionally, SMS notifications are sent to the designated emergency contacts, providing them with vital information to facilitate immediate assistance.

Furthermore, to aid in investigations, the system automatically sends the captured image of the crime scene along with the GPS coordinates to a predefined email address.

By seamlessly integrating hardware, software, and cloud-based functionalities, this women's security system not only offers a proactive approach to personal safety but also empowers women to reclaim their autonomy and pursue their aspirations with confidence and peace of mind.

[6] Safety Device with Fingerprint Activation Requires fingerprint activation.
Features a buzzer to alert nearby people.

In response to the persistent threat of violence against women, a comprehensive safety device has been developed to provide immediate assistance and defense in times of peril.

This innovative solution seamlessly integrates GPS and GSM modules to swiftly relay the victim's precise location to designated ICE (In Case of Emergency) contacts, ensuring prompt intervention and support. Beyond location tracking, the device incorporates a multifaceted approach to self-defense, featuring a shock generator, audio recording capability, and a display of nearby safe havens from the current crime location.

Central to its functionality is a fingerprint verification system, enhancing security and enabling rapid activation of self-defense mechanisms upon recognition of an authorized fingerprint. Upon successful verification, the device triggers an electric shock at its tip, capable of incapacitating potential assailants and providing the victim with a critical window of opportunity to escape or seek assistance.

Simultaneously, an alert message containing the victim's location is dispatched to pre-configured contacts, ensuring immediate aid and support until further assistance arrives.

The device's hardware components are orchestrated by the ARDUINO NANO microcontroller, which interfaces and controls various peripheral devices, including the GT-511C3 fingerprint module for biometric authentication and the SIM 808 module for GPS and GSM communication.

The electric shock circuit, designed to deliver a potent high-voltage shock upon contact, serves as a formidable deterrent against aggressors, bolstering the victim's capacity for self-defense. By integrating cutting-edge technology with robust security features, this safety device empowers women to navigate public spaces with confidence and resilience, offering a proactive solution to mitigate the risks associated with gender-based violence.

CHAPTER 3

SYSTEM DESIGN

3.1 BLOCK DIAGRAM :

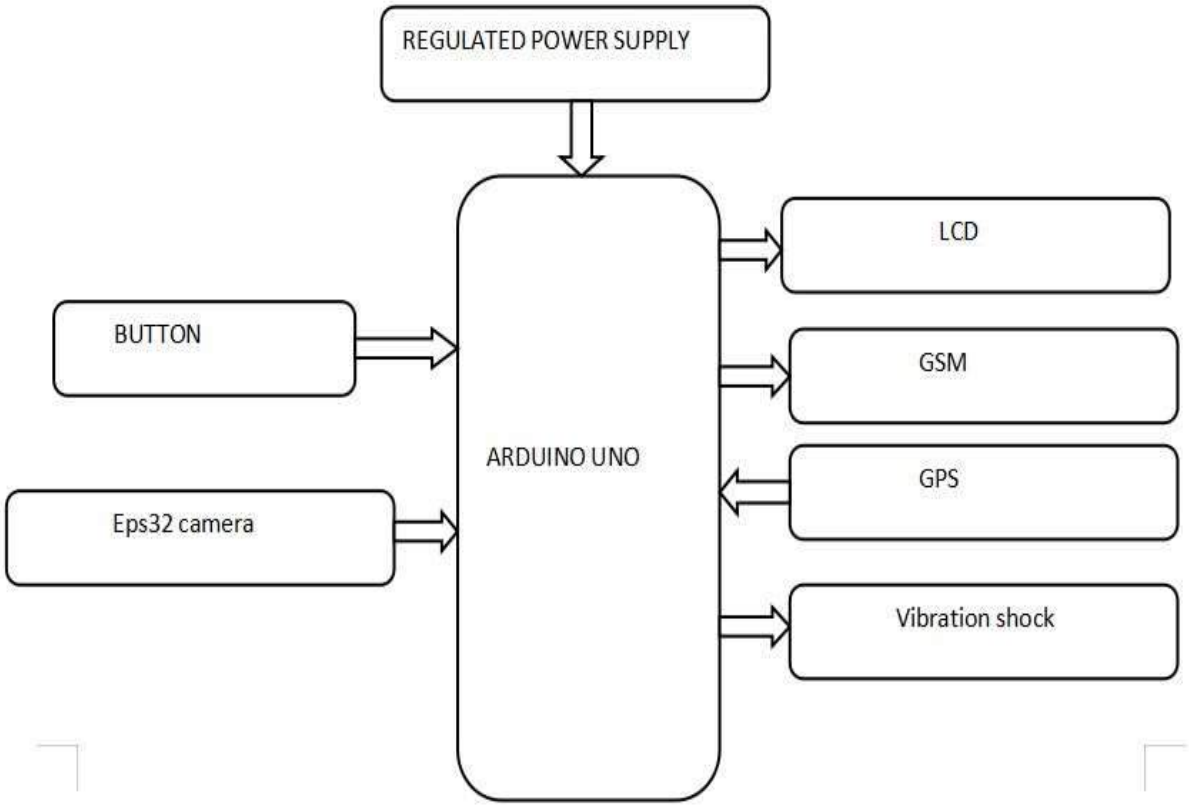


Figure 1: Block diagram

The block diagram briefly depicts how the mechanism has been carried out in the system which can be

Further made or fix into it tiny or micro objects like pendant and keychain

3.2 SYSTEM ARCHITECTURE

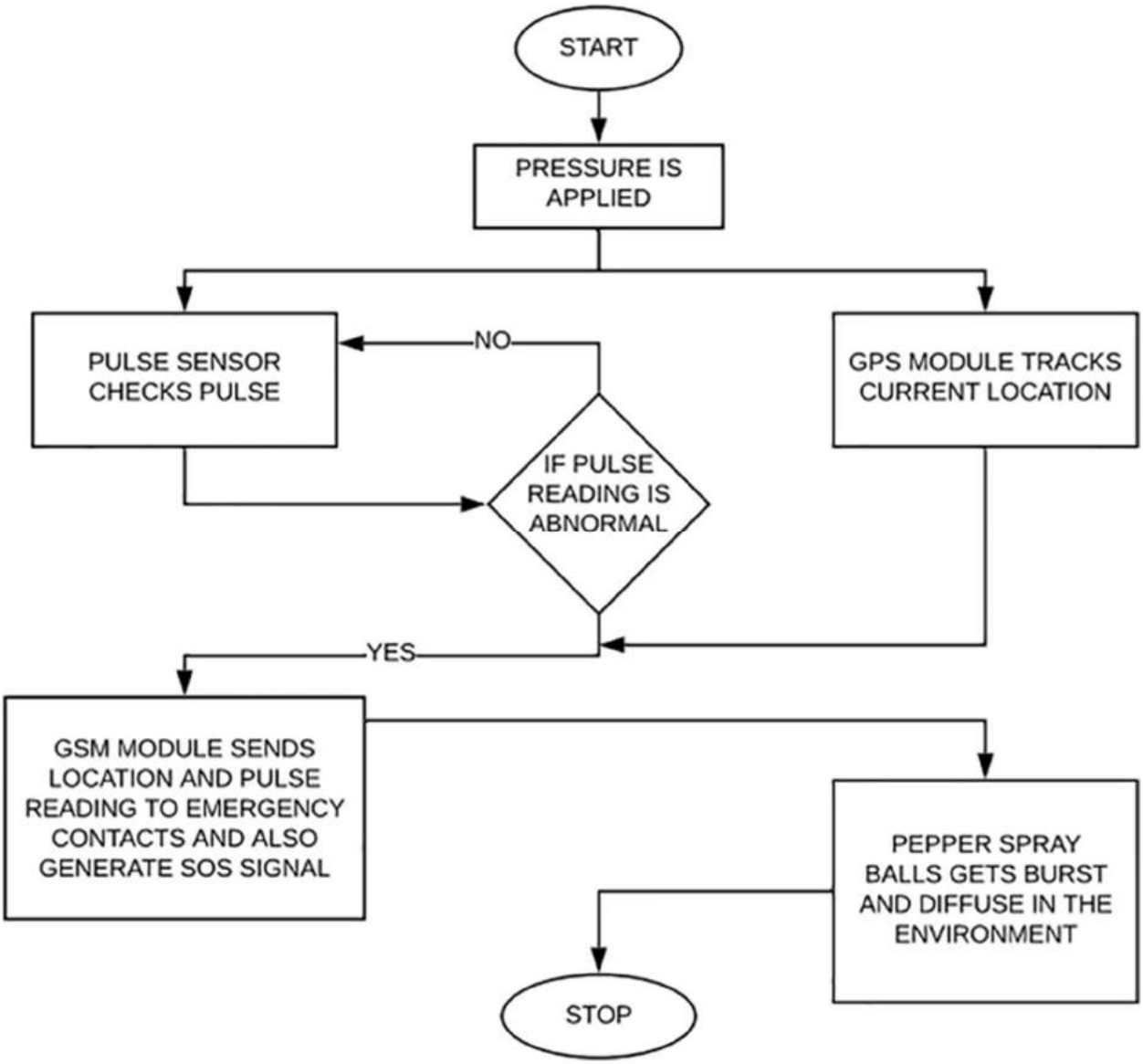


Figure 2: System Architecture

3.3 PROPOSED SYSTEM:

Our proposed system prioritizes self-defense by employing a mechanism that administers a controlled electric shock to deter perpetrators, thereby diminishing their state of agitation and facilitating the woman's escape from critical situations.

Additionally, we aim to integrate a device that operates autonomously, eliminating the need for manual intervention, thus ensuring women's safety in various public settings such as transportation vehicles (such as cabs, taxis, buses, and auto-rickshaws) and workplaces.

This device comprises an emergency button which not only tracks the user's location but also dispatches SMS alerts to parents or nearby law enforcement agencies. Within the proposed system, we have meticulously designed equipment to enhance the alerting mechanism, thereby bolstering its effectiveness.

For the control and coordination of the entire system, we have opted to utilize the Arduino controller.

The GSM module facilitates the transmission of SMS messages containing GPS coordinates, while the LCD screen serves as a means of visual feedback.

A switch is incorporated to be activated when a person is in imminent danger, triggering the system's response. Furthermore, to augment the deterrent effect, we have incorporated additional features such as a buzzer and a laser diode, both of which are activated upon the activation of the switch by the user.

The proposed system utilizes an Arduino controller as the central processing unit to oversee the entire operation. Leveraging the Arduino's versatility, the system integrates various components to enhance women's safety.

I. A GSM module facilitates the transmission of SMS alerts containing GPS coordinates to predefined contacts, ensuring swift assistance during emergencies.

II. An LCD display provides real-time feedback, offering users vital information at a glance. A strategically positioned switch serves as a panic button, enabling women to signal distress with a simple press.

III. Upon activation of the panic switch, the buzzer emits a loud alarm, attracting attention and deterring potential threats. This comprehensive approach amalgamates technology and practicality, empowering women with a reliable safety solution.

IV. Through seamless integration and efficient functionality, the system addresses the critical need for enhanced security measures tailored to women's safety concerns.

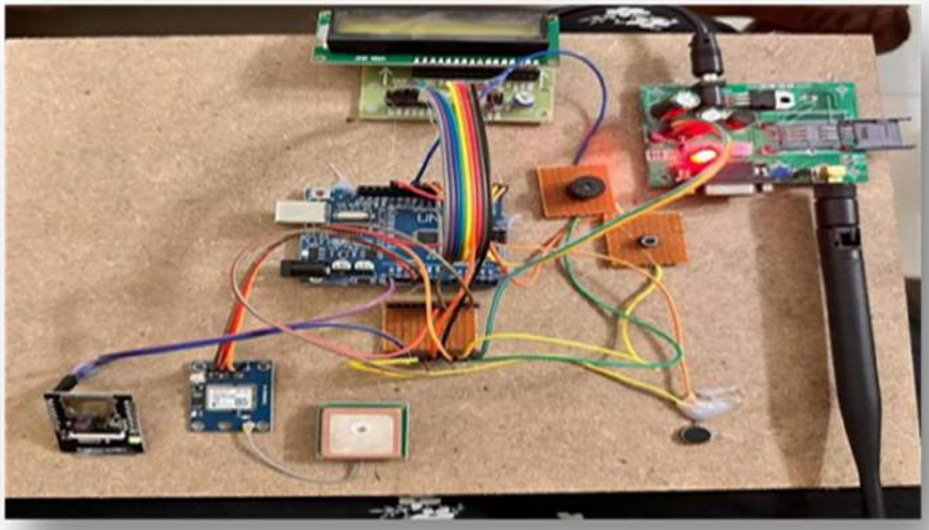


Figure 3: Prototype

Figure 4: Arduino Board

3.4 HARDWARE REQUIREMENTS:

ARDUINO :

Arduino Uno is a microcontroller board developed by Arduino.cc which is an open-source electronics platform mainly based on AVR microcontroller Atmega328. The current version of Arduino Uno comes with USB interface, 6analog input pins, 14 I/O digital ports that are used to connect with external electronic circuits. Out of 14 I/O ports, 6 pins can be used for PWM output.

Arduino boards are open-source microcontroller platforms that facilitate prototyping and creation of interactive electronic projects. They consist of a programmable circuit board with inputs and outputs for connecting various sensors, actuators, and other components.

Arduino boards are user-friendly, with a simple integrated development environment (IDE) for writing and uploading code. They support a wide range of programming languages and are popular among hobbyists, students, and professionals for developing projects in areas such as home automation, robotics, and IoT devices. With their versatility and affordability, Arduino boards have become a cornerstone in the world of DIY electronics and rapid prototyping.

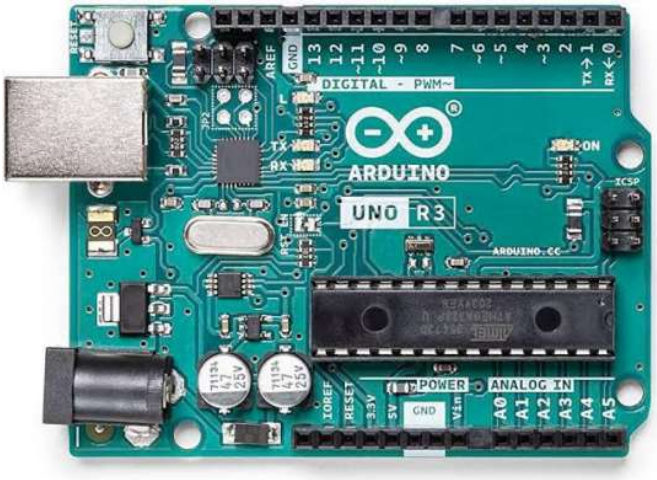


Figure 5: Arduino UNO R3

EMERGENCY BUTTON:

An emergency button, also known as a panic button or distress signal, is a safety device designed to summon immediate assistance in critical situations.

Typically, it's a simple mechanism that, when pressed, triggers a predefined response such as contacting emergency services or activating alarms.

Emergency buttons are commonly found in various environments including homes, workplaces, and public spaces where immediate assistance may be required in emergencies such as medical crises, security threats, or accidents.

These devices provide a quick and reliable means for individuals to call for help, enhancing safety and peace of mind in both personal and professional settings.

Figure 6: Emergency Button

RELAY :

A relay is an electromechanical switch used to control the flow of electricity in a circuit. It consists of a coil, an armature, and one or more contacts.

When an electrical current is passed through the coil, it generates a magnetic field that attracts the armature, causing it to move and close or open the contacts.

Relays are versatile components utilized in various applications such as automation, telecommunications, and automotive systems.
They enable the control of high-power or high-voltage circuits with low-power signals, offering isolation between the control circuit and the controlled circuit for safety and reliability.

BUZZER :

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers and conformation of user input such as a mouse click or keystroke.

A buzzer or beeper serves as an audio signaling device, encompassing mechanical, electromechanical, or piezoelectric components.
Widely utilized in various applications such as alarms, timers, and user input confirmation, buzzers integrate electronic transducers and DC power supplies.

Essentially, a buzzer operates as an electro-acoustic device, producing sound through the vibration of a diaphragm or piezoelectric element when an electrical current passes through it. This mechanism involves the generation of a magnetic field by a coil of wire, inducing vibrations in the diaphragm and thereby emitting sound waves..

Buzzer sound frequencies can vary depending on design and application, from low-frequency buzzes to high-pitched tones. Buzzers are commonly used in alarm systems, electronic devices, and industrial equipment to provide audible alerts or warnings. They serve as effective indicators of events or conditions requiring attention, enhancing safety and communication in various contexts.

Figure 7: Buzzer

GSM :

A GSM modem is a device which can be either a mobile phone or a modem device which can be used to make a computer or any other processor communicate over a network. A GSM modem requires a SIM card to be operated and operates over a network range subscribed by the network operator. It can be connected to a computer through serial, USB or Bluetooth connection.

GSM, or Global System for Mobile Communications, is a digital cellular technology widely used for mobile communication. It was developed to replace the analog cellular networks and provide better voice quality, data services, and increased security.
GSM operates on various frequency bands allocated globally, allowing for international roaming.

It employs time-division multiple access (TDMA) to divide the frequency spectrum into time slots, enabling multiple users to share the same frequency channel. GSM supports various services such as voice calls, text messaging (SMS), multimedia messaging (MMS), and mobile internet access. It has played a significant role in the proliferation of mobile communication worldwide, serving billions of users across the globe.

Figure 8: GSM

RPS:

A regulated power supply is an electronic device designed to deliver a stable and constant voltage output, regardless of variations in input voltage or changes in load conditions. It consists of several key components including a transformer, rectifier, filter, voltage regulator, and often a feedback mechanism.
The transformer converts the input AC voltage to a different voltage level suitable for rectification. The rectifier then converts AC voltage to pulsating DC voltage. Next, the filter smoothes the pulsating DC voltage, reducing ripple to provide a relatively stable DC output.

The voltage regulator is the core component of a regulated power supply, ensuring the output voltage remains constant despite fluctuations in input voltage or load variations. It achieves this by continuously monitoring the output voltage and adjusting it as needed. Some regulated power supplies also incorporate feedback mechanisms to further enhance stability and accuracy.

Regulated power supplies are indispensable in various applications, including electronics testing, telecommunications, industrial automation, and laboratory equipment, where precise and stable voltage is crucial for proper operation and component protection.

Figure 9: RPS

ESP32-CAMERA:

The ESP32-CAM can be widely used in intelligent IoT applications such as wireless video monitoring, WiFi image upload, QR identification, and so on. The ESP32-CAM suit for IOT applications such as: Smart home devices image upload. Wireless monitoring.

The ESP32-CAM is a versatile development board integrating the ESP32 microcontroller with a camera module, offering capabilities for capturing images, streaming video, and performing image processing tasks.

Equipped with built-in Wi-Fi and Bluetooth connectivity, it facilitates wireless communication, making it ideal for IoT projects, surveillance systems, and remote monitoring applications. The camera module typically features an OV2640 sensor capable of capturing high-resolution images and video. With its small form factor and low power consumption

The ESP32-CAM is suitable for various projects requiring visual data acquisition and transmission. Its integration with the ESP32 platform provides ample processing power and flexibility, enabling developers to create innovative solutions for image-based applications.

Figure 10: ESP32-CAM

LCD:

A 16*2 LCD implies 16 characters can be shown per line and 2 such lines exist. Each character is shown in a lattice of 5*7 pixels in this LCD. There are two registers in this LCD, in particular Command and Data

An LCD (Liquid Crystal Display) is a flat-panel display technology used in electronic devices for visual output. It consists of a grid of pixels that can change their optical properties in response to an electric current. LCDs are widely used in devices such as televisions, computer monitors, smartphones, and digital cameras due to their low power consumption, thin profile, and ability to display high-resolution images and text. They work by modulating the intensity of light passing through liquid crystal molecules controlled by electric fields, resulting in images or text displayed with sharp detail and vibrant colors.

Figure 11: LCD

3.5 SOFTWARE REQUIREMENTS:

- Arduino IDE
- Embedded C

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.

The Arduino Integrated Development Environment (IDE) is a software platform designed for programming Arduino microcontroller boards. It provides a user-friendly interface for writing, compiling, and uploading code to Arduino-compatible devices. The IDE is open-source and supports various operating systems, including Windows, macOS, and Linux.

Key features of the Arduino IDE :

- a text editor with syntax highlighting
- automatic code completion
- error checking to assist developers in writing code efficiently.

It also includes a built-in library manager, allowing users to easily install and manage additional libraries for extended functionality.

The IDE simplifies the process of uploading code to Arduino boards through a straightforward interface, enabling users to select the appropriate board and communication port with ease. Additionally, it provides a serial monitor for debugging and real-time communication with the microcontroller.

Overall, the Arduino IDE serves as a comprehensive tool for both beginners and experienced users to develop projects and prototypes using Arduino boards, fostering innovation and creativity in the maker community.

EMBEDDED C:

Embedded C is a variant of the C programming language tailored for embedded systems, which are computer systems designed to perform dedicated functions within a larger system or device. I

It retains the features of standard C while accommodating the constraints and requirements of resource-constrained embedded platforms, such as microcontrollers. Embedded C emphasizes efficient memory usage, precise control over hardware peripherals, and real-time performance.

It is widely used in industries like automotive, consumer electronics, and medical devices for developing firmware and low-level software to control embedded systems and interact with hardware components. Mastery of Embedded C is essential for embedded systems development due to its suitability for resource-constrained environments**.**

This is generally used to develop microcontroller-based applications. C is a high-level programming language. Embedded C is just the extension variant of the C language. This programming language is hardware independent.

CHAPTER 4

METHODOLOGY AND IMPLEMENTATION

4.1 ALGORITHM:

Here's an algorithmic representation of the provided Arduino code:

Initialize:

Set up the LiquidCrystal library.

Define pin numbers for components (button, buzzer, shock).

Initialize variables (button_value).

Set up serial communication.

Set pin modes for components.

Setup Function:

Initialize LCD display.

Initialize serial communication.

Set pin modes for components.

Display startup message on the LCD.

Wait for 2 seconds.

Main Loop:

Continuously repeat the following steps:

Read the state of the button.

If the button is pressed (LOW):
Clear the LCD.

Display "GPS location tracking" on the first line of the LCD.

Display "Sending SMS...." on the second line of the LCD.

Activate the shock and buzzer.

Call the sms() function.
If the button is not pressed (HIGH):

Clear the LCD.

Display "SAFE SITUATION" on the LCD.

Deactivate the shock and buzzer.

Delay for 2 seconds.

SMS Function:

Initialize serial communication.

Send AT commands to the GSM/GPRS module:

Set SMS mode.

Specify recipient phone number.

Send the message containing a Google Maps link with GPS coordinates.

Wait for acknowledgment from the module.

End the function.

This algorithm provides a step-by-step overview of how the Arduino code operates, from initialization to the main loop's continuous operation and the sending of an SMS when the distress button is pressed.

4.2 SOURCE CODE:

```
#include<LiquidCrystal.h>
LiquidCrystal lcd(2,3,4,5,6,7);
#define button 9
#define buzzer 10
int button_value;
int shock=8;
void setup()
{
lcd.begin(16,2);
Serial.begin(9600);
pinMode(button, INPUT_PULLUP);
pinMode(shock, OUTPUT);
pinMode(buzzer, OUTPUT);
lcd.setCursor(0,0);
lcd.print("GPS Based women ");
lcd.setCursor(0,1);
lcd.print("Tracking System");
delay(2000);
}
```

```
void loop()

{

button_value=digitalRead(button);

if (button_value==LOW)

{

lcd.clear();

lcd.print("GPS location tracking");

delay(1000);

lcd.setCursor(0,1);

lcd.print("Sending SMS....");

delay(1000);
digitalWrite(shock,HIGH);

digitalWrite(buzzer,HIGH);

delay(2000);

sms();

}

else

{

lcd.clear();

lcd.print("SAFE SITUATION");

digitalWrite(shock,LOW);
```

```
digitalWrite(buzzer,LOW);

delay(2000);

}

}

Void sms()

{
{

Serial.begin(9600); //Baud rate of the GSM/GPRS Module
Serial.print("\r");

delay(1000);

//Serial.print(“AT+CMGF=1\r”);

Serial.print("AT+CMGF=1\r");

delay(1000);

// Serial.print(“AT + CMGS = \”+919948896119\”\r”);
Serial.print("AT+CMGS=\"+919059110320\"\r");

delay(1000);

Serial.print("Women in danger at
https://maps.app.goo.gl/shTtELWiVwiiJ8YEA");

delay(1000);

Serial.write(0x1A);

delay(1000);

}
}
```

4.3 EXPLANATION

This Arduino code helps to build the GPS-based women tracking system with an alert mechanism through SMS. Let's break down the code step by step:

Including Libraries: The code starts by including the Liquid Crystal library, which is commonly used for interfacing LCDs with Arduino boards.

Defining Pins and Variables: The code defines pin numbers for button, buzzer, and shock (which seems to be used to simulate a shock or alarm). It also declares variables to store button state and define the pin for the shock.

Setup Function: This function runs once when the Arduino is powered on or reset.

Initializes the LCD display.
Initializes serial communication at 9600 bits per second.
Sets the pin modes for button, shock, and buzzer.
Prints a startup message on the L**Loop Function:** This function runs repeatedly as long as the Arduino has power.

Reads the state of the button.
If the button is pressed (LOW state), it:
Clears the LCD.
Prints a message indicating GPS location tracking and sending SMS.
Activates the shock and buzzer.
Calls the sms() function.
If the button is not pressed (HIGH state), it:
Clears the LCD.
Prints a message indicating a safe situation.
Deactivates the shock and buzzer.

SMS Function: This function seems to be responsible for sending an SMS.

Initializes serial communication again (which is unnecessary because it's already initialized in setup()).
Sends AT commands to the GSM/GPRS module:
Sets the SMS mode.
Specifies the recipient phone number.
Sends the message, which includes a Google Maps link with GPS coordinates (though there seems to be an error in the formatting of the link).
Delays are added between commands to ensure proper communication.

CHAPTER 5

RESULTS AND DISCUSSIONS

5.1 RESULTS:

- IoT-Based Women's Safety Device:

Utilizing IoT technology, our women's safety device yielded promising results in ensuring the security of women, especially those working night shifts in major Indian cities. Through our surveys, we found that 53% of working women across India reported feeling unsafe.

- Triggered Alerts and Functionalities:

The device's IoT-enabled features proved instrumental in providing a safe environment for women facing threats such as hidden cameras, physical assault, harassment, robbery, and stalking scenarios.

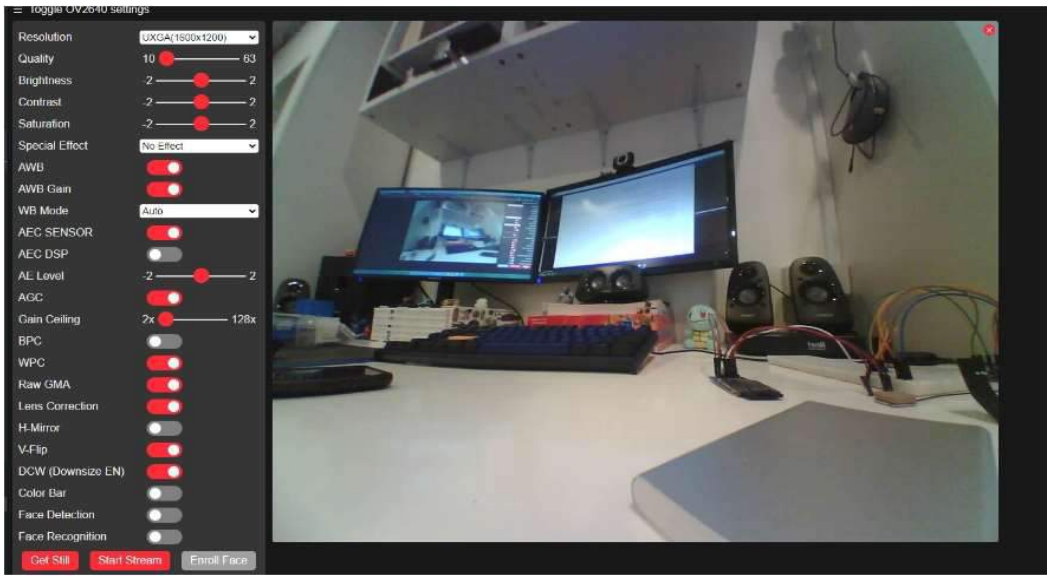
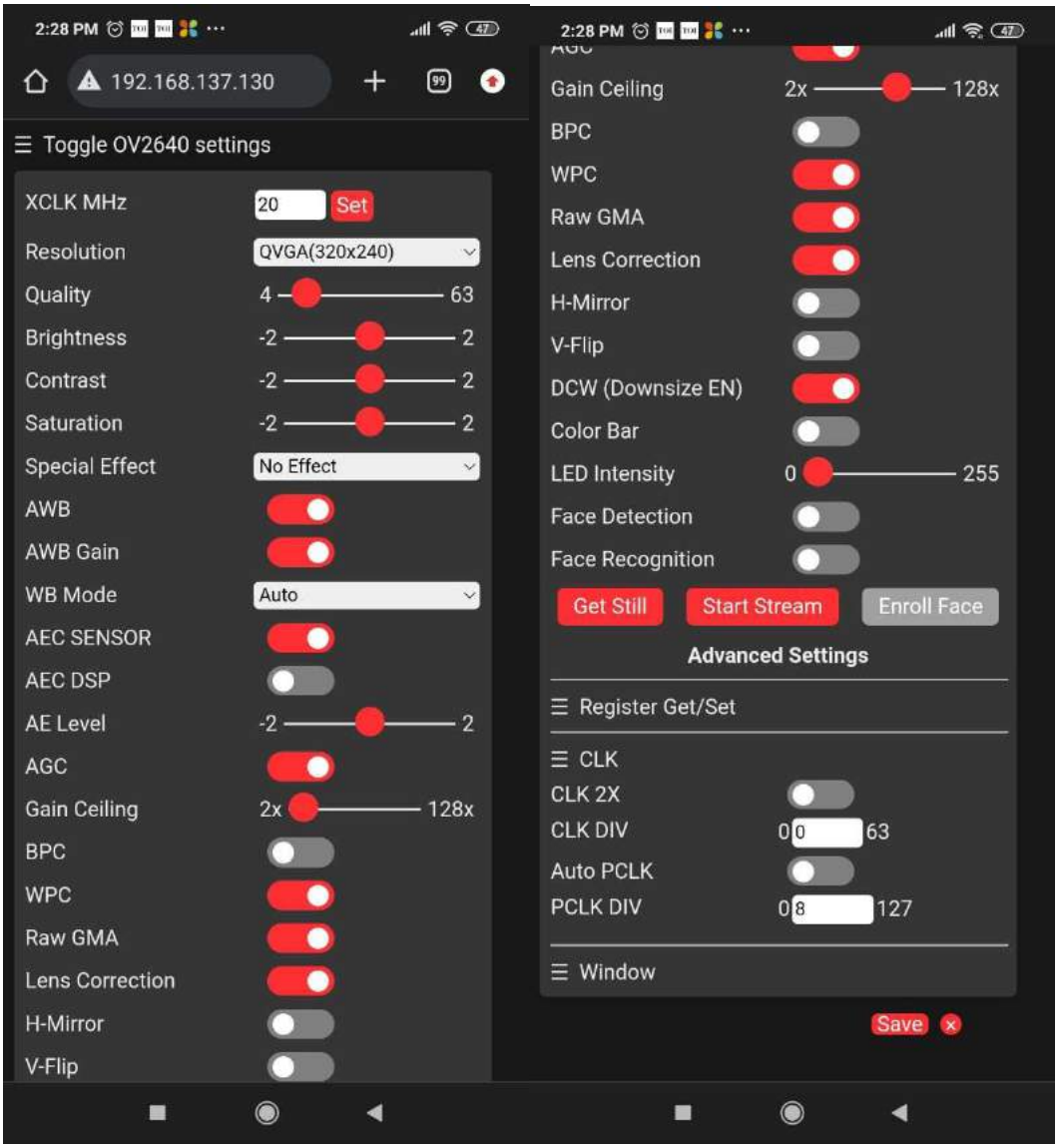


Figure 12: Live Streaming



Live streaming

Creating a live streaming application integrated with a women's safety device can greatly enhance personal security and peace of mind for users.

Along with video streaming, the application can also record audio, providing additional context to the emergency situation.

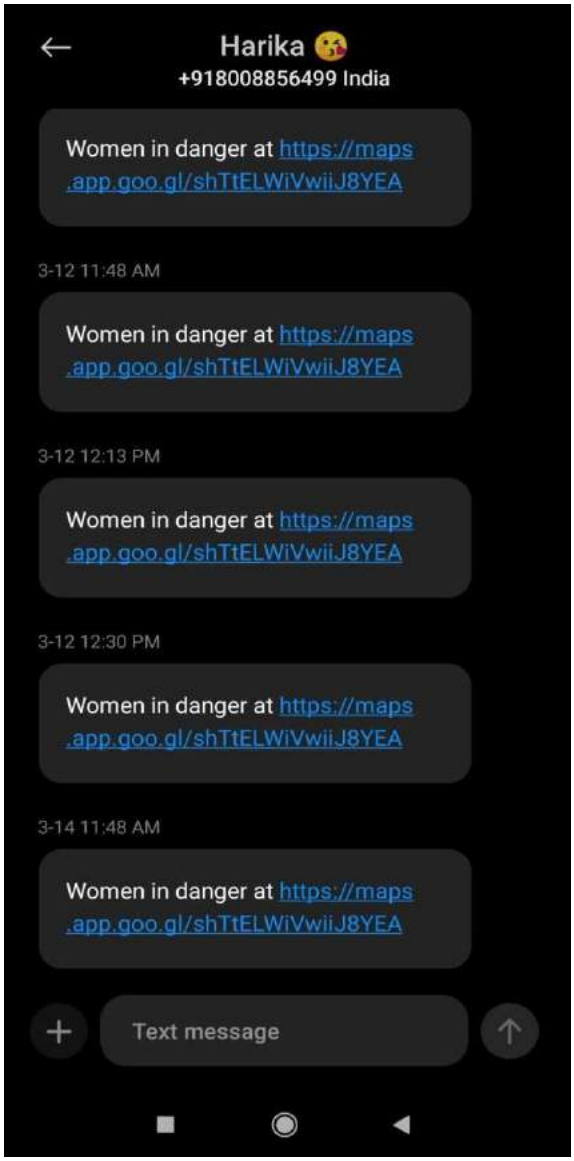


Figure 13: Emergency SMS

In this project we here used the Arduino controller for the controlling the whole process of the system. The GSM is used to send SMS regarding GPS locations.The basic approach is to intimidate the instant location and a distress message to the cops and the preset numbers, so that unfortunate incident can be averted and to provide real time evidence for the action against the perpetrators of crime against women incidents. This can also help police departments to reduce the crimes, which are against women and the evidence can be used to trace the crime.

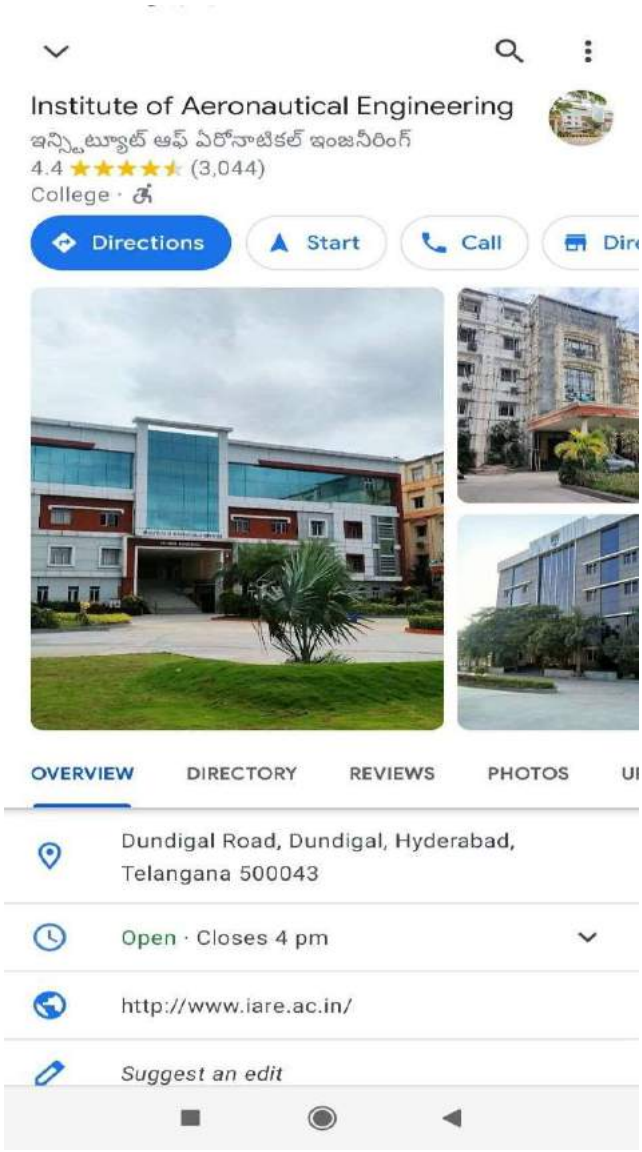


Figure 14: Live Location

Creating a live location application as part of a women's safety device can be crucial for providing real-time assistance and support in potentially dangerous situations.

The core feature of the application is the ability to share real-time location updates with trusted contacts or emergency services. This can be done through GPS technology integrated into the device.

5.2 DISCUSSIONS:

- Technological Advancements and Innovations:

Continuous research and innovation are pivotal for enhancing the device's capabilities.

- Collaborative Implementation and Policy Implications:

Collaboration with tech firms, governmental bodies, and NGOs is crucial for widespread deployment and accessibility of these safety devices

- User Empowerment and Ethical Considerations:

Empowering women through education on device usage and safety protocols remains imperative. Furthermore, ethical considerations, such as ensuring data privacy and avoiding misuse of the technology, should be central to the device's design and implementation.

- Impact Assessment and Community Engagement:

Evaluating the device's impact through user feedback, incident reports, and statistical analysis is essential. Community engagement initiatives, workshops, and awareness programs should accompany the device's introduction to promote its adoption and effectiveness.

- Accessibility and Cost-Effectiveness:

Ensuring affordability and accessibility across diverse socio-economic backgrounds is crucial. Initiatives to subsidize or provide these devices for marginalized communities must be considered.

- Discreet and Wearable Design:

IOT-based safety devices are often designed to be discreet and wearable, making them convenient for users to carry at all times. The seamless integration into daily life encourages consistent usage and accessibility.

- Data Analytics for Improved Safety Insights:

The data generated by IOT-connected safety devices can be analyzed to identify patterns, potential risks, and user habits. This information can be used to improve the effectiveness of safety measures and enhance overall safety strategies.

- Customizable and User-Centric Features:

IOT technology allows for the customization of safety features based on user preferences and needs. This user-centric approach ensures that the safety device aligns with individual lifestyles and preferences.

CHAPTER 6

CONCLUSION AND FUTURE SCOPE

6.1 CONCLUSION:

The Women Safety Pendant Device using IOT represents a significant stride towards revolutionizing personal safety for women.

This innovative project introduces a holistic solution that seamlessly integrates cutting-edge technology with the urgent need for enhanced security. The combination of IOT connectivity, real-time tracking, and proactive alert mechanisms addresses the shortcomings of existing solutions, providing women with a powerful tool to navigate the world with increased confidence and assurance.

women's safety devices utilizing IoT technology represent a crucial step forward in addressing the pressing issue of gender-based violence and ensuring the security and well-being of women worldwide. By leveraging the power of IOT and intelligent algorithms, these project offer a comprehensive solution for empowering women to navigate the world with confidence and peace of mind

In conclusion, the Women Safety Pendant Device using IOT not only addresses current safety concerns but also lays the groundwork for a future where technology plays a pivotal role in creating safer and more secure environments for women.

Smart pendants leveraging IoT technology represent a significant advancement in women's safety solutions, offering a blend of innovation, convenience, and reliability to empower women to lead safer and more secure lives

As technology advances and societal needs evolve, this project serves as a catalyst for ongoing innovation in the critical domain of women's safety.

6.2 FUTURE SCOPE:

As technology continues to evolve, the future scope of women's safety devices is vast, promising even more innovative features and functionalities to further enhance the safety and security of women in all walks of life. It is imperative that stakeholders, including governments, technology developers, and civil society organizations, collaborate to ensure the widespread adoption and effective implementation of these solutions, creating a safer and more inclusive world for women everywhere.

The Women Safety Pendant Device project lays the foundation for an evolving and dynamic future in the realm of women's safety. Several avenues for future development and enhancement can be explored:

Machine Learning Integration: Incorporating machine learning algorithms can enhance the device's ability to recognize patterns and differentiate between genuine threats and false alarms. This adaptive intelligence could further refine the device's responsiveness.

Community-Based Safety Networks: The project could evolve to include community-based safety networks, where multiple devices communicate with each other and local authorities. This collaborative approach could create a network effect, strengthening overall safety in specific regions.

Global Positioning System (GPS) Augmentation: Enhancing the GPS capabilities with advanced positioning technologies, such as Galileo or GLONASS, can improve location accuracy, especially in urban areas with tall buildings or challenging terrain.

Integration with Smart City Infrastructure: Collaborating with municipal authorities to integrate the Women Safety Pendant Device into smart city infrastructure could amplify its effectiveness. This could include direct links to surveillance systems, traffic lights, or other IoT devices for a more coordinated emergency response.

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