Report on

'Women's Safety Device'

By

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Abstract:

Women have no safety in society. A report noted that reported cases of crimes against women rose 83 percent between 2007 and 2016, where there were four cases of rape every hour. Most women are not allowed to achieve their dreams due to these reasons. And the working women, due to family conditions or passion feel that they are not safe. So, the motivation behind this project was to make women feel they are safe and secure at all conditions.

I have divided this project into two parts, one is the watch and the other is the main device. The watch part contains a button switch and a transmitter. When the button switch is pressed the transmitter transmits a signal to the receiver. The receiver is connected to the main device which will be kept inside the handbag. The main device contains a GPS module, GSM module, and a microcontroller(Arduino Nano). When the receiver receives the signal the Arduino requests the GPS module for the latitude(lat) and longitude(long) and on receiving the lat and long, the Arduino sends a message of the lat and long to the pre-stored phone number using the GSM module.

The main aim is to construct a safe device for women that can help them to communicate with someone, for example, relatives or police. This project many future scopes and real-life implementations such as this can be used as a location finder for the child or human trafficking. This device will be a lifesaver in a criminal violation situation.

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Objective:

To design a device that can help women in any extreme critical condition such as abduction, violation, despoliation, maltreatment, molestation, etc.

This device should also be used on children to control child trafficking or even human trafficking.

Problem Statement:

This project is an attempt to make a change in the life of every woman in terms of their safety and security. Many females or children face the same problem of being troubled in some or the other way, to stop this kind of activity that is to bring fear in the people who dare to do such activities, a solution has to be found. The result of this project or device should make a woman independent and feel safe.

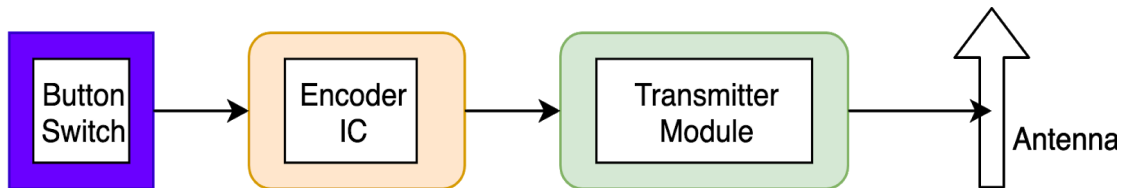The second objective is that the same device should be used to prevent human or child trafficking.

Literature Survey:

I have used the below books and websites for our project:
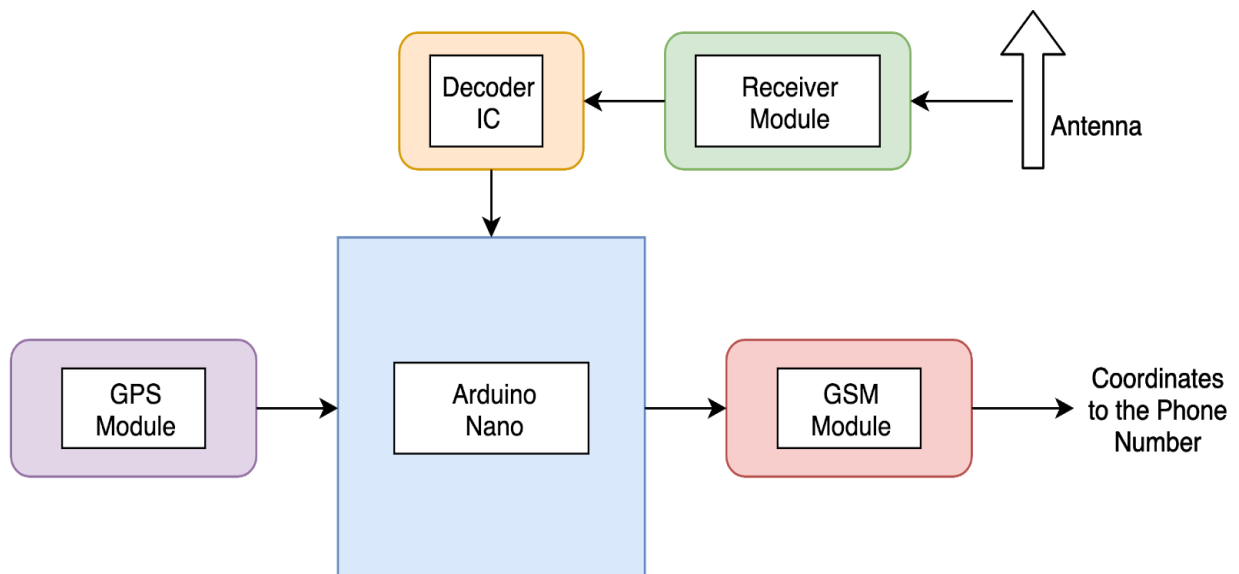
- Arduino: I referred to "Make: Getting Started with Arduino" by Massimo Banzi
- Transmitter and Receiver: I used resources from the "Circuit Digest" website for the implementation and connection of the Transmitter and Receiver module.
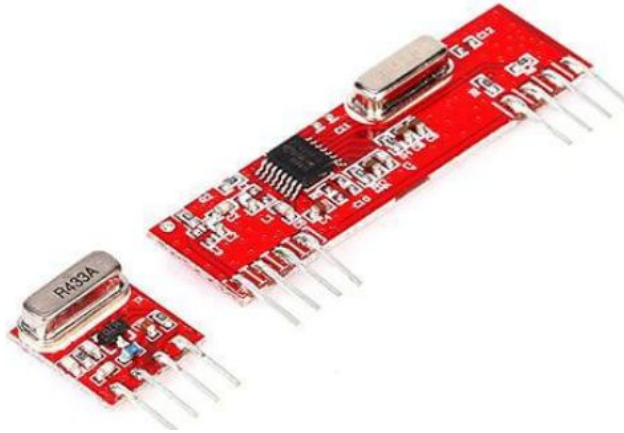
Block Diagram:

- Watch Part:

```
┌──────────┐     ┌──────────┐     ┌──────────────┐          ▲
│  Button  │ ──► │ Encoder  │ ──► │ Transmitter  │ ──►      │ │
│  Switch  │     │   IC     │     │   Module     │          │ │ Antenna
└──────────┘     └──────────┘     └──────────────┘
```

- Main Device Part:

```
                    ┌──────────┐     ┌──────────────┐          ▲
                    │ Decoder  │ ◄── │  Receiver    │ ◄──     │ │
                    │   IC     │     │   Module     │          │ │ Antenna
                    └──────────┘     └──────────────┘
                          │
                          ▼
   ┌──────────┐     ┌──────────────┐     ┌──────────┐      Coordinates
   │   GPS    │ ──► │   Arduino    │ ──► │   GSM    │ ──►  to the Phone
   │  Module  │     │    Nano      │     │  Module  │        Number
   └──────────┘     └──────────────┘     └──────────┘
```
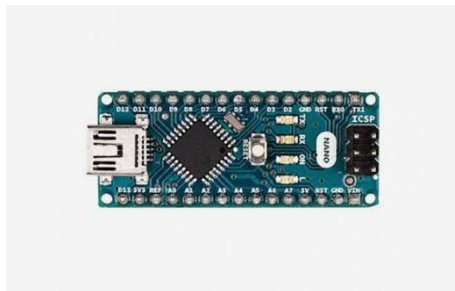
System Requirement Specification

Hardware Requirement:

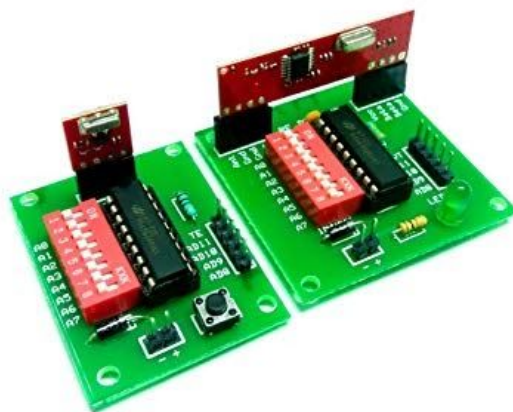● 433MHz RF Transmitter and Receiver:

● Arduino:

● Encoder and Decoder:

or

- Sim800 GSM Module:

- GPS module:

- Button Switch:

- led:

- Jumper cables:

__Software Requirements:__

- C/C++: C/C++ is a general-purpose, imperative computer programming language that supports structured programming. It is used in our project to program Arduino Nano

- Software Serial: The SoftwareSerial library has been developed to allow serial communication on other digital pins of the Arduino

Methodology:

In this project, I have built a device which sends GPS coordinates to a pre-stored phone number.

- SIM800 GSM Module:
  - ☐ A GSM module or a GPRS module is a chip or circuit that will be used to establish communication between a mobile device or a computing machine and a GSM or GPRS.
  - ☐ It stands for the global system for mobile communication (GSM).
  - ☐ With the help of a sim card, we can communicate with other mobile devices with a sim.

- NEO GPS Module:
  - ☐ GPS stands for global positioning system (GPS).
  - ☐ A very popular, cost-effective, high-performance GPS module with a ceramic patch antenna, an on-board memory chip, and a backup battery that can be conveniently integrated with a broad range of microcontrollers

- Arduino:
  - ☐ It is an open source microcontroller board based on atmega328p microcontroller.
  - ☐ It is equipped with sets of digital and analog input/output pins that may be interfaced with various expansion boards and other circuits.
  - ☐ The board has 14 digital pins, 6 analog pins, and is programmable with the Arduino IDE via a type B USB cable.
  - ☐ In this project, nano is loaded with gyroscopic sensor code and Uno is uploaded with StandardFirmata code for communication with raspberry pi.

- Transmitter and Receiver:
  - ☐ I have used a 433MHz RF Transmitter and Receiver.
  - ☐ We can use encoder and decoder ic instead of the Arduino or any other microcontroller.

Working Principle:

Part ONE: Watch -

- For the Watch part I have used a transmitter connected to a switch using an encoder.
- I chose an encoder instead of a microcontroller as microcontroller consumes more power and it is large compared to the encoder ic.
- For the power supply I used a 9 volts battery.
- When the button switch is pressed the encoder enables the transmitter to send a signal to the receiver.

Part TWO: Main Device -

- The Receiver is connected to the arduino via a decoder. The decoder enables the connection with the arduino as soon as it receives the signal from the receiver which in turn receives a signal from the transmitter.
- When the Arduino has received an enable signal from the receiver, it sends a request to the GPS module to give the lat and long using the satellite.
- In response when the GPS gives the coordinates, the arduino proceeds to communicate to the GSM module to send a text message saying 'I'm in trouble' and the lat and long.

Circuit Diagram:

- Watch Part:
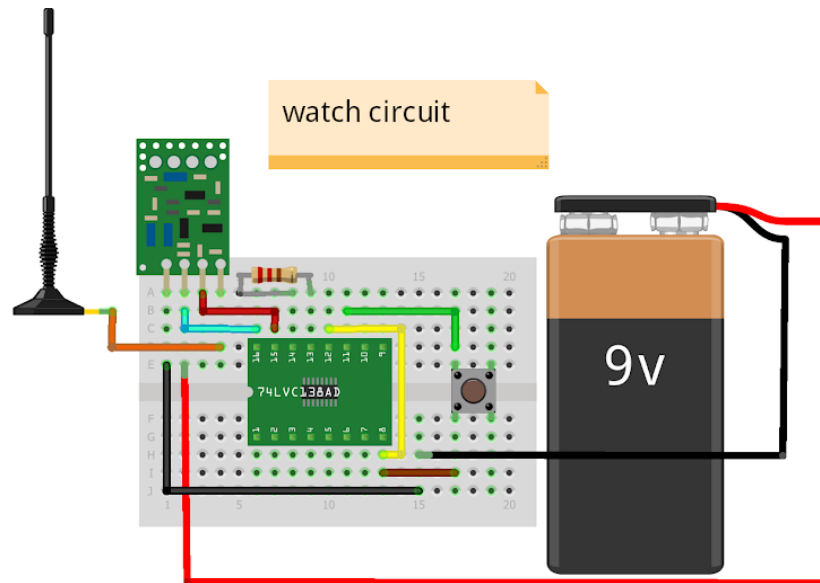
- Main Device Part:
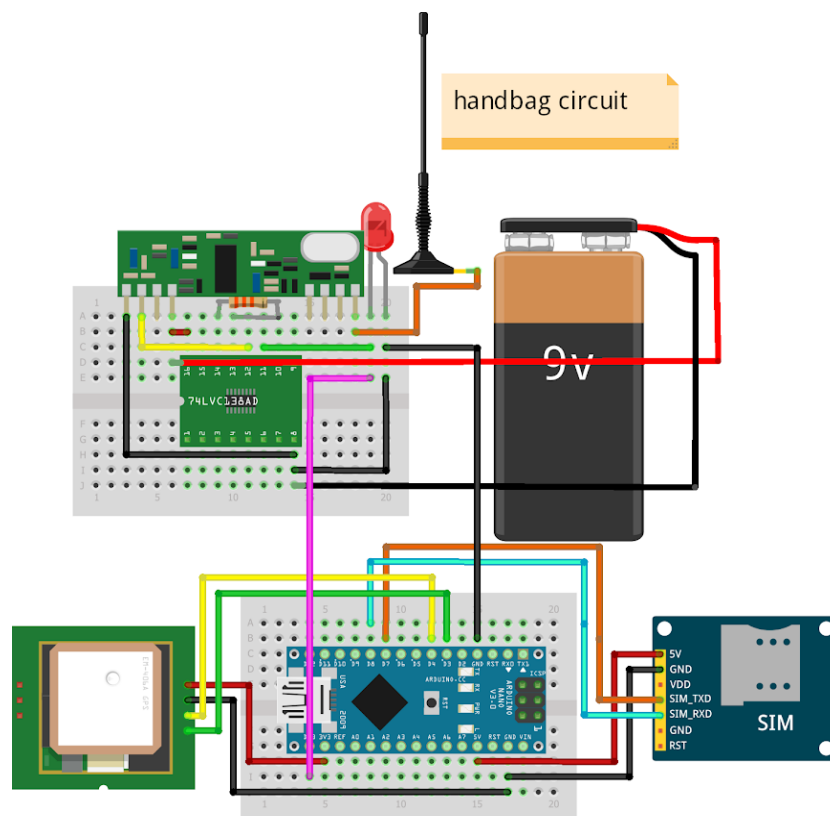
Difficulties Faced:

- I had problems getting the lat and long from the gps module as the signal led was not proper and the GPS signal will not work under concrete building and thick roof so I went out to receive the coordinates.
- I faced problems sending a message to the phone number but I tried until it worked.

Applications:

- This project is primarily built for women who wish to be safe in this society.

But this idea has many other applications such as,

- This can be used on children to locate them in case of trafficking.
- This can be implemented with IOT and we can keep track of children.

Future Scope and Conclusion:

This project is ready to be implemented in real life for daily use but some changes have to be made like a 3d printed case for the main device and the watch, using powerful GPS modules, etc.

I finally conclude by saying that the project Women's safety device is ready and can help a women under trouble or a child or human trafficking situations, with some small exceptions. It can be implemented on a large scale in the upcoming future.
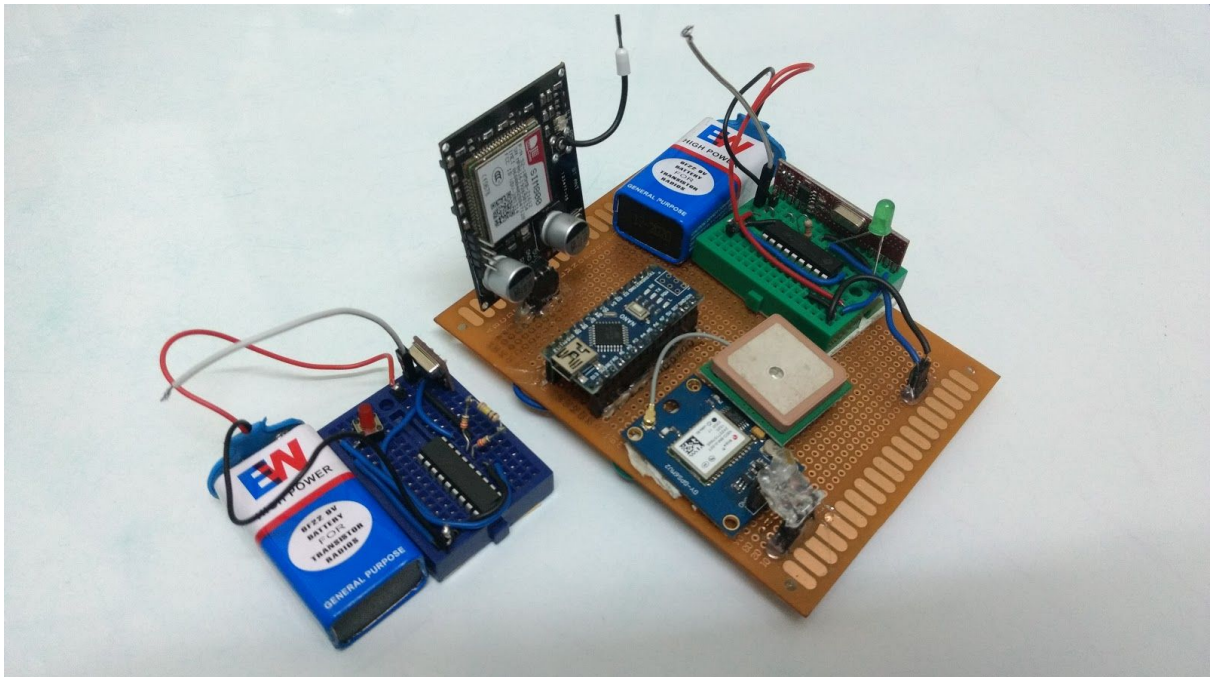
Yet to Develop or Future Scope:

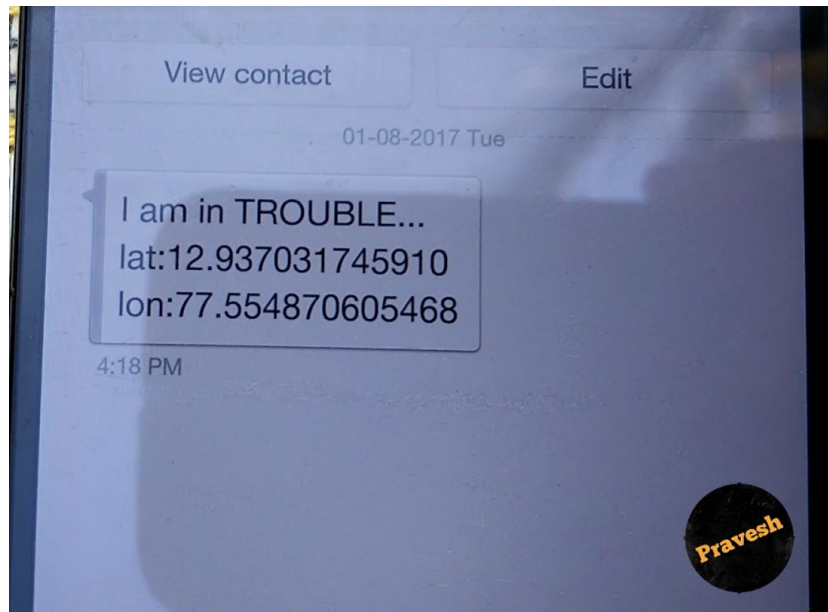- I would wish to make the components smaller and embed it on a pcb.

• The pressing of the button: It will work only if you press the button twice or after long press or can use two buttons and make a password like implementation. This is done so as not to make the device work when the button is accidentally pressed.

• The two parts(Watch and the main device) can be combined into one device, i.e only on watch.

• The watch part can be implemented with a bluetooth module to communicate with a mobile phone application and the rest can be done by the app.

And many more.

Result:

The result of the project Women's Safety Device is verified with the help of my imaginations and it satisfied all my requirements without any exceptions.

References:

- Websites:
  - https://circuitdigest.com/electronic-circuits/rf-transmitter-and-receiver-circuit-diagram
  - https://create.arduino.cc/projecthub/ruchir1674/how-to-interface-gps-module-neo-6m-with-arduino-8f90ad
  - http://www.circuitstoday.com/interface-gsm-module-with-arduino
- Books:
  - "Make: Getting Started with Arduino" by Massimo Banzi