Women Safety Device with GPS Tracking and Alerts Using Arduino.

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ABSTRACT:

The crimes against women have been rising significantly and we often hear about molestation, eve-teasing and rape cases in public places even though there are unprecedented numbers of laws against domestic violence, sexual assault and other forms of violence in each and every country to protect their female citizens, thus making the society unjust and insecure for women. In our project, we will build a band that can be worn by women, using which they can inform anyone that they are in trouble (an SMS will be sent to the police or anyone else of their current location). Using this the police/ whoever the message was sent to, will be able to save the victim from that location. For this we will be using an Arduino Nano which can be interfaced with GSM and GPS module for sending SMS alerts and getting the location coordinates. We will also be using an RF Transmitter and Receiver module for wireless communication between the Band and Receiving device with GPS/GSM.

Keywords: Arduino Nano, GPS Tracking, GSM Module, RF Transmitter, Women Safety.

SECTION I.

INTRODUCTION:

Women in India- a better half of Indian society, today, are becoming the most vulnerable section as far as their safety and security is concerned.

When we turn the pages of a newspaper, we come across many headlines reporting cases of sexual assault, molestation, sexual harassment, rapes, trafficking, illtreatment of women in houses, violence against women in remote areas, etc. Not a day goes by where you don't hear the news of a crime against women in India. According to the 2019 annual report of the National Crime Records Bureau (NCRB), 32033 rape cases were registered across the country, or an average of 88 cases daily.

One can take preventive measures to ensure women safety. Women must be taught selfdefense techniques (which is not possible as every woman cannot enroll into classes). Laws must be made more stringent relating to crimes against women. Men should be taught from an early age to respect women and treat them as equals. In some countries the use of self-defense equipment is legitimate. These equipments like stun gun and pepper spray are developed for a woman to defend herself by attacking the opposition, but if the victim needs assistance or if she is in a secluded area with no one to help then these equipments can be termed as temporary safety equipments. These devices can also be misused if fallen in the wrong hands.

To overcome this problem, technology can be used to develop a women safety device. This device will send a signal to the receiver part and

then the Smartphone will send a text to the mobile phone numbers which are feeded in the application. The text message provides the latitude and the longitude of the victim and by using them the victim can be found easily and can be saved from the unusual critical situation.

SECTION II.

Implementation of the Proposed System with Circuit Diagram:

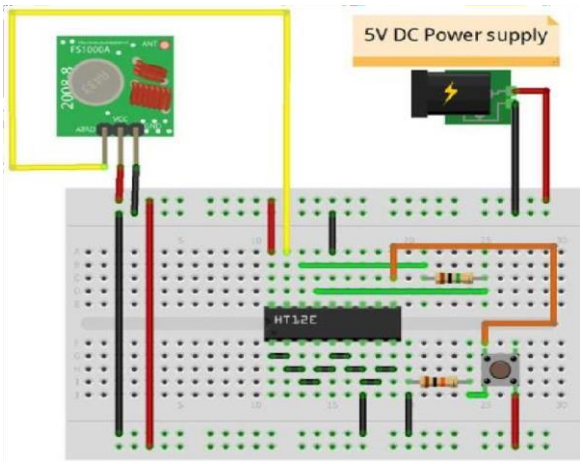
Our project is divided into two sections:

a) The Transmitter section,
b) The Receiver section.

The purpose of making two individual parts here is, to minimize the size of the transmitting module so that it can be worn as a wrist band.

A) Transmitter Section:

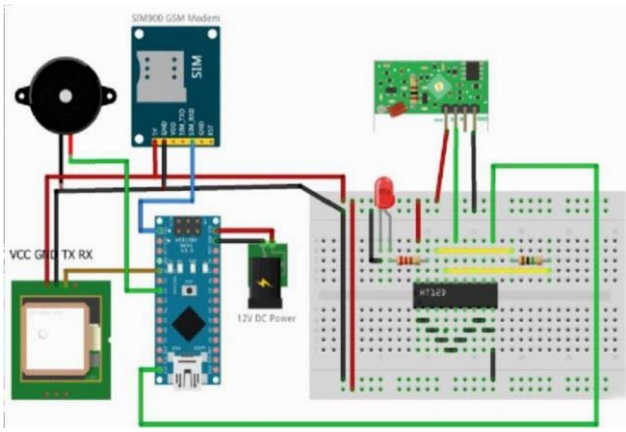
Circuit Diagram:



In the RF transmitter part, there will be an SOS button along with a 433 MHz RF transmitter, which will transmit the data to the receiver part wirelessly.

(B) Receiver Section:

Circuit Diagram:



In the RF Receiver section, the data that will be transmitted from the wrist band (Transmitter part) should be received by the device having a 433 MHz RF receiver. The RF receiver should then send this information to the Arduino through the digital pin. The Arduino Nano should then receive the signal and process it using the program which is flashed into it. When the victim presses the SOS button in the transmitter part, a HIGH signal should be generated and passed through the Arduino side, the Arduino should then send a signal to the SIM900 modem, which should then send an SMS to the registered user along with the GPS co-ordinates which has already been stored in the microcontroller with the help of the NEO6M GPS module.

SECTION III.

ALGORITHM:

The project is setup to perform the following tasks:

- Activate the emergency button,
- Signals sent from RF transmitter to the RF receiver,
- Information is sent to the processor,
- Location is tracked through GPS.

"Help" message is sent to 5 predefined contacts through GSM along with the location.

SECTION IV.

Hardware description:

For this prototype we are using an Arduino which can be interfaced with GSM and GPS module for sending SMS alerts and getting the location coordinates. We have also used an RF Transmitter and receiver module for wireless communication between the Band and Receiving device with GPS/GSM. The other components used are a push button, battery, breadboard and jumper wires.

A. Arduino Nano:

Arduino Nano is a small, compatible, flexible and breadboard friendly Microcontroller board Each of these Digital & Analog Pins are assigned with multiple functions but their main function is to be configured as input or output.

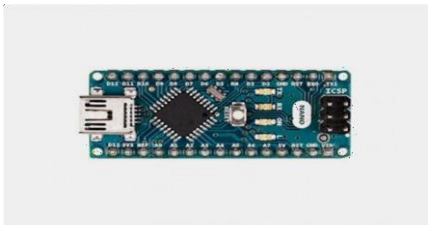


Figure 1: Arduino Nano

B. GPS Module:

Here we are using the NEO6M GPS module. The NEO-6M GPS module is a popular GPS receiver with a builtin ceramic antenna, which provides a strong satellite search capability. This receiver has the ability to sense locations and track up to 22 satellites and identifies locations anywhere in the world. With the on-board signal indicator, we can monitor the network status of the module. It has a data backup battery so that the module can save the data when the main power is shut down accidentally.

Figure 2: NEO6M GPS module

C. GSM Module:

This is a GSM/GPRS-compatible Quadband cell phone, which works on a frequency of 850/900/1800/1900MHz and which can be used for various applications such as access the Internet, make a voice call, send and receive SMS, etc. The frequency bands of the GSM modem can be set by AT Commands. The baud rate is

configurable from 1200-115200 through AT command. The GSM/GPRS Modem is having an internal TCP/IP stack which enables us to connect with the internet via GPRS.

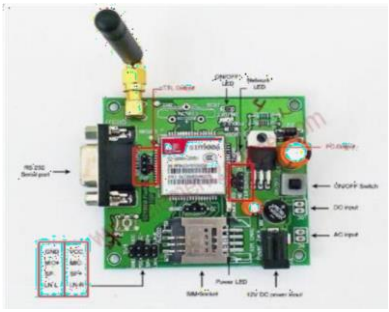
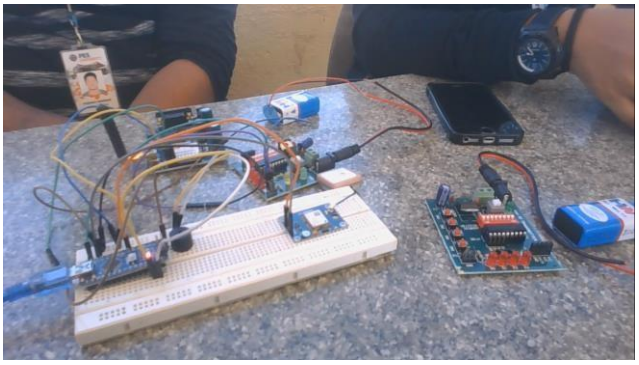


Figure 3: SIM900A GSM module

SECTION V.

CONCLUSION:

The main purpose of building a woman safety device to act as a rescue and prevent any harm at the time of hazard especially for women. With all the technology available to us in recent times, it's not hard to build a safety device for women which will not only generate an emergency alarm but also send a message to your friends, family, or concerned person.This system detects and sends the alerts for the dear ones and the nearest police station with the location coordinates of the women without the requirement of her interaction in critical times. The prototype is suitable to carry in any type of bags such as handbags and laptop. Carrying the prototype in these bags is suggested because even the person who is trying to harm may not notice the device inside the bag. The main advantage of our proposed system is that both automatic and manual mechanism is implemented and it is very cost efficient as well.



Final design of the project.

SECTION VI.

FUTURE SCOPE:

The addition of an EEG signal detection to help detect a situation of emergency as stimulated by the person in distress. This will make the device more practical and applicable in case of real-time emergencies. Once a state of emergency is detected, the device is set into its location send mode. Once the location is sent, an automated call could also be made based on the EEG signals. The electrodes which are to be placed on the scalp for reading the EEG signals can be inbuilt onto hairclips or hairbands that women usually wear.
This will significantly increase the cost of the device which could be a setback. We can also interface this system with Smart Phone or Mobile and laptop. We can use this **safety device** in hand bags, luggage, vehicle etc. By using Nano size materials, the kit size gets reduced. Using wireless GPS module and wireless panic button the carrying of the kit can be avoided. This device can be made so small that it can be used as a hand band. This device can be compatible with mobile phones. Voice messages can be sent during need. Voice recorder and camera can also be added to the system.

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