

GPS Based Self Defence System for Women Safety

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Abstract: The world is becoming unsafe for women in all aspects. The crime against women is increasing at a higher rate. The employed women are feeling unsafe due to increasing crimes. This paper proposes a quick responding mechanism that helps women during trouble. When someone is going to harass, she can just press the button and the location information is sent as an SMS alert to few pre-defined numbers in terms of latitude and longitude. It is interfaced with a push button, a GPS module, a GSM modem and a LCD Display (16x2). If the switch is pressed, the Arduino take the current location information from the GPS module and send those data to the predefined no. using a GSM modem. The program is developed in 'C' language. The purpose of this project is to feel safe the women's.

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Introduction: Even in this modern era women are feeling insecure to step out of their house because of increasing crimes in our country like harassment, abuse, violence etc., The corporate and IT sector are currently in boom. Many women are working in corporate even in night shifts. There is a feeling of insecurity among the working women. The proposed device is more like a safety system in case of emergency. This device can be fitted in a jacket (similar to a blazer for women). It is an easy to carry device with more features and functions. The emergency push button is held to one of the buttons of the jacket. The main purpose of this device is to intimate the parents and police about the current location of the women. A GPS system is used to trace the current position of the victim and a GSM modem is used to send the message to the pre-defined numbers. This model is also useful for small children's, elderly aged people also.

The main purpose of our project is to provide safety to the women's from the dangerous zone. In this project we are providing facility to secure the women's by providing this kit. As the women feels insecure at that time she can press the button .GPS will calculate the latitude and longitude co-ordinates of that area. The controller read this value and sends those data to the pre-defined number which is already saved in program.

Proposed: The Block diagram of our proposed system is as shown below:

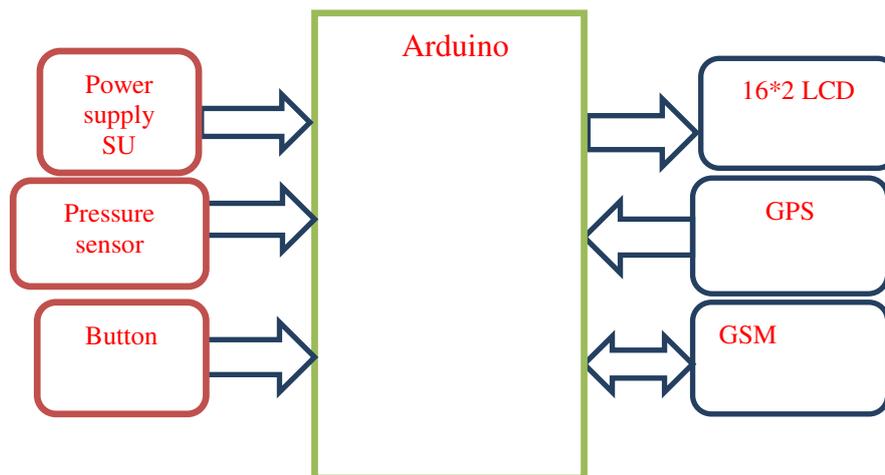


Figure-1: Block Diagram of GPS based self defence system for Women Security System.

Arduino: This development board provides small plate with the same powerful microcontroller like Arduino Uno. The Arduino Nano is small in size that uses ATMEGA328P Microcontroller. It lacks only a DC Power jack so its work with a Mini-B USB Cable instead of standard one. It operates on 5V DC supply. Remaining all component interface with this device. The RX and TX pin of this device is connected to the TX and RX of the GSM modem of SIM800 Module. D10 Pin is connected to the TX of The GPS module. D2 to D7 Pin is connected to the LCD Display. Then by given a proper power supply and system ground the Arduino is ready to do their job.

LCD Display (16×2): This display contains two internal byte wise registers, One for the commands (RS=0) and second for character to be displayed (RS=1). It also contains a user programmed RAM area (the character RAM) that can be programmed to generate any desired character that can form using a dot matrix. To distinguish between these two data areas. The display takes varying amounts of time to accomplish the functions. D4-D7 pin is connected to the D2-D5 Pin of Arduino. RS and EN Pin of display is connected to the D6, D7 Pin Respectively also by giving a proper supply and system ground LCD is ready to display the data.

GSM Module (SIM 800A): The GSM module can accept any GSM network operator SIM card and act just like a mobile phone with its own unique phone number. GSM/GPRS modem is a class of wireless modem devices that are designed for communication of a computer with the GSM and GPRS network. It requires a SIM Card just like mobile phones to activate communication with the network. Also they have an IMEI (International Mobile Equipment Identity). Similar to mobile phones for their identification. The module can perform following operations.

1. Receive, send or delete SMS messages in a SIM.
2. Read, add, search phonebook entries of the SIM.
3. Make, receive or reject a voice call.

The TX, RX, GND Pin of this module is connected to the respective pin of Arduino and is supplied by the 12volt, 2AMP Adaptor.

GPS Model: It consists of six wires out of which three wires are used for connection. The TX pin of this module which is connected to the D10 pin of the microcontroller. Voltage supply is about 3.3V to 5V. When Push button is pressed, GPS starts receiving signals from 4 satellites out of the 24 satellites in the orbit. Once if the connection is established the latitude and longitude values of the current location are obtained. The GPS acts as a transmitter. The 5V supply is given to the GPS from the controller.

Button: When it is pressed then it will send GPS signal to the controller, then controller will send the GPS co-ordinates via GSM to the pre-defined numbers.

Pressure sensor: Pressure transducers have a sensing element of constant area and respond to force applied to this area by fluid pressure. The force applied will deflect the diaphragm inside the pressure transducer. The deflection of the internal diaphragm is measured and converted into an electrical output.

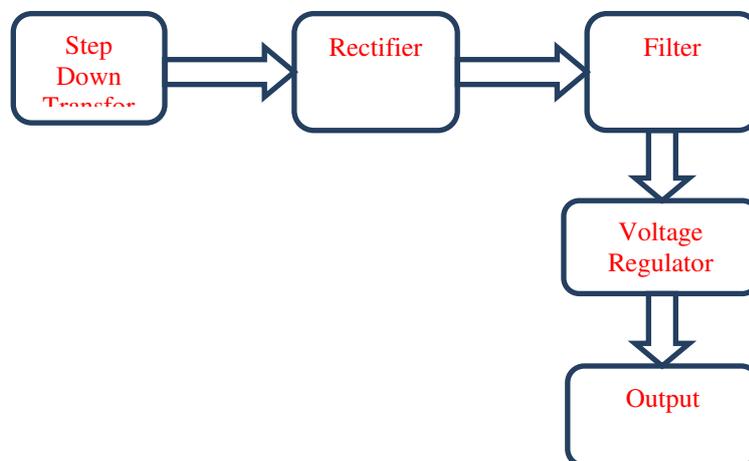


Figure: 2:Block diagram representation of power supply.

Step down transformer: The concept of a step down transformer is actually quite simple. The transfer has more turns of wire on the primary coil as compared to the turns on the secondary coil. This reduces the induced voltage running through the secondary coil, which ultimately reduces the output voltage.

Rectifier: A rectifier is an electrical device that converts alternating current (AC), which periodically reverses direction, to direct current (DC), which flows in only one direction. The process is known as rectification, since it "straightens" the direction of current.

Filter: The filter is a device that allows passing the dc component of the load and blocks the ac component of the rectifier output. Thus the output of the filter circuit will be a steady dc voltage. The filter circuit can be constructed by the combination of components like capacitors, resistors, and inductors.

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Voltage regulator: A voltage regulator generates a fixed output voltage of a preset magnitude that remains constant regardless of changes to its input voltage or load conditions. ... It compares the output voltage with a precise reference voltage and adjusts the pass device to maintain a constant output voltage.

Result: The program for our proposed model is coded in Embedded C language and is built using MPLAB software. The program is further tested in PROTEUS software. The GSM module is not available in proteus so we can use virtual terminal component to check the output of the GSM. The simulation output is given below. Using AT commands the GSM modem is able to send the message to the predefined numbers. Usually we prefer for information transfer to one or two numbers. But if necessary to send the message to many numbers, it is also possible. The numbers must be stored in the program of the microcontroller and must be dumped using the kit. The only problem is that it takes time to send message if the predefined numbers are more than three. Thus in the above output image we are able to see the transmission of message from the GSM modem to the predefined numbers using the virtual terminal.

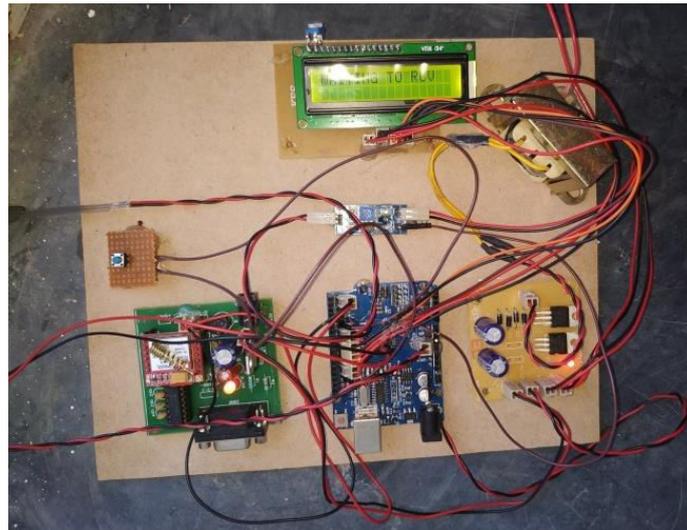


Figure 3: Hardware part of the system.

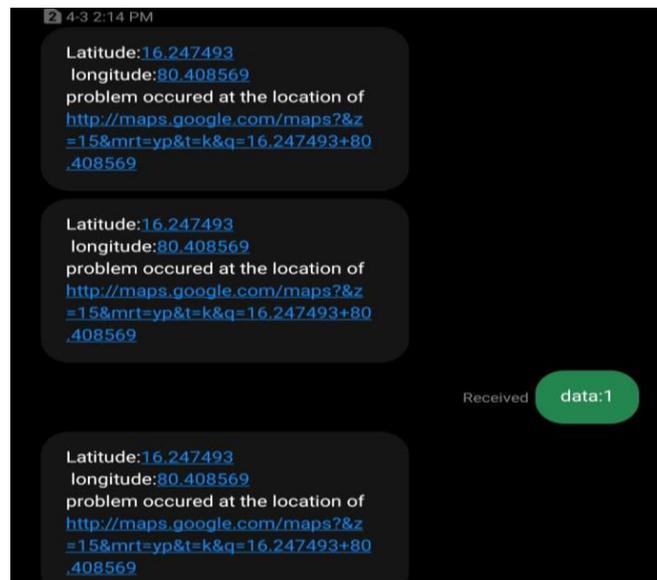


Figure 4: Tracking location

Conclusion: The proposed design will deal with critical issues faced by women in the near past and will help to solve them with technically sound equipment's and ideas. This system can overcome the fear that scares every woman in the country about her safety and security. In future, system can be interface with the Camera for capturing image and recording live video also.



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