

IoT Based Smart Security and Safety System for Women and Children

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Abstract

Now a days, women and children are facing various issues like sexual assaults. Such violence will definitely have huge impact on the lives of victim. It also affects their health and their psychological balance. These kinds of violence keep on increasing day by day. Even school children are kidnapped and sexually abused. We are living in a society where a nine months old girl child doesn't have security, the child was kidnapped, raped and then murdered. On witnessing those violations against women, its impulses us to do something for women and children safety. So, in this project we have planned to propose a device which will act as a tool to provide security and ensures the safety of the women and the children. Microcontroller, GSM and GPS module are used to send notifications and current location of women to various mobile numbers in their contact. In addition, this project will also act as a safety measure which will stun the opposition for few seconds. This project will help us to rescue many women and children from those fiendish in the society.

Keywords: GSM, GPS, Electric Shock, IoT, Safety System.

1. Introduction

Safety of women in India has become a major issue not. According to the National Crime Records Bureau, in 2016 the sexual harassment is increased by 82% compared with the previous years. Across all cases, 95% of rapists were not strangers but family, friends and neighborhood the wake of recent rape and murder of young women, much of the public speak about it has been confined to outrage, punishment and tougher laws. Each and every day women and children are being abused or molested around the world. It is necessary to safeguard women from those predators. Laws alone will not protect her from every situation, she has to defend herself. For that a self defence device is needed. Fig 1 shows the record cases of child rapes in India.

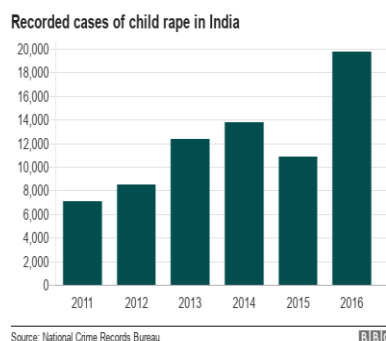


Fig 1. Block Diagram of IoT Based Smart Security and Safety System for Women and Children.

2. Literature Survey

Shaista Khanam, Trupti Shah [1] proposed algorithm for women safety using fingerprint module. This paper gives a detailed approach towards women safety. Here fingerprint is required for activation of device, electric shock producing circuit, GSM and GPS module for alerting and location tracking. At the time of emergency, it is hard to place the finger in the fingerprint module and recognition is not possible, if there is any undesired stuff (wet or dust) in the finger. To avoid this problem the fingerprint module will not be used in the proposed system.

Naeemul Islam, Md. Anisuzzaman, Sikder Sunbeam Islam, Mohammed Rabiul Hossain, Abuja far Mohammad Obaidullah [2] developed a device for safety and protection of women. Here three push buttons are implemented to define the types of accident victim is facing. To control a whole system a PIC16F887A microcontroller is used. Since it is a 40 pin IC, it increases the size of the device, which will make it difficult for women/children to carry all the time.

Sharifa Rania Mahmud, Jannatul Maowa, Ferry Wahyu Wibowo [3] proposed an algorithm for women empowerment. This paper discusses about violence against women and also different health issues of women. It is an application-based system. During the event of molestation using the application present in the victim's smartphone will automatically send out an emergency call to the assigned contacts. This can do only when GPS is enabled in the smartphone and if not the time delay taken to turn on the GPS is noted to be the downside of the project.

Anand Jatti, Madhvi Kannan, Alisha RM, Vijayalakshmi P, Shrestha Sinha [4] developed a wearable device, which uses physiological signals like galvanic skin resistance and body temperature. Data is monitored using cloud platform and analysed using MATLAB simultaneously. If there is any sudden change in the physiological parameter intimation will be sent to the parents. But body temperature may also change due to some other reasons. So, it is not fair to consider body temperature as a parameter to design a device for women safety.

Sunil K Punjabi, Suvarna Chaur, Ujwala Ravale, Deepti Reddy [5] developed an intelligent system for women and children. In this system they are using a pressure switch. When they feel unsafe, she has to compress the switch, then an intimation will be sent to parents followed by a call. If it is unanswered the call will be redirected to nearby police station.

M. Kavitha, V. Sivachidambaranathan [6] proposed a devie for women self-protection using IoT. In this system there are few bio sensors are used to sense the user's bodily changes. If there is any abnormalities detected on women an intimation will be sent to guardian as per preprogram of the device.

R. Pavithra, S. Karthikeyan [7] developed a survey on women's safety mobile application. This application helps women to discover and help them in any critical situations. It helps finds out the exact area of the individual and send SMS to the parents.

Madhura Mahajan, KTV Reddy, Manita Rajput [8] designed a rescue system for safety of women. It is a simpler safety solution that can be achieved by pressing a switch and instantly send out alerts to the near ones of the individual.

Nandita Viswanath, Naga Vaishnavi Pakyala, G. Muneeswari [9] developed a smart foot device for women safety. This smart device will be clipped to the footwear of the user. If the foot has been tapped behind the others on four times, an alert will be sent through Bluetooth.

3. Components

A. Microcontroller

Generally, microcontrollers are used to interface various peripherals in the circuit.

Arduino Uno is a microcontroller which has AT mega 328. The key features of Uno board are Pinout, Stronger reset circuit and AT mega 16U2 replace the 8U2.

Table 1. Specification of Arduino Uno

Parameter	Value
Microcontroller	ATmega 328
Operating voltage	5v
Flash memory	32KB
SRAM	2KB
Clock speed	16MHz
Digital I/O pins	14
Analog input pins	6

B. Capacitive Touch Sensor

Capacitive touch sensors are generally used in devices like mobile phones and MP3 players, they are also found in home appliances and industrial applications. The key features of capacitive touch sensor are robustness, cost, product design and durability.

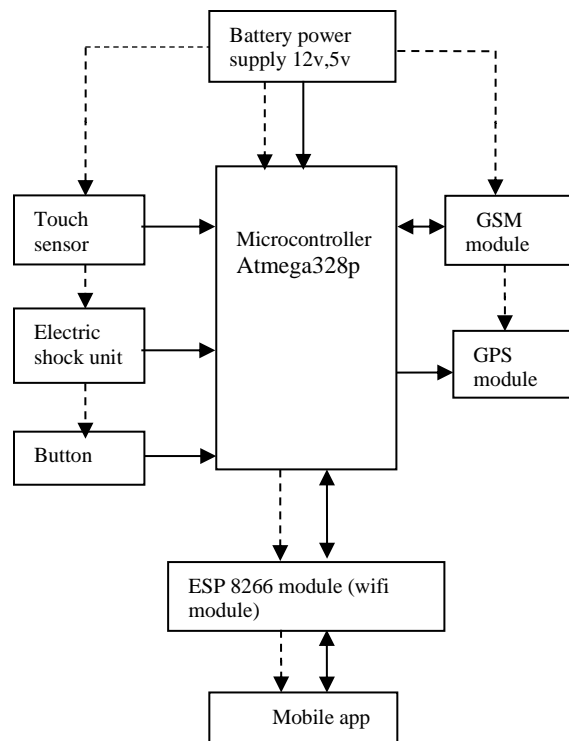
C. Global System for Mobiles

Interaction between computer and the system is enabled by GSM/GPRS. GPRS is nothing but extension of GSM which has high data transmission rate. There are different types of GSM modules available, we are using SIM 900 GSM.

D. Global Positioning System

GPS is used to determine the receiver's position such as latitude, longitude and altitude. Change in receiver position is also determined with more accuracy and the velocity is also determined.

3. System Description



The ultimate aim of the project is to developed a self defence device. Whenever there is an emergency, she has to press the button. Then the electric shock unit and the touch sensor gets activated. The High voltage Low current shock circuit will stun the opposition for few seconds, which acts as a self defence. An intimation along with the location will be sent to the contact mobile numbers of the person.

Fig. 1 shows the block diagram of IoT based smart security and safety system for women and children. Microcontroller, Arduino no is used for interfacing with peripherals. SIM 900 GSM and GPS are used to send notification along with location. Electric shock circuit is used to generate high voltage low current to paralyse the opponent for few seconds.

A. Interfacing of GSM Module with Arduino

Even though there are different types of GSM modules are available, we are using a SIM 900 GSM module. Only three connections are required between GSM module and Arduino to interface GSM with Arduino. Different types of output are taken from the PCB board, and it is connected with the GSM module. TTL output is for Arduino and RS232 output is for interfacing directly with the PC. For our project we are choosing an arduino compatible gsm module with TTL output provisions.

B. High Voltage Low Current Electric Shock Circuit

The High voltage circuit works on the principle of blocking oscillator concept is shown in Fig.2. R1 and C1 is mainly used for determining the frequency of oscillation. While adjusting the preset the transistor will never come within the unsafe zone, it is ensured by R1. 3V DC power supply is required to operate the circuit. When power supply is given, the center tapped transformer and transistor starts oscillating at high frequency as specified before. This makes the battery current to pass across the TR1 winding. Because of switching, a high voltage is induced across the secondary winding of TR1, which is around 200v. Then the voltage is raised to the appropriate level, such that it will generate a flying spark, which is done by a charge pump circuit used at the output of TR1. This network raises the output voltage from 200v to 600v. The bridge rectifier will rectify the high voltage and stepped up by 2uF/1KV capacitor. When the terminals are relatively close a flying spark will be generated.

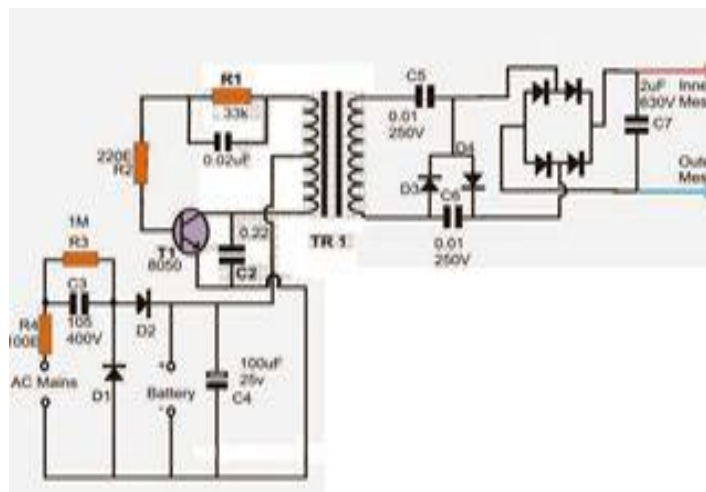


Fig 2. High voltage Low current circuit

5. System Design

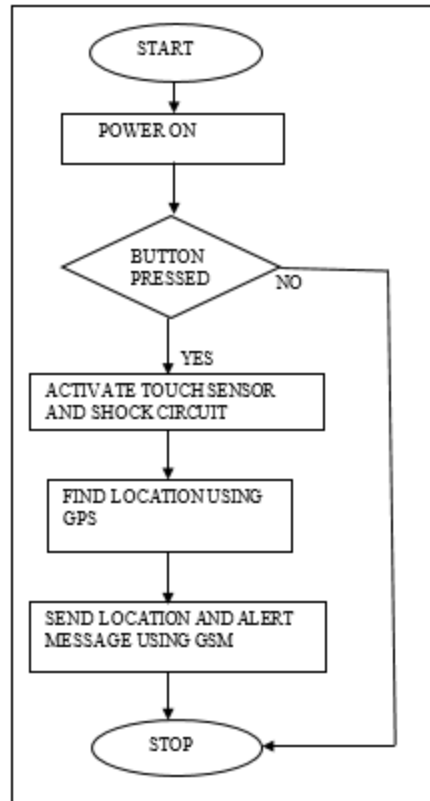


Fig 3. Flowchart of operation of device.

6. Result

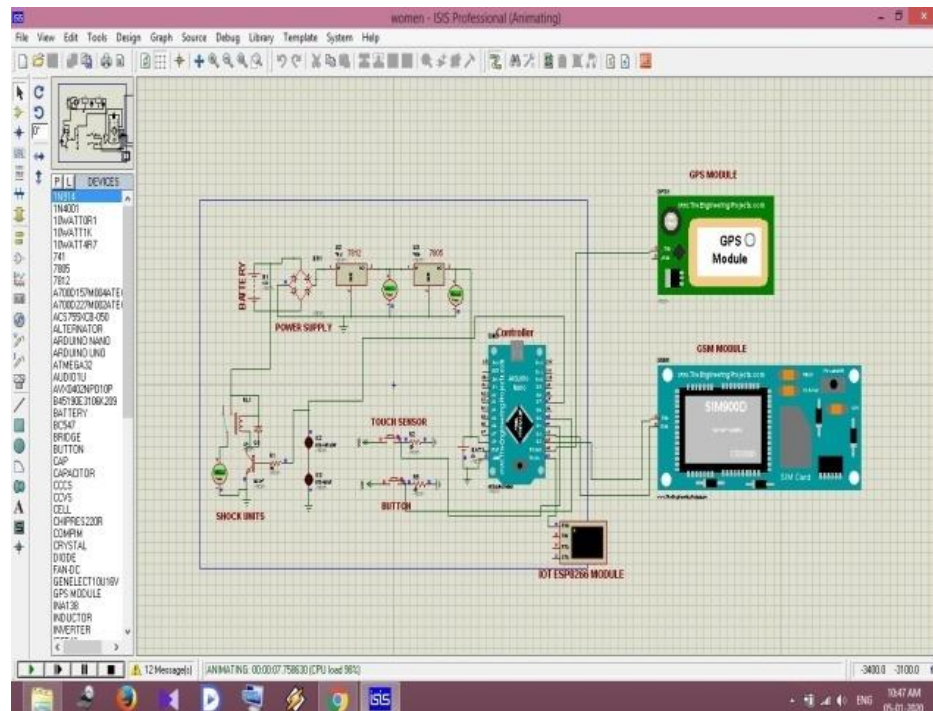


Fig 4. Simulation environment of the system.

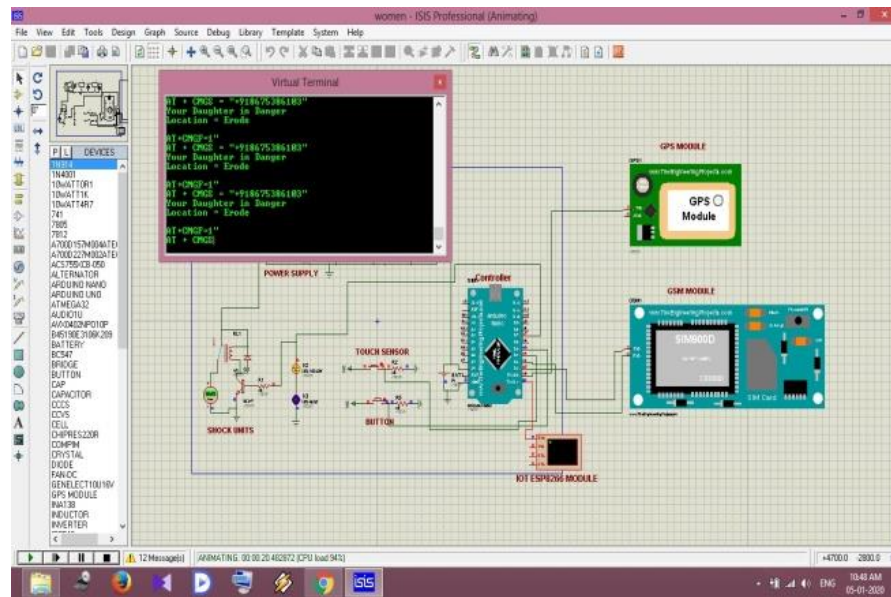


Fig 5. Operation of touch sensor.

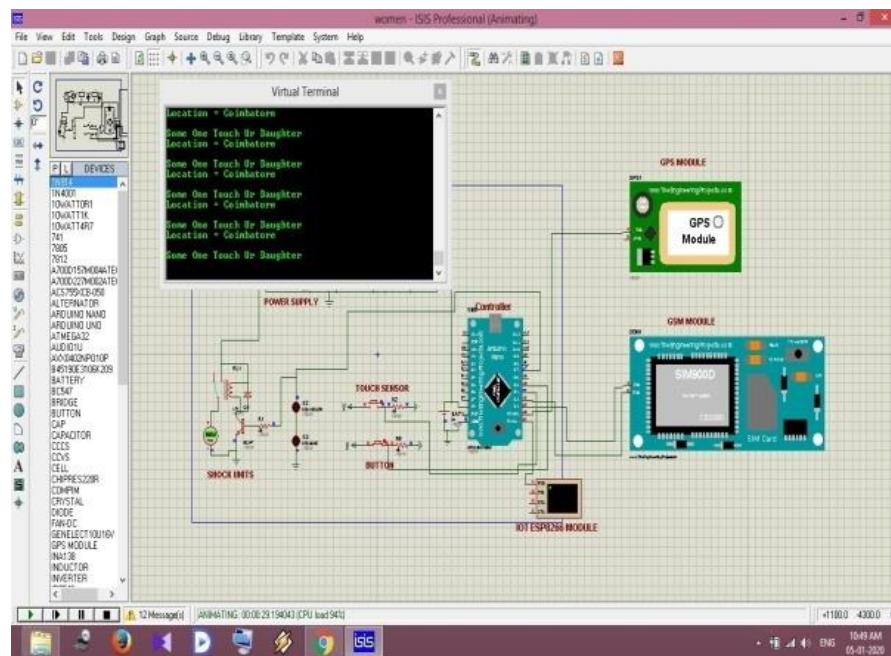


Fig 6. Operation of button.

7. Conclusion

Nowadays not only women but children also get molested. In order to provide security and to ensure their safety a system has been proposed in this paper. Many researchers have been working in this area and have developed different technologies. Using these technologies, a self defence device is proposed in this paper by adding new feature thereby making it more secure. This paper describes the basic design concept and functionality along with the expected outcomes.

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Conflict of interest

None of the authors have any conflicts of interest to declare.

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