

Smart Bag for Women Safety

Soumi Karmakar¹, Tapan Kumar Rana²

¹ Fourth Year Student, ECE Dept., IEM. Kolkata,

² Professor, ECE Dept., IEM. Kolkata

Email: soumikarmakar09@gmail.com, tkrana@rediffmail.com,

Abstract—In this paper, we are presenting the design of a smart bag which provides security for women. The smart bag comprises of GSM module, voice sensor, emergency switch, Arduino board and different actuators. The system gets activated either by pressing an emergency switch or by sensing the voice of the woman through a voice sensor. Upon detecting alarming situation a high intensity light starts flashing, a siren generates high pitch sound alarm, one pepper spray starts spraying peeper. Very high voltage is also produced on front part of the bag thus hurting the attacker. In the meantime message is sent automatically to registered numbers mentioning location and the situation.

Keywords—Emergency; GSM module; Siren; Flashlight;

I. INTRODUCTION

In the current global scenario, women are not safe in many locations. Women harassment is increasing in an alarming rate. Every day in newspaper, we see the headlines of violence against women. Woman need to learn self-defense to protect herself from the negative people. There are various kind of self-defense like Martial art training, classic karate moves, Aikido Defense etc. A lot of research has been done for women safety.



Fig. 1. Some steps of self-defense technique

Many papers are available as given in the reference list [1] to [10]. In [1-2] papers authors presented an IOT based women safety device for self-alert and protection. It provides self-defense and tracking information. The device consists of Raspberry Pi 3b+, GSM module, GPS module, relay module, buzzer and nerve stimulator. In [3] authors suggested a smart shoe that not only helps woman take care of them but also help them to be fearless. In [4] authors proposed smart band which is integrated with smart phone. It can detect the location and health condition of the victim that will enable to take

action accordingly based on GPS receiver, body temperature sensor, GSM, pulse rate sensor. In [5] authors presented a smart watch. When victim face any kind of harassment, she can press the switch located on the watch, the various information such as body posture, location, sms alert are sent to the predefined number by using GSM through Raspberry Pi. In [6] authors proposed idea is quite similar with [5]. Only the activation technique of total system that is implemented on the smart band is different. Here sound sensor is used. When the sensor crosses the threshold limit the device gets activated and starts to work. In [8] authors presented a self-defense device for the security of the women. It provides GSM alert and GSM tracking with fingerprint verification. In [10] authors introduced a mobile application called WoSApp. This application is the most reliable way for woman to place an emergency call to the police station.

In our paper we have designed a unique self-defense system. Different electronic units have been mounted in the system to give the protection. When woman feels any emergency situation, she presses the emergency switch and the system will get activated automatically. A high intensity light starts flashing with a loud siren. This also alerts nearby people. Front side of the bag produces high voltage. So if anybody touches it he will receive a heavy electrical shock. A pepper spray mechanism is activated that forces the attacker to close his eyes for minutes. The system generates SMS signal that is forwarded automatically to few registered mobile numbers informing about the attack and the geographical location. The most important thing about our system is that if victim is unable to press the switch, she can raise a loud voice, which a there is also a voice sensor detects it.

II. METHODOLOGY

The system is housed in a bag which the woman will carry. It is totally Arduino based system. The circuit block diagram is shown in figure 2. It senses the emergency situation with the help of sensing units. One is a voice sensor and another one is push button switch. When woman feels unsecured she can press the switch, the system is automatically turned on. The system generates bright flashing light to confuse the attacker. A loud siren is used to attract the nearby people. Also for self-defense, the system includes high voltage generated shock circuit. A pepper spray is also injected to the attacker. On

sensing the emergency condition, the system fetches the current location of woman and sends it to the emergency contacts mobile numbers via GSM module. There is another way to turn on the system by voice sensor. The sensor value is continuously read by controller. When the sensor value crosses the threshold, the system starts working.

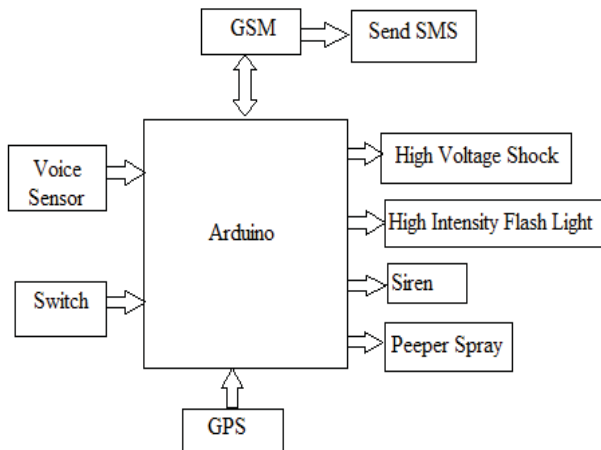


Fig. 2. Block diagram of the hardware

III. DIFFERENT SENSORS AND COMPONENTS USED

A. Voice sensor

It is LM393 sound detection sensor. Voice sound is detected via microphone and fed into an LM393 opamp. The threshold level is adjusted via onboard potentiometer. When the level exceeds the set point, an LED on the module is illuminated and output is sent low to the controller.

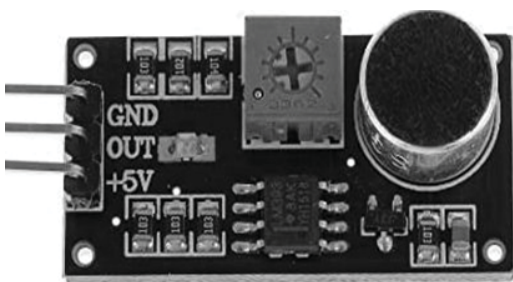


Fig .3. Voice Sensor



Fig. 4. UBLOX NEO-6M GPS module

C. GSM module

SIM900A is an ultra-compact and reliable wireless module. It is SMT type and designed with processor integrating AMR926J-S core. It works on frequencies 900/1800 MHZ.

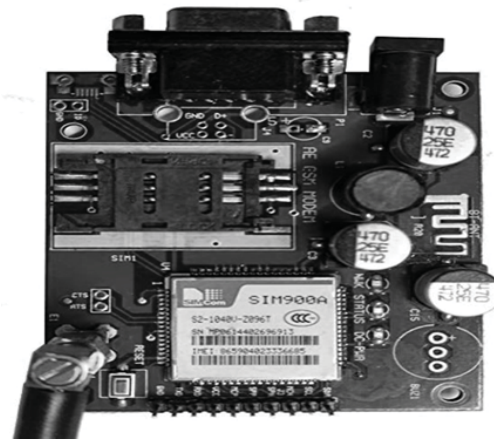


Fig. 5. SIM900A GSM module

D. Pepper Spray

Pepper Spray is used for women self defense. To resist the attacker, an electrically operated solenoid valve is actuated. It sprays the pepper through a nozzle. The spray prevents the attacker opening his eyes for a long time and helps the woman to run away.

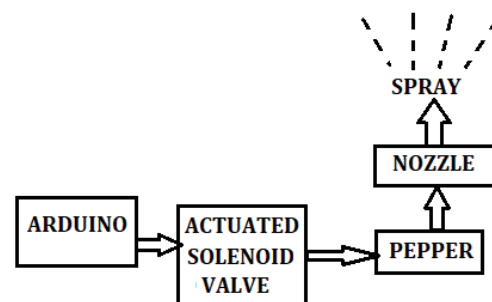


Fig. 6. Pepper Spray

Figure 6 shows the pepper spraying arrangement.

E. High voltage shock

Naked copper wires are embedded on the front of the bag. When the alarm condition is sensed the battery voltage is stepped up using a push-pull voltage inverter to a very high voltage level. It is in the order of more than 300V, 50Hz square wave. The person attempts to touch the woman will be in touch with the front part of the bag which is having high voltage in the embedded wires. The person will receive a heavy electrical shock. The base drive of the push-pull inverter will be generated by the Arduino. Figure 6 shows the high voltage generation arrangement.

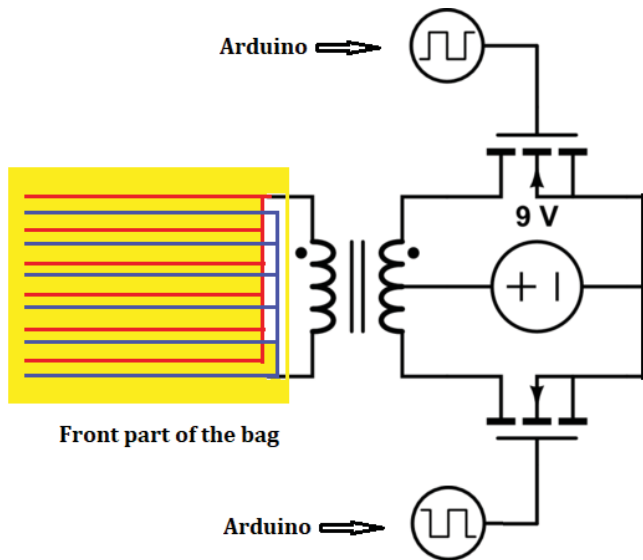


Fig.7. Generation of high voltage

F. Flashing light

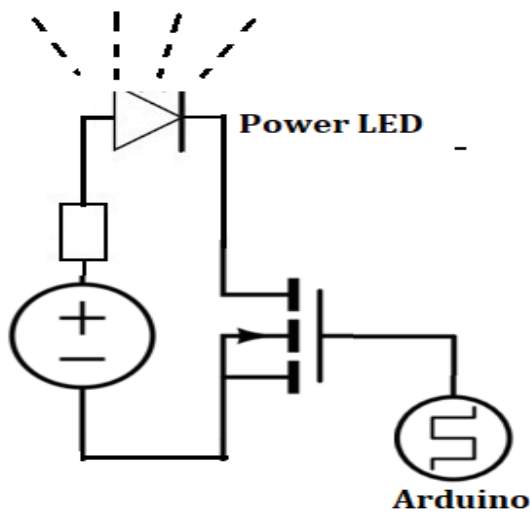


Fig.8. Flashing light

Figure 8 is showing the high intensity flashing light circuit.

Arduino generates pulses which are used to drive power LED. Light emitted from the LED is flashing in nature and creates a vision obstruction for the attacker. Similar circuits have been used to generate high intensity sound alarm.

IV. FLOW CHART

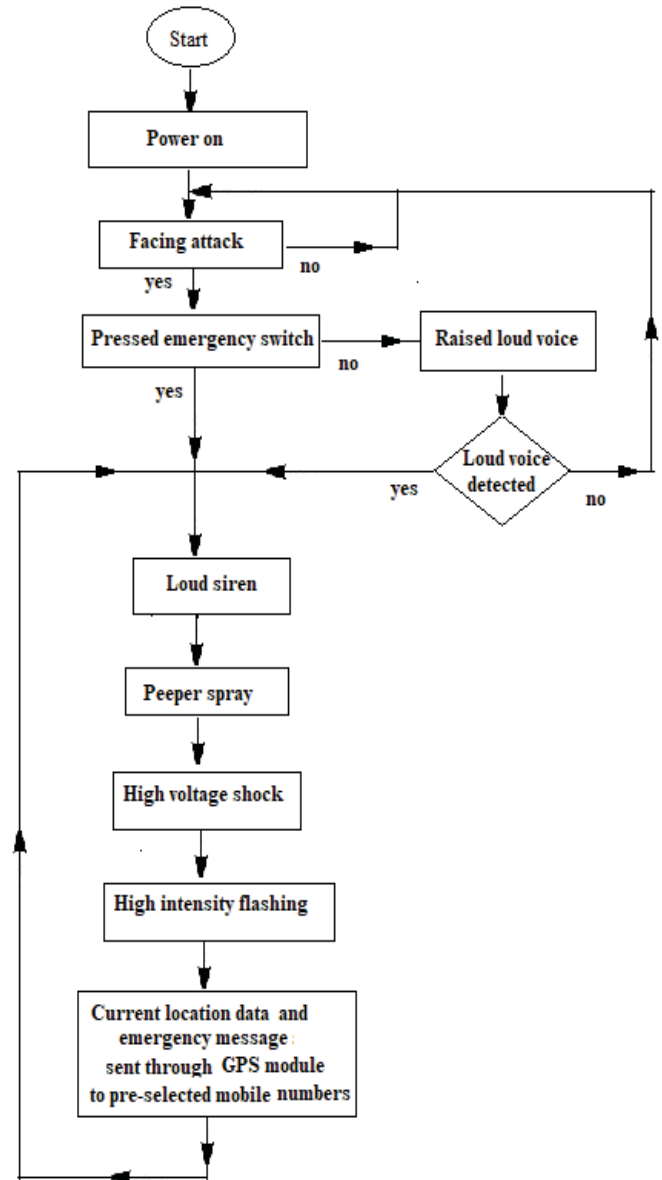


Fig.9. Flow chart

The figure 9 is a flowchart of the system. In power on mode, when the woman faces an attack she operates a switch or raised a loud voice. The unit starts operating following the flow chart as given above.

V. CONCLUSION

The system can be implemented at a very nominal investment. The unit is portable and everyone can carry it in a bag. The unit will find ultimate solution as far as women safety is concerned.

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