VISVESVARAYA TECHNOLOGICAL UNIVERSITY

BELAGAVI -590018

2023-2024

A Project Report On "Smart Self-Defense Gadget For Women's Safety Using IoT"

Submitted in the partial fulfilment of the requirements for the award of the Degree of

BACHELOR OF ENGINEERING
IN
COMPUTER SCIENCE AND ENGINEERING
BY

MOHAMMED SUHAIL R (1OX20CS078)

NAVYA T L (1OX20CS084)

NIHAR (1OX20CS089)

NISHA R (1OX20CS090)

Under the esteemed guidance of

Ms. Angel Donny F
Assistant Professor
Dept. Of CSE

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
THE OXFORD COLLEGE OF ENGINEERING
Hosur Road, Bommanahalli, Bengaluru-560068

2023-2024

THE OXFORD COLLEGE OF ENGINEERING

Hosur Road, Bommanahalli, Bengaluru – 560068

(Affiliated To Visvesvaraya Technological University, Belagavi)

Department of Computer Science and Engineering

CERTIFICATE

Certified that the project work Phase-2 entitled **"Smart Self-Defense Gadget For Women's Safety Using IoT"** carried out by **MOHAMMED SUHAIL R (1OX20CS078), NAVYA T L (1OX20CS084), NIHAR (1OX20CS089), NISHA R (1OX20CS090),** Bonafied students of VIII semester Computer Science and Engineering in partial fulfillment for the award of Bachelor of Engineering in **The Oxford College of Engineering, Bengaluru** during the year **2023-2024**. It is certified that all correction/suggestions indicated for Internal Assessment have been incorporated in the report.

The Project report has been approved as it satisfies the academic requirements in respect of project work Phase- 2 prescribed for the said degree.

Prof. Angel Donny F	**Dr. E. Saravana Kumar**	**Dr. N Kannan**
Project Guide	Professor and HOD	Principal
Dept of CSE, TOCE	Dept of CSE, TOCE	TOCE

External Viva

Name of the Examiner	Signature with Date
1. _____	_____
2. _____	_____

DEPARTMENT VISION

To establish the department as a renowned Centre of excellence in the area of scientific education, research with industrial guidance, and exploration of the latest advances in the rapidly changing field of computer science.

DEPARTMENT MISSION

1. To Produce the Best Computer Science Professionals with intellectual skills.
2. To Provide a Vibrant Ambiance that promotes Creativity, Technology Competent and Innovations for the new Era.
3. To Pursue Professional Excellence with Ethical and Moral Values to sustain in the highly demanding world.

THE OXFORD COLLEGE OF ENGINEERING

Hosur Road, Bommanahalli, Bengaluru – 560068

(Affiliated To Visvesvaraya Technological University, Belagavi)

Department of Computer Science and Engineering

DECLARATION

We, the students of Eight semester B.E, in the Department of Computer Science and Engineering, **The Oxford College of Engineering**, Bengaluru declare that the Project work Phase-2 entitled **"Smart Self-Defense Gadget For Women's Safety Using IoT"** has been carried out by us and submitted in partial fulfilment of the course requirements for the award of degree in **Bachelor of Engineering in Computer Science and Engineering** discipline of **Visvesvaraya Technological University, Belagavi** during the academic year **2023-2024**.

Name	USN	Signature
MOHAMMED SUHAIL R	**1OX20CS078**	
NAVYA T L	**1OX20CS084**	
NIHAR	**1OX20CS089**	
NISHA R	**1OX20CS090**	

Place: Bengaluru

Date:

ABSTRACT

Thousands of people (mainly women) are daily mistreated, battered and abused by their ex- couples or their current couples. In this sense, electronic surveillance can be an efficient tool for helping to guarantee the safety of victims. Ambient Intelligence (AmI), based on ubiquitous computing, represents a promising approach to make technology adapt to people in order to solve the challenge of developing strategies that allow the early detection and prevention of problems in safety environments and, more specifically, the protection of people under risk situations, including cases of mistreatment or loss. This project describes Guardian, an integral solution designed for improving the protection of mistreated and at-risk people by means of the integration of GPS, Wifi and IOT technologies. The basic architecture of the system, the proposed wireless devices, as well as the communication protocol used between the system and the devices are described. Furthermore, a first hardware and software prototype are depicted and tested.

ACKNOWLEDGEMENT

A project is a job of great enormity and it can't be accomplished by an individual all by them. Eventually, we are grateful to a number of individuals whose professional guidance, assistance and encouragement have made it a pleasant endeavor to undertake this project.

It gives us great pleasure in expressing our deep sense of gratitude to our respected Chairman **Sri S.N.V.L Narasimha Raju**, for having provided us with great infrastructure and well-furnished labs.

We take this opportunity to express our profound gratitude to our respected Principal of The Oxford College of Engineering **Dr. N. Kannan** for his support.

We are grateful to the Professor and Head of the Department **Dr. E. Saravana Kumar**, for his unfailing encouragement and suggestion given to us in the course of our project work. Guidance and deadlines play a very important role in successful completion of the project on time.

We also convey our gratitude to our project guide **Prof.Angel Donny F** Department of CSE, for having constantly guided and monitored the development of the project. A note of thanks to the Department of Computer Science Engineering, both teaching and non-teaching staff for their co-operation extended to us.

We thank our parents for their constant support and encouragement. Last, but not the least, we would like to thank our peers and friends.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1

INTRODUCTION

1.1 OVERVIEW

According to the National Crime records Bureau, the total number of rape cases in India was a staggering 228,650 and Delhi, the national capital accounted for 5234 of those and in 2011 according to Ministry of Home Affairs, a total of 24193 cases were reported. This is just the tip of the iceberg. Rape is a notoriously under-reported crime, thanks to its social stigma.
A woman is raped every 21 minutes in India and every 18 hrs in Delhi it's shameful for the whole world.

The primary reasons behind such shocking statistics is the society which is prejudiced against the girl child, lack of proper policing, ineffective laws etc. While the long term solutions should aim to correct the above factors. Now there is requirement of some change.

By observing such bad conditions of women in the world, we the team "Dream Team" came up with "Smart Watch for Women". This "Smart Watch for Women" has the potential to help women by the technologies that are embedded in it. "Smart Watch for Women" provide watch and this watch is specially designed for women safety. It has a button that will be used by women to inform nearby police when they feel danger. This watch directly gets connected to the satellite through GPS when activated. Then the location is transferred through the GSM and this watch is also provided with a system that produces 60 shockwaves in 1 second in emergency situations.

1.2 EXISTING SYSTEM ANALYSIS

The world is becoming unsafe for children and women in all aspects. The crimes against women due to sexual harassment and eve teasing are increasing at a higher rate. The employed women are feeling threaten due to increasing crime rates. There are many methods raised for providing security to the women. In this section we discussed few methods for women's security. 2.1 Women and Children's Security based Location Tracking System Now-a-days children and women are fronting many safety related difficulties. In such circumstances, they are helpless and don't have any way to protect them or inform it to their family supporters, neighbors or police station and they feel as handicaps. Hence there should

be a system to guard them in such times. So this system helps them to search for help in any critical condition. For that, the system comprises GPS to detect location and GSM mechanisms to pass their current position to any one of the trusted contacts as a Google map link and services are provided to track the locations from that moment onwards to save the person [4].

Smart Security Solution for Women Based on Internet of Things (IOT) they propose to have a device which is the integration of multiple devices, hardware comprises of a wearable "Smart band" which continuously communicates with Smart phone that has access to the internet. The application is automated and loaded with all the required data which comprises Human behavior and responses to different situations like anger, fear and anxiety. This makes a signal which is communicated to the smart phone. The software or application has access to GPS and Messaging facilities which is pre-programmed in such a way that whenever it receives emergency indicator, it can send help request along with the site co-ordinates to the nearest Police station, relatives and the people in the near radius who have request. This action allows help immediately from the Police as well as Public in the near area who can reach the victim with great precision [5].

Prototype of an Intelligent System Based on RFID and GPS Technologies for Women Safety The main objective of this paper is to design and implement a highly reliable system for protecting women from being harassed. In this paper, they have developed an intelligent women safety system using Radio Frequency Identification (RFID) and Global positioning system (GPS). The main idea here is using an active RFID tag with passive RFID reader to test the information and this information is conveyed to the AT89C52 microcontroller where in the connections of around 4 to 5 people is kept in the data base. Once the data is received by the controller, it sends the note to the contacts through GSM module and the location is tracked through the GPS. The simulation is done in ISIS proteus [6].

Ultra-Low Power Self-Security System This system adopts a hidden camera system that makes smart decisions and becomes active on recognizing human postures and hand gestures maintained in the database. On processing and recognizing gestures by the frontend of the camera system, the system starts recording the video and sends an alert message to the authorized officials. As the self-security system is supported with IOT environment, it enables the system to transmit the video to the cloud platform. And the anti-social activities could be monitored through smart phone/PC. Moreover, the hidden Markov and Baum-Welch algorithm is adopted to classify, train and test the system. In order to enable an ultra-low

power operation, the system is implemented using ARM cortex A8 processor with optimized algorithm [7].

Domestic Violence and Information Communication Technologies Physical violence against women is pervasive throughout the world and domestic violence has been a longstanding issue in feminist activism and research. Yet, these familiarities are often not characterized in technological research or design. In the move to consider HCI at the margins, in this paper, we ask: how have ICTs pretentious the familiarities of domestic violence survivors? We interviewed female fighters living in domestic violence housing about their experiences with technology. Contestants testified that they were stressed with mobile phones, skilled additional harassment (but also support) via community networking sites, and tried to resist using their information of security and confidentiality [8].

1.3 PROBLEM STATEMENT

In the latest horrific incident in Jammu and Kashmir, we have shocked the nation and warned us about women's safety and security. In regards to issues, people have different means of protection. Finally, tools should be introduced to ensure women's protection with different technologies.

- The problem is that overall cost of continuously sending data for tracking System is very high because of the cost of packet size transmitted.

- In our Country, even though it has super power and an economic development, but still there are many crimes against women.

- The atrocities against the women can be brought to an end with the help of proposed project. This device is a security system, specially designed for women in distress.

1.4 OBJECTIVES:

- In this project, an attempt is made through the usage of GPS technologies to detect and trackthe position of the Mankind specially women's, Child's and those person they are in trouble in this project, real time implementation of hybrid personal tracking system for anomaly detection is proposed. For future days demand of personal tracking system is increases.
- Using the advancement in the current technology, it becomes a favorable solution tomeet the above requirement.
- Initially, the position of the target is tracked by the authorized care taker using GPStechnology.
- The proposed hybrid tracking system is implemented in real-time using a customizedembedded device Esp32 cam is capturing the image of the victim person.

1.5 LITERATURE SURVEY

1.5.1 Project Title: "Women safety system using Arduino UNO and integrated safety app"

Authors name: *R Anitha*

Publication: *International Journal of Advance Research, Ideas and Innovations in Technology*

Abstract

It is an accepted fact that brutal crimes against women are occurring in India daily. Now many Indians do not deny or shy away from conversations relating to eve-teasing, sexual assaults or rape. Even the common man's conversation on the streets often steers towards the escalated and horrendous attacks on women. The device called as "Virtual Friend" is specially designed for the women in trouble. It is a device used for the women in a chaotic situation. The basic approach is to use the Arduino Uno microcontroller based on ATmega328P has the function of send and receive data which is provided by Arduino GSM shield using GSM network. Arduino Uno gets the coordinates of the current location; it transfers the coordinate details to the user's smart phone via Arduino GSM shield. The SOS light is a signal used to alert the passerby and it gives the sign of universal help to the victim who is in distress. The alarm buzzer is activated if the woman is in danger situation. In the critical situation, the women send the message or make a call including the location of the particular incident to the registered contacts through the use of GSM and GPS.

1.5.2 Project Title: "A Smart Alarm System for Women's Security"

Authors name: *K.Mohanaprakash and T.Guna Sekar*

Publication: *International Journal of Engineering and Management Research*

Abstract

This paper detailed about a smart alarm system for women's security. Women all over the world are facing much unscrupulous physical irritation. This acquires a fast pace due to lack of a suitable investigation system. The system look like a group on the wrist merged with pressure switch as an input which when triggers shows the result loud alarm imposed for self-defensing purpose and send location and messages to the emergency contacts. The whole process will be held in Arduino Microcontroller. The digital switch incorporates with the controlling unit. Whenever the user presses the digital switch, the emergency message will be passed to the server unit via GSM SIM 800A module. By implementing the proposed system, the physical harassment on the women will be reduced.

1.5.3 Project Title: "Arduino Based Security System for Women"

Author's name: *Abhijeet Mane, Manoj Gharge, Omkar Pol, Karan Grover, Prof. Vijaya Chavan.*

Publication: *International Journal of Advanced Research in Computer and Communication Engineering*

Abstract:

Nowadays women are facing many problems like rape, molestation, kidnapping etc. This uniquely designed system will help to reduce crime rates against women. It has been prioritized to give security to women especially to the women in urban areas as they can face problems while travelling the system is not so expensive thus many women can benefit themselves.

1.5.4 Project Title: "One Touch Alarm for Women's Safety Using Arduino"

Authors name: *C. Priya, Ramya C, Befy D, Harini G, Shilpa S, SivaniKiruthiga B*

Publication: *International Journal of Innovative Technology and Exploring Engineering (IJITEE)*

Abstract:

In our country, it has rule and financial betterment, but still there are many abuse against women. These activities can be terminated with the beneficence of mentioned product. This

device is used for defense system, especially designed for women in hardship. Method/Analysis: The hardware device used for this is ARM controller. It is the most productive system and it use up very less power. Application / Improvement: Above mentioned ARM controller is used for tracking mechanism. Tracking mechanism which is called GPS is connected to ARM controller. The capacitive sensor need to be pressed for fraction milliseconds to alert locate, and can send emergency message to the emergency contacts with intent location and the buzzer will alert to nearby people for help, then the tear gas will be released after the touching sensor is touched .Thus the victims can have enough time to escape from stranger using our application.

1.5.5 Project Title: "SMART SOLUTION FOR WOMEN SAFETY USING IoT"

Authors name: *A.Jesudoss, Y. Nikhila, T. Sahithi Reddy,*

Publication: *International Journal of Pure and Applied Mathematics*

Abstract:

Now-a-days women are facing many problems based on their security. The application which is proposed has access to track location and will send messages to the nearby police stations and the scanned phone numbers. This application is not only used for cases like rapes and any perverts teasing girls but this also helps them from any bad condition or any health problem like fainting suddenly. GPS is to track the location of the victim and to send messages, the location of the victim to the nearby police station and the phone numbers of the relatives of the victim. This application helps women to overcome their fear in going out and do things what they like to do.

CHAPTER 2:

SYSTEM DESIGN AND SPECIFICATION

2.1 METHODOLOGY:

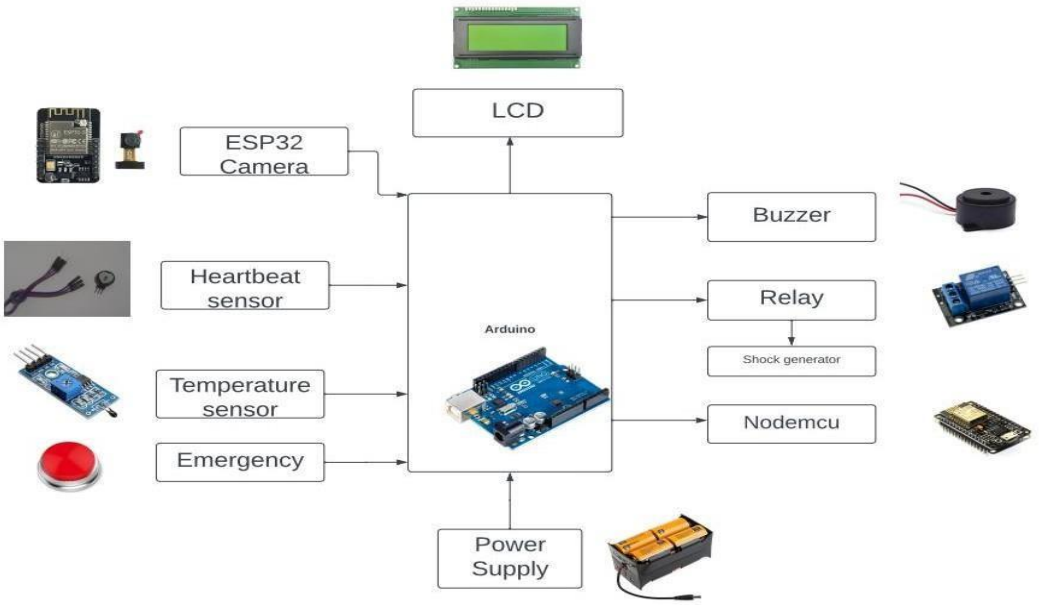


Figure 1 Block Diagram

The block diagram of the conceptual system is shown in above figure. The microcontroller acts as an Embedded computing system and controls the activities of all the subsystems. It is interfaced with Emergency Switch, Voice recognition module, GPS Receiver, Wifi Modulator demodulator (MODEM), High Voltage Shock Circuit, LCD display, Buzzer, and Wireless camera. The microcontroller periodically monitors the status of all the devices and also keeps on checking for any incoming SMS message from the parents or any caretakers. When there is no Wifi network, on pressing the Emergency Switch, the processor activates the speech circuit to make loud shouting sound to catch the attention of the nearby people for help.

Thus, when the user asserts the voice command the buzzer will automatically turn on. It also prepares the High Voltage Electric Shock Circuit to be ready to give a non-lethal shock to the attacker. If the help is not available and if the system is not reset within the stipulated time, the system obtains location information from the GPS and prepares a text SMS containing the present location information and sends a SMS through the nodemcu modem to the police control room and a distress message to the pre-programmed mobile number[3]. The design is

implemented using an embedded microcontroller, in a modular form to be adaptable to different types of location tracking. Based on the total design of the system, the hardware and software of the system is designed to be near realtime monitoring of the women and immediate help.

The lady can protect herself by electric shock to the person harassing her. The software developed in assembly language Demonstrate the system capability in providing real-time response. Using the location information supplied by the system, the location can be tracked and traced using GPS and Google Maps. Thus the lady will be safe and she feels protected. At the product level it can be as compact as a smart watch.

2.2 SYSTEM REQUIREMENT SPECIFICATION

2.2.1 Functional Requirement:

- System Should Automatically Detect Pulse Sensor Value
- System Should Automatically Intimate When Emergency Switch is Pressed
- System Should Automatically Detect Threat
- System Should Automatically Intimate to Care Taker
- System Should Automatically Track the Women
- System should Automatically Capture the image of the victim.

2.2.2 Non – Functional Requirement:

Usability

Easy Interface for women's in emergency Situations

Reliability

Easy Handling

Immediate Response

Performance

Should not take excessive time in Responding Emergency Situation

Supportability

Contain easy to understand code with provisions for future enhancement

2.3 ESP32:

ESP32 is the SoC (System on Chip) microcontroller which has gained massive popularity recently. Whether the popularity of ESP32 grew because of the growth of IoT or whether IoT grew because of the introduction of ESP32 is debatable. If you know 10 people who have been part of the firmware development for any IoT device, chances are that 7−8 of them would have worked on ESP32 at some point. So what is the hype all about? Why has ESP32 become so popular so quickly? Let's find out.

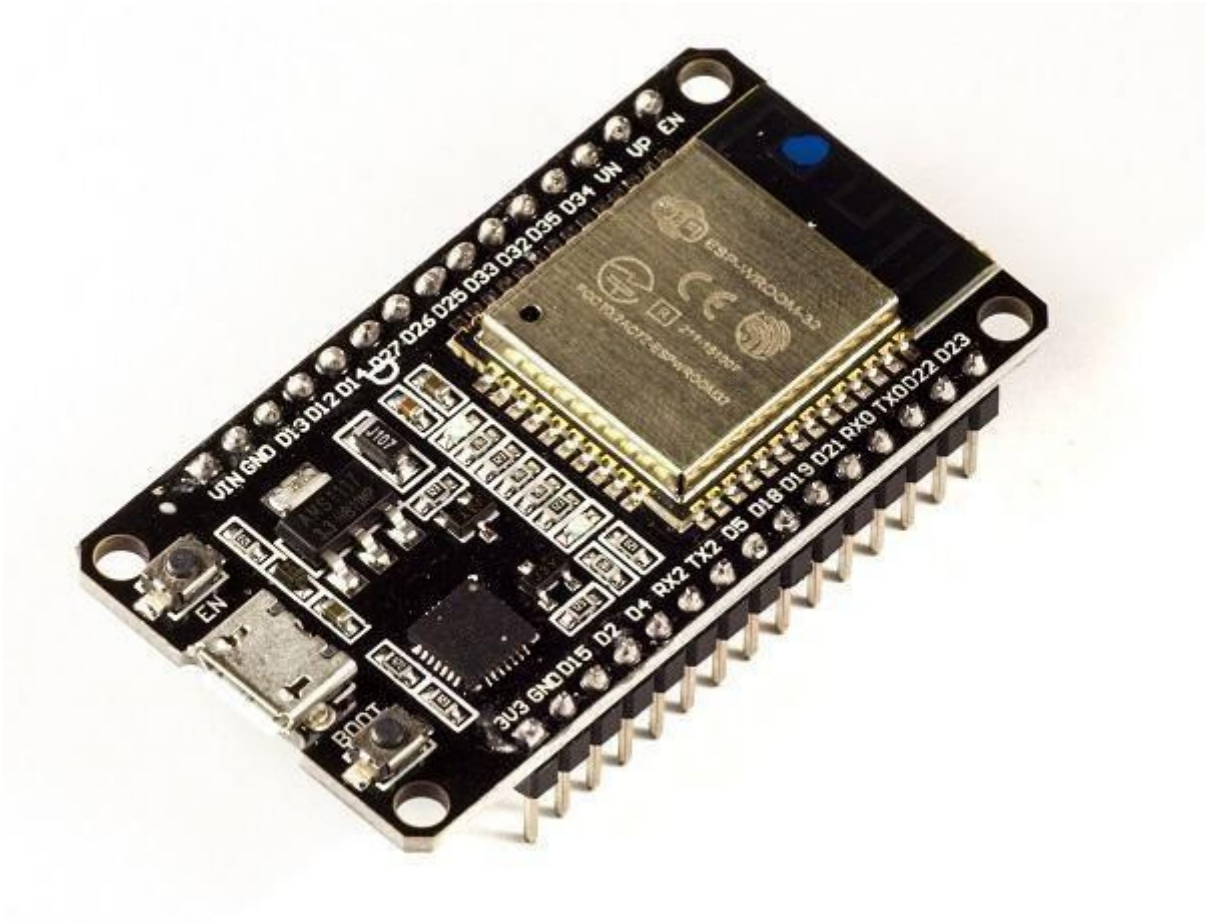


Figure 2 ESP32

Before we delve into the actual reasons for the popularity of ESP32, let's take a look at some of its important specifications. The specs listed below belong to the ESP32 WROOM 32 variant.−

- Integrated Crystal− 40 MHz
- Module Interfaces− UART, SPI, I2C, PWM, ADC, DAC, GPIO, pulse counter, capacitive touch sensor
- Integrated SPI flash− 4 MB
- ROM− 448 KB (for booting and core functions)

- SRAM− 520 KB
- Integrated Connectivity Protocols− WiFi, Bluetooth, BLE
- On−chip sensor− Hall sensor
- Operating temperature range− −40 – 85 degrees Celsius
- Operating Voltage− 3.3V
- Operating Current− 80 Ma (average)
- With the above specifications in front of you, it is very easy to decipher the reasons for ESP32's popularity. Consider the requirements an IoT device would have from its microcontroller (Mc). If you've gone through the previous chapter, you'd have realized that the major operational blocks of any IoT device are sensing, processing, storage, and transmitting. Therefore, to begin with, the Mc should be able to interface with a variety of sensors. It should support all the common communication protocols required for sensor interface: UART, I2C, SPI. It should have ADC and pulse counting capabilities. ESP32 fulfills all of these requirements. On top of that, it also can interface with apacitivee touch sensors. TherEFore, most common sensors can interface seamlessly with ESP32.
- Secondly, the Mc should be able to perform basic processing of the incoming sensor data, sometimes at high speeds, and have sufficient memory to store the data. ESP32 has a max operating frequency of 40 MHz, which is sufficiently high. It has two cores, allowing parallel processing, which is a further add-on. Finally, its 520 KB SRAM is sufficiently large for processing a large array of data onboard. Many popular processes and transforms, like FFT, peak detection, RMS calculation, etc. can be performed onboard ESP32. On the storage front, ESP32 goes a step ahead of the conventional microcontrollers and provides a file system within the flash. Out of the 4 MB of onboard flash, by default, 1.5 MB is reserved as SPIFFS (SPI Flash File System). Think of it as a mini−SD Card that lies within the chip itself. You can not only store data, but also text files, images, HTML and CSS files, and a lot more within SPIFFS. People have displayed beautiful Webpages on WiFi servers created using ESP32, by storing HTML files within SPIFFS.
- Finally, for transmitting data, ESP32 has integrated WiFi and Bluetooth stacks, which have proven to be a game-changer. No need to connect a separate module (like a GSM module or an LTE module) for testing cloud communication. Just have the ESP32 board and a running WiFi, and you can get started. ESP32 allows you to use WiFi in Access Point as well as Station Mode. While it supports TCP/IP, HTTP, MQTT, and other traditional communication protocols, it also supports HTTPS. Yep, you heard that right. It has a crypto−core or a crypto-accelerator, a dedicated piece of hardware

whose job is to accelerate the encryption process. So you cannot only communicate with your web server, you can do so securely. BLE support is also critical for several applications. Of course, you can interface LTE or GSM or LoRa modules with ESP32. Therefore, on the 'transmitting data' front as well, ESP32 exceeds expectations.

- With so many features, ESP32 would be costing a fortune, right? That's the best part. ESP32 dev modules cost in the ballpark of ₹ 500. Not only that, the chip dimensions are quite small (25 mm x 18 mm, including the antenna area), allowing its use in devices requiring a very small form factor.
- Finally, ESP32 can be programmed using the Arduino IDE, making the learning curve much less steep. Isn't that great? Are you excited to get your hands dirty with ESP32? Then let's start by installing the ESP32 board in the Arduino IDE in the next chapter. See you there.

2.3.1 Specifications of ESP32

ESP32 has a lot more features than ESP8266 and it is difficult to include all the specifications in this Getting Started with ESP32 guide. So, I made a list of some of the important specifications of ESP32 here. But for complete set of specifications, I strongly suggest you to refer to the Datasheet.

- Single or Dual-Core 32-bit LX6 Microprocessor with clock frequency up to 240 MHz.
- 520 KB of SRAM, 448 KB of ROM and 16 KB of RTC SRAM.
- Supports 802.11 b/g/n Wi-Fi connectivity with speeds up to 150 Mbps.
- Support for both Classic Bluetooth v4.2 and BLE specifications.
- 34 Programmable GPIOs.
- Up to 18 channels of 12-bit SAR ADC and 2 channels of 8-bit DAC
- Serial Connectivity include 4 x SPI, 2 x I^2C, 2 x I^2S, 3 x UART.
- Ethernet MAC for physical LAN Communication (requires external PHY).
- 1 Host controller for SD/SDIO/MMC and 1 Slave controller for SDIO/SPI.
- Motor PWM and up to 16-channels of LED PWM.
- Secure Boot and Flash Encryption.
- Cryptographic Hardware Acceleration for AES, Hash (SHA-2), RSA, ECC and RNG.

2.3.2 Different Ways to Program

A good hardware like ESP32 will be more user friendly if it can be programmed (writing code) in more than one way. And not surprisingly, the ESP32 supports multiple programming environments.

Some of the commonly used programming environments are:

- Arduino IDE
- PlatformIO IDE (VS Code)
- LUA
- MicroPython
- Espressif IDF (IoT Development Framework)
- JavaScript

As Arduino IDE is already a familiar environment, we will use the same to program ESP32 in our upcoming projects. But you can definitely try out others as well.

Layout

We will see what a typical ESP32 Development Board consists of by taking a look at the layout of one of the popular low-cost ESP Boards available in the market called the ESP32 DevKit Board.

The following image shows the layout of an ESP32 Development Board which I have.

IMPORTANT NOTE: There are many ESP32 Boards based on ESP-WROOM-32 Module available in the market. The layout, pinout and features vary from board to board.

The board which I have has 30 Pins (15 pins on each side). There are some board with 36 Pins and some with slightly less Pins. So, double check the pins before making connections or even powering up the board.

2.3.2 ESP-WROOM-32

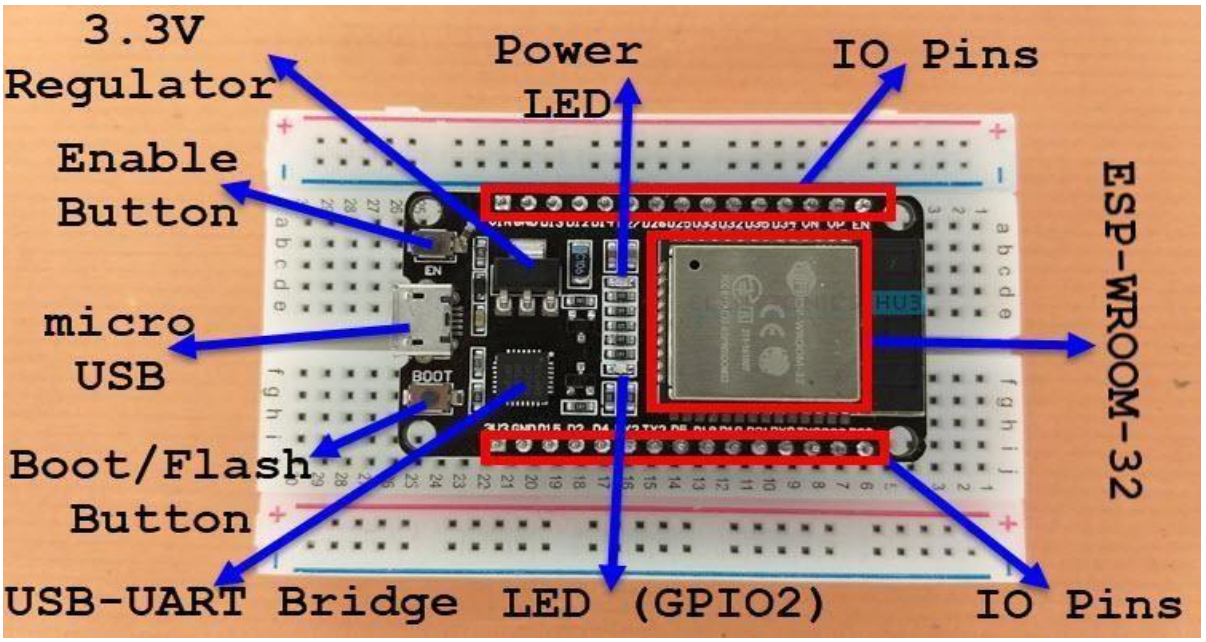


Figure 3 ESP32 Layout

As you can see from the image, the ESP32 Board consists of the following:

- ESP-WROOM-32 Module
- Two rows of IO Pins (with 15 pins on each side)
- CP2012 USB – UART Bridge IC
- micro–USB Connector (for power and programming)
- AMS1117 3.3V Regulator IC
- Enable Button (for Reset)
- Boot Button (for flashing)
- Power LED (Red)
- User LED (Blue – connected to GPIO2)
- Some passive components

An interesting point about the USB-to-UART IC is that its DTR and RTS pins are used to automatically set the ESP32 in to programming mode (whenever required) and also rest the board after programming.

Pinout of ESP32 Board

I will make a separate dedicated tutorial on ESP32 Pinout. But for the time being, take a look the pinout diagram of the ESP32 Development Board.

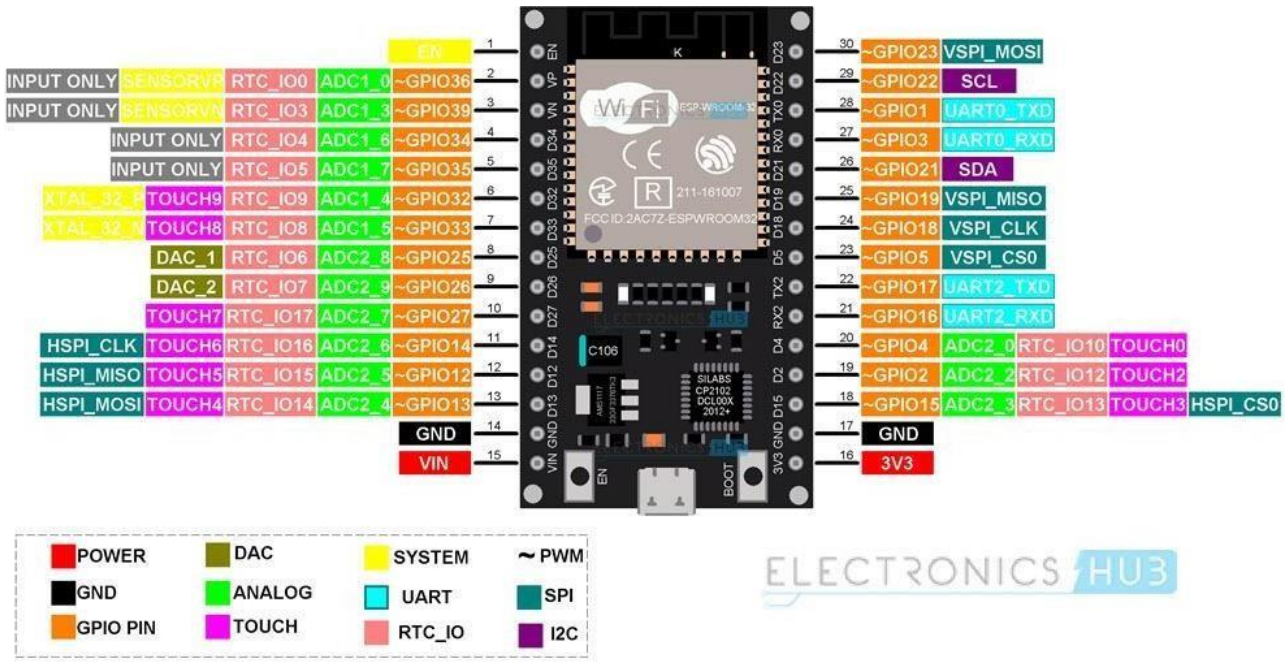


Figure 4 ESP Board

This pinout is for the 30 – pin version of the ESP Board. In the pinout tutorial, I will explain the pin out of both the 30 – pin as well as the 36 – pin version of the ESP Boards.

2.4 Relay

A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and they are double throw (changeover) switches. The relay's switch connections are usually labeled COM(POLE), NC and NO. In order to trigger the laser we use driver relay.

Figure 5 Relay

Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid-state relays. Relays are used where it is necessary to control a circuit by a separate low-power signal, or where several circuits must be controlled by one signal. The first relays were used in long distance telegraph circuits as amplifiers:

they repeated the signal coming in from one circuit and re-transmitted it on another circuit. Relays were used extensively in telephone exchanges and early computers to perform logical operations.

2.5 Pulse Rate Sensor:

Figure 6 Pluse Rate Sensor

Pulse Sensor is a well-designed plug-and-play heart-rate sensor for Arduino. It can be used by students, artists, athletes, makers, and game & mobile developers who want to easily incorporate live heart rate data into their projects. The sensor clips onto a fingertip or earlobe and plugs right into Arduino.

How Pulse Sensor Works:

The working of the Pulse/Heart beat sensor is very simple. The sensor has two sides, on one side the LED is placed along with an ambient light sensor and on the other side we have some circuitry. This circuitry is responsible for the amplification and noise cancellation work. The LED on the front side of the sensor is placed over a vein in our human body. This can either be your Finger tip or you ear tips, but it should be placed directly on top of a vein.

Now the LED emits light which will fall on the vein directly. The veins will have blood flow inside them only when the heart is pumping, so if we monitor the flow of blood we can monitor the heart beats as well. If the flow of blood is detected then the ambient light sensor will pick up more light since they will be reflect ted by the blood, this minor change in received light is analysed over time to determine our heart beats.

How to use Pulse sensor

Using the pulse sensor is straight forward, but positioning it in the right way matters. Since all the electronics on the sensor are directly exposed it is also recommended to cover the sensor with hot glue, vinyl tape or other non conductive materials. Also it is not recommended to handle these sensors with wet hands. The flat side of the sensor should be placed on top of the vein and a slight presser should be applied on top of it, normally clips or Velcro tapes are used to attain this pressure.

To use the sensor simply power it using the Vcc and ground pins, the sensor can operate both at +5V or 3.3V system. Once powered connect the Signal pin to the ADC pin of the microcontroller to monitor the change in output voltage. If you are using a development board like Arduino then you can use the readily available code which will make things a lot easier. Refer the datasheet at the bottom of the page for more information on how to interface the sensor with Arduino and how to mount it. The schematics of the sensor, code and processing sketch can be obtained from the Sprakfun product page.

Applications

- Sleep Tracking
- Anxiety monitoring
- Remote patient monitoring/alarm system
- Health bands
- Advanced gaming consoles

Features

- Biometric Pulse Rate or Heart Rate detecting sensor
- Plug and Play type sensor
- Operating Voltage: +5V or +3.3V
- Current Consumption: 4mA
- Inbuilt Amplification and Noise cancellation circuit.
- Diameter: 0.625”
- Thickness: 0.125” Thick

2.6 Temperature sensor

The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 does not require any external calibration or trimming to provide typical accuracies.

Figure 7 Temperature Sensor

2.6.1 GENERAL DESCRIPTION

The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in° Kelvin, as the user is not required to subtract a large constant voltage from its output to obtain convenient Centigrade scaling. The LM35 does not require any external calibration or trimming to provide typical accuracies of ±1⁄4°Cat room temperature and ±3⁄4°C over a full −55 to +150°Ctemperature range. Low cost is assured by trimming and calibration at the wafer level.

The LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy. It can be used with single power supplies, or with plus and minus supplies. As it draws only 60 μA from its supply, it has very low self-heating, less than 0.1°C in still air. The LM35 is rated to operate over a −55° to +150°C temperature range, while the LM35C is rated for a −40° to +110°C range (−10° with improved accuracy). The LM35 series is available packaged in hermetic TO-46 transistor packages, while theLM35C, LM35CA, and LM35D are also available in the plastic TO-92 transistor package. The LM35D is also available in an 8-lead surface mount small outline package and a plastic TO-220 package.

2.6.2 FEATURES

- Calibrated directly in ° Celsius (Centigrade)
- Linear + 10.0 mV/°C scale factor
- 0.5°C accuracy guarantee able (at +25°C)
- Rated for full −55° to +150°C range
- Suitable for remote applications
- Low cost due to wafer-level trimming
- Less than 60μA current drain
- Operates from 4 to 30 volts
- Low self-heating, 0.08°C in still air
- Low impedance output, 0.1 W for 1 mA load

2.6.3 CIRCUIT DIAGRAM

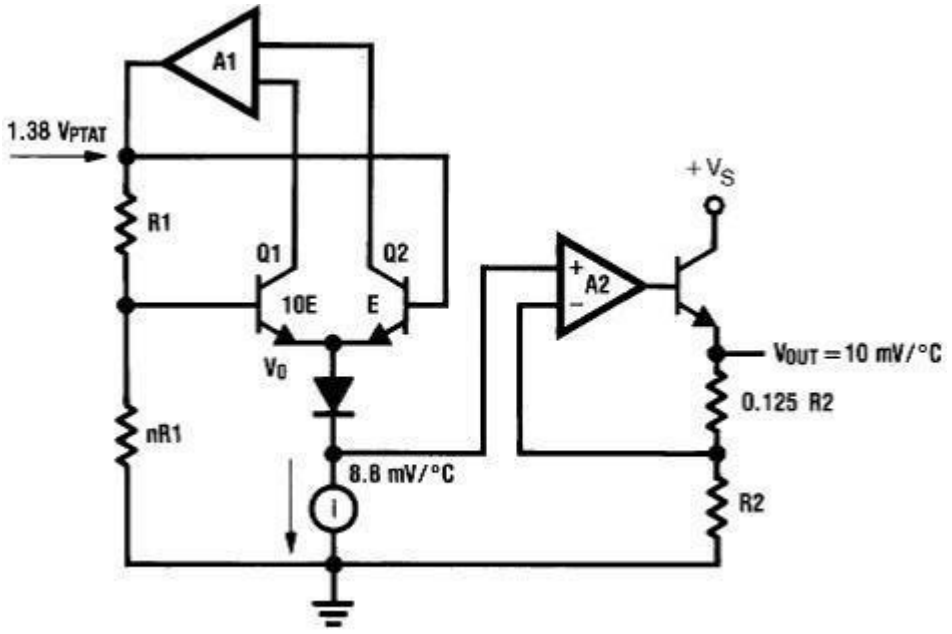


Figure 8 Circuit Diagram of Temperature sensor

2.6.4 APPLICATIONS

The LM35 can be applied easily in the same way as other integrated-circuit temperature sensors. It can be glued or cemented to a surface and its temperature will be within about 0.01§C of the surface temperature. This presumes that the ambient air temperature is almost the same as the surface temperature; if the air temperature were much higher or lower than the surface temperature, the actual temperature of the LM35 die would be at an inter- mediate temperature between the surface temperature and the air temperature. This is especially true for the TO-92 plastic package, where the copper leads are the principal thermal path to carry heat into the device, so its temperature might be closer to the air temperature than to the surface temperature. To minimize this problem, be sure that the wiring to the LM35, as it leaves the device, is held at the same temperature as the surface of interest. The easiest way to do this is to cover up these wires with a bead of epoxy which will insure that the leads and wires are all at the same temperature as the surface, and that the LM35 die's temperature will not be affected by the air temperature.

The TO-46 metal package can also be soldered to a metal surface or pipe without damage. Of course, in that case the Vb terminal of the circuit will be grounded to that metal. Alternatively, the LM35 can be mounted inside a sealed-end metal tube, and can then be dipped into a bath or screwed into a threaded hole in a tank. As with any IC, the LM35 and accompanying wiring and circuits must be kept insulated and dry, to avoid leakage and corrosion. This is especially true if the circuit may operate at cold temperatures where condensation can occur. Printed-circuit coatings and vanishes such as Humiseal and epoxy paints or dips are often used to insure that moisture cannot corrode the LM35 or its connections. These devices are sometimes soldered to a small light- weight heat fin, to decrease the thermal time constant and speed up the response in slowly-moving air.

2.7 LCD DISPLAY

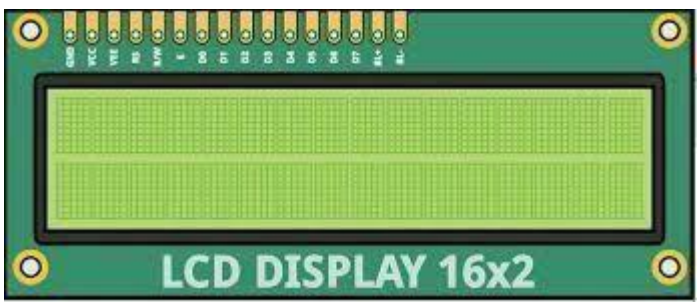


Figure 9 LCD display

A **liquid-crystal display** (**LCD**) is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals. Liquid crystals do not emit light directly, instead using a backlight or reflector to produce images in color or monochrome. LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images with low information content, which can be displayed or hidden, such as preset words, digits, and 7-segment displays, as in a digital clock. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements.

LCD is used in wide range application including computer monitors, televisions, instrument panels, aircraft cockpit displays, and indoor and outdoor signage. Small LCD screens are common in portable consumer devices such as digital cameras, watches, calculators, and mobile telephones, including smart phones. LCD screens are also used on consumer electronics products such as DVD players, video game devices and clocks. LCD screens have replaced heavy, bulky cathode ray tube (CRT) displays in nearly all applications. LCD screens are available in a wider range of screen sizes than CRT and plasma displays, with LCD screens available in sizes ranging from tiny digital watches to huge, big- screen television sets.

Since LCD screens do not use phosphors, they do not suffer image burn-in when a static image is displayed on a screen for a long time (e.g., the table frame for an aircraft schedule on an indoor sign). LCDs are, however, susceptible to image persistence.

2.8 NODEMCU

Pin Category	Name	Description
Power	Micro-USB, 3.3V, GND, Vin	**Micro-USB:** NodeMCU can be powered through the USB port **3.3V:** Regulated 3.3V can be supplied to this pin to power the board **GND:** Ground pins **Vin:** External Power Supply
Control Pins	**EN, RST**	The pin and the button resets the microcontroller
Analog Pin	A0	Used to measure analog voltage in the range of 0-3.3V
GPIO Pins	GPIO1 to GPIO16	NodeMCU has 16 general purpose input-output pins on its board
SPI Pins	SD1, CMD, SD0, CLK	NodeMCU has four pins available for SPI communication.

UART Pins	TXD0, RXD0, TXD2, RXD2	NodeMCU has two UART interfaces, UART0 (RXD0 & TXD0) and UART1 (RXD1 & TXD1). UART1 is used to upload the firmware/program.
I2C Pins		NodeMCU has I2C functionality support but due to the internal functionality of these pins, you have to find which pin is I2C.

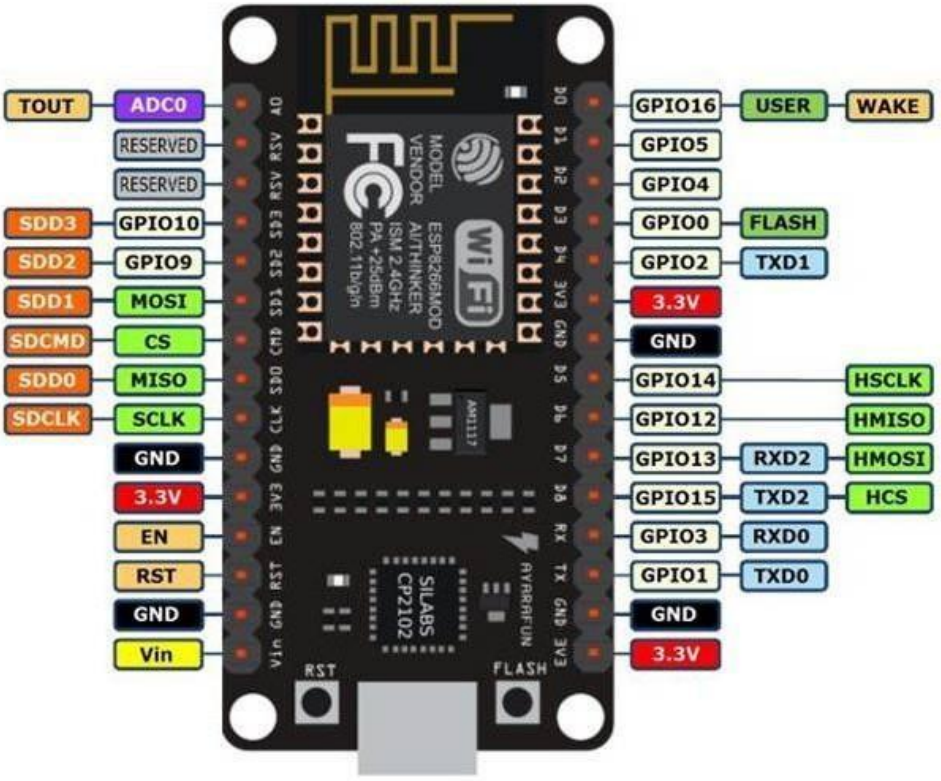


Figure 10 NodeMCU

NodeMCU ESP8266 Specifications & Features

- Microcontroller: Tensilica 32-bit RISC CPU Xtensa LX106
- Operating Voltage: 3.3V
- Input Voltage: 7-12V
- Digital I/O Pins (DIO): 16
- Analog Input Pins (ADC): 1
- UARTs: 1

- SPIs: 1
- I2Cs: 1
- Flash Memory: 4 MB
- SRAM: 64 KB
- Clock Speed: 80 MHz
- USB-TTL based on CP2102 is included onboard, Enabling Plug n Play
- PCB Antenna
- Small Sized module to fit smartly inside your IoT projects

2.9 Buzzer:

Figure 11 Buzzer

Buzzer Pin Configuration

Pin Number	Pin Name	Description
1	Positive	Identified by (+) symbol or longer terminal lead. Can be powered by 6V DC

2	Negative	Identified by short terminal lead. Typically connected to the ground of the circuit

2.9.1 Buzzer Features and Specifications

- Rated Voltage: 6V DC
- Operating Voltage: 4-8V DC
- Rated current: <30mA
- Sound Type: Continuous Beep
- Resonant Frequency: ~2300 Hz
- Small and neat sealed package
- Breadboard and Perf board friendly

2.9.2 How to use a Buzzer

A **buzzer** is a small yet efficient component to add sound features to our project/system. It is very small and compact 2-pin structure hence can be easily used on breadboard, Perf Board and even on PCBs which makes this a widely used component in most electronic applications.

There are two types are buzzers that are commonly available. The one shown here is a simple buzzer which when powered will make a Continuous Beeeeeeppp sound, the other type is called a readymade buzzer which will look bulkier than this and will produce a Beep. Beep. Beep. Sound due to the internal oscillating circuit present inside it. But, the one shown here is most widely used because it can be customised with help of other circuits to fit easily in our application.

This buzzer can be used by simply powering it using a DC power supply ranging from 4V to 9V. A simple 9V battery can also be used, but it is recommended to use a regulated +5V or +6V DC supply. The buzzer is normally associated with a switching circuit to turn ON or turn OFF the buzzer at required time and require interval.

2.9.3 Applications of Buzzer

- Alarming Circuits, where the user has to be alarmed about something
- Communication equipments
- Automobile electronics
- Portable equipments, due to its compact size

2.10 Regulated power supply:

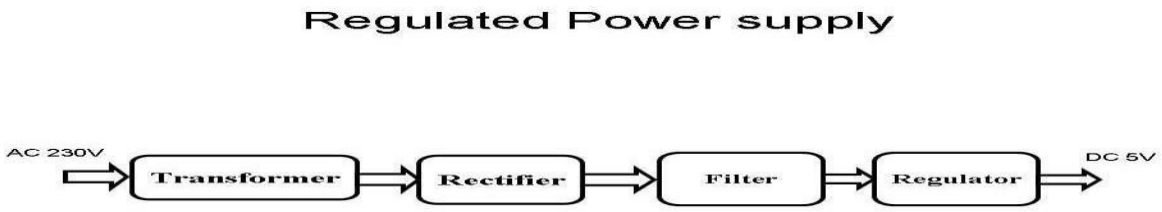


Figure 12 Regulated Power supply chain

2.10.1 Transformer:

A transformer is a device that transfers electrical energy from one circuit to another through inductively coupled conductors without changing its frequency. A varying current in the first or primary winding creates a varying magnetic flux in the transformer's core, and thus a varying magnetic field through the secondary winding. This varying magnetic field induces a varying electromotive force (EMF) or "voltage" in the secondary winding. This effect is called mutual induction. If a load is connected to the secondary, an electric current will flow in the secondary winding and electrical energy will be transferred from the primary circuit through the transformer to the load. This field is made up from lines of force and has the same shape as a bar magnet. If the current is increased, the lines of force move outwards from the coil. If the current is reduced, the lines of force move inwards. If another coil is placed adjacent to the first coil then, as the field moves out or in, the moving lines of force will "cut" the turns of the second coil. As it does this, a voltage is induced in the second coil. With the 50 Hz AC mains supply, this will happen 50 times a second. This is called MUTUAL INDUCTION and forms the basis of the transformer.

2.10.2 Rectifier:

A rectifier is an electrical device that converts alternating current (AC) to direct current (DC), a process known as rectification. Rectifiers have many uses including as components of power supplies and as detectors of radio signals. Rectifiers may be made of solid-state diodes, vacuum tube diodes, mercury arc valves, and other components. A device that it can perform the opposite function (converting DC to AC) is known as an inverter. When only one diode is used to rectify AC (by blocking the negative or positive portion of the

waveform), the difference between the term diode and the term rectifier is merely one of usage, i.e., the term rectifier describes a diode that is being used to convert AC to DC. Almost all rectifiers comprise a number of diodes in a specific arrangement for more efficiently converting AC to DC than is possible with only one diode. Before the development of silicon semiconductor rectifiers, vacuum tube diodes and copper (I) oxide or selenium rectifier stacks were used.

2.10.3 Filter:

The process of converting a pulsating direct current to a pure direct current using filters is called as filtration. Electronic filters are electronic circuits, which perform signal-processing functions, specifically to remove unwanted frequency components from the signal, to enhance wanted ones.

2.10.4 Regulator:

A voltage regulator (also called a _regulator‘) with only three terminals appears to be a simple device, but it is in fact a very complex integrated circuit. It converts a varying input voltage into a constant _regulated ‘output voltage. Voltage Regulators are available in a variety of outputs like 5V, 6V, 9V, 12V and 15V. The LM78XX series of voltage regulators are designed for positive input. For applications requiring negative input, the LM79XX series is used. Using a pair of _voltage-divider‘ resistors can increase the output voltage of a regulator circuit. It is not possible to obtain a voltage lower than the stated rating. You cannot use a 12V regulator to make a 5V power supply. Voltage regulators are very robust. These can withstand over-current draw due to short circuits and also over-heating. In both cases, the regulator will cut off before any damage occurs. The only way to destroy a regulator is to apply reverse voltage to its input. Reverse polarity destroys the regulator almost instantly.

2.11 Software Requirements Description

Software Requirements is a field within software engineering that deals with establishing the needs of stakeholders that are to be solved by software. The IEEE Standard Glossary of Software Engine

- A condition or capability that must be met or possessed by a system or system component to satisfy a contract, standard, specification, or other formally imposed

document.

Some of the important Software requirements required in our project are:

2.11.1 Arduino IDE

The Arduino integrated development environment (IDE) (figure 4.4.1) is a cross-platform application for Windows, macOS, Linux that is written in the programming language Java. It is used to write and upload programs to Arduino compatible boards, but also, with the help of 3rd party cores, other vendor development boards. The Arduino IDE supports the languages C and C++ using special rules of code structuring. It is an official Arduino software, making code compilation too easy that even a common person with no prior technical knowledge can get their feet wet with the learning process. The main code, also known as a sketch, created on the IDE platform will ultimately generate a Hex File which is then transferred and uploaded in the controller on the board. The main code, also known as a sketch, created on the IDE platform will ultimately generate a Hex File which is then transferred and uploaded in the controller on the board

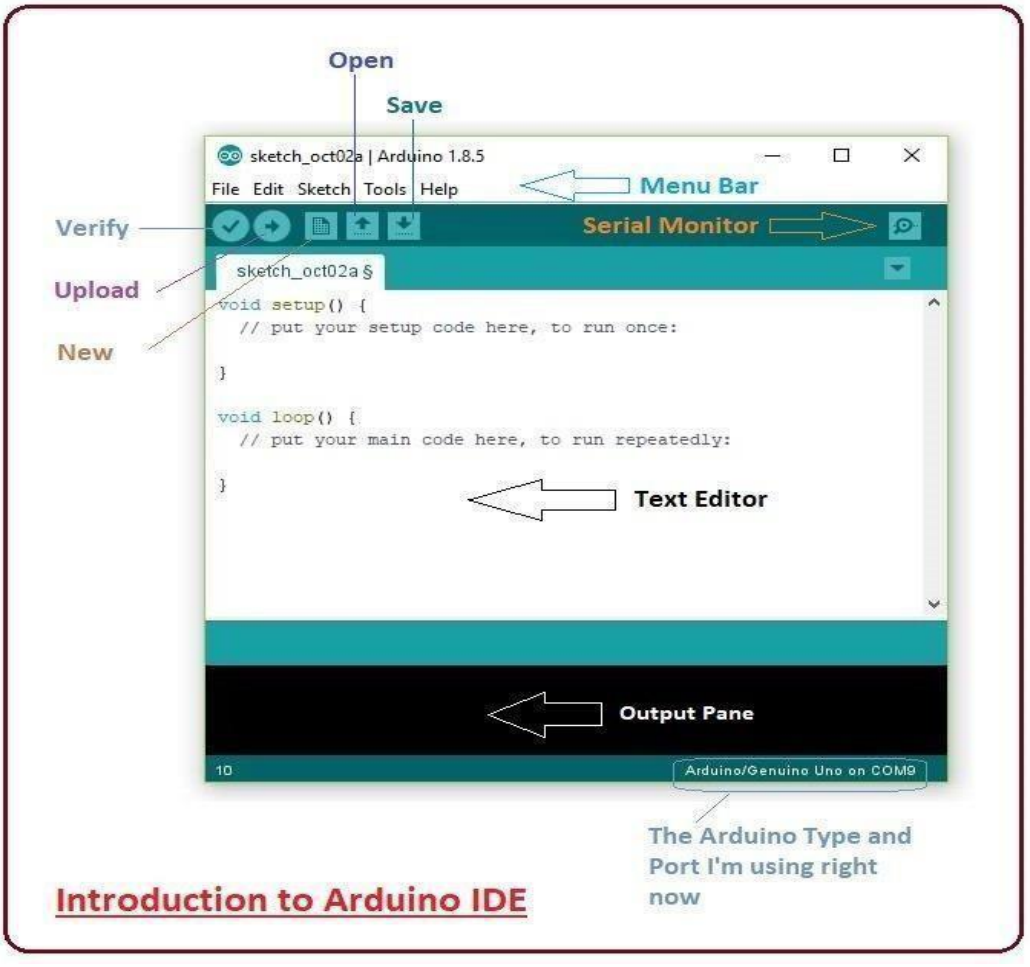


Figure 13 Arduino IDE

The IDE environment is mainly distributed into three sections:

- Menu Bar
- Text Editor
- Output Pane

2.11.2 Embedded C

Embedded C is an extension to C programming language that provides support for developing efficient programs for embedded devices. It is not a part of the C language. C is the most widely used programming language for embedded processors/controllers. Assembly is also used but mainly to implement those portions of the code where very high timing accuracy, code size efficiency, etc. are prime requirements.

Arduino IDE (Integrated development Environment) is fully developed into functionality of full of libraries, as long as programming the Arduino UNO in Embedded C language is possible because Arduino IDE can compile both Arduino code as well as AVR standard code.

- When designing software for a smaller embedded system with the 8051, it is very common place to develop the entire product using assembly code. With many projects, this is a feasible approach since the amount of code that must be generated is typically less than 8 kilobytes and is relatively simple in nature. If a hardware engineer is tasked with designing both the hardware and the software, he or she will frequently be tempted to write the software in assembly language.
- The trouble with projects done with assembly code can is that they can be difficult to read and maintain, especially if they are not well commented. Additionally, the amount of code reusable from a typical assembly language project is usually very low. Use of a higher-level language like C can directly address these issues. A program written in C is easier to read than an assembly program.
- Since a C program possesses greater structure, it is easier to understand and maintain. Because of its modularity, a C program can better lend itself to reuse of code from project to project. The division of code into functions will force better structure of the software and lead to functions that can be taken from one project and used in another, thus reducing overall development time. A high order language

such as C allows a developer to write code, which resembles a human's thought process more closely than does the equivalent assembly code. [25]The developer can focus more time on designing the algorithms of the system rather than having to concentrate on their individual implementation. This will greatly reduce development time and lower debugging time since the code is more understandable.

- By using a language like C, the programmer does not have to be intimately familiar with the architecture of the processor. This means that someone new to a given processor can get a project up and running quicker, since the internals and organization of the target processor do not have to be learned. Additionally, code developed in C will be more portable to other systems than code developed in assembly. Many target processors have C compilers available, which support ANSI C.
- All of this is not to say that assembly language does not have its place. In fact, many embedded systems (particularly real time systems) have a combination of C and assembly code. For time critical operations, assembly code is frequently the only way to go. One of the great things about the C language is that it allows you to perform low-level manipulations of the hardware if need be, yet provides you the functionality and abstraction of a higher order language.

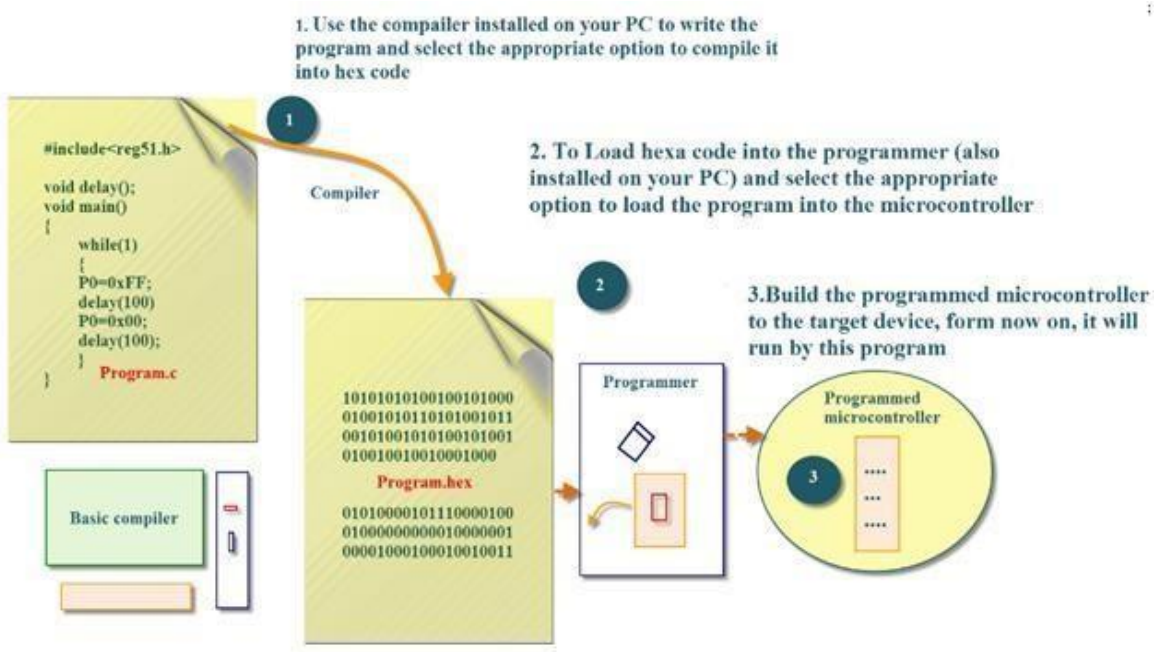


Figure 14 Embedded C

CHAPTER 3

SYSTEM DESIGN

3.1 FLOWCHART:

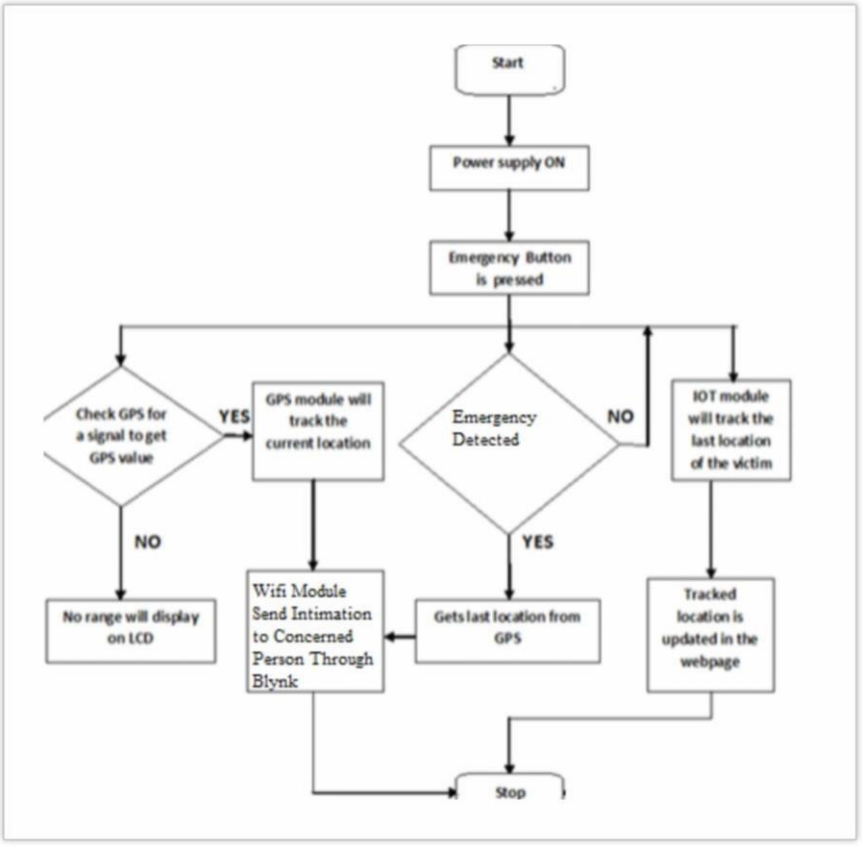


Figure 15 Flow Chart

3.1 Flow Chart

The flowchart you sent depicts a GPS tracking system designed for personal safety. It outlines the steps taken by the system to track a person's location and send an emergency notification in case of an emergency.

The flowchart starts with the power supply being turned on. The system then checks for a GPS signal to get the user's current location.

If a GPS signal is available, the GPS module tracks the current location and the location is updated on a webpage. This webpage can be accessed by authorized personnel, such as guardians or emergency services, to view the user's location in real-time.

If a GPS signal is not available, the system checks if the emergency button is pressed.

- If the emergency button is pressed:
    - The system sends an emergency notification to a designated contact person through Blynk, a mobile app for IoT devices.
    - The IOT module tracks the last location of the user.
- If the emergency button is not pressed and there is no GPS signal, the system displays "No range" on the LCD screen, indicating that the user's location cannot be tracked.

Overall, this GPS tracking system provides a way to monitor a person's location and send help in case of an emergency, even if the GPS signal is weak.

3.2 Arduino

- The IoT based system consist of the main part is Arduino board gets the signs from GPS system which has introduce area data and after that the Arduino uno controller permits to send the Alert Message with the location of the women to the saved predefined numbers.
- At the time of dangerous situation, we know that everyone's pulse rate get high, hence we are using a pulse rate sensor that will sense the heart rate and send through message with the location.
- Auto defender system is consisting of the buzzer which will make sound so that someone in the surrounding can listen and help her and Thus the women can self defense her.

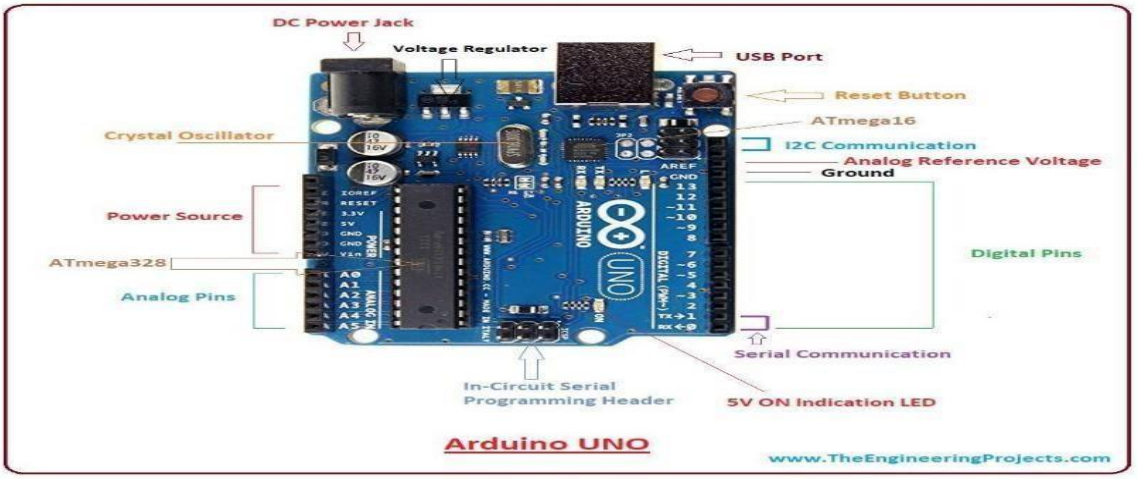


Figure 16 Arduino UNO

3.3 HeartBeat Sensor

- This sensor is designed to measure heart beat when finger is placed on it.
- It works on the principle of light modulation by blood flow through finger at each pulse.
- Whenever heartbeat of person will deviate from the threshold value, the system will transmit information to control room.

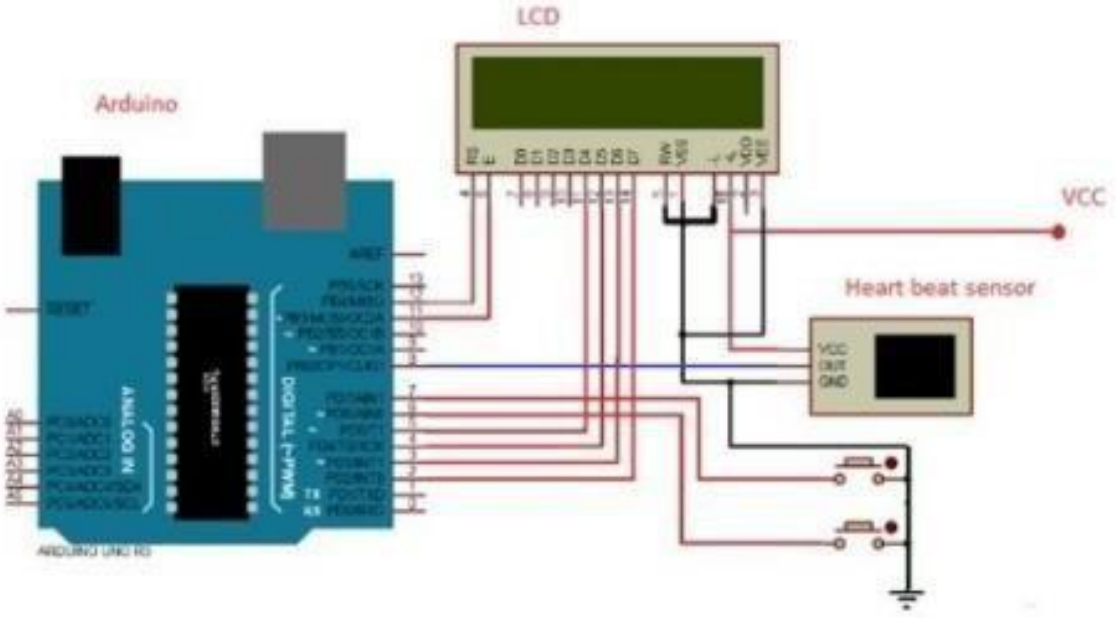


Figure 17 Heartbeat Sensor

3.4 Temperature Sensor

- LM35 is a precision IC temperature sensor with its output proportional to the temperature
- LM35 temperature sensor is used to measure surface temperature as it is more accurate than a thermistor and lung capacity is measured using an arrangement of fan with motor like spirometry.
- The output voltage is converted to temperature by a simple conversion factor. The operating temperature range is from -55°C to 150°C.

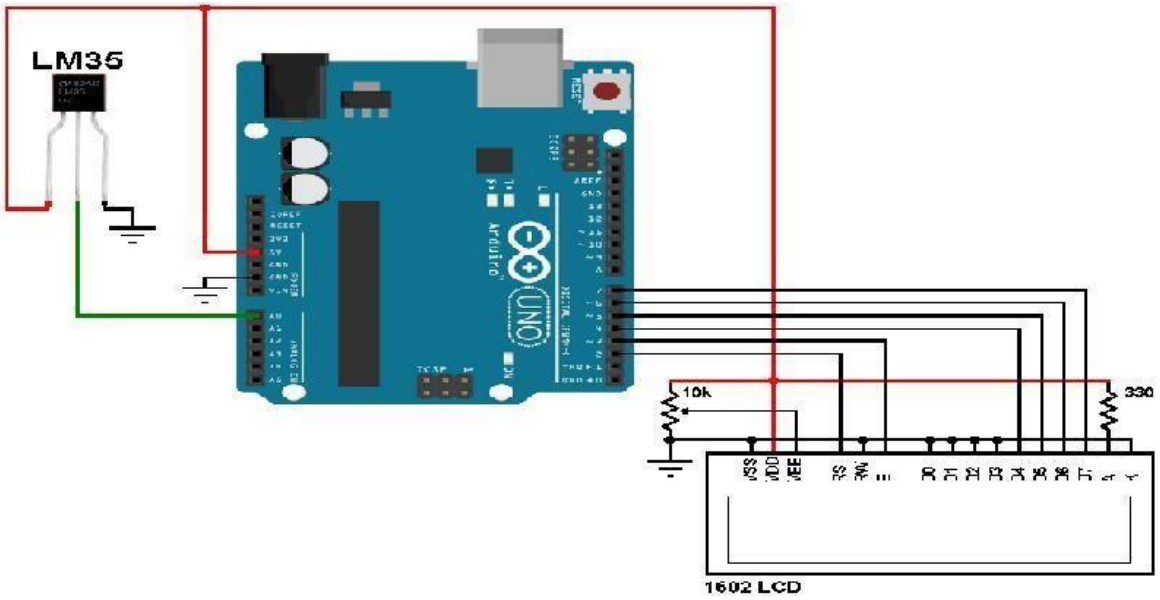


Figure 18 Temperature Sensor

3.5 Live streaming camera

- The ESP32-CAM is a very small camera module with the ESP32-S chip.Besides the OV2640 camera, and several GPIOs to connect peripherals, it also features a microSD card slot that can be useful to store images taken with the camera or to store files to serve to clients.
- The ESP32-CAM can be widely used in intelligent IoT applications such as wireless video monitoring, WiFi image upload, QR identification, and so on.
- When the threat is detected by the sensors, the ESP32 camera starts live streaming the incident thgrough which the culprit identity can be found**.**

Figure 19 Live streaming camera

3.6 Shock Device-Relay

- A relay is an electronically operated switch that is remotely activated by an electromagnet which pulls a set of contacts to either make or break a circuit.
- The relay permits a small amount of electrical current to control high current loads.
- In this project whenever there is a need of safety, they will be able to press the realy button that will produce a non lethal shock.

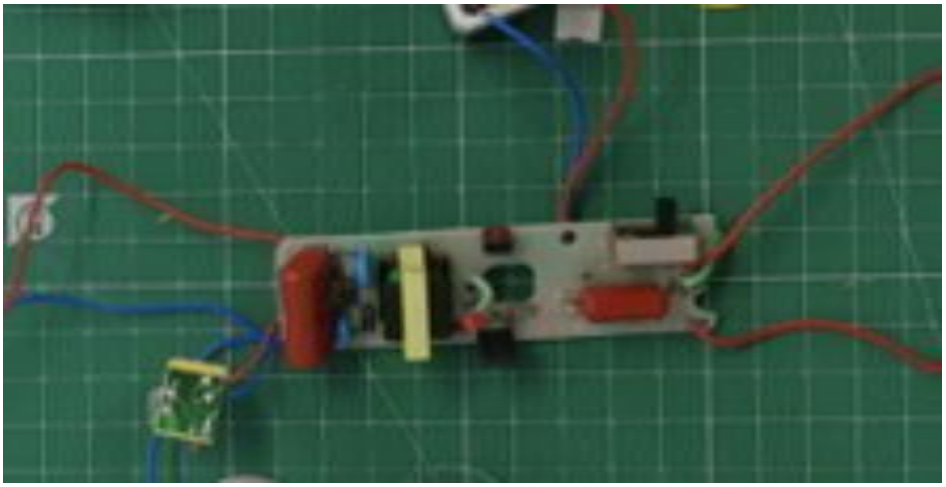


Figure 20 Shock device-Relay

CHAPTER 4:

CODE

```
#include<LiquidCrystal.h>

const int rs = 13, en = 12, d4 =11 , d5 = 10, d6 =9, d7 = 8;

LiquidCrystal lcd(rs, en, d4, d5, d6, d7);

int data=A0;//heartbeat sensor

int buzzer=7;

int relay=5;

int sw=4;

unsigned long temp=0;

byte customChar1[8] = {0b00000,0b00000,0b00011,0b00111,0b01111,0b01111,0b01111,0b01111};

byte customChar2[8] = {0b00000,0b11000,0b11100,0b11110,0b11111,0b11111,0b11111,0b11111};

byte customChar3[8] = {0b00000,0b00011,0b00111,0b01111,0b11111,0b11111,0b11111,0b11111};

byte customChar4[8] = {0b00000,0b10000,0b11000,0b11100,0b11110,0b11110,0b11110,0b11110};

byte customChar5[8] = {0b00111,0b00011,0b00001,0b00000,0b00000,0b00000,0b00000,0b00000};

byte customChar6[8] = {0b11111,0b11111,0b11111,0b11111,0b01111,0b00111,0b00011,0b00001};

byte customChar7[8] = {0b11111,0b11111,0b11111,0b11111,0b11110,0b11100,0b11000,0b10000};

byte customChar8[8] = {0b11100,0b11000,0b10000,0b00000,0b00000,0b00000,0b00000,0b00000};

// Timer variables

unsigned long lastTime = 0;

unsigned long timerDelay = 30000;

int count=0;

char mystr[20];

char ch;

#include <OneWire.h>

#include <DallasTemperature.h>

#define ONE_WIRE_BUS 6

OneWire oneWire(ONE_WIRE_BUS);
```

```
DallasTemperature sensors(&oneWire);
float temperature;
 void setup() {
  // put your setup code here, to run once:
  Serial.begin(9600);
  pinMode(buzzer,OUTPUT);
  pinMode(relay,OUTPUT);
  pinMode(sw,INPUT_PULLUP);
  lcd.begin(16, 2);
       lcd.createChar(1, customChar1);
    lcd.createChar(2, customChar2);
    lcd.createChar(3, customChar3);
    lcd.createChar(4, customChar4);
    lcd.createChar(5, customChar5);
    lcd.createChar(6, customChar6);
lcd.createChar(7, customChar7);
    lcd.createChar(8, customChar8);
    lcd.clear();
    lcd.print("WOMEN SAFETY");
//   lcd.setCursor(0,1);
// lcd.print("-ON SYSTEM ");
    Serial.println("WOMEN SAFETY");}
void loop() {
  HEART_BEAT_MONITOR();
  TEMPERATURE();
  EMERGENCY();
//  delay(1000);
}
void EMERGENCY()
```

```
{
 if(digitalRead(sw)==LOW)
 {
  float latitude=12.9016798;
  float longitude=77.6287308;
  Serial.println("EMERGENCY");
  lcd.clear();
  lcd.setCursor(0,0);
 lcd.setCursor(0, 1);
 lcd.print("to check HB");
// Serial.println("Place The Finger to check HB");
  delay(2000);
 // while(digitalRead(start)>0);
  lcd.clear();
  temp=millis();
  while(millis()<(temp+5000))
  {
    if(analogRead(data)<100)
      {
       count=count+1;
       lcd.setCursor(6, 0);
       lcd.write(byte(1));
       lcd.setCursor(7, 0);
       lcd.write(byte(2));
       lcd.setCursor(8, 0);
       lcd.write(byte(3));
       lcd.setCursor(9, 0);
       lcd.write(byte(4));
       lcd.setCursor(6, 1);
```

```
        lcd.write(byte(5));}
lcd.setCursor(3, 1);
        lcd.write(byte(6));
        lcd.setCursor(4, 1);
        lcd.write(byte(7));
        lcd.setCursor(5, 1);
        lcd.write(byte(8));
        lcd.setCursor(7, 1);
        lcd.print(count);
        lcd.print(" BPM");
        temp=0;
delay(1000);
      sprintf(mystr, "HB:%d", count);
     Serial.print(mystr);
     Serial.println("");
     delay(1500);
     if(count>120)
     {
      Serial.println("$MORE HEARTBEAT#");
      lcd.clear();
      lcd.print("MORE HEARTBEAT");
      digitalWrite(buzzer,HIGH);
      delay(1000);
      digitalWrite(buzzer,LOW);
      delay(500);
     } }
void TEMPERATURE(){
  sensors.requestTemperatures();
  temperature = sensors.getTempCByIndex(0);
```

```
  Serial.print("Temperature: ");
  Serial.println(temperature);
  delay(1000);
  lcd.clear();
lcd.print("TEMP:");
lcd.print(temperature);
delay(1500);
// dtostrf(temperature, 5, 3, tempStr);
  if(temperature>35){
  Serial.println("$More Temperature#");
  lcd.clear();
    lcd.setCursor(0,0);
    lcd.print(" MORE ");
    lcd.setCursor(0,1);
    lcd.print(" TEMPERATURE ");
    delay(1000);
  }
}
```

CHAPTER 5:

ADVANTAGES AND DISADVANTAGES

Advantages :

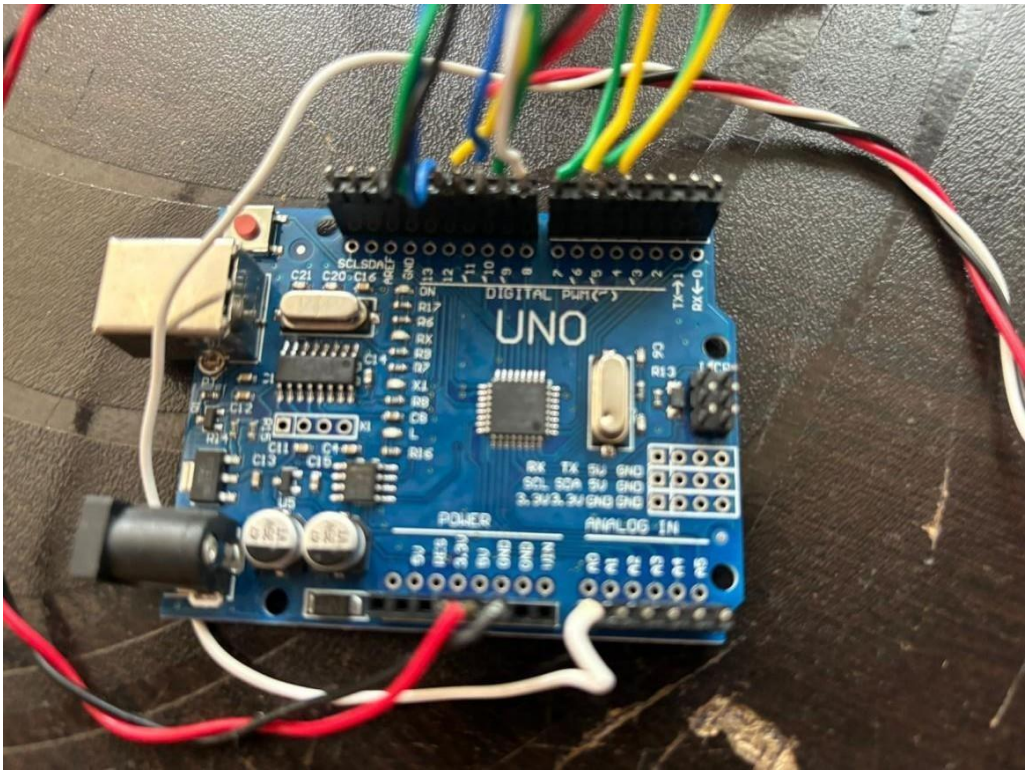
- For women's
- Children's
- Senior citizens
- Just by modifying it we can use it for employee safety in industries.

Disadvantages :

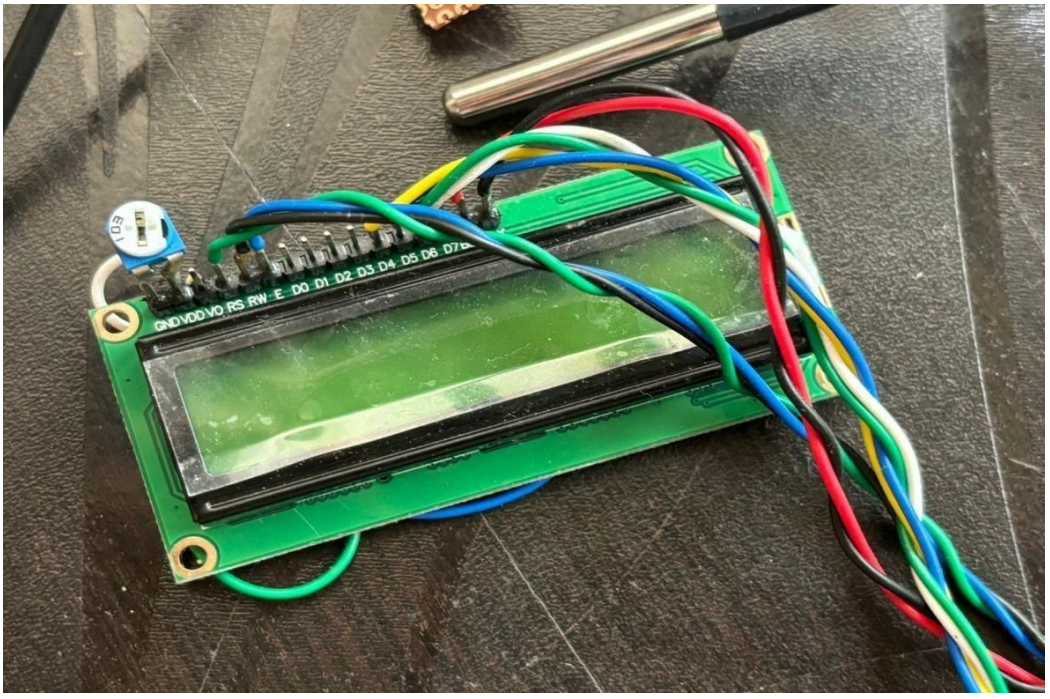
- Difficult to illiterates.
- If network fails, then it is not possible to INTIMATE.
- Network oriented system.

CHAPTER 6:

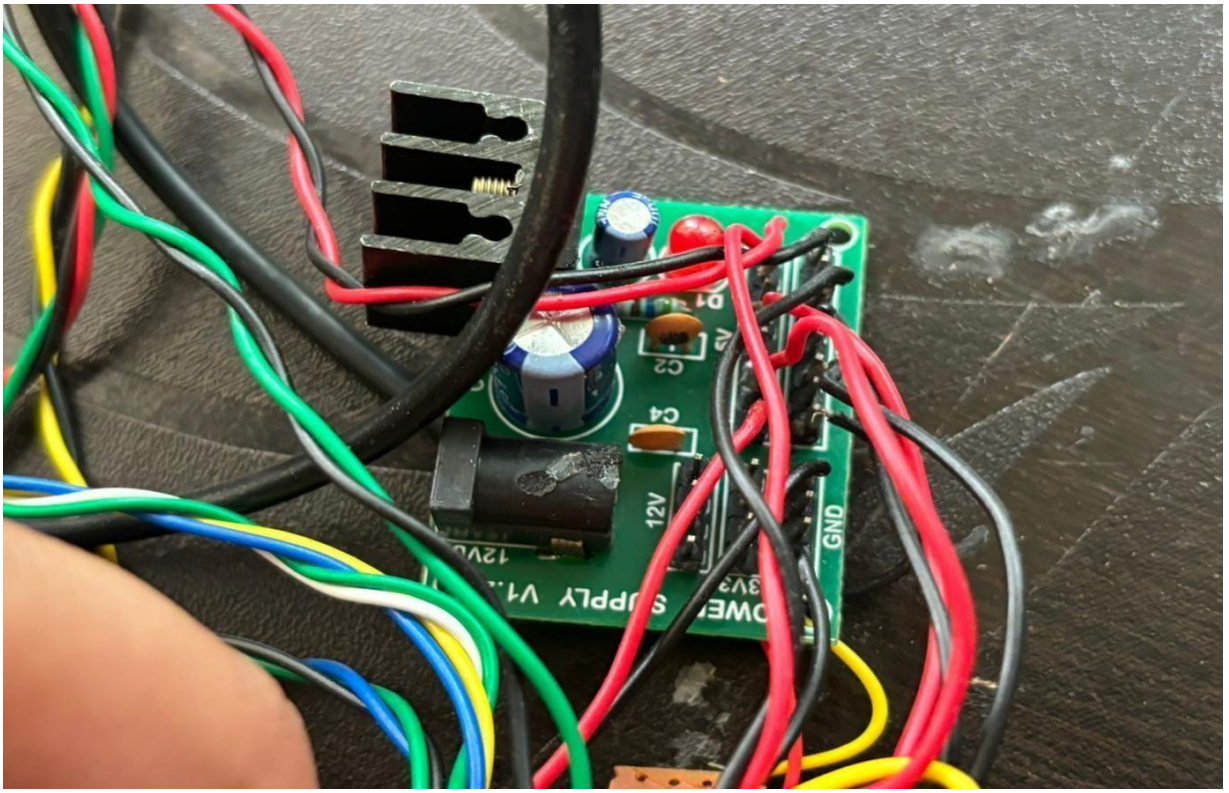
SNAPSHOTS



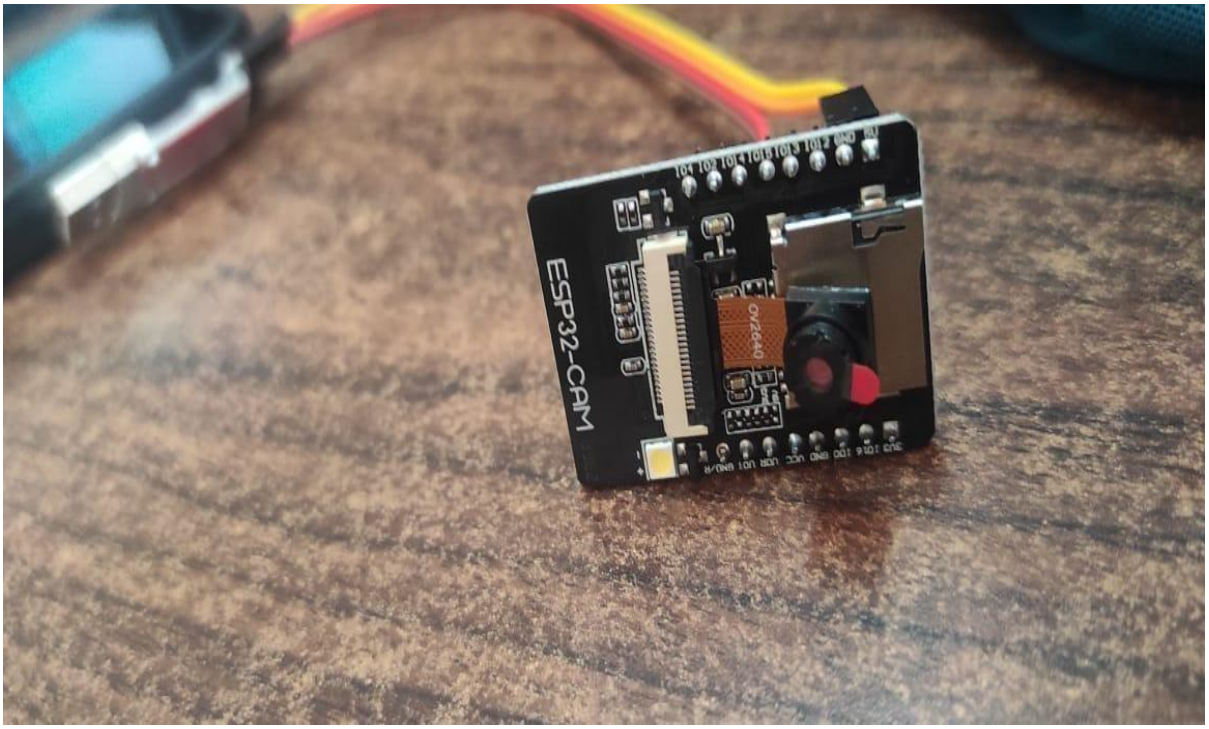
AURDINO



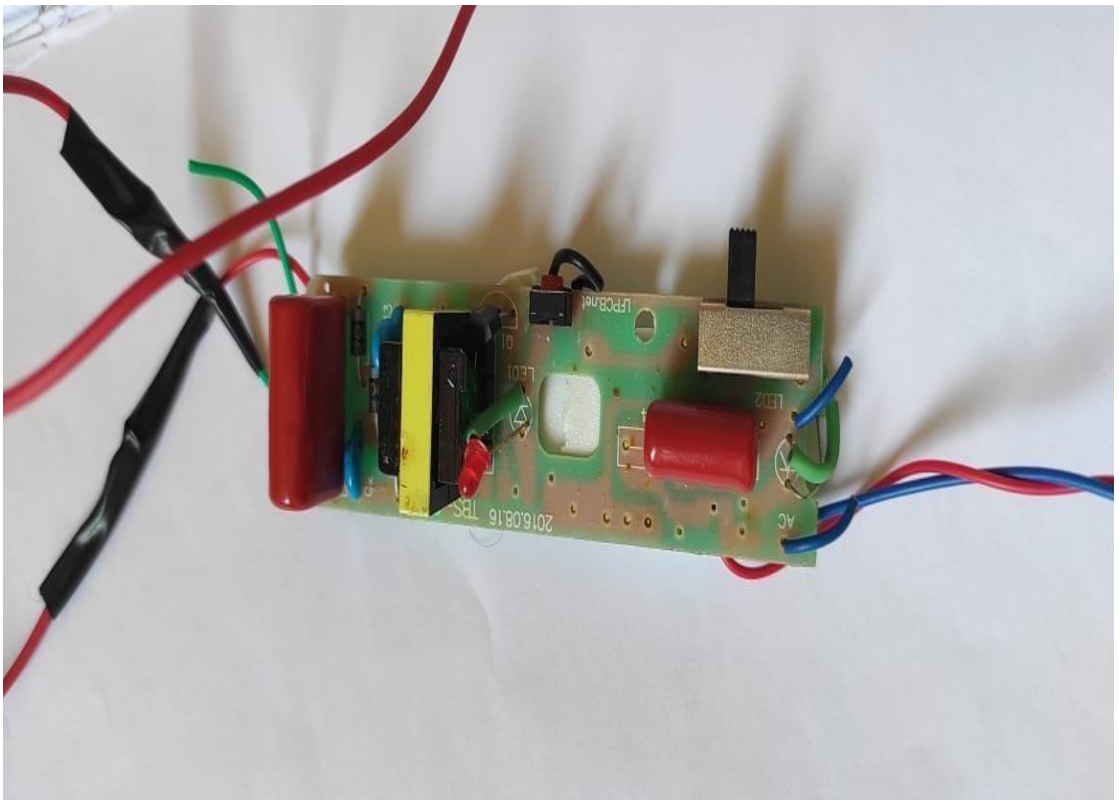
LCD DISPLAY



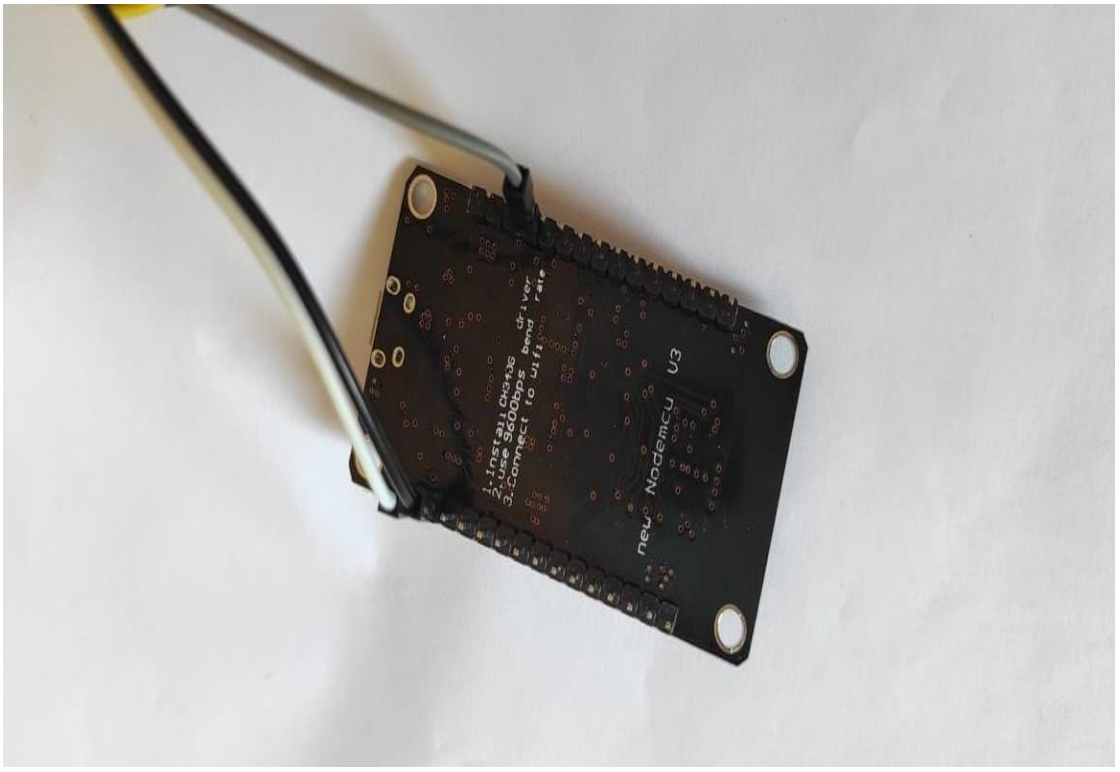
POWER SUPPLY



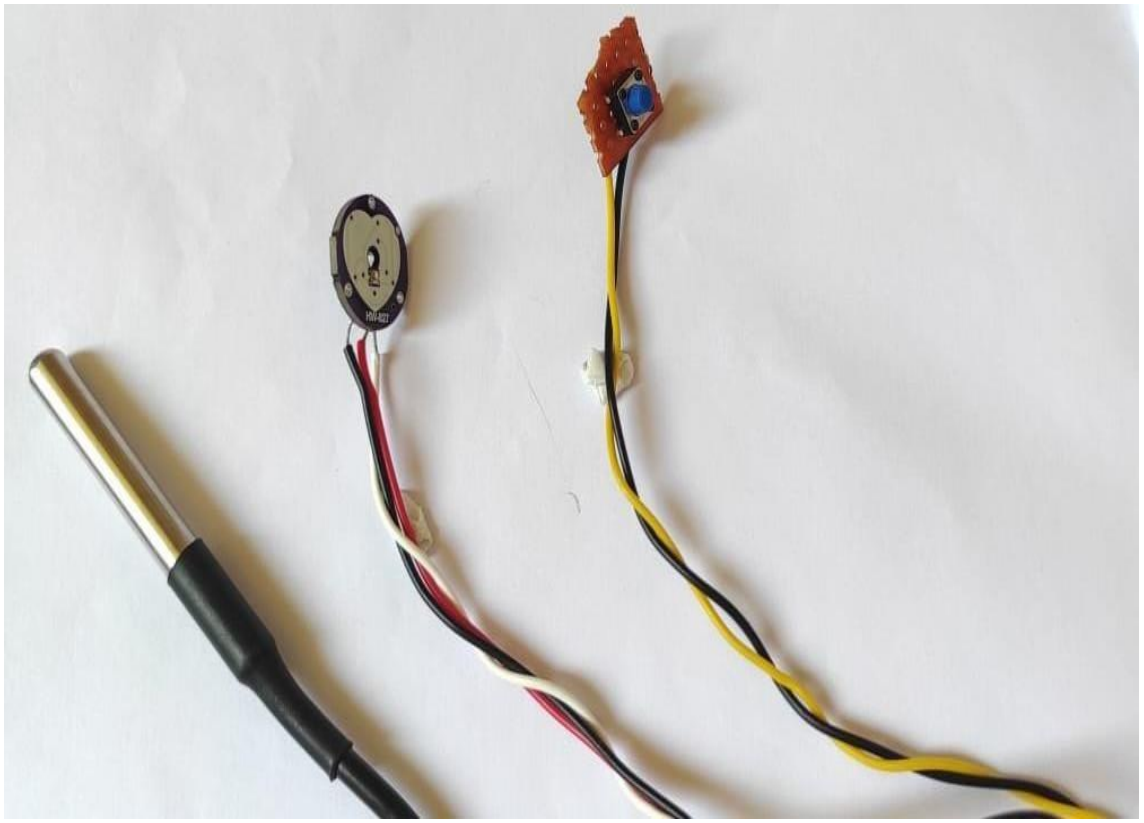
CAMERA



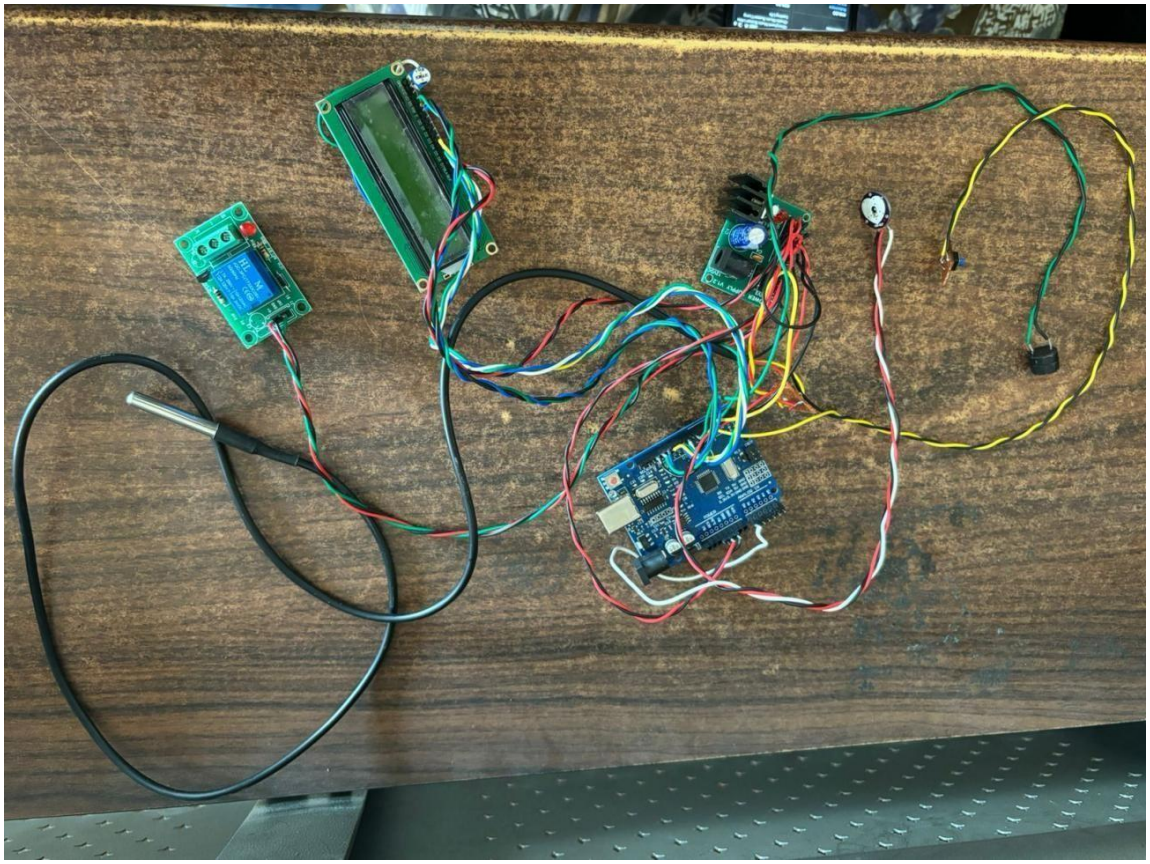
SHOCK GENERATOR



NODEMCU

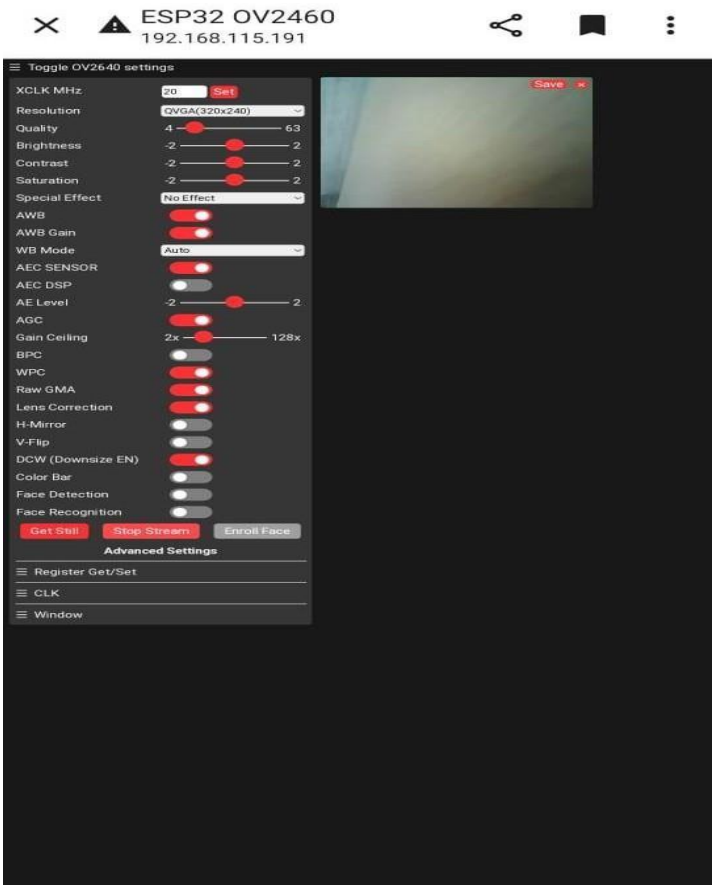


TEMPERATURE SENSOR,HEART BEAT SENSOR AND EMERGENCY SWITCH



CIRCUIT CONNECTIONS

LIVE STREAMING WEBSITE



CAMERA STILLS

WOMENS SAFETY JACKET

CHAPTER 7:

CONCLUSION AND FUTURE SCOPE

CONCLUSION

The project outlined above presents a comprehensive solution to address the critical situations women face in today's world. By utilizing innovative technology such as wristbands and spectacles equipped with mechanisms like tear gas release and location-based messaging, this project aims to provide women with a scientifically backed means of clarification and assistance during distressing situations. The ultimate goal is to enhance women's assurance and security globally. With a focus on scalability and affordability, this model has the potential to extend its reach to rural areas, empowering women with a sense of safety even in traditionally underserved regions. By incorporating additional features such as a calling function and automatic location sharing with law enforcement, the system can be further enhanced to provide real-time support and aid in emergency response efforts.

Furthermore, the integration of image capture capabilities in advanced iterations of the system adds an extra layer of documentation and evidence gathering, strengthening women's ability to seek justice and accountability. In essence, this project not only addresses the immediate needs of women in distress but also contributes towards a larger goal of promoting gender equality and ensuring the safety and well-being of women worldwide

FUTURE SCOPE

Here are some potential avenues for future development and expansion:

- Integration of Artificial Intelligence (AI): Incorporating AI algorithms can enhance the system's capabilities in recognizing and responding to various distress signals and situations. AI can also analyze data patterns to provide personalized safety recommendations and predictive alerts to users.
- Enhanced Wearable Technology: Future iterations of the wristband and spectacles can include additional sensors and functionalities such as biometric authentication, health monitoring, and automatic emergency response activation based on physiological indicators.
- Global Deployment and Partnerships: Collaborating with governments, NGOs, and technology companies can facilitate the widespread adoption of the system, especially in regions with high rates of gender-based violence. Partnerships can also ensure continuous updates and support for the technology.
- Community Engagement and Education: Implementing outreach programs and educational initiatives can raise awareness about the system's capabilities and empower women to utilize it effectively. Training sessions can be conducted to teach users how to respond to emergencies and access support services.
- Data Privacy and Security Measures: Implementing robust data encryption and privacy protocols is essential to safeguard users' information and prevent misuse of the technology. Regular security audits and updates should be conducted to mitigate potential risks.

By exploring these avenues and continually innovating, the project can evolve into a comprehensive and indispensable tool for ensuring the safety and security of women worldwide

REFERENCES

[1] S. Ruiz, L. Negredo, A. Ruiz, C. García-Moreno, Ó. Herrero, M. Yela, et al., "Violencia de género", Programa de Intervención para Agresores, Ministry of Interior of Spain, May. 2010.

[2] E. Aarts and B. de Ruyter, "New research perspectives on Ambient Intelligence", Journal of Ambient Intelligence and Smart Environments, vol. 1, n. 1, pp. 5–14, Jan. 2009.

[3] J. Bajo, J. F. de Paz, Y. de Paz, and J. M. Corchado, "Integrating case- based planning and RPTW neural networks to construct an intelligent environment for health care", Expert Syst. Appl., vol. 36, n. 3, pp. 5844–5858, Apr. 2009.

[4] D. I. Tapia, A. Abraham, J. M. Corchado, and R. S. Alonso, "Agents and ambient intelligence: case studies", Journal of Ambient Intelligence and Humanized Computing, vol. 1, n. 2, pp. 85–93, Jun. 2010.

[5] BI Incorporated, "One-piece active GPS offender tracking: BI ExacuTrack® One". Available: http://bi.com/exacutrackone [Accessed 9 September 2011].

[6] iSECUREtrac, "One-piece GPS Systems from iSECUREtrac". Available: http://www.isecuretrac.com/Services.aspx?p=GPS#onepiece [Accessed 9 September 2011].

[7] G.M.Djuknic and R. E. Richton, "Geolocation and Assisted GPS", Computer, vol. 34, n.2, pp. 123–125, 2001.

[8] Yieh-Ran Haung and Yi-Bing Lin, "A bandwidth-on-demand strategy for GPRS", IEEE Transactions on Wireless Communications, vol. 4, n.4, pp. 1394–1399, Jul. 2005.

[9] P. Baronti, P. Pillai, V. W. C. Chook, S. Chessa, A. Gotta, and Y. F. Hu, "Wireless sensor networks: A survey on the state of the art and the 802.15.4 and ZigBee standards", Comput. Commun., vol. 30, n. 7, pp. 1655–1695, 2007.

[10] A. Küpper, Location-Based Services: Fundamentals and Operation, 1st ed. Wiley, 2005.

[11] S.Anynye and Y. Rajala, "System and Method for Tracking, Monitoring, Collecting, Reporting and Communicating with the Movement of Individuals", U.S. Patent Application, 20100222073, 09- Feb-2010.

[12] Nebusens "n-Core®: A faster and easier way to create Wireless Sensor Networks", 2011. Available: http://www.n-core.info [Accessed 2 January 2012].

[13] D. Ibrahim, "Design of a GPS data logger device with street-level map interface", Advances in Engineering Software, vol. 41, n. 6, pp. 859–864, Jun. 2010.

[14] D. Seth, A. Chowdhury, and S. Ghosh, ''A hidden Markov model and Internet of Things hybrid based smart women safety device,'' in Proc. 2nd Int. Conf. Power, Energy Environ., Towards Smart Technol. (ICEPE),Jun. 2018, pp. 1–9.

[15] S. Srinivasan, P. M. Kannan, and R. Kumar, ''A machine learning approach to design and develop a BEACON device for women's safety,'' in Recent Advances in Internet of Things and Machine Learning. Cham, Switzerland: Springer, 2022.

[16] V. R. Balaji, N. Paramanandham, and M. Murugan, ''Guardian device for women—A survey and comparison study,'' in Proc. 2nd Int. Conf. Robotics, Intell. Automat. Control Technol., Chennai, India, 2021, Art. no. 012030.

[17] L. F. Cardoso, S. B. Sorenson, O. Webb, and S. Landers, ''Recent and emerging technologies: Implications for women's safety,'' Technol. Soc., vol. 58, Aug. 2019, Art. no. 101108.

[18] S. Das, S. Dasar, and J. S. Rao, ''Women's security system,'' Int. J. Eng. Res. Technol. (IJERT), vol. 10, no. 7, pp. 483–486, 2021.

[19] D. Kaur, R. Chahar, and J. Ashta, ''IoT based women security: A contemplation,'' in Proc. Int. Conf. Emerg. Smart Comput. Informat. (ESCI), Mar. 2020, pp. 257–262.

[20] E. T. Rother, ''Systematic literature review X narrative review,'' Acta Paul Enferm., vol. 20, no. 2, pp. 5–6, 2007.