WOMAN SECURITY SYSTEM USING EMBEDDED

Project report submitted in partial fulfillment of the Requirements for the Award of the Degree of B.Tech in Electronics And Communication Engineering

BY

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CH. MERCY GLORY	**(203B5A0404)**
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Under the Esteemed Guidance of

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Assistant Professor, Dept.of E.C.E.

Department of Electronics and Communication Engineering

V.S.M COLLEGE OF ENGINEERING

(Approved by AICTE New-Delhi and Affiliated to Jawaharlal Nehru Technological University, Kakinada)

Ramachandrapuram-533255, A.P, INDIA

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

CERTIFICATE

This is to certify that the project report entitled WOMAN SECURITY SYSTEM USING EMBEDDED being submitted by **K. UDAYA SHANKAR (Regd. No: 203B5A0409), CH. MERCY GLORY (Regd. No: 203B5A0404)**, **N.N.M.LAKSHMI PRASAD (Regd.No: 203B5A0415)**, **V. MADHU LATHA (Regd. No: 193B1A0421)**, **A. RAVI RAJA (Regd. No: 203B5A0401)**, in partial fulfillment for the award of the Degree of Bachelor of Technology in Computer Science and Engineering to the Jawaharlal Nehru Technological University, Kakinada is a record of bonafied work carried out under my guidance and supervision.

The results embodied in this project report have not been submitted to any other University or Institute for the award of any Degree or Diploma.

MR. S. SIVA KRISHNA, M.TECH   Mr. A.NARAYANA MURTHY, M.Tech

Assistant Professor   Assistant Professor

Project Guide   Head of the Department

EXTERNAL EXAMINAR

ACKNOWLEDGMENT

We would like to thankful to **Shri M S R PRASAD,** President and Correspondent, V S M Group of Institutions, **Shri M S N MURTHY, M.S (U.S.A),** Academic Director, V S M College of Engineering & other officials of the organization for giving us opportunity and facilities according to carry out this work.

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DECLARATION

We hereby declare that this project titled as **"WOMAN SECURITY SYSTEM USING EMBEDDED"** has been under taken at this work is submitted to V.S.M COLLEGE OF ENGINEERING, RAMACHANDRAPURAM, affiliated to JAWAHARLAL NEHHRU TECHHNOLOGICAL UNIVERSITY, KAKINADA in the partial fulfillment of the degree of BACHHELOR OF TECHNOLOGY.

We further declare that the project has not been submitted in full or part for the award of any other degree in any other educational institutions.

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PLACE:

DATE:

ABSTRACT:

The system aims to provide real-time protection to women in emergency situations. The system is equipped with a GPS module (Neo 6m v2) which provides the current location of the user. This information is sent to a designated guardian or emergency contact via SMS using the SIM 800L GSM module. In case the user presses the emergency button, the system sends an SMS to the designated guardian with the user's current location and an emergency message.

The system uses the ESP 32 microcontroller to integrate all the components and ensure their seamless operation. The microcontroller ensures that the system is constantly monitoring the user's location and sending regular updates to the guardian. In case of an emergency, the microcontroller sends an emergency alert to the designated guardian. The system is designed to be portable and can be carried by the user at all times. The compact size and low power consumption of the components ensure that the system is convenient to use and can be operated for extended periods on a single charge.

Overall, the Woman Security System Using Embedded using the SIM 800L GSM module, Neo 6m v2 GPS module, and ESP 32 microcontroller is a reliable and effective solution for providing real-time protection to women in emergency situations.

Keyword:- ESP 32, SIM 800L GSM Module, Neo 6m v3 GPS Module, OLED Display.

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CHAPTER-1

CHAPTER-1 : INTRODUCTION

Present days Woman safety refers to the measures and strategies put in place to protect women from harm and ensure their physical, emotional, and psychological well-being. Unfortunately, women are often subjected to various forms of violence, harassment, and discrimination in different settings, including at home, in public spaces, and in the workplace. These incidents can have long-lasting effects on women's lives, such as trauma, anxiety, and a sense of insecurity.

The woman safety system using NEO 6M V2 GPS module, SIM800L GSM module, and ESP32 is a device designed to enhance the safety and security of women by tracking their location and providing them with a quick and easy way to send an SOS signal to emergency services or a designated contact. The NEO 6M V2 GPS module is used to track the location of the device and the user wearing it. The SIM800L GSM module is used to communicate with emergency services or a designated contact via text message or call. The ESP32 is a microcontroller that handles the logic and controls the GPS and GSM modules. The system is designed to be portable and can be worn on the body as a pendant or placed in a bag. In the event of an emergency, the user can press a button on the device, which will send a signal to the ESP32. The ESP32 will then use the GPS module to obtain the user's location and send a distress signal to emergency services or a designated contact via the GSM module. The device can be programmed to send text messages or make phone calls to multiple contacts in case of an emergency. It can also be programmed to send regular updates on the user's location to a designated contact or a web server. Overall, this system is an effective solution for enhancing the safety and security of women, particularly those who frequently travel alone or in unsafe areas.

CHAPTER-2

CHAPTER-2 : LITERATURE SURVEY

In recent years, there has been a growing concern about the safety of women in various parts of the world. Women have been the victims of various crimes such as sexual assault, harassment and violence. To address this issue, there have been several technological advancements that have been made to ensure the safety of women. In this literature survey, we will explore some of the existing technologies that have been developed to ensure the safety of women. Personal safety apps are mobile applications that are designed to ensure the safety of women. These apps can be downloaded on smartphones and can be used to send alerts to emergency contacts in case of danger. Some of the popular personal safety apps include bSafe, Circle of 6, and Life360.bSafe, for example, allows users to send an SOS alarm to their emergency contacts, share their location, and even record audio and video of the situation.

2.1 Wearable Safety Devices:

Wearable safety devices are gadgets that women can wear to ensure their safety. These devices can be worn as jewellery or attached to clothing. They can be used to send alerts to emergency contacts or the police in case of danger. Some of the popular wearable safety devices include Athena, Nimb, and Safer. Athena, for example, is a small device that can be worn as a necklace or bracelet. It can be used to send alerts to emergency contacts and also has a loud alarm that can be activated to draw attention.

2.2 Self Defense Gadgets:

Self defense gadgets are devices that women can use to protect themselves in case of danger. These gadgets include pepper sprays, stun guns, and personal alarms. Pepper sprays are a popular self defense gadget that can be used to temporarily blind an attacker. Stun guns, on the other hand, can be used to deliver a shock to the attacker that can immobilize them. Personal alarms are also popular self defense gadgets that can be used to draw attention in case of danger.

2.3 Smart Clothing:

Smart clothing is a type of clothing that has been designed to ensure the safety of women. Smart clothing is embedded with sensors that can detect dangerous situations and send alerts to emergency contacts or the police. Some of the popular smart clothing includes the Smart Dress, which is embedded with sensors that can detect when someone

is trying to touch the wearer inappropriately, and the Wonder Hoodie, which is designed to protect women from bullets.

2.4 IoT Module(ESP-32):

The Internet of things(IoT) has evolved due to convergence of multiple technologies, real-time analytics, machine learning, commodity sensors, and embedded systems the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit. IoT is that the network of the physical devices, vehicles, buildings and alternative things embedded with physics, software, sensors, actuators and network property that modify to gather and exchange information. The IoT allows objects to be sensed and controlled remotely across existing network infrastructure, creating opportunities for direct integration.

This work had proposed that the user can get quick and immediate help in any emergency situation . It make use of GPS technology. The System refers the Global Positioning System to trace out the position of the person and uses the Messaging service to send the message to get the help. All the entire flow of operations are control and manage by the mail Glassfish server. The message is sent to the emergency contacts into the application. This work had proposed when the switch is pressed the device will get activated .The audio and video recorder can begin to capture the live incident. If the pressure sensing element sense the physical pressure the message are send to contacts with the live recording through GSM. Buzzer is provided within the device, when the device gets activated the buzzer produces high sound in the surrounding.

2.5 EXISTING SYSTEM

A few decades back, Woman safety refers to the measures and strategies put in place to protect women from harm and ensure their physical, emotional, and psychological well-being. Unfortunately, women are often subjected to various forms of violence, harassment, and discrimination in different settings, including at home, in public spaces, and in the workplace. These incidents can have long-lasting effects on women's lives, such as trauma, anxiety, and a sense of insecurity.

Present days The existing system describes an equipment which consists of a GPS module by which one can get the geographical location via SMS. In case of any emergency conditions, she can press a button once, and then the location will be tracked

and sent to police and relation so that they will know the exact location of the individual, so that the incident could be prevented and the culprit is apprehended. There are also several kinds of applications developed in the market for women's safety and security. These applications allow the users to register themselves on the app by creating their account. After making an account, users would be qualified to use all the services intended to protect and empower them. Services include an automated distress SOS to the nearest police station and her emergency contacts. These applications can share the location only to a maximum of a single contact. Also, one needs to constantly press the button to share the location at various intervals while saving herself from emergency situations. There are some applications through which one can send pictures. When activating the camera or video option automatically on button click, sometimes an offensive photograph can also be taken, which may rarely lead to suicidal issues.

2.6 PROPOSED SYSTEM

The proposed system describes a safety device that gets automatically triggered when a woman is in danger from anywhere at any time. This device has a transmitter and receiver in which the receiver is placed in a bag, and the transmitter is placed in the slipper. When the RF signal between the receiver and transmitter goes low, the device automatically sends SMS to the emergency contacts and provides alert to the nearby people. Here WiFi module and GPS are used. GPS is used to track the location of the women, and the WiFi module is used to send the tracked location as SMS to the emergency contacts. The microcontroller used here is nodemcu ESP8266 by which the parents receive the message when the button is pressed or when the sensor reads the input. GPS reads the data for every 20 seconds and sends it to the nodemcu. The WiFi module is used to send the GPS data to the cloud. Radio Frequency module is used here to measure the distance between the transmitter and receiver. If theRFsignal goes low, it sends SMS to the emergency contacts and provides an alarm. The software used here is the Arduino IDE. The coding is compiled in the software and uploaded in nodemcu. After uploading code in nodemcu, it will have the data of the GPS and radio frequency module.In case of an emergency, when one unable to press the button, this device will be very useful. Figure 3.1.1 describes the block diagram for a women safety device. The proposed system also describes an android application, which will be very helpful when one forgets to carry the device along with us. The application consists of various buttons like help, safe,

ambulance, fire service, sharing. When one is in danger, the victim can either trigger the button using a click or by shaking the mobile phone when the application is open. In this application, one can store up to 5 contacts to send the location via location sensor, and one can store a call contact to make a phone call to the close neighbor so that when attended they can easily hear what is happening around us which can be very helpful in tracking the victim and secure them. In times of accident and fire alerts, one can call ambulance number and fire service number by triggering the ambulance and fire service number. In case of security threats, one can send alerts to police via the help button. To alert the nearby people, a distress sound will also be produced. When one gets relief from the danger, they can send safe zone messages to the neighbors by clicking on the safe button. Represents the flow diagram for the android application that describes the workflow of the application. In this application, one can also share their location via social media using the sharing option. As the impact of social media is increasing among all ages of people, sharing the alert in any of the media such as Facebook, WhatsApp, Twitter, can rescue the victim in the most effective way. The modules in the safety device are Location Tracking and Alert Sound. The modules in the android application are Location tracking, Call a contact, Shaking Alert, Sharing via social media. The location tracking module is used to track the location of the women, and the location is sent to the emergency contacts via SMS. The alert sound module provides alert sound to the surrounding people in case of an emergency. Call a contact module is used to make a phone call to the emergency contacts in case of an emergency. The siren sound also beeps to alert the nearby people. Shaking alert is used to activate the alert by just shaking the phone. Sharing via social media module is used to share the location via social media platforms such as Whatsapp, Instagram, Twitter, etc.

CHAPTER-3

CHAPTER-3 : HARDWARE COMPONETS

3.1 BLOCK DIAGRAM

GPS Module: This module is responsible for determining the location of the woman using GPS technology. ESP32 Microcontroller: It is the main controller of the system, which receives the data from the GPS module, processes it, and sends it to the GSM module. GSM Module: This module sends the location data of the woman to the API server through SMS or call. API Server: It is responsible for receiving the location data from the GSM module and storing it in a database. Mobile Application: It is used by the user to access the location data of the woman. The application receives the data from the API server and displays it to the user./

Overall, this system works by continuously determining the location of the woman using the GPS module, and then sending that information to the API server through the GSM module. The mobile application then displays this information to the user, allowing them to keep track of the woman's location in real-time. This system can be used to provide an extra layer of security and peace of mind to women who are concerned about their safety.
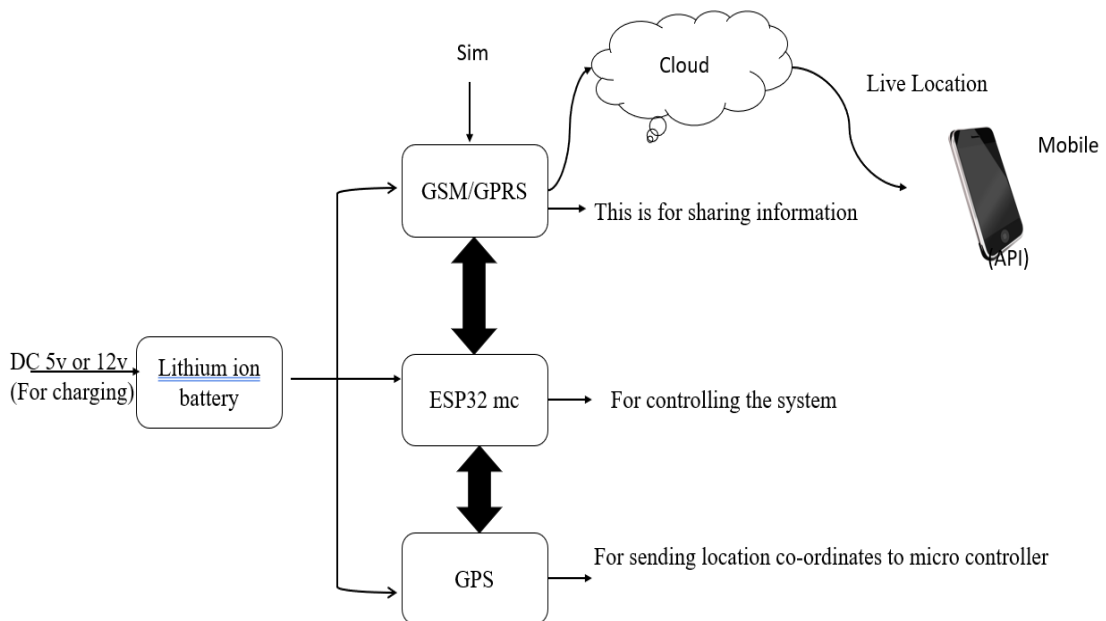

Fig3. 1 Block diagram of Woman Safety System

The woman security system circuit diagram is shown in below. First we will connect battery source to the DC- DC Buck Step Down converter and 3.3v Step down convertor. The Buck convertor is connect to supply the power to the GSM Module and GPS Module . The stepdown convertor is supply the OLED Display, ESP 32 Microcontroller. The GPS Module Tx, Rx is connect to the pin 4,2 in the ESP 32 Board. The GSM Module Tx, Rx is connect to the pin 16, 17. OLED displays SDA, SCL is connects to in pin SDA, SCL pin in the micro controller. In the circuit two LED one Push button is connect to the pins 25,32,35.
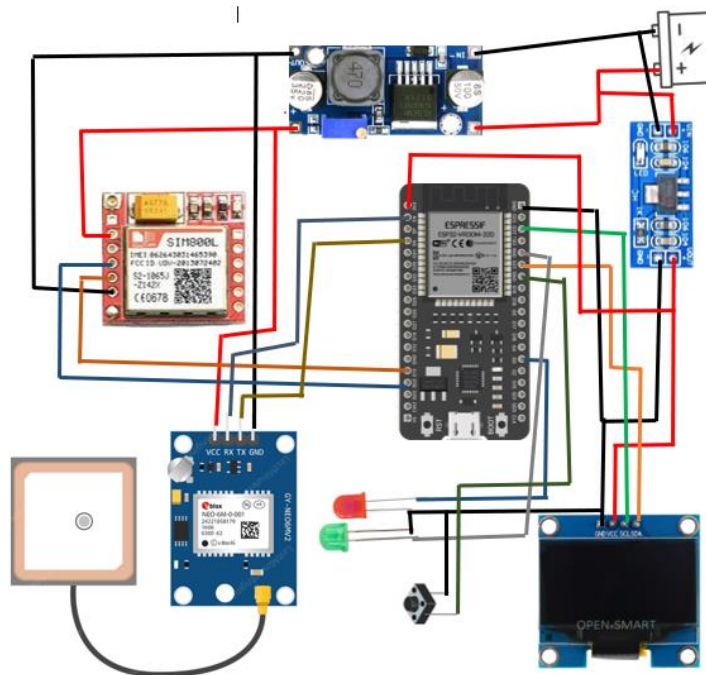

Fig 3. 1 Woman Safety system circuit diagram

HARDWARE REQUIREMENTS

- ESP32 Microcontroller.
- NEO 6M V2 GPS Module.
- SIM 800L GSM Module.
- Lithium ion Battery.
- OLED Display.
- DC-DC Buck Converter
- 5v Step Down Power Supply Module

3.2 ESP32 MICROCONTROLLER

Arduino is a great platform for beginners into the World of Microcontrollers and Embedded Systems. With a lot of cheap sensors and modules, you can make several projects either as a hobby or even commercial. As technology advanced, new project ideas and implementations came into play and one particular concept is the Internet of Things or IoT. It is a connected platform, where several "things" or devices are connected over internet for exchange of information. In DIY community, the IOT projects are mainly focused on Home Automation and Smart Home applications but commercial and industrial IoT projects have far complex implementations like Machine Learning, Artificial Intelligence, Wireless Sensor Networks etc. The important thing in this brief intro is whether it is a small DIY project by a hobbyist or a complex industrial project, any IoT project must have connectivity to Internet. This is where the likes of ESP8266 and ESP32 come into picture. If you want to add Wi-Fi connectivity to your projects, then ESP8266 is a great option. But if you want build a complete system with Wi-Fi connectivity, Bluetooth connectivity, high resolution ADCs, DAC, Serial Connectivity and many other features, then ESP32 is the ultimate choice.

Fig3. 2ESP32 Microcontroller

ESP32 is a low-cost System on Chip (SoC) Microcontroller from Espressif Systems, the developers of the famous ESP8266 SoC. It is a successor to ESP8266 SoC

and comes in both single-core and dual-core variations of the Tensilica's 32-bit Xtensa LX6 Microprocessor with integrated Wi-Fi and Bluetooth. The good thing about ESP32, like ESP8266 is its integrated RF components like Power Amplifier, Low-Noise Receive Amplifier, Antenna Switch, Filters and RF Balun. This makes designing hardware around ESP32 very easy as you require very few external components.
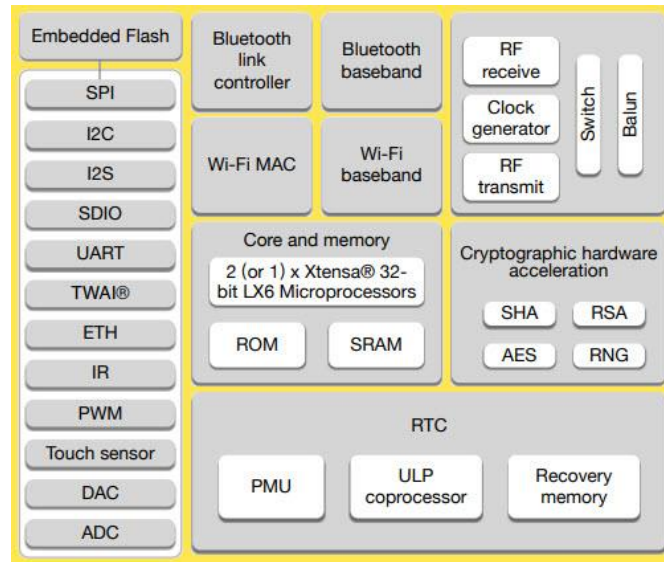

Fig3. 3 ESP 32 internal block diagram

Another important thing to know about ESP32 is that it is manufactured using TSMC's ultra-low-power 40 nm technology. So, designing battery operated applications like wearables, audio equipment, baby monitors, smart watches, etc., using ESP32 should be very easy.

3.1.1 ESP32 Specifications

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 240MHz.
- 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 I2C, 2 x I2S, 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.

3.1.2 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

- Platform IO IDE (VS Code)

- LUA

- Micro Python

- Espress if 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.

3.1.3 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.
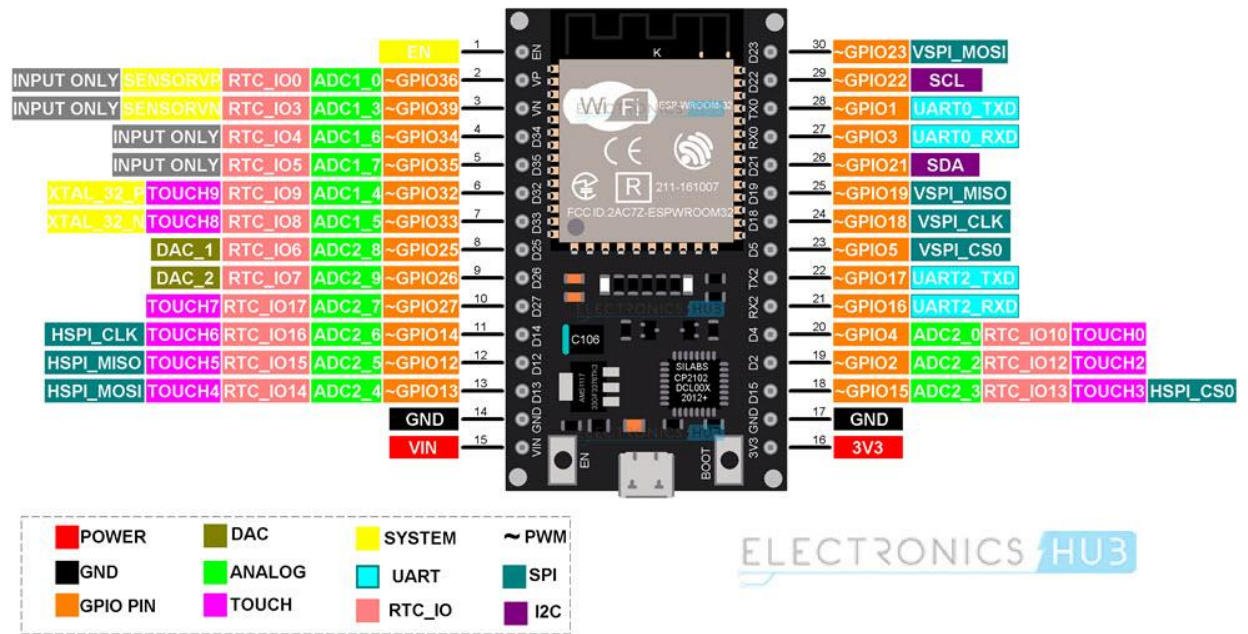
Fig3. 4 ESP32 Pin diagram

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.

3.2 NEO 6M V2 GPS MODULE

The NEO-6MV2 is a GPS (Global Positioning System) module and is used for navigation. The module simply checks its location on earth and provides output data which is longitude and latitude of its position.It is from a family of stand-alone GPS receivers featuring the high performance u-blox 6 positioning engine. These flexible and cost effective receivers offer numerous connectivity options in a miniature (16 x 12.2 x 2.4 mm) package. The compact architecture, power and memory options make NEO-6 modules ideal for battery operated mobile devices with very strict cost and space constraints. Its Innovative design gives NEO-6MV2 excellent navigation performance even in the most challenging environments.
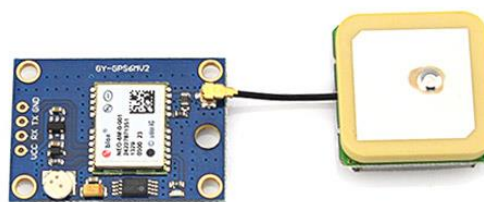

Fig3. 5 NEO 6M V2 GPS Module

3.2.1 NEO-6MV2 GPS Module Pin Configuration

The module has four output pins and we will describe the function each pin of them below. The powering of module and communication interface is done through these four pins.
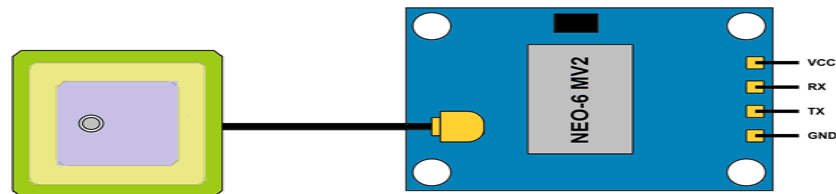

Fig3. 6 NEO 6M v2 GPS MODULE pin diagram

Pin Name	Description
VCC	Positive power pin
RX	UART receive pin
TX	UART transmit pin
GND	Ground

Table 3. 1 Gps module pin list

3.2.2 Features and Electrical Characteristics

- Standalone GPS receiver
- Anti-jamming technology
- UART Interface at the output pins (Can use SPI ,I2C and USB by soldering pins to the chip core)
- Under 1 second time-to-first-fix for hot and aided starts
- Receiver type: 50 Channels - GPS L1 frequency - SBAS (WAAS, EGNOS, MSAS, GAGAN)

- Time-To-First-fix: For Cold Start 32s, For Warm Start 23s, For Hot Start <1s

- Maximum navigation update rate: 5Hz

- Default baud rate: 9600bps

- EEPROM with battery backup

- Sensitivity: -160dBm

- Supply voltage: 3.6V

- Maximum DC current at any output: 10mA

- Operation limits: Gravity-4g, Altitude-50000m, Velocity-500m/s

- Operating temperature range: -40ºC TO 85°C

3.2.3 Applications

- GPS application

- Smart phone and tablets

- Navigation systems

- Drones

- Hobby projects

3.3 SIM 800L GSM MODULE

SIM800L GSM/GPRS module is a miniature cellular GSM modem from Simcom, which can easily interface with any microcontroller to give the microcontroller GSM functionality, and allows for GPRS transmission. This module connects the microcontroller to the mobile network to make or receive phone calls, send or receive SMS (text messages), and connect to the internet using GPRS, TCP, or IP. Another advantage is It supports quad-band GSM/GPRS network, which means it can work anywhere in the world. These important functionalities as well as the low cost and small footprint make this module more perfect for any project where long-range connectivity is required and also it can be integrated into a great number of IoT projects.

Fig3. 7 SIM 800L GSM Module

3.3.1 SIM800L Pinout Configuration

Pin Number	Pin Name	Description
1	NET	External antenna attachment pin
2	VCC	Power supply pin, 3.4V to 4.4V input
3	RST	Reset pin, pull low for 100ms to perform hard reset
4	RXD	Serial data input
5	TXD	Serial data output
6	GND	Module ground reference

7, 8	SPK	Speaker differential output
9, 10	MIC	Microphone differential input
11	DTR	Serial data terminal ready pin, pull high to enable sleep mode
12	RING	Interrupt output, active low

Table 3. 2 Sim 800l pin configration

Fig3. 8 SIM 800L Module Pin diagram

3.3.2 Features and Specifications

- Full modem serial port
- Two microphone inputs and speaker output
- SIM card interface
- Supports FM and PWM
- Sleep mode with 0.7mA current

3.3.3 Applications

- Home automation
- Emergency systems
- Remote sensing
- Communication

3.4 LITHIUM ION BATTERY.

A lithium-ion or Li-ion battery is a type of rechargeable battery which uses the reversible reduction of lithium ions to store energy. The anode (negative electrode) of a conventional lithium-ion cell is typically graphite made from carbon. The cathode (positive electrode) is typically a metal oxide. The electrolyte is typically a lithium salt in an organic solvent.[9][10]

It is the predominant battery type used in portable consumer electronics and electric vehicles. It also sees significant use for grid-scale energy storage and military and aerospace applications. Compared to other rechargeable battery technologies, Li-ion batteries have high energy densities, low self-discharge, and no memory effect (although a small memory effect reported in LFP cells has been traced to poorly made cells).

Chemistry, performance, cost and safety characteristics vary across types of lithium-ion batteries. Most commercial Li-ion cells use intercalation compounds as the active materials. The anode or negative electrode is usually graphite, although silicon-carbon is also being increasingly used. Cells can be manufactured to prioritize either energy or power density.[12] Handheld electronics mostly use lithium polymer batteries (with a polymer gel as electrolyte), a lithium cobalt oxide ($LiCoO_2$) cathode material, and a graphite anode, which together offer a high energy density.[13][14] Lithium iron phosphate ($LiFePO_4$), lithium manganese oxide ($LiMn_2O_4$ spinel, or Li_2MnO_3-based lithium rich layered materials, LMR-NMC), and lithium nickel manganese cobaltoxide ($LiNiMnCoO_2$ or NMC) may offer longer lives and may have better rate capability. NMC and its derivatives are widely used in the electrification of transport, one of the main technologies (combined with renewable energy) for reducing greenhouse gas emissions from vehicles.

M. Stanley Whittingham discovered the concept of intercalation electrodes in the 1970s and created the first rechargeable lithium-ion battery, which was based on a titanium disulfide cathode and a lithium-aluminum anode, although it suffered from safety issues and was never commercialized. John Goodenough expanded on this work in 1980 by using lithium cobalt oxide as a cathode. The first prototype of the modern Li-ion battery, which uses a carbonaceous anode rather than lithium metal, was developed

by Akira Yoshino in 1985, which was commercialized by a Sony and Asahi Kasei team led by Yoshio Nishi in 1991.

Fig3. 9 Lithium-ion Batteries

Lithium-ion batteries can be a safety hazard if not properly engineered and manufactured since cells have flammable electrolytes and if damaged or incorrectly charged, can lead to explosions and fires. Much development has made progress in manufacturing safe lithium-ion batteries.[20] Lithium ion all solid state batteries are being developed to eliminate the flammable electrolyte. Improperly recycled batteries can create toxic waste, especially from toxic metals and are at risk of fire. Moreover, both lithium and other key strategic minerals used in batteries have significant issues at extraction, with lithium being water intensive in often arid regions and other minerals often being conflict minerals such as cobalt. Both environmental issues have encouraged some researchers to improve mineral efficiency and alternatives such as iron-air batteries.

Research areas for lithium-ion batteries include extending lifetime, increasing energy density, improving safety, reducing cost, and increasing charging speed, among others. Research has been under way in the area of non-flammable electrolytes as a pathway to increased safety based on the flammability and volatility of the organic solvents used in the typical electrolyte. Strategies include aqueous lithium-ion batteries, ceramic solid electrolytes, polymer electrolytes, ionic liquids, and heavily fluorinated systems.

3.5 OLED DISPLAY

An organic light-emitting diode (OLED), also known as organic electroluminescent (organic EL) diode,[1][2] is a light-emitting diode (LED) in which the emissive electroluminescent layer is a film of organic compound that emits light in response to an electric current. This organic layer is situated between two electrodes; typically, at least one of these electrodes is transparent. OLEDs are used to create digital displays in devices such as television screens, computer monitors, and portable systems such as smartphones and handheld game consoles. A major area of research is the development of white OLED devices for use in solid-state lighting applications.

There are two main families of OLED: those based on small molecules and those employing polymers. Adding mobile ions to an OLED creates a light-emitting electrochemical cell (LEC) which has a slightly different mode of operation. An OLED display can be driven with a passive-matrix (PMOLED) or active-matrix (AMOLED) control scheme. In the PMOLED scheme, each row and line in the display is controlled sequentially, one by one,[6] whereas AMOLED control uses a thin-film transistor (TFT) backplane to directly access and switch each individual pixel on or off, allowing for higher resolution and larger display sizes.

OLED is fundamentally different from LED which is based on a p-n diode structure. In LEDs doping is used to create p- and n- regions by changing the conductivity of the host semiconductor. OLEDs do not employ a p-n structure. Doping of OLEDs is used to increase radiative efficiency by direct modification of the quantum-mechanical optical recombination rate. Doping is additionally used to determine the wavelength of photon emission.
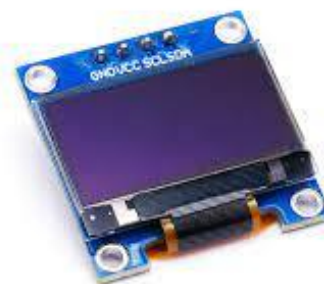

Fig3. 10 OLED Display

An OLED display works without a backlight because it emits its own visible light. Thus, it can display deep black levels and can be thinner and lighter than a liquid crystal display (LCD). In low ambient light conditions (such as a dark room), an OLED screen can achieve a higher contrast ratio than an LCD, regardless of whether the LCD uses cold cathode fluorescent lamps or an LED backlight. OLED displays are made in the same way as LCDs, but after TFT (for active matrix displays), addressable grid (for passive matrix displays) or indium-tin oxide (ITO) segment (for segment displays) formation, the display is coated with hole injection, transp

ort and blocking layers, as well with electroluminescent material after the first 2 layers, after which ITO or metal may be applied again as a cathode and later the entire stack of materials is encapsulated. The TFT layer, addressable grid or ITO segments serve as or are connected to the anode, which may be made of ITO or metal.[8][9] OLEDs can be made flexible and transparent, with transparent displays being used in smartphones with optical fingerprint scanners and flexible displays being used in foldable smartphones

3.6 DC-DC Buck Converter:-

A buck converter or step-down converter is a DC-to-DC converter which steps down voltage (while stepping up current) from its input (supply) to its output (load). It is a class of switched-mode power supply. Switching converters (such as buck converters) provide much greater power efficiency as DC-to-DC converters than linear regulators,
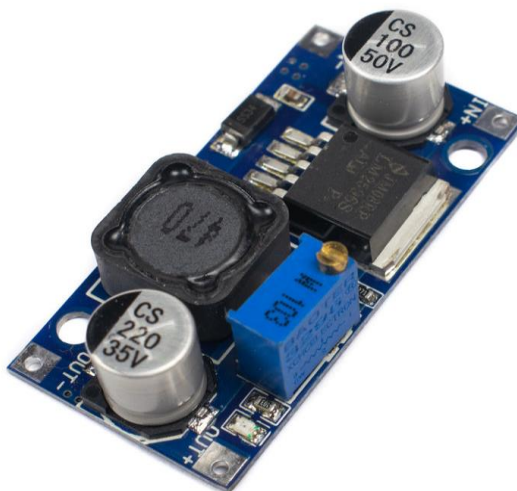

Fig3. 11 LM2596 DC-DC Buck Converter Step Down Module

which are simpler circuits that lower voltages by dissipating power as heat, but do not step up output current. The efficiency of buck converters can be very high, often over 90%, making them useful for tasks such as converting a computer's main supply voltage, which is usually 12 V, down to lower voltages needed by USB, DRAM and the CPU, which are usually 5, 3.3 or 1.8 V.

Buck converters typically contain at least two semiconductors (a diode and a transistor, although modern buck converters frequently replace the diode with a second transistor used for synchronous rectification) and at least one energy storage element (a capacitor, inductor, or the two in combination). To reduce voltage ripple, filters made of capacitors (sometimes in combination with inductors) are normally added to such a converter's output (load-side filter) and input (supply-side filter).Its name derives from the inductor that "bucks" or opposes the supply voltage.

3.7 5v Step Down Power Supply Module:-

A 5V step-down power supply module is an electronic component that is used to reduce or "step-down" a higher voltage to a stable 5V output voltage. This module is commonly used in electronic circuits where a stable 5V DC voltage is required to power microcontrollers, sensors, LEDs, and other electronic components.
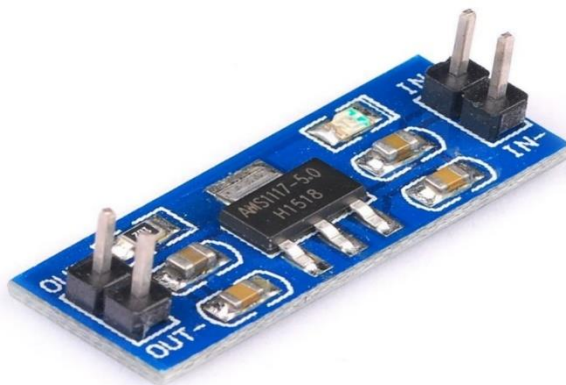

Fig3. 12 5v Step Down Power Supply Module

The module typically consists of an input voltage range of 6V to 24V, which is stepped down to a regulated 5V output voltage. The module includes a voltage regulator, which controls the output voltage to ensure that it remains stable even if the input voltage fluctuates. The module may also include protection features such as over-current protection, over-voltage protection, and over-temperature protection.

The 5V step-down power supply module can be found in various forms, including PCB-mounted modules, breadboard-friendly modules, and plug-in modules. They are widely used in hobby projects, robotics, and other DIY electronics projects, where a reliable and stable power supply is necessary to ensure the proper functioning of the circuit.

FEATURES

1. Onboard AMS1117 chip.
2. Onboard power indicator to indicate power is turned on: Red LED.
3. Output voltage interface, connection to facilitate the experimental.
4. Small Compact Size, 4Pin Type, Breadboard Friendly.
5. 2P single row pin input and output for easy connection
6. Dual-panel design, the layout is nice.

CHAPTER-4

CHAPTER-4 : SOFTWARE REQUIREMENTS

SOFTWARE REQUIREMENTS

- Application Programming Interface(API)
- Arduino IDE Software.
- Android Application

4.1 APPLICATION PROGRAMMING INTERFACE(API)

API stands for Application Programming Interface. In the context of APIs, the word Application refers to any software with a distinct function. Interface can be thought of as a contract of service between two applications. This contract defines how the two communicate with each other using requests and responses. Their API documentation contains information on how developers are to structure those requests and responses.
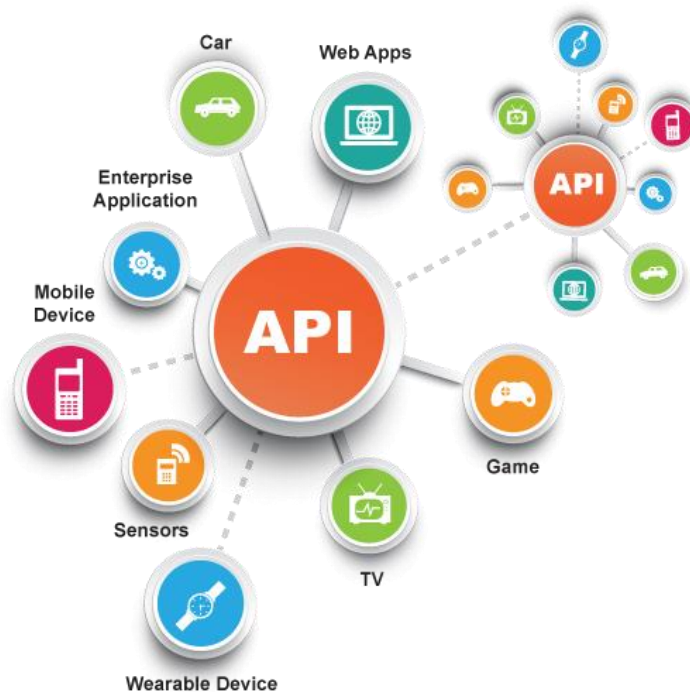
Fig4. 1API interface

In contrast to a user interface, which connects a computer to a person, an application programming interface connects computers or pieces of software to each other. It is not intended to be used directly by a person (the end user) other than a computer programmer who is incorporating it into the software. An API is often made up of different parts which act as tools or services that are available to the programmer. A

program or a programmer that uses one of these parts is said to call that portion of the API. The calls that make up the API are also known as subroutines, methods, requests, or endpoints. An API specification defines these calls, meaning that it explains how to use or implement them.

4.2 INTRODUCTION TO ARDUINO SOFTWARE (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. It connects to the Arduino and Genuino hardware to upload programs and communicate with them.

4.2.1 DEVELOPMENT TOOLS

- ⦾ Writing Sketches
- ⦾ File
- ⦾ Edit
- ⦾ Sketch
- ⦾ Tools
- ⦾ Help
- ⦾ Sketchbook
- ⦾ Tabs, Multiple Files and Compilation
- ⦾ Uploading
- ⦾ Libraries
- ⦾ Third-Party Hardware
- ⦾ Serial Monitor
- ⦾ Preferences
- ⦾ Language Support
- ⦾ Boards

4.2.2 WRITING SKETCHES

Programs written using Arduino Software (IDE) are called sketches. These sketches are written in the text editor and are saved with the file extension .ino. The editor

has features for cutting/pasting and for searching/replacing text. The message area gives feedback while saving and exporting and also displays errors. The console displays text output by the Arduino Software (IDE), including complete error messages and other information. The bottom righthand corner of the window displays the configured board and serial port. The toolbar buttons allow you to verify and upload programs, create, open, and save sketches, and open the serial monitor. NB: Versions of the Arduino Software (IDE) prior to 1.0 saved sketches with the extension .pde. It is possible to open these files with version 1.0, you will be prompted to save the sketch with the .ino extension on save.

Verify

Checks your code for errors compiling it.

Upload

Compiles your code and uploads it to the configured board. See uploading below for details.

Note: If you are using an external programmer with your board, you can hold down the "shift" key on your computer when using this icon. The text will change to "Upload using Programmer"
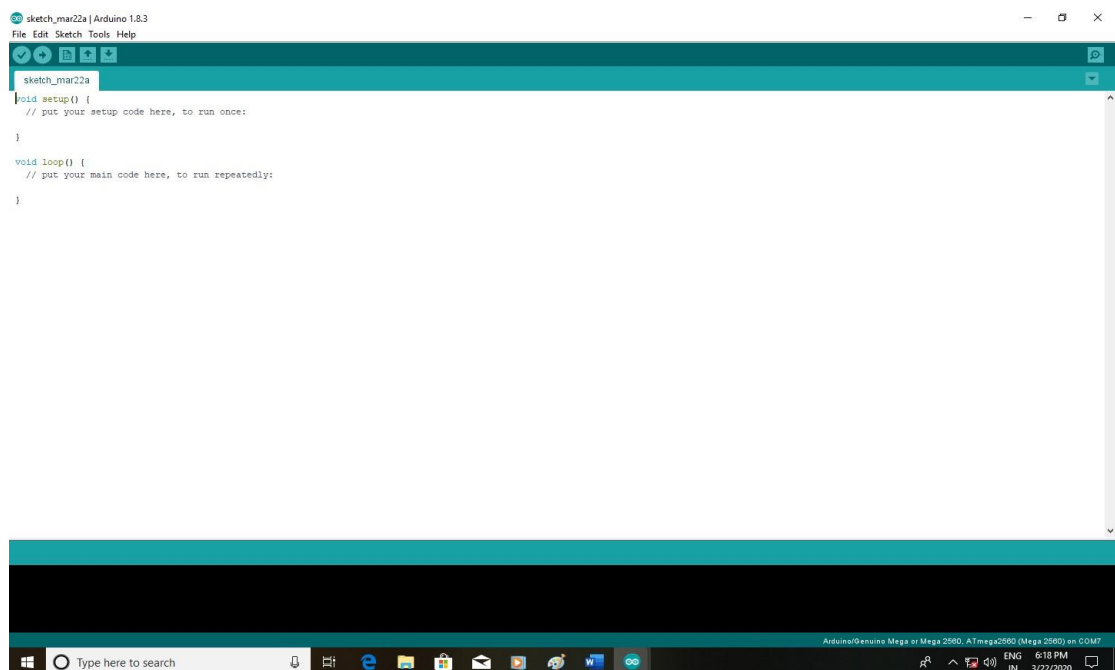
New

Creates a new sketch.

Fig4. 2 ARDUINO 1.6.11 WINDOW PAGE

Open

Presents a menu of all the sketches in your sketchbook. Clicking one will open it within the current window overwriting its content.

Note: due to a bug in Java, this menu doesn't scroll; if you need to open a sketch late in the list, use the File | Sketchbook menu instead.

Save

Saves your sketch.

Serial Monitor Opens the serial monitor. Additional commands are found within the five menus: File, Edit, Sketch, Tools, Help. The menus are context sensitive, which means only those items relevant to the work currently being carried out are available.

4.2.3 FILE

New

Creates a new instance of the editor, with the bare minimum structure of a sketch already in place.
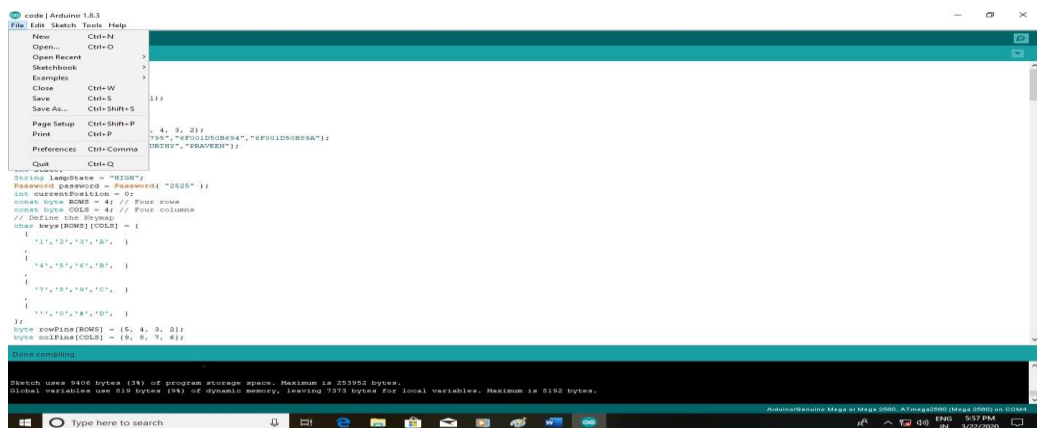
Fig4. 3 ARDUINO 1.6.11 WITH FILE MENU

Open

Allows to load a sketch file browsing through the computer drives and folders.

Open Recent

Provides a short list of the most recent sketches, ready to be opened.

Sketchbook

Shows the current sketches within the sketchbook folder structure; clicking on any name opens the corresponding sketch in a new editor instance.

Examples

Any example provided by the Arduino Software (IDE) or library shows up in this menu item. All the examples are structured in a tree that allows easy access by topic or library.

Close

Closes the instance of the Arduino Software from which it is clicked.

Save

Saves the sketch with the current name. If the file hasn't been named before, a name will be provided in a "Save as.." window.

Save as...

Allows to save the current sketch with a different name.

Page Setup

It shows the Page Setup window for printing.

Print

Sends the current sketch to the printer according to the settings defined in Page Setup.

Preferences

Opens the Preferences window where some settings of the IDE may be customized, as the language of the IDE interface.

Quit

Closes all IDE windows. The same sketches open when Quit was chosen will be automatically reopened the next time you start the IDE.

EDIT

Undo/Redo

Goes back of one or more steps you did while editing; when you go back, you may go forward with Redo.

Copy

Duplicates the selected text in the editor and places it into the clipboard. Copy for Forum Copies the code of your sketch to the clipboard in a form suitable for posting to the forum, complete with syntax coloring. Copy as HTML Copies the code of your sketch to the clipboard as HTML, suitable for embedding in web pages.
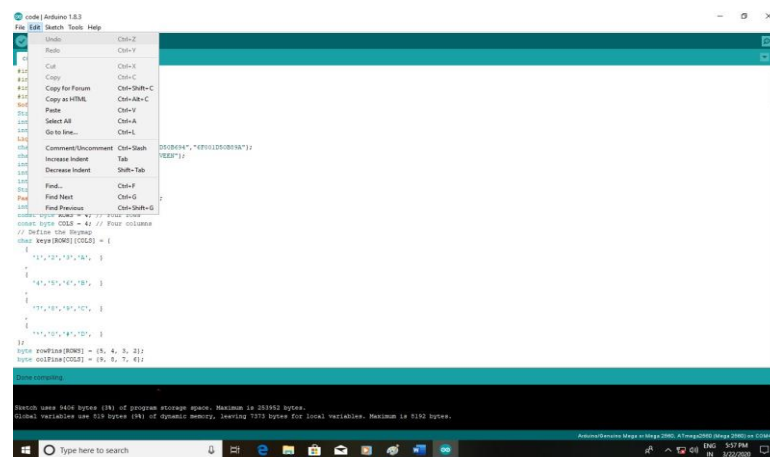

Fig4. 4 ARDUINO 1.6.11 WITH EDIT MENU

Paste

Puts the contents of the clipboard at the cursor position, in the editor.

Select All

Selects and highlights the whole content of the editor.

Comment/Uncomment

Puts or removes the // comment marker at the beginning of each selected line.

Increase/Decrease Indent

Adds or subtracts a space at the beginning of each selected line, moving the text

One space on the right or eliminating a space at the beginning.

Find

Opens the Find and Replace window where you can specify text to search inside the current sketch according to several options.

Find Next

Highlights the next occurrence - if any - of the string specified as the search item in the Find window, relative to the cursor position.

Find Previous

Highlights the previous occurrence - if any - of the string specified as the search item in the Find window relative to the cursor position.
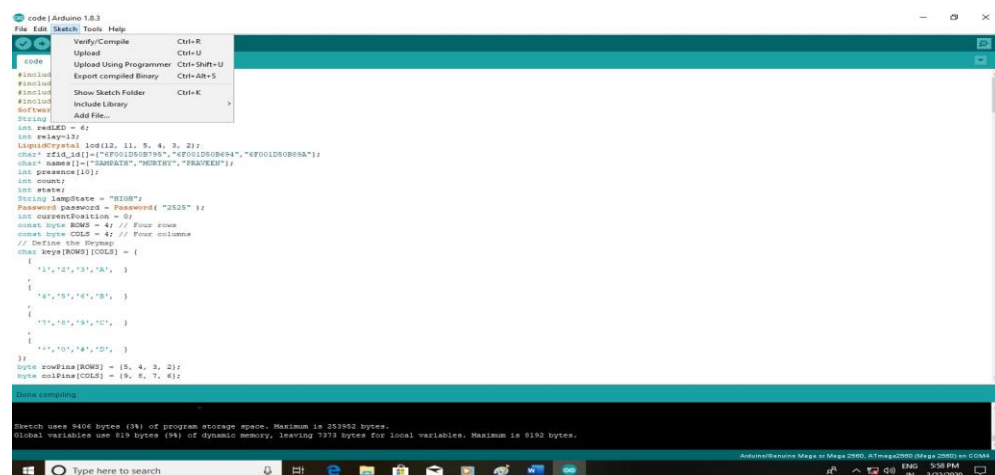
4.2.4 SKETCH

Fig4. 5 ARDUINO 1.6.11 WITH SKETCH MENU

Verify/Compile

Checks your sketch for errors compiling it; it will report memory usage for code and variables in the console area.

Upload

Compiles and loads the binary file onto the configured board through the Configured Port.

Upload Using Programmer

This will overwrite the boot loader on the board; you will need to use Tools > Burn Boot loader to restore it and be able to Upload to USB serial port again.

However, it allows you to use the full capacity of the Flash memory for your sketch. Please note that this command will NOT burn the fuses. To do so a Tools -> Burn Boot loader command must be executed.

Export Compiled Binary

Saves a .hex file that may be kept as archive or sent to the board using other tools. Show Sketch Folder Opens the current sketch folder.

Include Library

Adds a library to your sketch by inserting #include statements at the start of your code. For more details, see libraries below. Additionally, from this menu item you can access the Library Manager and import new libraries from .zip files.

UPLOADING

Before uploading your sketch, you need to select the correct items from the Tools > Board and Tools > Port menus. The boards are described below. On the Mac, the serial port is probably something like /dev/tty.usbmodem241 (for an Uno or Mega2560 or Leonardo) or /dev/tty.usbserial-1B1 (for a Duemilanove or earlier USB board), or /dev/tty.USA19QW1b1P1.1 (for a serial board connected with a Keyspan USB-to-Serial adapter). On Windows, it's probably COM1 or COM2 (for a serial board) or COM4, COM5, COM7, or higher (for a USB board) - to find out, you look for USB serial device in the ports section of the Windows Device Manager. On Linux, it should be /dev/ttyACMx , /dev/ttyUSBx or similar. Once you've selected the correct serial port and board, press the upload button in the toolbar or select the Upload item from the Sketch menu. Current Arduino boards will reset automatically and begin the upload. With older boards (pre-Diecimila) that lack auto-reset, you'll need to press the reset button on the board just before starting the upload. On most boards, you'll see the RX and TX LEDs blink as the sketch is uploaded.
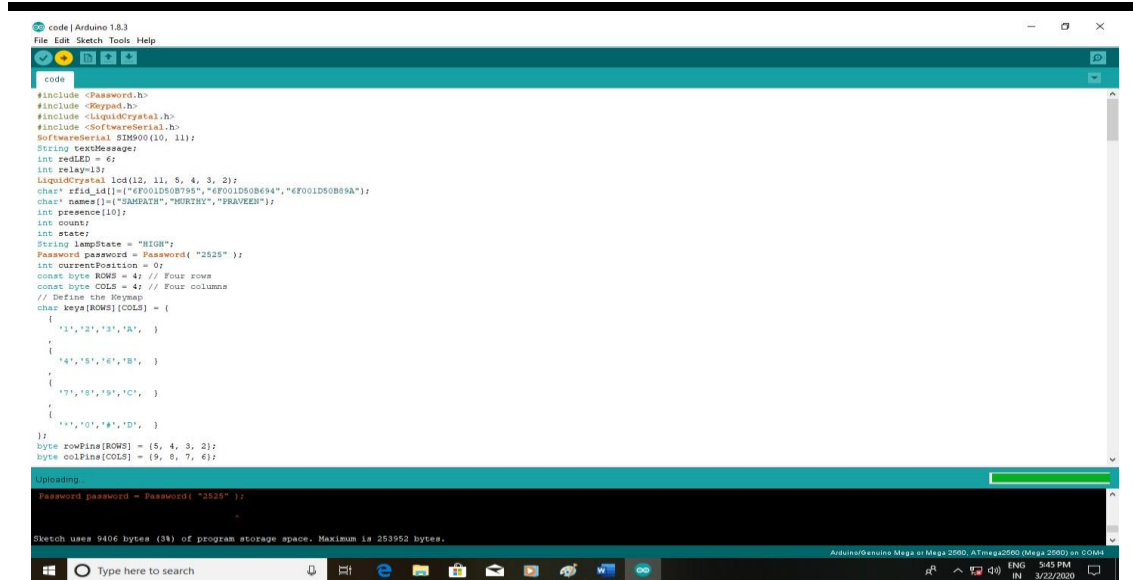
Fig4. 6 ARDUINO 1.6.11 UPLOAD WINDOW

The Arduino Software (IDE) will display a message when the upload is complete, or show an error. When you upload a sketch, you're using the Arduino bootloader, a small program that has been loaded on to the microcontroller on your board. It allows you to upload code without using any additional hardware. The bootloader is active for a few seconds when the board resets; then it starts whichever sketch was most recently uploaded to the microcontroller. The bootloader will blink the on-board (pin 13) LED when it starts (i.e. when the board resets).

4.2.5 LIBRARIES

Libraries provide extra functionality for use in sketches, e.g. working with hardware or manipulating data. To use a library in a sketch, select it from the Sketch > Import Library menu. This will insert one or more #include statements at the top of the sketch and compile the library with your sketch. Because libraries are uploaded to the board with your sketch, they increase the amount of space it takes up. If a sketch no longer needs a library, simply delete its #include statements from the top of your code. There is a list of libraries in the reference. Some libraries are included with the Arduino software. Others can be downloaded from a variety of sources or through the Library Manager. Starting with version 1.0.5 of the IDE, you do can import a library from a zip file and use it in an open sketch. See these instructions for installing a third-party library.

4.2.6 LANGUAGE SUPPORT

Since version 1.0.1, the Arduino Software (IDE) has been translated into 30+ different languages. By default, the IDE loads in the language selected by your operating system. (Note: on Windows and possibly Linux, this is determined by the locale setting which controls currency and date formats, not by the language the operating system is displayed in.) If you would like to change the language manually, start the Arduino Software (IDE) and open the Preferences window. Next to the Editor Language there is a dropdown menu of currently supported languages. Select your preferred language from the menu, and restart the software to use the selected language. If your operating system language is not supported, the Arduino Software (IDE) will default to English. You can return the software to its default setting of selecting its language based on your operating system by selecting System Default from the Editor Language dropdown. This setting will take effect when you restart the Arduino Software (IDE). Similarly, after changing your operating system's settings, you must restart the Arduino Software (IDE) to update it to the new default language.
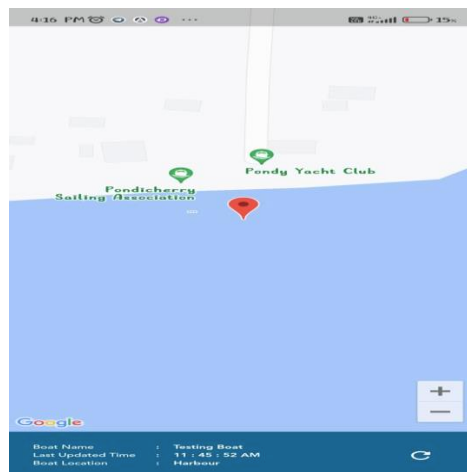
4.3 APP Interface

Fig4. 7 Application interface maps

Over app interface is shown in figure. When the device is on position if activate the emergency alert message is sent to the trust guardians open the message such as a file to click it then the app is open location is open the find the exact location shown in the application. This over app interface

4.4 SOURCE CODE

```
/*1.gps tracker by using NE0-6M-0-001 GPS MODULE,SIM800L and Esp32.

  2.HTTPS POST request by using SIM800L.

  3.Attached with 0.96 inch OLED dislay and it can supports I2C communication
protocol*/

#define TINY_GSM_MODEM_SIM800    // Modem is SIM800

#define TINY_GSM_RX_BUFFER 1024  //set bufeer

//gsm configuration

#define RXD2 16

#define TXD2 17

//gps configuration

#define RXD1 4

#define TXD1 2

//serial monitor

#define SerialMon Serial

#define SerialAT Serial2

#define TINY_GSM_DEBUG SerialMon

//indicatorse

#define redled 25

#define greenled 33

#define SMS_Button 32

//gprs credintials

const char apn[] = "**********";  // Your APN

const char gprs_user[] = "";        // User

const char gprs_pass[] = "";        // Password

const char simPIN[] = "";

//api credentials

const char server[] = "************";

const char resource[] = "*****************";
```

```
const int port = 443;

unsigned long timeout;

String imei;

String Latitude, Longitude;

String requestBody;

//library files

#include <Adafruit_GFX.h>

#include <Adafruit_SSD1306.h>

#include <TinyGsmClient.h>

#include <ArduinoHttpClient.h>

#include <ArduinoJson.h>

#include <TinyGPS++.h>

#include <TimeLib.h>

#include <AceButton.h>

#include "SSLClient.h"

#include "ca_cert.h"

#include <Wire.h>

using namespace ace_button;

//for emargency purpose

String message = "It's an Emergency. I'm at this location ";

String mobile_number = "+91***********";

String message_with_data;

//sms button configuration

ButtonConfig config1;

AceButton sms_button(&config1);

void handleEvent_sms(AceButton*, uint8_t, uint8_t);

TinyGPSPlus gps;

#ifdef DUMP_AT_COMMANDS
```

```
#include <StreamDebugger.h>

StreamDebugger debugger(SerialAT, SerialMon);

TinyGsm modem(debugger);

#else

TinyGsm modem(SerialAT);

#endif

//transport layer credentials

//Layers stack

TinyGsm sim_modem(SerialAT);

TinyGsmClient gsm_transpor_layer(modem, 0);

SSLClient secure_presentation_layer(&gsm_transpor_layer);

HttpClient client = HttpClient(secure_presentation_layer, server, port);

//for OLED screen

#define SCREEN_WIDTH 128  // OLED display width, in pixels

#define SCREEN_HEIGHT 64  // OLED display height, in pixels

#define OLED_RESET -1  // Reset pin

#define SCREEN_ADDRESS 0x3C

Adafruit_SSD1306    display(SCREEN_WIDTH,    SCREEN_HEIGHT,    &Wire,
OLED_RESET);

#define time_offset +0530

char    ISO8601[]    =    "2000-00-00T00:00:00.000Z";    //year-month-date    T
hour:min:sec:micsecZ.ISO1608byte last_second, Second, Minute, Hour, Day, Month;

int Year;

void setup() {

 pinMode(redled, OUTPUT);

 pinMode(greenled, OUTPUT);

 pinMode(SMS_Button, INPUT);

 SerialMon.begin(115200);

 delay(100);
```

```
 //for gsm module

 SerialAT.begin(115200, SERIAL_8N1, RXD2, TXD2);

 //for gps module

 Serial1.begin(9600, SERIAL_8N1, RXD1, TXD1);

 secure_presentation_layer.setCACert(root_ca);

display.begin(SSD1306_SWITCHCAPVCC, 0x3C);

 display.clearDisplay();

digitalWrite(redled, HIGH);

 digitalWrite(greenled, HIGH);

 delay(1000);

 digitalWrite(redled, LOW);

 digitalWrite(greenled, LOW);

 delay(1000);

 config1.setEventHandler(handleEvent_sms);

 sms_button.init(SMS_Button);

}

 void loop() {

//for setup the modem

 SerialMon.print("Initializing modem...");

 if (!sim_modem.init()) {

  SerialMon.print(" fail... restarting modem...");

  digitalWrite(redled, HIGH);

  //setupModem();

  // Restart takes quite some time

  // Use modem.init() if you don't need the complete restart

  if (!sim_modem.restart()) {

   digitalWrite(redled, HIGH);

   SerialMon.println(" fail... even after restart");
```

```
   return;

  }

}

 SerialMon.println(" OK");

// General information

digitalWrite(redled, LOW);

digitalWrite(greenled, HIGH);

String name = sim_modem.getModemName();

Serial.println("Modem Name: " + name);

String modem_info = sim_modem.getModemInfo();

Serial.println("Modem Info: " + modem_info);

// Unlock your SIM card with a PIN if needed

if (strlen(simPIN) && sim_modem.getSimStatus() != 3) {

  sim_modem.simUnlock(simPIN);

}

// Wait for network availability

SerialMon.print("Waiting for network...");

if (!sim_modem.waitForNetwork(240000L)) {

  SerialMon.println(" fail");

  digitalWrite(greenled, LOW);

  digitalWrite(redled, HIGH);

  delay(10000);

  return;

}

SerialMon.println(" OK");

digitalWrite(redled, LOW);

digitalWrite(greenled, HIGH);

// Connect to the GPRS network
```

```
SerialMon.print("Connecting to network...");

if (!sim_modem.isNetworkConnected()) {

  SerialMon.println(" fail");

  digitalWrite(greenled, LOW);

  digitalWrite(redled, HIGH);

  delay(10000);

  return;

}

SerialMon.println(" OK");

digitalWrite(redled, LOW);

digitalWrite(greenled, HIGH);

// Connect to APN

SerialMon.print(F("Connecting to APN: "));

SerialMon.print(apn);

if (!sim_modem.gprsConnect(apn, gprs_user, gprs_pass)) {

  SerialMon.println(" fail");

  digitalWrite(greenled, LOW);

  digitalWrite(redled, HIGH);

  delay(10000);

  return;

}

SerialMon.println(" OK");

digitalWrite(redled, LOW);

digitalWrite(greenled, HIGH);

 // More info..

Serial.println("");

String ccid = sim_modem.getSimCCID();

Serial.println("CCID: " + ccid);
```

```
imei = sim_modem.getIMEI();

Serial.println("IMEI: " + imei);

String cop = sim_modem.getOperator();

Serial.println("Operator: " + cop);

IPAddress local = sim_modem.localIP();

Serial.println("Local IP: " + String(local));

int csq = sim_modem.getSignalQuality();

Serial.println("Signal quality: " + String(csq));

gpsdata();

  sms_button.check();

}

void httpspostreq() {

 if (!modem.isGprsConnected()) {

  DBG("... not connected");

  digitalWrite(greenled, LOW);

  digitalWrite(redled, HIGH);

 }

 else {

  DBG("Connecting to ", server);

  // Make a HTTPS POST request:

  digitalWrite(greenled, LOW);

  digitalWrite(redled, LOW);

  Serial.println("Making POST request securely");

  String contentType = "Content-Type: application/json";

  String postData = requestBody;

  client.post(resource, contentType, postData);

  int status_code = client.responseStatusCode();

  String response = client.responseBody();
```

```
Serial.print("Status code: ");

Serial.println(status_code);

Serial.print("Response: ");

Serial.println(response);

if (status_code == 200) {

  digitalWrite(redled, LOW);

  digitalWrite(greenled, HIGH);

} else {

  digitalWrite(greenled, LOW);

  digitalWrite(redled, HIGH);

}

display.clearDisplay();

display.setTextSize(1.5);

display.setTextColor(WHITE);

display.setCursor(0, 5);

display.println("Status code: ");

display.setTextSize(1);

display.setCursor(70, 5);

display.println(status_code);


display.setTextSize(1.5);

display.setTextColor(WHITE);

display.setCursor(0, 25);

display.println("Responce: ");

display.setTextSize(1);

display.setCursor(60, 25);

display.println(response);

display.display();
```

```
   delay(300);


   client.stop();

  }

  SerialMon.println();

  client.stop();

  SerialMon.println(F("Server disconnected"));

  modem.gprsDisconnect();

  SerialMon.println(F("GPRS disconnected"));

}

void gpsdata() {

  boolean newData = false;

  for (unsigned long start = millis(); millis() - start < 2000;) {

    while (Serial1.available()) {

      if (gps.encode(Serial1.read())) {

        newData = true;

        break;

      }


    }


  }

  if (true) {

    newData = false;

     Latitude = String(gps.location.lat(), 6);  // Latitude in degrees (double)

    SerialMon.print("latitude: ");

    SerialMon.println(Latitude);

    Longitude = String(gps.location.lng(), 6);
```

```
SerialMon.print("longitude: ");

SerialMon.println(Longitude);


if (gps.time.isValid()) {

  Minute = gps.time.minute();

  Second = gps.time.second();

  Hour = gps.time.hour();



 }


 // get date drom GPS module

 if (gps.date.isValid()) {

  Day = gps.date.day();

  Month = gps.date.month();

  Year = gps.date.year();

 }


 if (last_second != gps.time.second())  // if time has changed

 {


  last_second = gps.time.second();

   // set current UTC time

  setTime(Hour, Minute, Second, Day, Month, Year);

  // add the offset to get local time

  adjustTime(time_offset);

  ISO8601[2] = (year() / 10) % 10 + '0';

  ISO8601[3] = year() % 10 + '0';

  ISO8601[5] = month() / 10 + '0';
```

```
ISO8601[6] = month() % 10 + '0';

ISO8601[8] = day() / 10 + '0';

ISO8601[9] = day() % 10 + '0';

ISO8601[11] = hour() / 10 + '0';

ISO8601[12] = hour() % 10 + '0';

ISO8601[14] = minute() / 10 + '0';

ISO8601[15] = minute() % 10 + '0';

ISO8601[17] = second() / 10 + '0';

ISO8601[18] = second() % 10 + '0';

Serial.println(ISO8601);  // print ISO STANDARD TIME STAMP


  }


}


display.clearDisplay();
display.setTextSize(1.5);
display.setTextColor(WHITE);
display.setCursor(0, 5);
display.println("LATITUDE: ");
display.setTextSize(1);
display.setCursor(60, 5);
display.println(Latitude);
display.setTextSize(1.5);
display.setTextColor(WHITE);
display.setCursor(0, 25);
display.println("LONGITUDE: ");
display.setTextSize(1);
```

```
display.setCursor(65, 25);

display.println(Longitude);

display.display();

delay(300);

display.setTextSize(1.5);

display.setTextColor(WHITE);

display.setCursor(0, 45);

display.println("TIMESTAMP: ");

display.setTextSize(1);

display.setCursor(65, 45);

display.println(ISO8601);

display.display();

delay(300);

//json formate

StaticJsonDocument<200> doc;

doc["lat"] = Latitude;

doc["long"] = Longitude;

doc["device_id"] = imei;

doc["time_stamp"] = ISO8601;

serializeJson(doc, requestBody);

SerialMon.println(requestBody);

httpspostreq();

requestBody = "";


}


void handleEvent_sms(AceButton* /* button */, uint8_t eventType,

        uint8_t /* buttonState */) {
```

```
switch (eventType) {

  case AceButton::kEventPressed:

    // Serial.println("kEventPressed");

    message_with_data = message + "Latitude = " + (String)Latitude + "Longitude = " + (String)Longitude;

    modem.sendSMS(mobile_number, message_with_data);

    message_with_data = "";

    break;

  case AceButton::kEventReleased

 //Serial.println("kEventReleased");

    break;

}
```

CHAPTER-5

CHAPTER-5 : ADVANTAGES & APPLICATION

5.1 ADVANTAGES

- Improved safety: The primary benefit of a woman safety system is that it can help to improve the safety of women. By providing a way to quickly and easily call for help in an emergency, such systems can help to prevent or minimize harm in dangerous situations.

- Peace of mind: Knowing that a safety system is in place can provide women with greater peace of mind. This can be particularly important for women who have experienced harassment or violence in the past and may be more vulnerable to future incidents.

- Increased confidence: Having a safety system can also help to increase women's confidence and sense of empowerment. This can be especially important in situations where women may feel intimidated or threatened, such as when walking alone at night.

- Deterrent effect: The mere presence of a safety system can also have a deterrent effect on potential perpetrators. Knowing that women have a way to call for help and that their actions may be recorded can discourage would-be attackers from acting on their impulses.

- Rapid response: If an emergency does occur, a woman safety system can help to ensure that emergency responders are alerted quickly and can respond as soon as possible. This can help to minimize the harm caused by the incident and improve the chances of a positive outcome.

- Increased accountability: If a perpetrator is caught, a woman safety system can provide important evidence that can be used to hold them accountable for their actions. This can help to prevent future incidents and ensure that justice is served.

5.2 APPLICATION

- Personal safety: Women can carry a device equipped with a GPS and GSM module that can send an emergency alert to a designated contact or to the police

in case of an emergency. The device can also provide the location of the user in real-time, enabling responders to provide assistance quickly.

- Public transportation safety: Women who use public transportation can use a GPS and GSM-based safety system to alert authorities if they feel unsafe or if they are being harassed. The system can also help track the location of the vehicle in case of an emergency.

- Workplace safety: Employers can provide their female employees with GPS and GSM-enabled devices that can be used to alert security personnel or the police in case of a security breach or harassment in the workplace.

- Campus safety: Educational institutions can use GPS and GSM-based safety systems to provide an extra layer of protection for female students on campus. The system can help track their location and alert authorities if they feel unsafe or if they are in danger.

- Elderly safety: GPS and GSM-based safety systems can also be used to provide safety to elderly women. They can carry a device that can be used to alert their caregiver, family member or the emergency services in case of an emergency.

CHAPTER-6

CHAPTER-6 : RESULT

- The result is shown in figures. The above pic is is assemble of the woman security system of this device. So the ESP 32 Microcontroller , GSM Module , GPS Module, in PCB Board.

Fig5. 1 Woman Safety System device

- When device is ON or Activate. But it takes 5min of time to display longitude and latitude on OLED display.

- When SIM 800 L module send the emergency alert desired gradience .

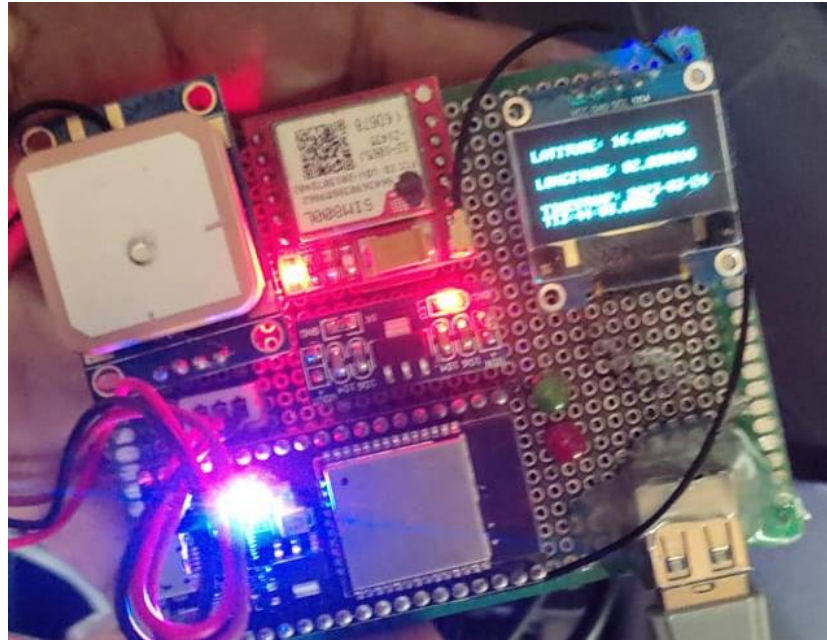- Its will display live location in the application.

Fig5. 2 The Device is ON position

- So the app interface is shown in figure below.

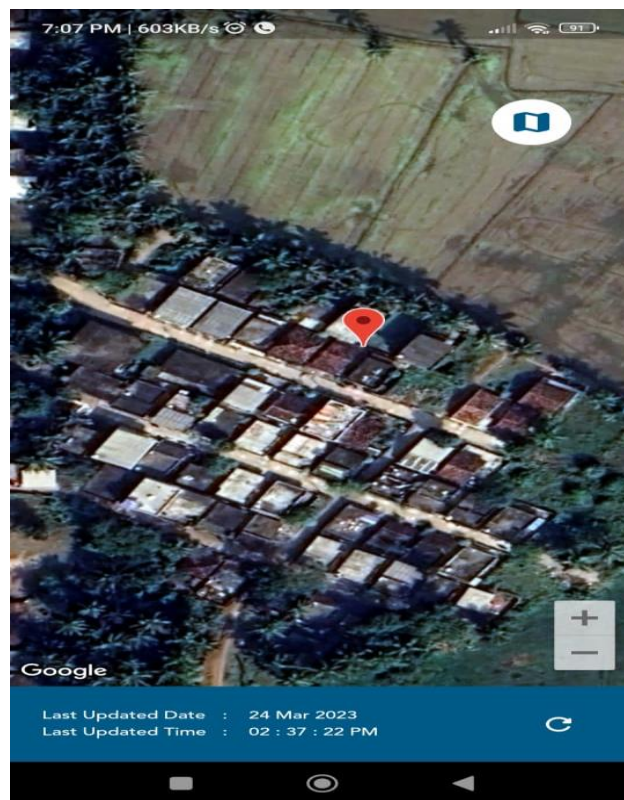- Then the emergency alert send to the api the it connects to the mobile application

Fig5. 3 Output of Woman Safety System

CHAPTER-7

CHAPTER-7 : CONCLUSION AND FUTURESCOPE

6.1 FUTURE SCOPE

In terms of the future scope, there are several possibilities. Firstly, the technology can be further improved by incorporating more advanced sensors, such as accelerometers or heart rate monitors, to detect and report distress signals automatically. This would eliminate the need for manual intervention and improve the speed and accuracy of the system.

Secondly, the system can be integrated with smart home automation systems, such as Alexa or Google Home, to provide voice-activated emergency alerts and responses. This would make it even easier and more convenient for women to use the system, particularly in situations where they may not have access to a phone or other device.

Thirdly, the system can be integrated with social media platforms and other online services to provide a more comprehensive safety network for women. For example, it could be linked to Facebook or Twitter to allow users to quickly and easily share their location and status with their friends and family in real-time.

6.2 CONCLUSION

Being safe and secure is the demand of the day. Our effort behind this project is to design and fabricate a gadget which is so compact in itself that provide advantage of personal security system. This design will deal with most of the critical issues faced by women and will help them to be secure. Existing systems provide the mechanism to track the vehicle but no other emergency mechanism is proposed. The proposed mechanism provides viewing the location of the victim in terms of latitude and longitude which can further be tracked using Google maps. This system helps to decrease the crime rate against women. Women's security is a critical issue in current situation. These crimes can be brought to end with the help of real time implementation of our proposed system

REFERENCES

REFERENCES

1)   Prof. Basavaraj Chougula , Archana Naik , Monika Monu , Priya Patil and Priyanka Das SMART GIRLS SECURITY SYSTEM Web Site: www.ijaiem.org Email: editor@ijaiem.org Volume 3, Issue 4, April 2019

2)   Poonam Bhilare1 ,Akshay Mohite 2 , Dhanashri Kamble3 , Swapnil Makode4 and Rasika Kahane5 Women Employee Security System using GPS And GSM Based Vehicle Tracking INTERNATIONAL JOURNAL FOR RESEARCH IN EMERGING SCIENCE AND TECHNOLOGY, VOLUME-2, ISSUE-1, JANUARY-2019

3)   Prof. Rupali Mahajan, SAYALI A. LAVHATE, SAYALEE P. WAGHMARE, PRERANA K. PINGALE A Survey on Women's Security System Using GPS and GSM NTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH IN COMPUTER AND COMMUNICATION ENGINEERING volume 5 issue 2 feb-2020

4)   Ms.Sonali S. Kumbhar1, Ms.Sonal K.Jadhav2, Ms. Prajakta A.Nalawade3 ,Ms. Tamanna Y.Mutawalli4 WOMEN SECURITY SYSTEM USING GSM AND GPS International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 Volume: 05 Issue: 03 | Mar-2020 www.irjet.net p-ISSN: 2395-0072

5)   Mohamad Zi kriya, Parmeshwar M G , Shanmukayya R Math, Shraddha Tankasali , Dr.Jayashree D Mal lapur " Smart Gadget for Women Safety using IoT", International Journal o f Engineering Research & Technology, ISSN: 2278-0181, 2022