

A Novel Smart Protection System for Women

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Abstract

Present world is less secure and dangerous for women. They are facing many security issues once they step out on work. Although there are many existing systems for security purpose need of advanced smart security system is increased. In order to overcome such problems smart security system for women is developed in this paper using Arduino controllers and various sensors like temperature, flex sensor, MEMS accelerometer, pulse rate sensor, sound sensors, which has to be implemented in daily life. A buzzer, LCD, GSM and GPS are used in this project.

When women is in any difficulty, the smart protection system senses the body parameters like heartbeat rate, change in temperature, the movement of victim, MEMS accelerometer and the voice of the victim. When the various sensors gets activated, the device traces the location of the victim using the GPS module. By using the GSM module, the victim's location is sent to the registered contact number.

Keywords: Women safety, Arduino controllers, Sensors, GPS module, GSM module.

1. Introduction

Safety is now a days the major issue in today's world. Present world is less secure and dangerous for women. Although government is providing many safety measures, it is difficult for a women to reach back home safely once they step out on work. Technology is the best way to achieve it. So, the project of smart security systems is to be implemented in practice to protect them at the time of danger. A smart protection system is to be built and detect the location as well as health condition of the person. So that we can act accordingly based on electronic gadgets like GPS receiver. The heartbeat of a person increases abruptly in such situations which gives a buzzer and helps to make decisions to detect the abnormal motion of the women while she is victimized.

This protection and tracking system in the device consists of a GPS receiver, Arduino controller and a GSM Modem. The GPS Receiver gets the location information from satellites in the form of latitude and longitude. The controller processes this information and this processed information is sent to the certain person using GSM modem.

In cost point of view, its very less for woman at risk. The proposed solution can be used in other types of application like child security, woman security even.

2. Existing Systems

In the security systems, which are existing, the victim has to press the emergency button, where the victim may not have a choice to do so. If the victim is a child or an uneducated, who may not have a knowledge of smart phone, sending the location to trusted ones is difficult. In "Mobile Tracking Application for Locating Friends", a tracking application software must be installed in the mobile phones which may not be possible if the signal is weak at the sending end or at receiving terminal.

If a tracking and sensor system is kept in bag or in any thing which victim is carrying, the victim may lose it in the spot of danger and may run away.

The main drawback of such device is that the initial action has to be triggered by the victim. It may not happen at that particular situation.

This paper presents a new method to provide smart protection for women or children by a buzzer and send the location using GSM module with latitudes and longitude directions to the registered mobile number where the victim is present.

3. Proposed System

The Block diagram for the women security system is shown in the figure below.

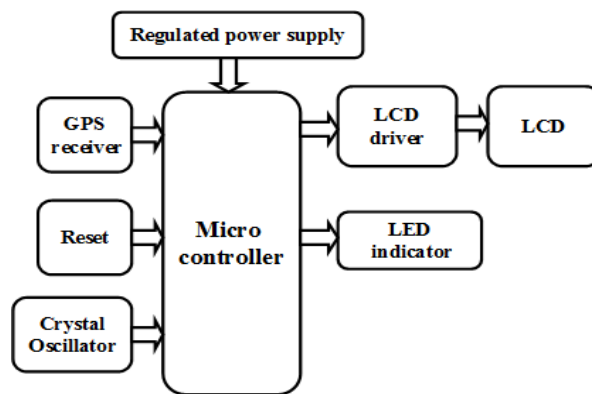


Figure 1: Block Diagram of Arduino Based GPS and GSM Based Smart Woman Security System

The above figure consists of Arduino controller which receives input signals from the sensors, when the victim is in danger. The various sensors connected to arduino like temperature sensor,(used here is LM35 sensor) to detect the body temperature of the victim, MEMS accelerometer, heartbeat sensor, flex sensor, sound sensor are used and connected to the appropriate pins in arduino. To display body parameters of the victim an output used is LCD 16*2 display, also a buzzer, GSM is used to send messages, GPS is used to send location to registered mobile number. The fig. 2 shows the line diagram of the project, smart security system for protection of women.

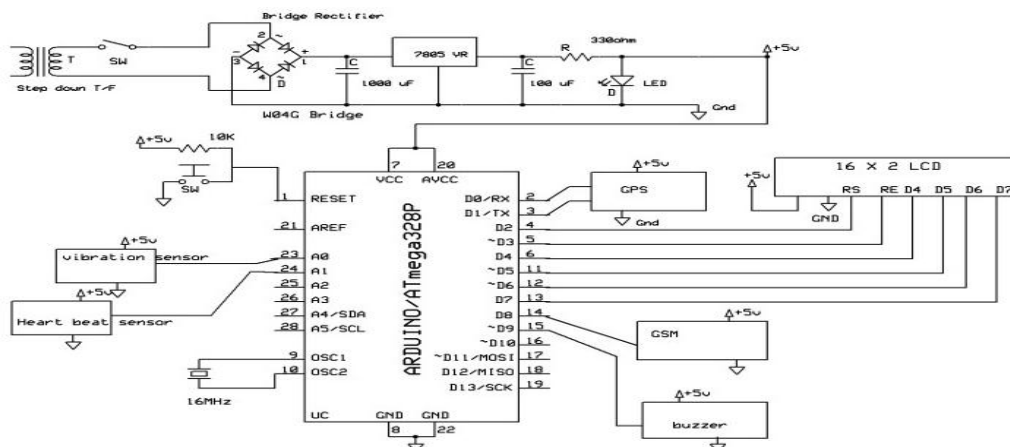


Figure :2: Line Diagram of Women Security System

4. Working Principle

The purpose behind this principle is to detect the body parameter signals from the respective Sensors which are in contact with the women who are in abnormal conditions. When detecting signals, the sensors transmits the output signals to the controller. The Arduino receives the signals from the sensors as an analog input and generates output parameters and display it on LCD display.

The sensors in the project detects signals of the victim who are in abnormal situations. If any value of the sensor crosses the threshold limit indicating that the women is in threat the buzzer is activated. Hence the GPS transmits the location to the Arduino and the Arduino transmits signals to the GSM. Finally the alert message, along with latitude and longitudinal location is send to the registered contact number.

5. Hardware

- The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs.
- Buzzer: Now-a-days, it is more popular to use a ceramic based piezo-electric sounder like a Sonalert which makes a high-pitched tone.
- GPS Module: Global positioning system (GPS) is a navigation and precise positioning tool, which tracks the location in the form of longitude and latitude based on Earth by calculating the time difference for signals from various satellites to reach the receiver.
- Temperature Sensor: LM35 which has series of precision integrated circuit sensors whose output voltage is linearly proportional to the Celsius temperature, where body temperature of victim can be identified.
- Flex Sensor: Resistive flex sensors can be used to measure bending or flexing with relatively little effort, motion of the victim can be identified.
- MEMS Accelerometer: An accelerometer is an electromechanical device that is used to measure acceleration and the force producing it.
- Pulse Rate Sensor: The Pulse Sensor is a plug-and-play heart-rate sensor for Arduino which senses the heart rate of victim.
- Sound Sensor: The sound sensor module provides an easy way to detect sound and is generally used for detecting sound intensity.

6. Implementation of the Proposal

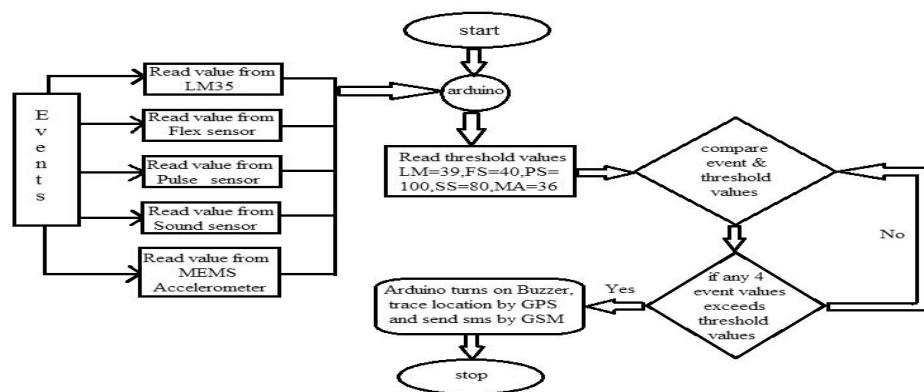


Figure 3. Flow Chart of Proposed System

The fig. 3 shows the flow chart of the proposed system. When the victim's body temperature is changed due to any unexpectency, the output signal from sensor which is a voltage signal is fed to Arduino, which turns on the buzzer and sends the message through GSM module.

When the victim is in any danger, she may shout out loudly screaming for help and hence the sound sensor detects the signal and if the sound generated by the women proceeds the threshold value, the change in the voice signal is fed as input to the Arduino, which turns on the buzzer and sends the message through GSM module.

The sensor is placed on the hand to detect the resistive change in that particular placement of the sensor, when the victim is in any unexpected situation, the resistive change changes, which is detected by the FLEX sensor and if the change generated proceeds the threshold value, signal is fed as input to the Arduino, which turns on the buzzer and sends the message through GSM module.

Generally the heart rate of the human is 72beats/min. If the heart rate of the victim is increased due to danger, the change generated proceeds the threshold value, signal is fed as input to the Arduino, which turns on the buzzer and sends the message through GSM module.

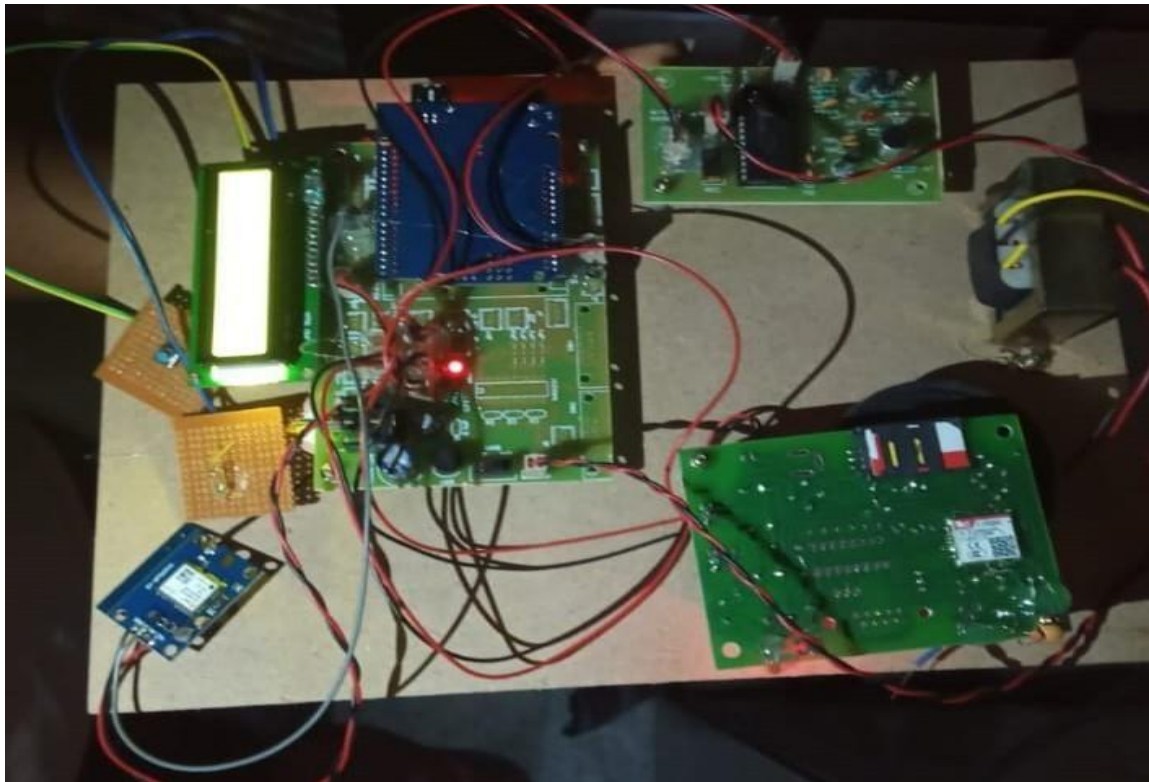


Figure 4. Experimental kit.

7. Softwares Used:

This project is implemented using following software's:

- Express PCB – for designing circuit
- PIC C compiler - for compilation part
- Proteus 7 (Embedded C) – for simulation part

8. Advantages

1. Efficient and low cost design.
2. Low power consumption
3. Easy to operate.
4. Fast response

9. Disadvantages

1. Interfacing GSM and GPS to microcontroller is highly sensitive

10. Applications

This system will be an efficient solution for real time applications to track the location of victim.

11. Conclusion

Our project “A NOVEL SMART PROTECTION SYSTEM FOR WOMEN” is mainly intended to applications to track the location of victim.

This project can be extended using a GPRS technology. GPRS is used to applications to track the location of vehicle in weblinks.

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