THE DISCERNING WEAPONIZATION FOR WOMEN SELF -DEFENSE USING EMBEDDED

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ABSTRACT

In the current global scenario, the prime question in every girl's mind, considering the ever rising increase of issues on women harassment in recent past is mostly about her safety and security. To self safe and secure the women, we develop this project that this system can act as a rescue device and protect at the time of danger. The design of a smart bag which provides security for women. The system gets activated either by pressing an emergency switch or by sensing the voice of the woman through a sound sensor. 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. And 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.

Keywords : Emergency, GPS/GSM module, Siren, Flashlight,

I. INTRODUCTION

This paper focuses on a security system that is designed merely to serve the purpose of providing security to women so that they never feel helpless while facing a trouble. 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.

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 selfdefense 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.

II. EXISTING SYSTEM FOR WOMEN SECURITY

Having this concern in mind many developers have come up with creative applications. Some of such applications are:
Codes like *91# is used to provide emergency services, which will alert police control. Free mobile application 'Help me on mobile' to ensure safety of women was launched to assist those who need emergency .These applications need a single click to do this task. But when a girl is in trouble, there can be times that the girl is not capable of taking the phone and pressing button.

A. SHE (Society Harnessing Equipment): It is a garment embedded with an electronic device. This garment has an electric circuit that can generate 3800kV which can help the victim to escape. In case of multiple attacks it can send around 80 electric shocks [3].

B. ILA security: The co-founders of this system, have designed three personal alarms that can shock and disorient potential attackers and hence safegaurd the victim from perilous situations.

C. AESHS (Advanced Electronics System for Human Safety) It is a device that helps track the location of the victim when attacked using GPS facility.

D. VithU app: This is an emergency app initiated by a popular Indian crime television series "Gumrah" aired on Channel [V]. When the power button of the Smartphone is pressed twice consecutively, it begins sending alert messages with a link of the location of the user every two minutes to the contacts.

E. Smart Belt: This system is designed with a portable device which resembles a normal belt. It consists of Arduino Board, screaming alarm and pressure sensors. When the threshold of the pressure sensor crosses, the device will be activated automatically. The screaming alarm unit will be activated and send sirens asking help [4].

The main drawback of these applications and services is that the initial action has to be triggered by the victim which often in situation like these doesn't happen. So the emphasis is to build a solution that works autonomously in situations encountered.

III. PROPOSED SYSTEM

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. As seen in Fig. 1 A high intensity light starts flashing with a loud siren. This also alerts nearby people. 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.
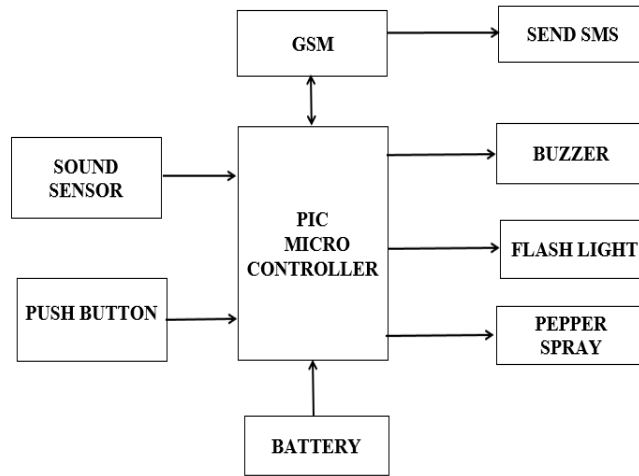
PROPOSED DIAGRAM

Fig. 1. Main block Diagram

IV. 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 .2. Voice Sensor

B. 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.
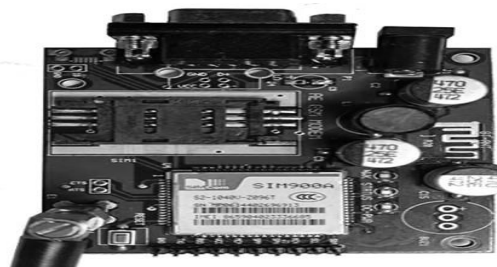

Fig. 3. SIM900A GSM module

C.   GPS MODULE

Global positioning system (GPS) is able to determine the latitude and longitude of a receiver on Earth by calculating the time difference for signals from varios satellites to reach the receiver. In six different orbits approximately 12,500 miles above the earth, 24 MEO (Medium-Earth Orbit) satellites revolve around the earth 24 hours and transmit location every second as well as present time from atomic clocks and by monitoring blood flow through skin when is in contact with the wrist band at each pulse.

Fig. 4.UBLOX NEO-6M GPS module

D. Pepper Spray

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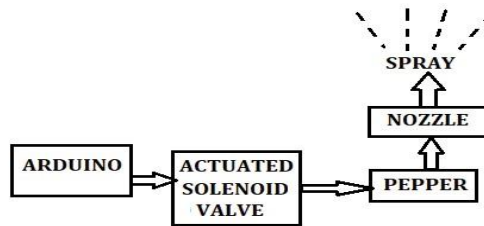

Fig. 5. Pepper Spray

E. Flashing light

Figure 6 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.
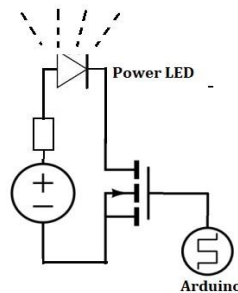

Fig.6. Flashing light

F. BUZZER

Active Buzzer Arduino module produces a single-tone sound when signal is high. The Active Buzzer module consists of a piezoelectric buzzer with a built-in oscillator. It generates a sound of approximately 2.5 kHz when signal is high.

Fig. 7. Buzzer

V. SOFTWARE ALGORITHM

 The following steps are initiated when once the unusual behaviour of the user is detected. The decision is made by the inputs given by the various sensors like pulse rate sensor, temperature sensor and unusual motion detected by the motion sensor. The situations are pre-programmed into the system based upon which the device makes the decision and is handled by the smart phone app.

1. Assign the transmitter and reciever pins of GPS module.
2. Set the serial buffer with baud rate 9600 and bit rate 4800.
3. Now set a loop which will then trigger the following actions:
    a) Scan the contact number from SIM.
    b) Get data from GPS module.
    c) Convert the longitude and latitude obtained from GPS into a Goggle URL.
    d) Attach this URL with an alert message.
    e) Send this message to pre-selected ICE(In Case of Emergency) numbers from SIM memory periodically until device is reset.

VI. 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

With further research and innovation, this project can be implemented in different areas of security and surveillance. The system can perform the real time monitoring of desired area and detect the violence with a good accuracy.

VII.   REFERENCES

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