

Project Stage-II Report
on

**A ESP BASED SMART DEVICE FOR WOMEN
SAFETY USING IOT**

SUBMITTED TO THE SAVITRIBAI PHULE PUNE UNIVERSITY



IN THE FULFILLMENT OF PROJECT PART-II OF THE REQUIREMENTS
FOR THE AWARD OF THE DEGREE OF BACHELOR OF
ENGINEERING

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CERTIFICATE

This is to certify that *Shivani R. Jadhav, Pushpa S.Patil, Vaibhav H. Thigale* , has successfully completed the Project Stage II entitled "A ESP BASED SMART DEVICE FOR WOMEN SAFETY USING IOT" under my supervision, in the partial fulfillment of Bachelor of Engineering - Electronics & Telecommunication of Savitribai Phule Pune University.

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ABSTRACT

In today's world the safety of women, girls have become a major issue. They are struggling to be protected and feel safe in the outside world. Also in urban areas the women experience harassment. The horribly insensitive men who threatened the women, who molest them, harass them on a daily basis. Due to this scenario a smart security device developed for the security of the women using internet of things. It is implemented in the form of a smart gadget which consists of esp32, buzzer, camera module, push button to trigger the services for security of the women. This device has been made more compact so that it can be used by a victim in any situation by just clicking a press button. On pressing this button the device will get triggered which will turn on the camera, give the location of the victim. Location of the victim along with the image link will be sent on the emergency contact numbers or police through the smart phone of the victim and not also making the use of any extra hardware thus making the device compact.

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Chapter 1

Introduction

1.1 Introduction

In the present scenario, women are keeping pace with men in every walk of life but unfortunately at cost of being subjected to abuse, harassment, violence in public and even at their own houses. They cannot step out of their houses at any time of the day, cannot wear clothes as per their will, nor can they even go for work in peace. There is some kind of inhibition that women are subjected to which not only takes away their sense of freedom but also shatters their confidence and dreams. Due to the above said reasons, it is quite apparent that there is a striving need for women security in the country. However, it is a point worth to note that advancement in technology has paved its path in almost all walks of life. As such, it is now possible to intelligently apply the benefits of current technology to resolve societal issues. This project, therefore, aims to apply the current trend in technology, i.e., Internet of Things (IoT) to eliminate fear filled lifestyle of female folks.

The Internet of Things (IoT) is an ecosystem of connected physical objects that are accessible through the internet. It refers to the ever-growing network of physical objects that feature an IP address for internet connectivity, and the communication that occurs between these objects and other Internet-enabled devices and systems. Typically, IoT is expected to offer advanced connectivity of devices, systems, and services that goes beyond machine-to-machine (M_2M) communications and covers a variety of protocols, domains, and applications. The interconnection of these embedded devices (including smart objects), is expected to usher in automation in nearly all fields, while also enabling advanced applications like a smart grid, and expanding to areas such as smart cities.

In the recent past, issues on women harassment are accentuating at great heights, creating anguish and distress among the women of today. As a matter of grave concern, this project introduces a ESP based wearable Smart device that proves constructive to the women in danger and helps them to fight such odds.

1.2 Objective

The main objective of the system is to intimate an instant location and a help message through an Android app to a registered number of contacts and the police, so that untoward incidents could be prevented and to provide real time evidence for swift action against the perpetrators of the crime.

Chapter 2

Literature Review

2.1 Literature Review

Authors have worked on the use of Internet of Things (IoT) that leads to the Smart Security technology. They have highlighted the development of a safety device called the Smart Band that communicates with a Smart Phone that has access to the Internet, thereby, alerting the victims family, friends and police about the incident, aided by GPS tracking and message services. Also, authors have proposed a smart intelligent security system for women and have shown their concern regarding various issues faced by women. Their proposed system uses two objects, a wrist band and spectacles, where the band incorporates a switch to activate a screaming alarm and tear gas mechanism for self-defending purpose and also sends alert messages and location to emergency contacts. The system also incorporates a mechanism to figure out the attacker using a live streaming video. Authors of have developed a smart security device based on IoT concept. Throwing light on societal challenges faced by women, a device called watch me has been proposed that includes a sensor to detect the heart beat rate of a person that will become high when the woman is in danger, generating an alarm sound to grab the attention of nearby people. The device also automatically makes a call to registered contacts and supports GPS tracking to track the victims location.

Authors have described the deployment of Internet of Things in the physical world across many sectors. The project presents a novel approach to collect data from the devices using sensors and many case studies in which it can be applied, through a sample demonstration of smart home based on this principle. Suraksha: The device is based on Blood pressure sensors and sends a help message to registered numbers and location tracking Child Safety wearable device:0

This device enables to track the daily activity of children and also locate the child using Wi-Fi and Bluetooth services present on the device. HearMe: An application that includes lock screen access and instant siren on the receiver device and can be accessed through hardware buttons to facilitate quick access to the woman . Femme: It consists of a device and a smart phone that are synchronized using Bluetooth, which triggers the instant location to the registered contacts and includes audio recordings . Abhaya app: It is an android app which was mainly developed for women safety that provides instant location to the registered contacts by pressing a single power button in the phone.

2.2 Internet of Things

The Internet of Things is a novel paradigm shift in IT arena. The phrase Internet of Things which is also shortly well-known as IoT is coined from the two words i.e. the first word is Internet and the second word is Things. The Internet is a global system of interconnected computer networks that use the standard Internet protocol suite (TCP/IP) to serve billions of users worldwide. It is a network of networks that consists of millions of private, public, academic, business, and government networks, of local to global scope, that are linked by a broad array of electronic, wireless and optical networking technologies . Today more than 100 countries are linked into exchanges of data, news and opinions through Internet. According to Internet World Statistics, as from the Universal. This signifies 32.7% of the worlds total population is using Internet. Even Internet is going into space through Ciscos Internet Routing in Space (IRIS) program in the coming yearsIRIS . While coming to the Things that can be any object or person which can be distinguishable by the real world. Everyday objects include not only electronic devices we encounter and use daily and technologically advanced products such as equipment and gadgets, but things that we do not do normally think of as electronic at all such as food, clothing; and furniture; materials, parts and equipment, merchandise and specialized items; landmarks, monuments and works of art and all the miscellany of commerce, culture and sophistication.

That means here things can be both living things like person, animals: cow, calf, dog, pigeons, rabbit etc., plant: mango tree, jasmine, banyan and so on and nonliving things like chair, fridge, tube light, curtain, plate etc. any home appliances or industry apparatus. So at this point, things are real objects in this physical or material world.

Womens security is a critical issue in todays world and its very much needed for every individual to be acting over such an issue. This project describes a GPS and GSM based vehicle tracking and women employee security system that provides the combination of GPS device and specialized software to track the vehicles location as well as provide alerts and messages with an emergency button trigger. The information of vehicle position provided by the device can be viewed on Google maps. The IT companies are looking forward to the security problem and require a system that will efficiently evaluate the problem of women employees security working in night shifts. This project focuses on the proposed model that can be used to deal with the problem of security issues of women employees using GPS and GSM based vehicle tracking.

Advanced women security system based on IoT. The idea behind this system is a hardware that has a switching alarm in case of emergency. An application tracks the location of the victim during emergency and lists the nearest police station around, sends alert message and a voice recording of the situation to the guardians. Data analysis is done using K- nearest neighbouring (KNN) algorithm to find the nearest person who is the subscriber of the application. KNN works in a manner such that the location of all the subscriber in the database. Whenever a person is in trouble, her current position will be compared to other location and the nearest neighbour will be informed. Data analysis is done using Glassfish server. Thus immediate help is provided. Mobile Application for Womens Safety. This project focuses on creating a mobile application for women safety where the user has to first register herself by filling a simple form which contains her name, number and the names and numbers of her emergency contacts. In a critical situation she could either shake her phone 40 times or simply click a panic button in the user interface by doing so a message will be sent to the nearest police station which will contain the location coordinates of the user in the form of a URL and all her emergency contacts.

The police station has a Google Maps interface which pinpoints each location where an emergency is taking place at that point of time. This allows the authorities to take swift action and dispatch policemen from the police station nearest to the location of the user.

Immediately after the message is sent a call is placed to the provided helpline number and the necessary action is taken. The Phone Gap API from Cordova was used for plug-ins to implement the existence of the application as a background service Red-Folder, to enable shake detection Gibson, to send the emergency message to the police Apache Cordova, and to place the emergency call. The system is low cost not

noticeable easily. The system is accurate, specific, sensitive and effortless. This project focuses on developing an application on which a single click is required as an initial action. As soon as you click the start button an emergency call is placed to one of the contacts and location is sent in the form of SMS. A unique feature of this application is that location is sent every five minutes because there is a possibility that the victim might try to escape and for that she is moving from one location to another. The application is physically dependent and speed is slow. But it provides continuity.

The term Internet of Things (IoT) was first used in 1999 by British technology pioneer Kevin Ashton to describe a system in which objects in the physical world could be connected to the Internet by sensors. Today, the Internet of Things has become a popular term for describing scenarios in which Internet connectivity and computing capability extend to a variety of objects, devices, sensors, and everyday items. While the term Internet of Things is relatively new, the concept of combining computers and networks to monitor and control devices has been around for decades. By the late 1970s, for example, systems for remotely monitoring meters on the electrical grid via telephone lines were already in commercial use. In the 1990s, advances in wireless technology allowed machine-to-machine enterprise and industrial solutions for equipment monitoring and operation to become widespread. Many of these early solutions, however, were based on closed purpose-built networks and proprietary or industry-specific standards, rather than on Internet Protocol (IP)-based networks and Internet standards. Using IP to connect devices other than computers to the Internet is not a new idea. The first Internet device an IP-enabled toaster that could be turned on and off over the Internet was featured at an Internet conference in 1990.

Over the next several years, other things were IP enabled, including a soda machine at Carnegie Mellon University in the US and a coffee pot in the Trojan Room at the University of Cambridge in the UK (which remained Internet-connected until 2001).

From these whimsical beginnings, a robust field of research and development into smart object networking helped create the foundation for today's Internet of Things. If the idea of connecting objects to each other and to the Internet is not new, it is reasonable to ask, Why is the Internet of Things a newly popular topic today? From a broad perspective, the confluence of several technology and market trends is making it possible to interconnect more and smaller devices cheaply and easily. Many organizations have developed their own taxonomies and categorizations of IoT applications and use cases. For example, Industrial IoT is a term widely used by companies and associations to describe IoT applications related to the production of goods and services.

Chapter 3

METHODOLOGY

3.1 System Design

3.1.1 Block Diagram

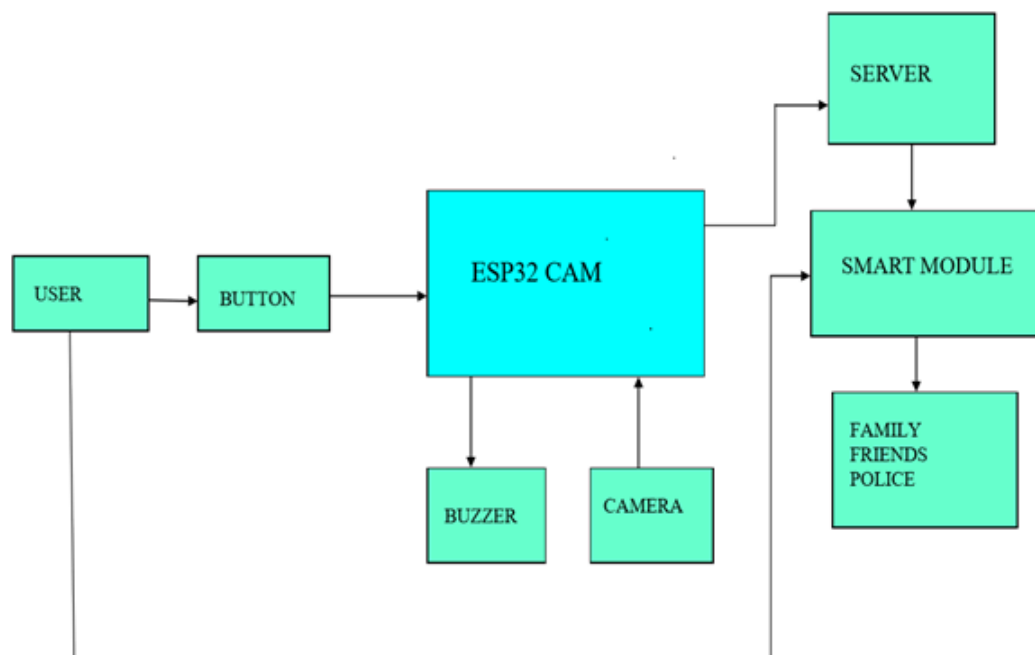


Figure 3.1: Block Diagram

A Smart device is a wearable ESP 32 based device that aims to help women in distress. It is integrated with a GPS tracking to find the victims location, a camera

module to record the crime for evidence and messaging services to aid in alerting the emergency contacts with the incident there by proving to be soon.

Fig 3.1 shows the block diagram of Smart Device. The Smart Device consists of a button, a ESP 32 board , a camera module and a buzzer. When a woman is in danger, she presses the button that triggers the ESP 32 module that enables the camera module to capture an image of the incident. At the same time the gps sends the location of the incident. The captured image and the location traced is send to the emergency contacts and police. The buzzer connected to ESP 32 module is activated and it generates a high frequency screeching alarm to seek the attention of the people in that vicinity and also serves as a warning to the intruder, on the click of the same button. In woman safety application camera is used to find out location of the user and send surrounding images to emergency contact numbers respectively. This device is better than the existing systems and can be really helpful to individuals in danger because of the following reasons:

- Criminal Identification.
- Increased accessibility and portability
- A boon to senior citizens and people suffering from medical issues.
- Can also employed for children safety thus preventing crimes like child abuse and child trafficking.
- Need for a movement towards safer environments.

This project is an endeavor to develop an effective self-defense gadget which would provide protection to women in case of any assault or unsolicited contact. The major merit of this product is its simplicity and is also economical and effective handy device for women who travel alone. This gives more confidence to the women about their safety. Since it is implemented in the form of a device that device can be easily concealed and extremely accessible in dangerous situations.

3.2 Hardware Description

3.2.1 ESP32-Cam

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.



Figure 3.2: ESP32 CAM

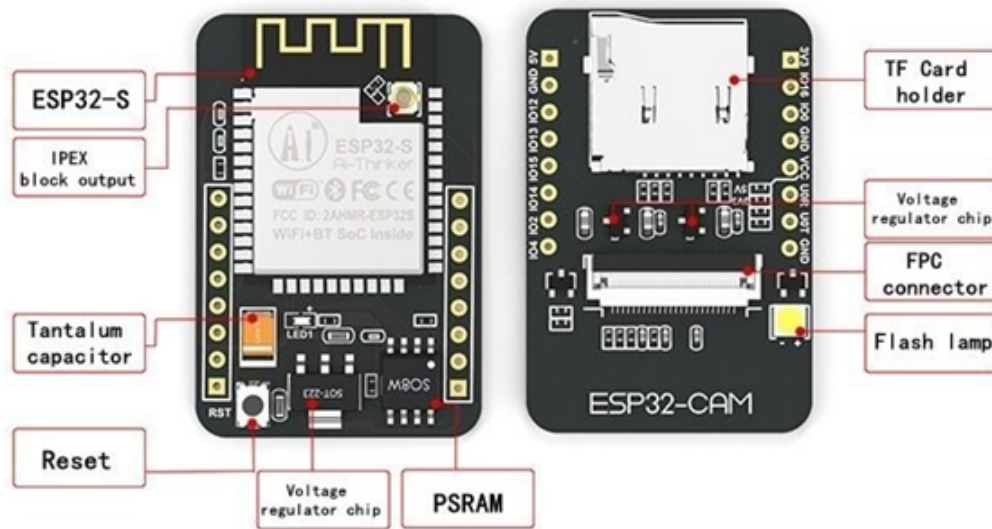


Figure 3.3: ESP32 CAM

The ESP32-CAM doesn't come with a USB connector, so you need an FTDI programmer to upload code through the U_0R and U_0T pins (serial pins).

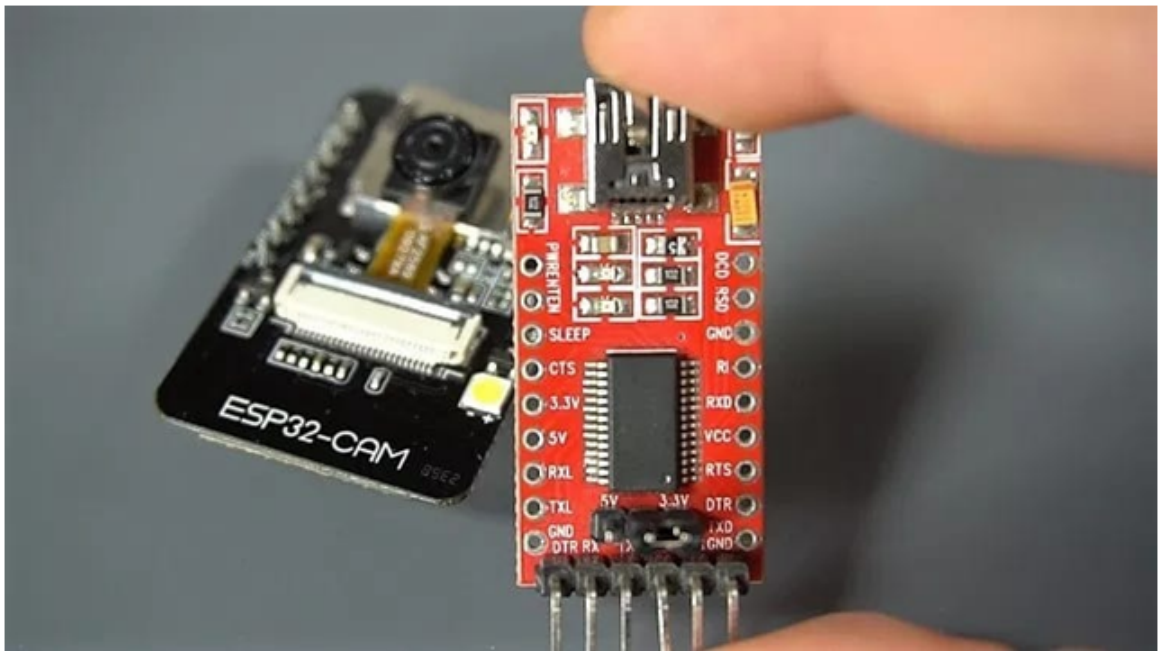


Figure 3.4: FTDI USB serial module

Features

- Here is a list with the ESP32-CAM features:
- The smallest 802.11b/g/n Wi-Fi BT SoC module
- Low power 32-bit CPU, can also serve the application processor
- Up to 160 MHz clock speed, summary computing power up to 600 DMIPS
- Built-in 520 KB SRAM, external 4MPSRAM
- Supports UART/SPI/I2C/PWM/ADC/DAC
- Support OV2640 and OV7670 cameras, built-in flash lamp
- Support image WiFi upload
- Support TF card
- Supports multiple sleep modes
- Embedded Lwip and FreeRTOS
- Supports STA/AP/STA+AP operation mode
- Support for serial port local and remote firmware upgrades (FOTA)

3.2.2 ESP32-CAM Pinout



Figure 3.5: CAM Pinout

There are three GND pins and two pins for power: either 3.3V or 5V.

GPIO 1 and GPIO 3 are the serial pins. You need these pins to upload code to your board. Additionally, GPIO 0 also plays an important role, since it determines whether the ESP32 is in flashing mode or not. When GPIO 0 is connected to GND, the ESP32 is in flashing mode.

The following pins are internally connected to the microSD card reader:

GPIO 14: CLK

GPIO 15: CMD

GPIO 2: Data 0

GPIO 4: Data 1 (also connected to the on-board LED)

GPIO 12: Data 2

GPIO 13: Data 3

3.2.3 SIM900A GSM

SIM900A GSM Module is the smallest and cheapest module for GPRS/GSM communication. It is common with Arduino and microcontroller in most of embedded application. The module offers GPRS/GSM technology for communication with the uses of a mobile sim.



Figure 3.6: CAM Pinout

It uses a 900 and 1800MHz frequency band and allows users to receive/send mobile calls and SMS. The keypad and display interface allows the developers to make the customize application with it. Furthermore, it also has modes, command mode and data mode. In every country the GPRS/GSM and different protocols/frequencies to operate. Command mode helps the developers to change the default setting according to their requirements.

SIM900A Pin Configuration

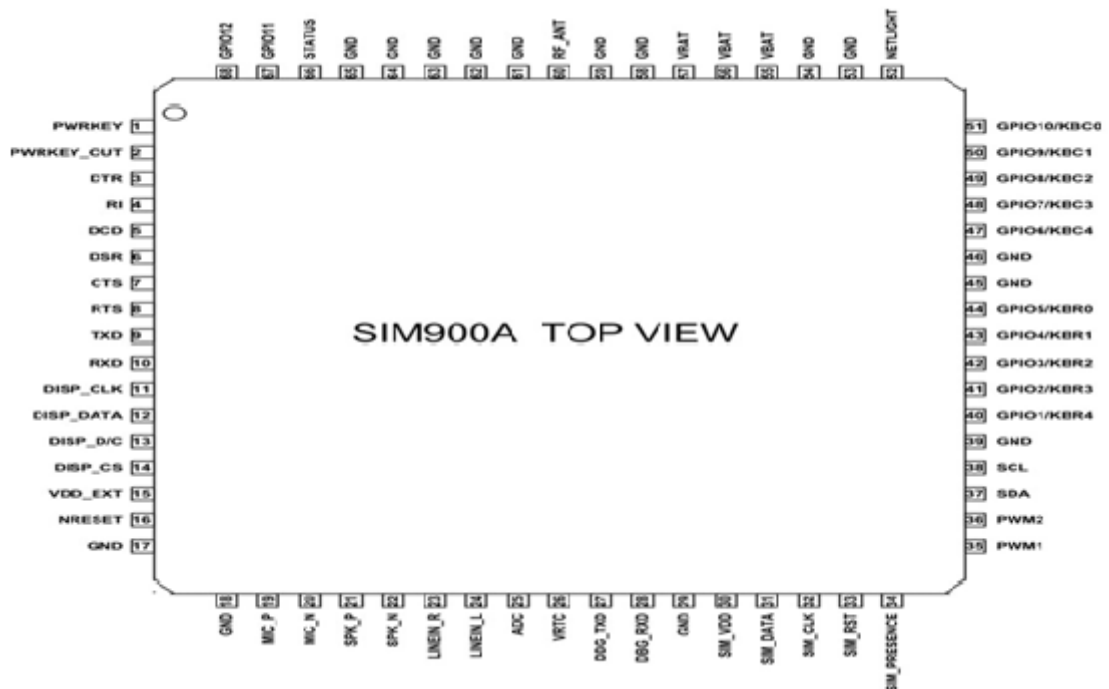


Figure 3.7: SIM900A Pin Configuration

The Module SIM900A looks like a single chip but it has a bunch of features that can help to build almost many commercial applications. Although, there are a total of 68 pins on SIM900A and using these pins helps to build the applications. But we will need few pins if you we use a module for interfacing with Arduino. We lists details of pinout diagram in next section.

SIM900A GSM Module Pin Configuration Description

GPIO Pins :

The GPIO pins help to perform the simple and advance I/O function. All pins give the maximum output equal to the power supply which is useable to control most of the devices like sensors and other modules.

- GPIO Pins :

The GPIO pins help to perform the simple and advance I/O function. All pins give the maximum output equal to the power supply which is useable to control most of the devices like sensors and other modules.

- Status Pins :

The module has two status pins which help to indicate two different kinds of status. The first one is the working status of the module and the second for communication status. Net status means either the module is connecting to the network or other network functions, etc. Both these pins cant operate LED directly.

- Serial Port :

The UART serial interface uses the two pins for proper data communication, which are RX and TX. Both pins have no independence on any other pins or modules. In SIM900A these pins are available but it also has some other pins for status/indication of data. By combining these pins, the serial port helps to generate the RS-232 connector too. All the serial pins are:

RXD Pin10 To receive the data

TXD Pin 9- To send the data

RTS Pin8 To send the request of data transmission

CTS Pin7 To clear the send request

RI Pin4 Ring indicator

DSR Pin6 To indicate that data set ready

DCD Pin5 To indicate data carry detect

DTR Pin3 To indicate data terminal ready

- SIM Interface :

As we know that module SIM900A is a GPRS/GSM module. The module is dependent on some devices for some of its features. The most important one is the SIM. The SIM needs to connect with the module for GPRS/GSM functions to fully operate. All the sim interface of the module is:

SIM_VDD Pin30 Power Supply of the SIM

SIM_DATA Pin31 For data output

SIM_CLK Pin32 For clock pulse

SIM_RST Pin33 For reset

SIM_PRESENCE Pin34 To detect the SIM.

The device has an external LOW input signal reset pin to reset the device with the use of an external signal

NRESET Pin16

SIM900A GSM Module Block Diagram:

The following diagram is describing the SIM900A internal structure of the module.

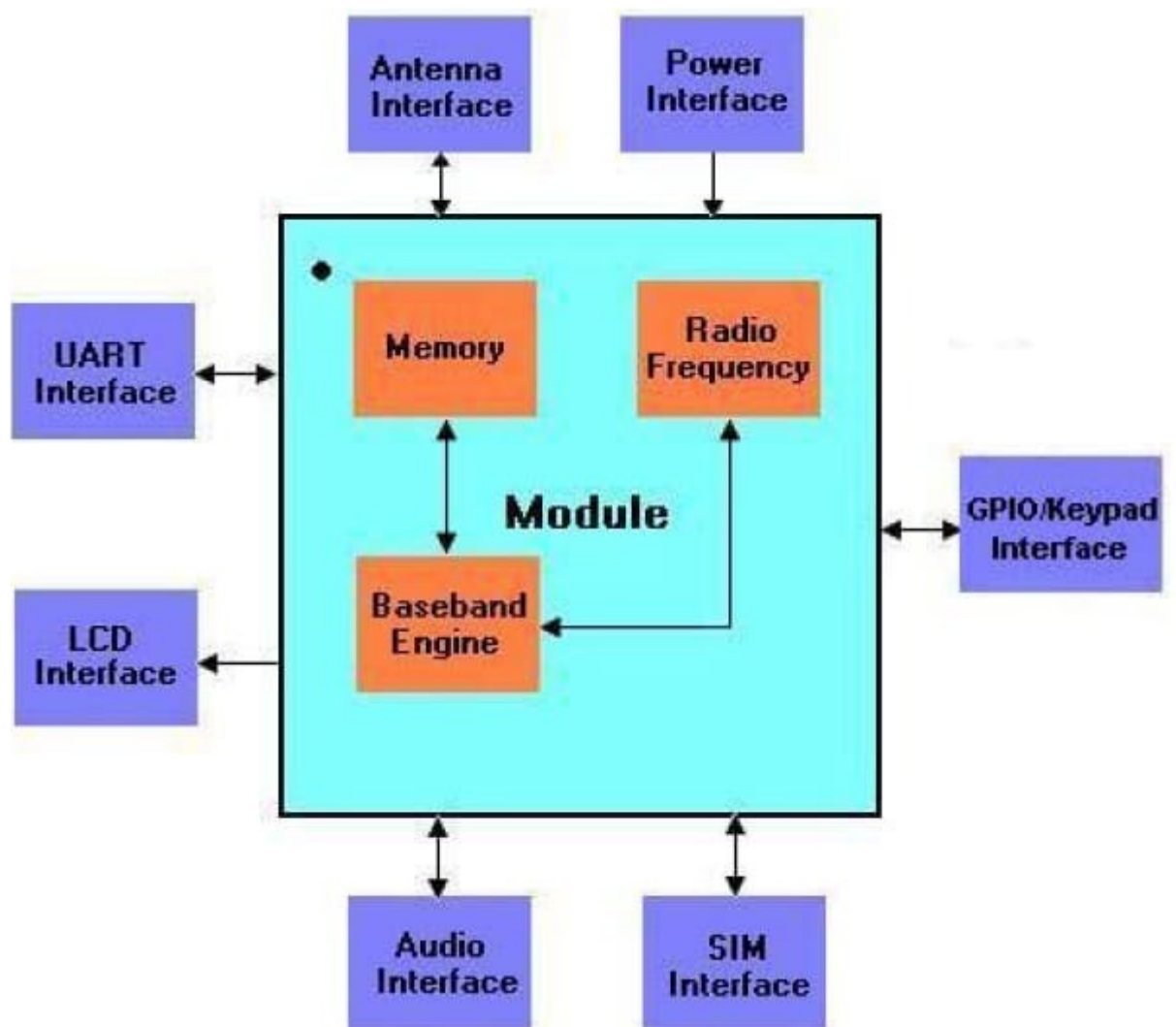


Figure 3.8: SIM900A GSM Module Block Diagram

SIM900A GSM Module Main Features

- Power Input - 3.4V to 4.5V
- Operating Frequency -EGSM900 and DCS1800
- Transmitting Power Range -
- 2W for EGSM900
- 1W for DCS1800
- Data Transfer -
- LinkDownload: 85.6kbps,
- Upload:42.8kbps
- SMS - MT, MO, CB, Text and PDU mode
- Antenna Support - Available
- Audio Input/output - Available
- Serial Port - I2C and UART
- Serial Debug Port -Available

Applications

- The module is the best application to design a graphic for Voice call and SMS application.
- Some IoT applications, mostly in an emergency have the module
- The location trancing system also uses SIM900A
- SIM900A can use for mobile communication

3.2.4 SIM28 GPS

GPS is used to determine the location of the victim that has GPS receiver.GPS sensor gives the two value, first is latitude and second is longitude. SIM28 is a stand-alone or A-GPS receiver.

SIM28 Functional Diagram

The following figure shows a functional diagram of the SIM28 and illustrates the mainly functional parts: spacing

label The GPS chip

label SAW filter

label LNA

label The antenna interface

label The communication interface

label The control signals

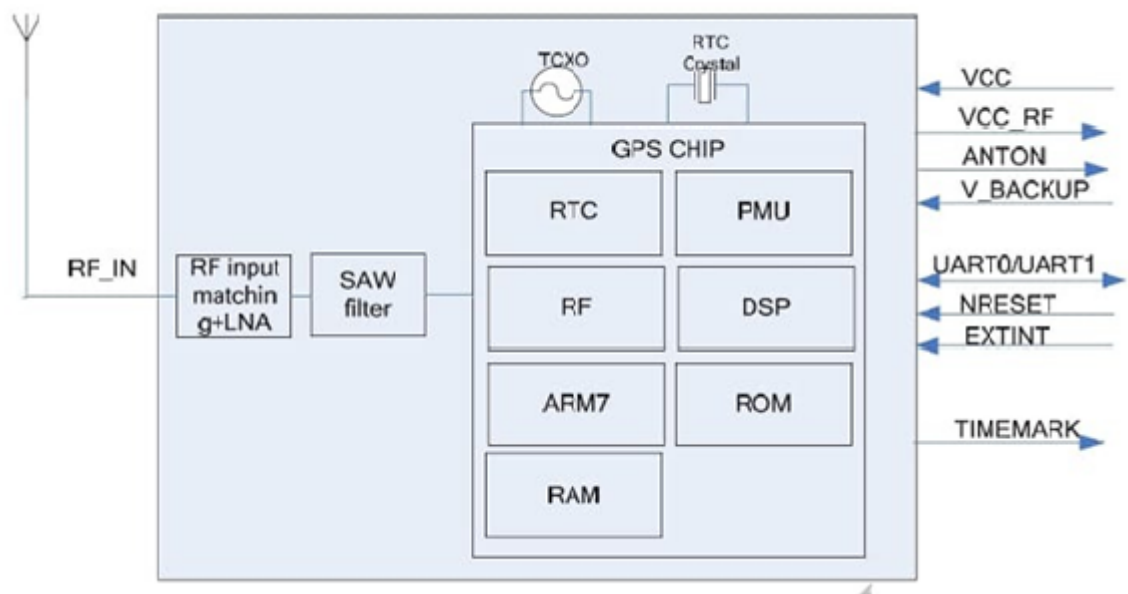


Figure 3.9: Functional Block Diagram of SIM28

General features

| Parameters | | Value |
|-----------------------------------|-----|---|
| Supply voltage VCC | | +2.8V 4.3V |
| Supply voltage ripple VCC | | 54 mV(RMS) max @ f = 0 3MHz 15 mV(RMS) max @ f \leq 3 MHz |
| Power consumption(acquisition) | | 16mA type. @ VCC=3.3 V |
| Power consumption(sleep) | | 150uA type. @ VCC=3.3 V |
| Storage temperature | | -40C +85C |
| Operating temperature | | -40C +85C (note 1) |
| I/O signal levels | VIL | -0.3V 0.8V |
| | VIH | 2.0V 3.3V |
| | VOL | -0.3V 0.4V |
| | VOH | 2.4V 3.1V |
| I/O output sink/source capability | | +/- 3mA max |
| I/O input leakage | | +/- 10 uA max |
| Host port | | UART0 |
| Serial port protocol (UART) | | NMEA; 8 bits, no parity, 1 stop bit; 9600 baud |
| TIMEMARK output (1PPS) | | 1 pulse per second, synchronized at rising edge, pulse length 100ms |

Table 3.1: General Feature

Pin Out Diagram

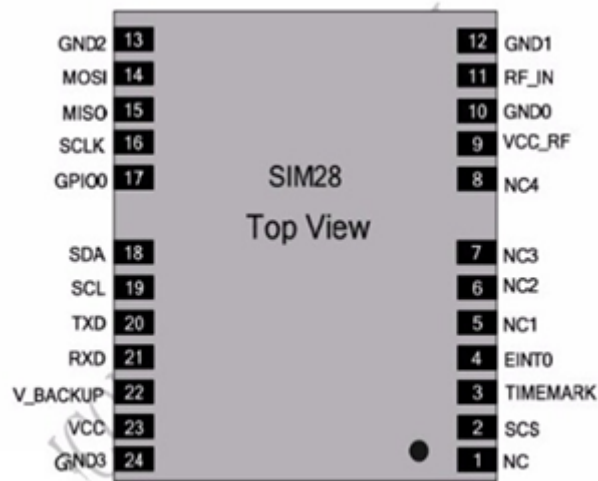


Figure 3.10: Pinout Diagram of SIM28

Pin Discription

| Pin name | Pin number | I/O | Description | Comment |
|---------------------|------------|-----|--|--|
| Power supply | | | | |
| VCC | 8 | I | Main power input, which will be used to power the baseband and RF section internally. | Provide clean and stable power source to this pin. Add a 4.7uF capacitor to this pin for decoupling. |
| ANTON | 13 | O | 2.8V power output supply for active antenna or external LNA control pin for power save | If unused, keep open. |
| VCC_RF | 14 | O | Power supply for active antenna or external LNA | IF unused, keep open |
| V_BACKUP | 6 | I/O | The backup battery input power supply for RTC | If unused, keep open. |
| GND | 1, 10, 12 | | Ground | GND |
| Host port interface | | | | |
| TXD0 | 2 | O | NMEA serial output | |
| RXD0 | 3 | I | MMEA serial input | |
| TXD1/SDA | 16 | I/O | Serial output as RTCM | I2C communicate not supported yet |
| RXD1/SCL | 17 | I | Serial input as RTCM | |
| GPIOs | | | | |
| TIMEMARK | 4 | O | Time Mark outputs timing pulse related to receiver time | If unused, keep open. |
| NRESET | 9 | I | Reset input, active low, default pull Up | If unused, keep open. |
| EXTINT | 5 | I | This interrupt source could act as wake up event during power saving mode. | Not supported yet, keep open. |
| RF Interface | | | | |
| RF_IN | 11 | I | Radio antenna connection | Impedence must be controlled to 50. |
| Other interface | | | | |
| NC | 7, 15, 18 | | Not Connected | |

Table 3.2: Pin Discription

3.2.5 FTDI USB Serial Module

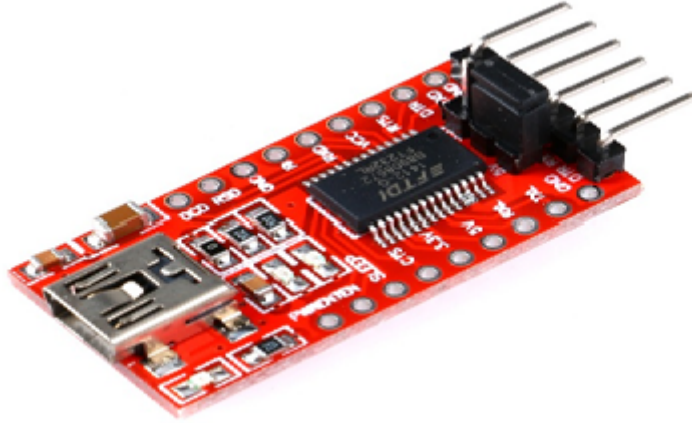


Figure 3.11: FTDI USB Serial Module

Description

The FT232RL is a USB to serial UART interface. A low-cost way to add USB capability to For arduino or other microcontrollers. Use this to give your own breadboard For arduino USB capability for bootloading or downloading sketches. It has an on board LED indicator for RXD/TXD transceiver communication. Includes over-current protection, using a 500 ma self-restoring fuse. This board includes a DTR pin needed to auto-reset For arduino when downloading to your device.

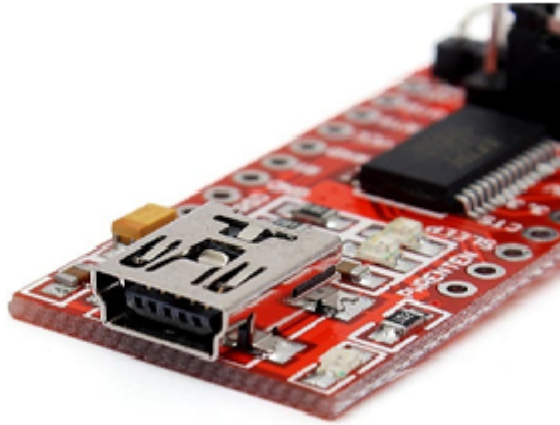


Figure 3.12: FTDI USB PORT

This usb to serial adapter module has a selectable 5V or 3.3V operation mode making it suitable for connecting it to the ESP serial port pins.

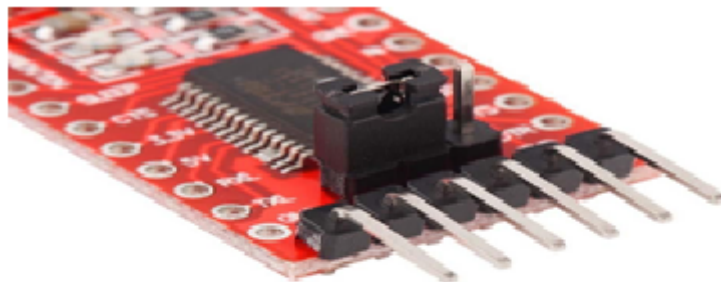


Figure 3.13: FTDI connector pins

This is the ideal tool to connect to Serial GPS, configuring Openlog modules and flashing/upgrading the bootloader for Arduino. This is a must have module in the hobbyist toolkit. At its heart is the FTDI module which is well supported on Windows, Linux and MAC, which gives you a plug and play operations without having to run behind drivers. We provide a 4 wire connector cable free with the module to make it easy for you to connect it to your device.

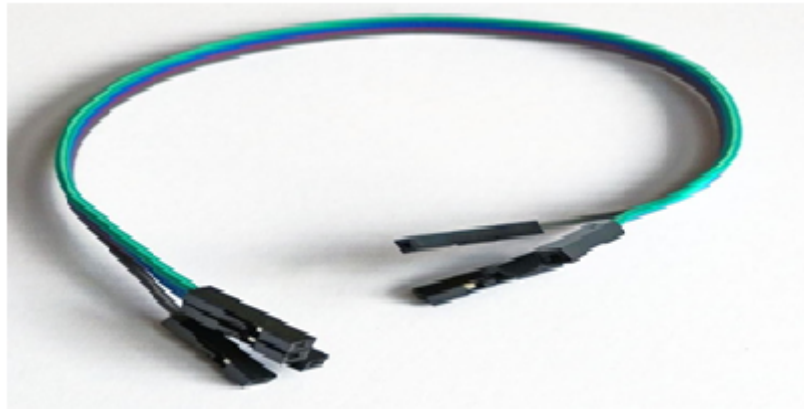


Figure 3.14: Free 4 wire connector

Specification

- Chip: FT232RL
- Draw out all signal port of FT232RL chip
- RXD / TXD transceiver communication indicator
- USB power supply, can choose 5V or 3.3V, set by jumper With over current protection, using 500mA self-restore fuse
- Pin definition: DTR, RXD, TX, VCC, CTS, GND
- Pitch: 2.54mm
- Size: 36 x 18mm (L x W)
- Interface: Mini USB

3.2.6 Buzzer

A buzzer is a device that is used to generate beep sound (generally a warning or alert in embedded system). It is a two leg device the longer leg is positive. If voltage is supplied it generates beep sound. Through analog write volume of beep can be controlled. If a buzzer is switched with different time intervals it generates a melody. Apply 3V to 5V to this piezo buzzer module and you'll be rewarded with a loud 2KHz BEEEEEEEEEEEEEEEEEP. Unlike a plain piezo, this buzzer does not need an AC signal. Inside is a piezo element plus the driver circuitry that makes it oscillate at 2KHz. The piezo buzzer is 5V TTL logic compatible and Breadboard friendly pin spacing. This buzzer is ideal when you need to fit a buzzer in a small place. It has its own built-in drive circuit. It offers low current consumption. Used in manufacturing applications such as laptops, alarms, pagers, etc. Great for use as part of a Code Practice Oscillator.



Figure 3.15: Buzzer

Buzzer Specifications

- Rated Voltage: 6V DC.
- Operating Voltage: 4-8V DC.
- Rated current: ≤ 30 mA.
- Sound Type: Continuous Beep.

3.2.7 Push Button

A push-button or simply button is a simple switch mechanism for controlling some aspect of a machine or a process. Buttons are typically made out of hard material, usually plastic or metal.

The surface is usually flat or shaped to accommodate the human finger or hand, so as to be easily depressed or pushed. Buttons are most often biased switches, although many un-biased buttons (due to their physical nature) still require a spring to return to their un-pushed state. ,Terms for the "pushing" of a button include pressing, depressing, mashing, slapping, hitting, and punching.



Figure 3.16: Push Button

Push Button Specifications

- Mode of Operation: Tactile feedback.
- Power Rating: MAX 50mA 24V DC.
- Insulation Resistance: 100Mohm at 100v.
- Operating Force: 2.550.69 N.
- Contact Resistance: MAX 100mOhm.
- Operating Temperature Range: -20 to +70 °C.
- Storage Temperature Range: -20 to +70 °C.

3.2.8 SD Card

A memory card or memory cartridge is an electronic data storage device used for storing digital information, typically using flash memory. These are commonly used in portable electronic devices, such as digital cameras, mobile phones, laptop, computers, tablets, PDAs, portable media players, video game consoles, synthesizer.



Figure 3.17: SD Card

- **Capacity:** Add additional storage space to any device with this 16 GB microSDHC memory card. Expanding the memory of your smartphone or tablet lets you capture more photos and videos and enjoy your favorite music wherever you go.
- **Compatibility:** This memory card is compatible with most smart phones, digital cameras and e-book readers that support the microSDHC format. It features Class 10 video rating for high-quality video recording, so you can capture Full HD without dropouts and stuttering.
- **Safety Features:** This memory card can operate in temperatures ranging from -25 to 85 degrees Celsius. This lets you access your mobile media even in extreme weather conditions.
- **Robust Design:** This memory card features a robust design to withstand the toughest conditions. It is waterproof, shockproof, and X-ray proof. Even if your phone gives up, this SanDisk memory card will survive.

3.3 SOFTWARE DESCRIPTION

3.3.1 OPERATING SYSTEM

Arduino IDE

The Arduino Integrated Development Environment (IDE) is a cross platform application (for Windows, macOS, Linux) that is written in functions from C and C++. 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.

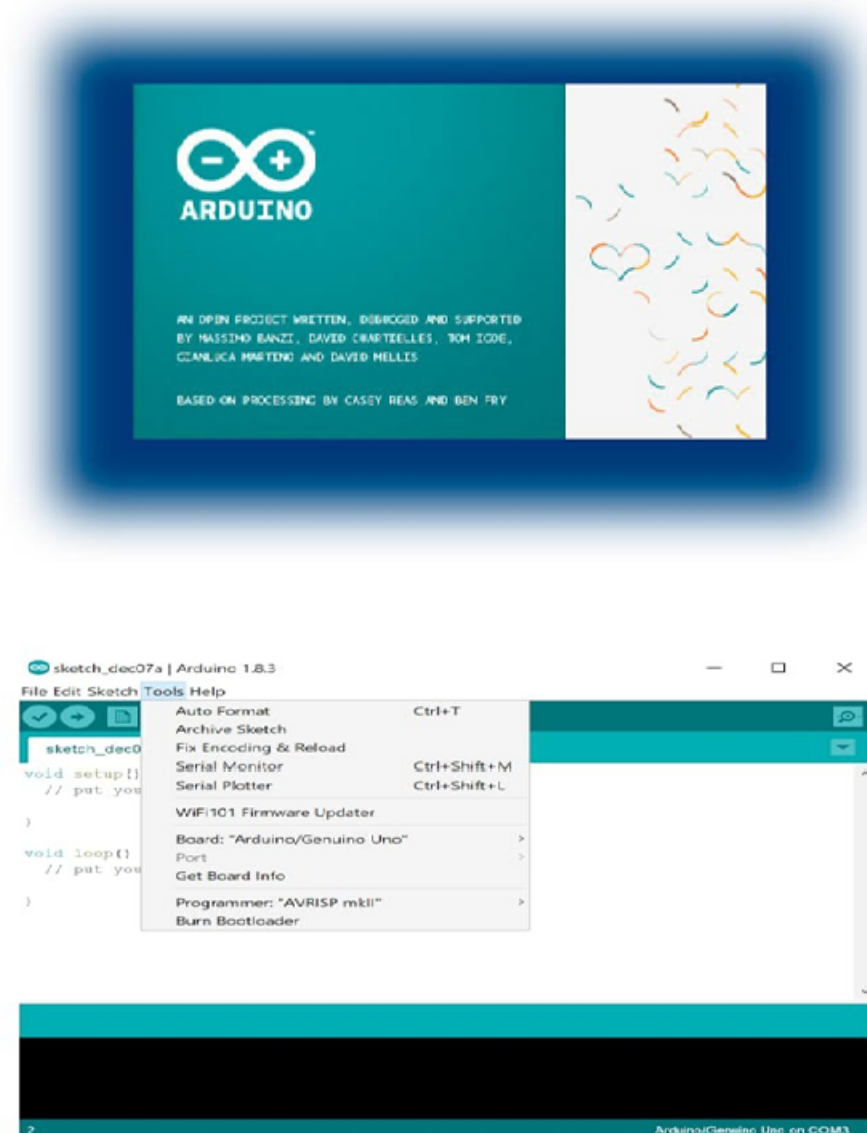


Figure 3.18: Arduino

The source code for the IDE is released under the GNU General Public License, version 2. The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures. User-written code only requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub `main()` into an executable cyclic executive program with the GNU toolchain, also included with the IDE distribution. The Arduino IDE employs the program `avrdude` to convert the executable code into a text file in hexadecimal encoding that is loaded into the Arduino board by a loader program in the board's firmware. By default, `avrdude` is used as the uploading tool to flash the user code onto official Arduino boards.

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. 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.

ESP32-CAM with Arduino IDE

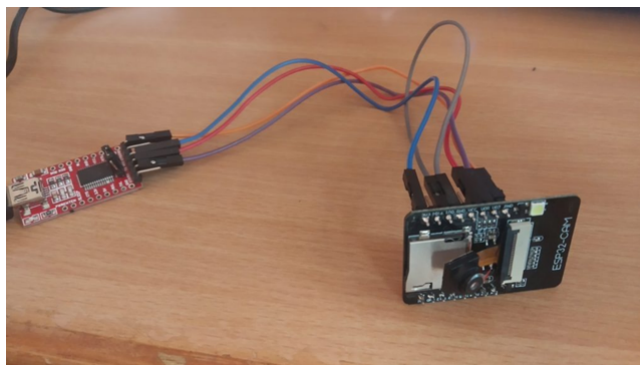


Figure 3.19: ESP32-CAM with Arduino IDE

Connections

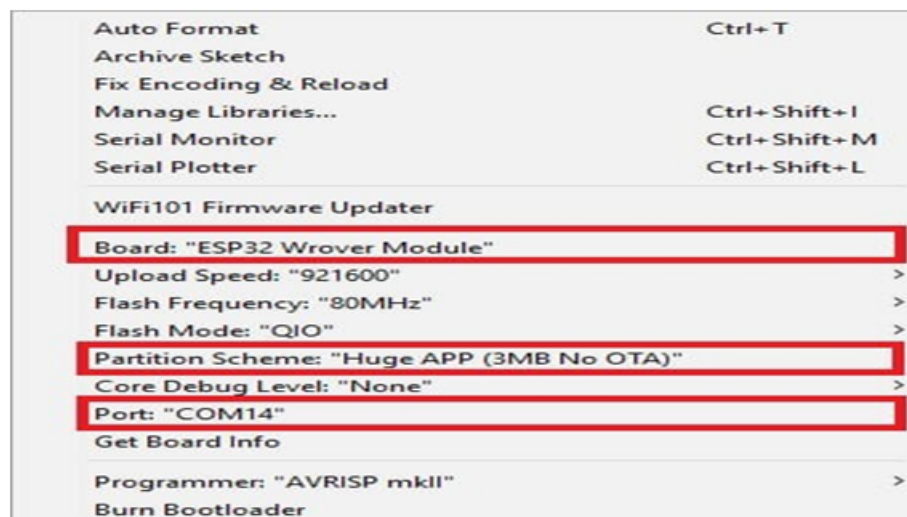
| ESP32 CAM | FTDI 3.3V |
|-----------|-----------|
| UDR | TX |
| UTD | RX |
| 3.3V | VCC |
| GND | GND |

Table 3.3: Connections

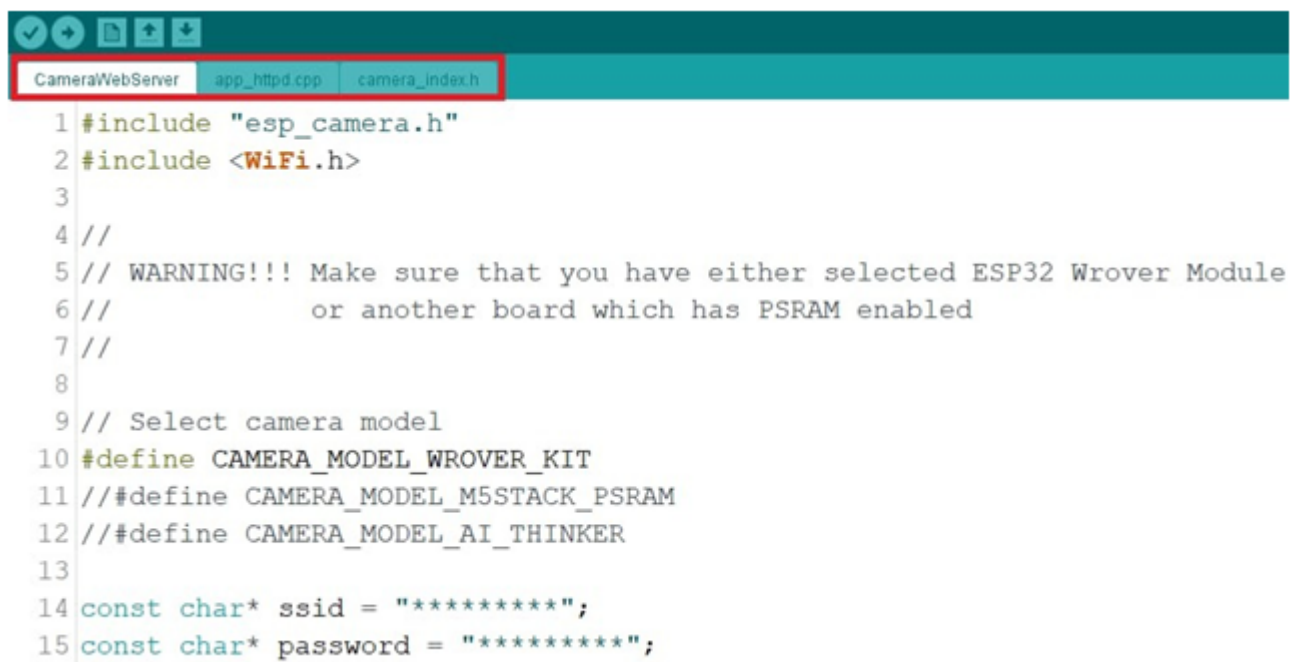
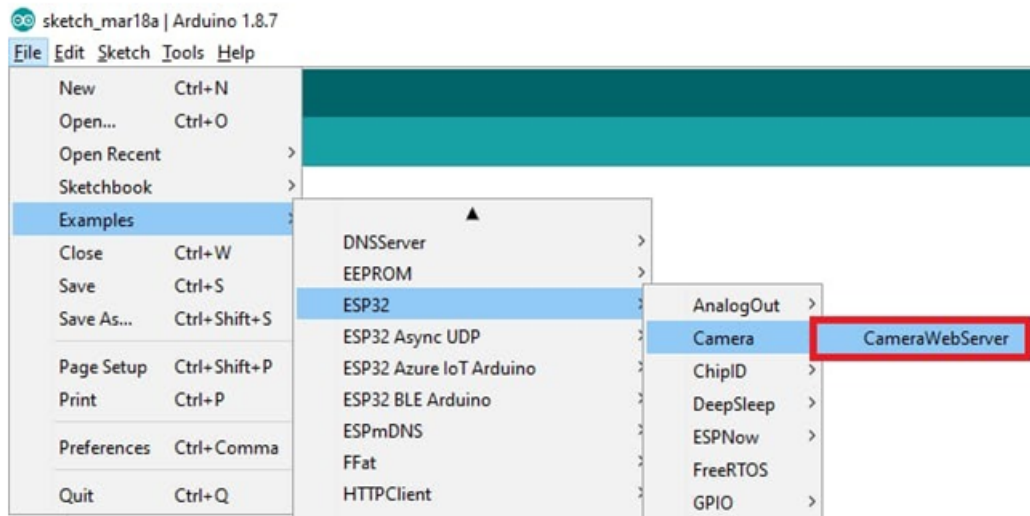
Additionally, GPIO 0 also plays an important role, since it determines whether the ESP32 is in flashing mode or not. When GPIO 0 is connected to GND, the ESP32 is in flashing mode.

Software Setup

- Firstly, Download ESP32 Board in Arduino IDE, from Board Manager.
- Go to Tools \hookrightarrow Board and select ESP32 Wrover Module
- Go to Tools \hookrightarrow Port and select the COM port the ESP32 is connected to.
- In Tools \hookrightarrow Partition Scheme, select Huge APP (3MB No OTA)



Coding



Before uploading the code, you need to insert your network credentials in the following variables:

```
Const char*ssid="REPLACE_WITH_YOUR_SSID";
```

```
const char* password = "REPLACE_WITH_YOUR_PASSWORD";
```

Then, make sure you select the right camera module. In this case, were using the AI-THINKER Model. So, comment all the other models and uncomment this one:

```
#define CAMERA_MODEL_AI_THINKER
```

Now, the code is ready to be uploaded to your ESP32.

Upload Code

Connect the ESP32-CAM board to your computer using an FTDI programmer.

Important: GPIO 0 needs to be connected to GND so that you're able to upload code.

- Press the ESP32-CAM on-board RESET button
- Then, click the upload button to upload the code if you can't upload the code, double-check that GPIO 0 is connected to GND and that you selected the right settings in the Tools menu. You should also press the on-board Reset button to restart your ESP32 in flashing mode.

Getting the IP address :

After uploading the code, disconnect GPIO 0 from GND.

Open the Serial Monitor at a baud rate of 115200. Press the ESP32-CAM on-board Reset button.

The ESP32 IP address should be printed in the Serial Monitor.

Chapter 4

CIRCUIT AND DESCRIPTION

4.1 CIRCUIT DIAGRAM

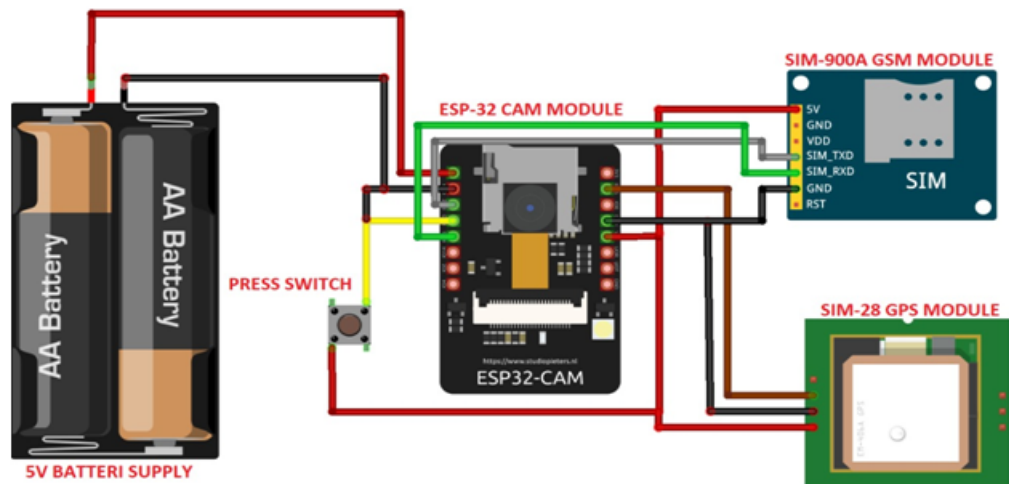


Figure 4.1: Circuit Diagram

Considering the issues with women of today, the need of the hour is to keep our women in safe hands. The blooming technologies of the 21st century have been best utilized in developing various applications and devices to protect women in distress. Technologies such as IoT and Virtual Reality are in demand and have proved beneficial to the women society however, still tragedies prevail indicating the need for better approaches.

This project aims at designing a device that is more accessible and portable to

help the victim to reach her family and friends in an emergency. Most of the times, it is challenging to apprehend the criminal. This issue can be solved by the image that is captured by the device that is being developed. Also, there is a need for a system that helps senior citizens of the society to call for help in case of a health crisis where the situation does not favor the person to contact for medical help. This work, thus leads towards the development of a ESP based Smart device using IOT technology.

The Smart device consists of a button, ESP32 CAM board, a camera module and a buzzer. When a woman is in danger, she presses the button that triggers the ESP32 that enables the camera module to capture an image of the incident. This device is better than the existing systems and can be really helpful to individuals in danger because of the following reasons:

- Criminal Identification
- Increased accessibility and portability
- A boon to senior citizens and people suffering from medical issues
- Can also employed for children safety thus preventing crimes like child abuse and child trafficking
- Need for a movement towards safer environments.

This project is an endeavor to develop an effective self-defense gadget which would provide protection to women in case of any assault or unsolicited contact. The major merit of this product is its simplicity and is also economical and effective handy device for women who travel alone. This gives more confidence to the women about their safety. Since it is implemented in the form of a device that device can be easily concealed and extremely accessible in dangerous situations.

4.2 Flow Chart

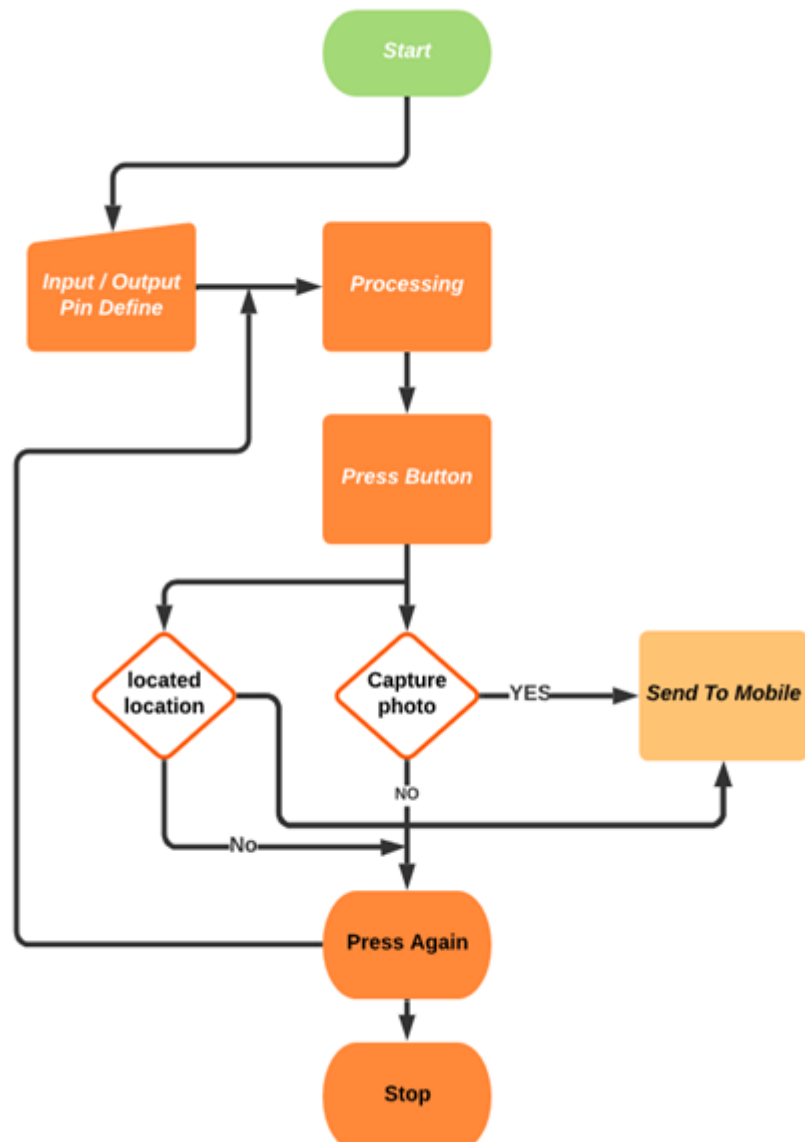


Figure 4.2: Flowchart

4.3 Algorithm

- Step1:Initiate the system.
- Step2:Press the push botton. By pressing the button, esp32 module will get triggered.
- Step3:Simultaneously the buzzer will ring which will alert the surrounding people,so that they will come to know that something wrong is happening.
- Step4:The camera connected to the esp32 module will get enabled and will click the images of culprit, the location of the victim will also get detected.
- Step5:The captured image and the location link will be send to mobile emergency contacts and the police.
- Step6:End

Chapter 5

ADVANTAGES, DISADVANTAGEs, APPLICATION

5.1 ADVANTAGE

- Criminal Identification.
- Increased accessibility and portability.
- A boon to senior citizens and people suffering from medical issues.
- Can also employed for children safety thus preventing crimes like child abuse and child trafficking.
- Need for a movement towards safer environments.

5.2 DISADVANTAGE

- Its required internet connetion and mobile hotspot.
- Its always requird power supply.

5.3 APPLICATIONS

- To provide security for women in danger.
- Reduces the chances of women harassment.
- Locating the position of the women in danger.
- Image capturing to identify the tracker.

Chapter 6

RESULT

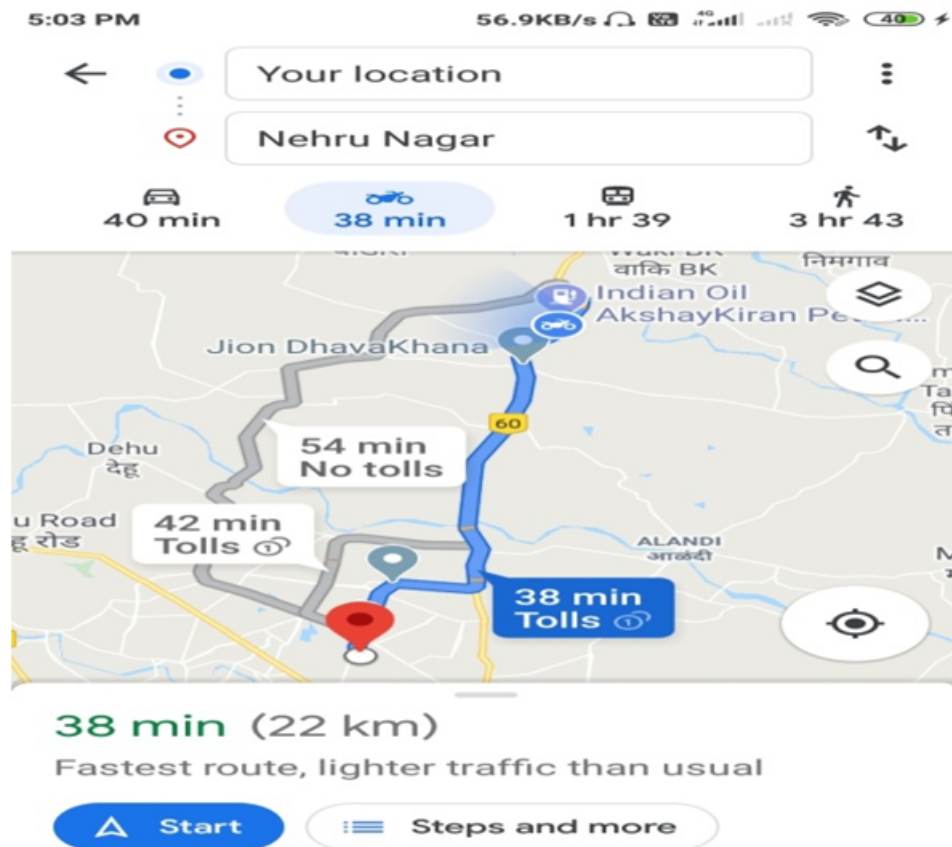


Figure 6.1: Output of gps location tracking

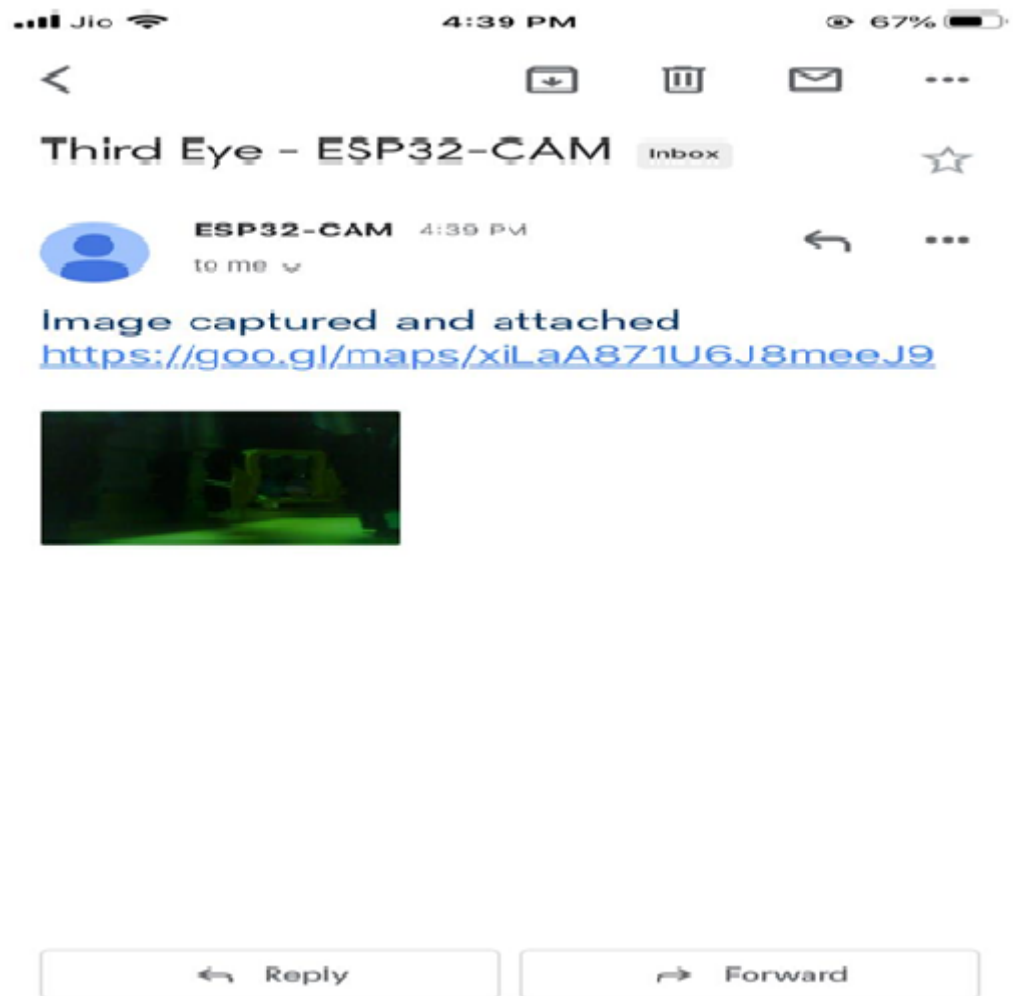


Figure 6.2: link and images going to the respectively gmail

```
COM15
|
ets Jun  8 2016 00:22:19
rst:0x1 (POWERON_RESET),boot:0x13 (SPI_FAST_FLASH_BOOT)
configsip: 0, SPIWP:0xee
clk_drv:0x00,q_drv:0x00,d_drv:0x00,cs0_drv:0x00,hd_drv:0x00,wp_drv:0x00
mode:DIO, clock div:1
load:0x3fff0018,len:4
load:0x3fff001c,len:1216
ho 0 tail 12 room 4
load:0x40078000,len:9720
ho 0 tail 12 room 4
load:0x40080400,len:6352
entry 0x400806b8

Booting...
Connecting to AP..
WiFi connected.
IP address:
192.168.43.51

Mounting SD Card...
Next image number:31
Image saved: /IMG31.jpg
Sending email...
Connecting to SMTP server...
Identification...
Authentication...
Sign in...
Sending Email header...
Sending Email body...
Sending attachments...
/IMG31.jpg
Finalize...
Finished
Email sent successfully
-----
Entering deep sleep mode

☒ Autoscroll ☐ Show timestamp
[Windows Taskbar: Type here to search, icons for network, volume, battery, and system clock]
```

Figure 6.3: Output On Serial Monitor

Chapter 7

OUTCOMES OF PROJECT

7.1 Project Exhibition

Participation in ABHIKALP 2020 At the SPPU, Pune.

7.2 Conference Attended

CONFERENCE ON Indian Patents, Copyrights, Innovations & Startups (CIPCIS 2019)At PCCOE&R, Ravet, Pune.

7.3 Journal Paper Published

International Journal of Recent Technology and Engineering (IJRTE).

7.4 Copyright And Patent

Copyright diary number (Diary Number: 17457/2019-CO/L).

Chapter 8

CONCLUSION

8.1 CONCLUSION

The existing systems are not powerful enough to prevent crimes against Women. Main purpose of the system is fast process, low cost of development, accurate tracking. This project put forth a technique where a woman, when in danger, can instantaneously intimate to the concerned authorities. The proposed technique uses GPS tracking of the smart phone to get the device co-ordinate. This technique further uses the image and alert message to inform the family and police personnel.

References

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- [2] Sutar Megha, Ghewari M.U., "Intelligent Safety System for Women Security", published in IARJSET, January 2, 2017.
- [3] G.C. Harikiran, Karthik Menasinkai, Suhas Shirol, "Smart Security Solution for Women based on Internet Of Things (IoT)", published in International Conference on Electrical, Electronics, and Optimization Techniques (ICEEOT) - 2016.
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