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# IOT Based Device for Women’s Self Security System

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**ABSTRACT:** Now-a-days, the public, mostly women and children are facing much harassment from the societies. The unlawful activities against ladies and children have been increasing significantly, and regularly we find out about eve-teasing, sexual assault cases, and attempt to molest or even killing after rape in public places or open areas. Also, many cases had gone unwarranted due to short pieces of evidence. In India, the current statistics of sexual assaults and various unlawful activities are proliferating. To acknowledge these problems, in this paper, we have designed an IoT-based (Internet of Things) embedded device that is able to communicate with the law enforcement agency by dialling “100” (An Emergency Telephone Number in India) on demand. The device contains Arduino Pro-Mini Microcontroller with a GSM (Global System for Mobile communication) module and can send SMS (short message service) with the victim’s present area to the law enforcement agency and relatives via GPRS (General Packet Radio Services). The proposed device’s form factor is too tiny to carry out easily at anywhere and anytime. The device features the “Plug & Play” functionalities, which means one button to operate the entire device. Also, the device is cost effective so that people of every level can afford it at a reasonable price.

**KEYWORDS:** Anti-rape; IoT device; smart-safety device; women safety; wearable device; GSM/GPRS

## I. INTRODUCTION

In the present scenario ladies stay aware of men inside and out of life, however tragically at the expense of being presented to harassing, viciousness and fierceness out in the open and even in their own homes. They cannot leave their homes whenever of the day they cannot wear garments as indicated by their will and cannot go to work in harmony. There is a shame towards ladies that pulverizes their feelings of opportunity, yet besides, sabotages their trust and dreams. Because of the above factors, it is quite clear that in the country there is a struggling need for women's safety.

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. At this moment, we can undoubtedly get to the necessary information in real-time, from (nearly) whichever area we are at. Due to rapid advancements in embedded systems, the IoT-based devices are getting popular day by day because of its flexible interactivity. IoT energizes the correspondence between gadgets. It also makes robotics easy and minimizes humanoid sweats that can save much time. Nevertheless, some security and privacy issues also are there in the IoT system. So, in this paper, we have designed an IoT-based device,

to ensure women and child safety in daily life. The device can send SMS with the victim’s current location to her friends and family. Also, the device can make the call to “100” (Emergency Number of India) as on-demand. We have developed the device in such a way that every level of women or people can afford it at a reasonable price. Moreover, we designed the prototype model as too small, and also it can be formed in a smaller device to use it in a locket, hand-bag, and pocket or as a bracelet, etc. So the contributions of our device are:

- It can send SMS with the current location.
- It can make a call by pressing a single button.
- The device is cost and power-efficient.
- The device overcome burst-transmission phenomenon.



## II. RELATED WORK

[1] Authors here discuss about the present scenario of security to women is very less and in order to provide security to women is very essential. Hence to provide the security, an application is to be built and given with sufficient data like human behaviour. It has to be accessed to GPS services. This application can detect the location and check the condition of women health by which actions can be taken accordingly. Hence this proposed system helps in dealing with the problem faced by women which can be solved with technical knowledge.

[2]. Women Employee Security System using GPS and GSM Based Vehicle Tracking - By Poonam Bhilare, Akshay Mohite in the year 2015, It describes a GPS and GSM based vehicle tracking and women employee security system that provides the combination of GPS device and specialized software to track the vehicles location as well as provide alerts and messages with an emergency button trigger.

[3] Khanna Samrat Vivekanand Omprakash depicted about the working procedure characterized by different ways and the accompanying thought is. This framework is an essential movement enacted alert. It is worked around an Arduino Microcontroller. It is associated with a PIR movement sensor, a ringer, a resistor, and a couple of outside terminals. The entire framework is battery fueled with the goal that it is effectively compact. When you have the code, you can interface all the outer parts. The least demanding approach to do this is with a breadboard. This will give you a chance to make transitory associations with test everything out. What's more, they likewise incorporate the favourable circumstances and weaknesses for this thief alarm

The device is so tiny and can be carried out efficiently in daily life. Moreover, our device is very much cost efficient that people of all levels can afford it at a reasonable price. The device also has the feature of “Plug & Play”. So, one operational button to activate the device for all functionalities.

## III. PROPOSED DESIGN FOR WOMEN SAFETY DEVICE

At first, we turn on the device, and when the system is started, it will initialize the SIM800L module. Then the GPRS and GSM module will ready to read the data from the user when we press the button once it obtains the Geo-Coordinate of the current location via GPRS. Then the system sends the HTTP (Hypertext Transfer Protocol) POST request using the “AT” attention command along with the Geo-Coordinate location to the associated application server. Then the application server sends the Geo-Coordinate location to the prestored phonebook of the victim’s relatives and “100” via SMS gateway. When we long-press the panic button, the system is ready to call the pre-saved emergency phone number, or “100” on demand. Here, Fig. 1 illustrates the overall working framework of our proposed safety system.

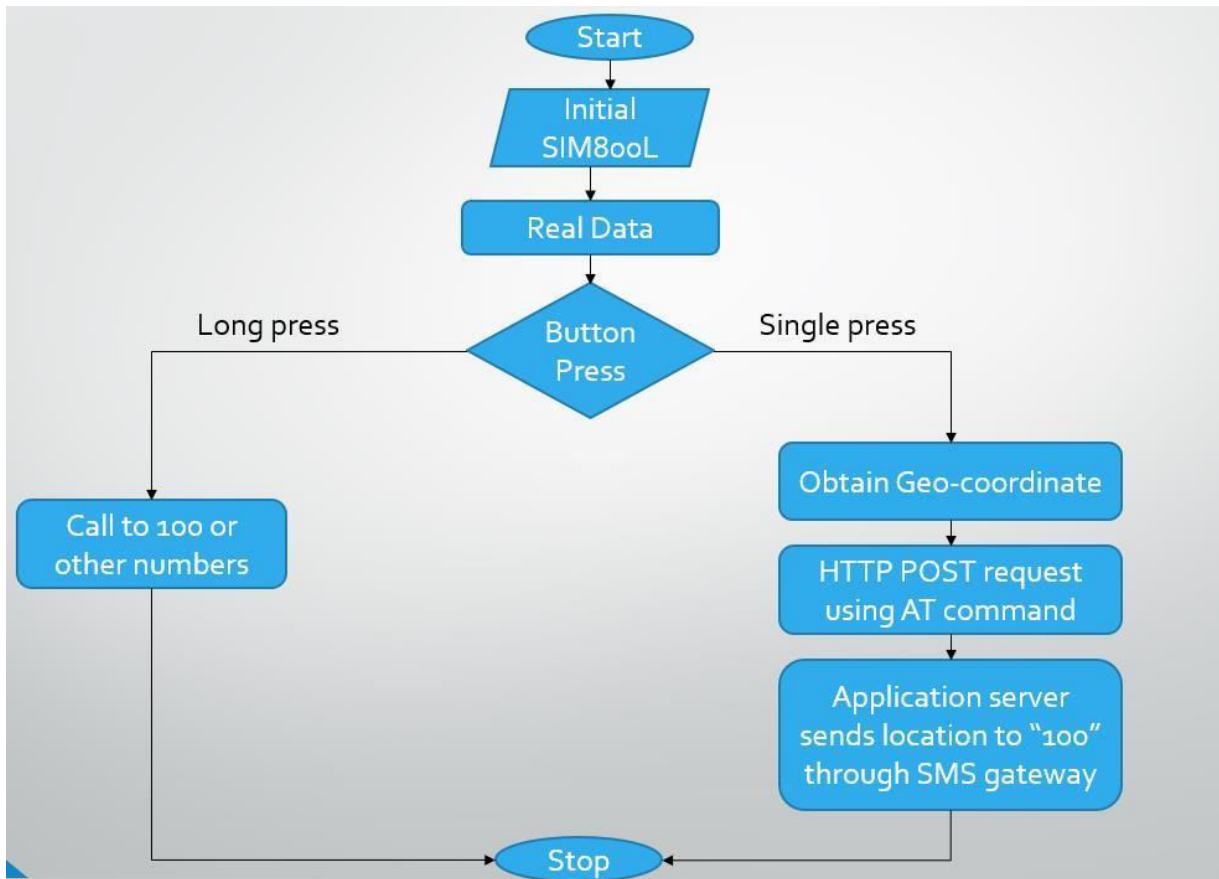


Fig. 1. The Working Framework for our IOT Based women’s Safety Device.

#### IV. BLOCK DIAGRAM

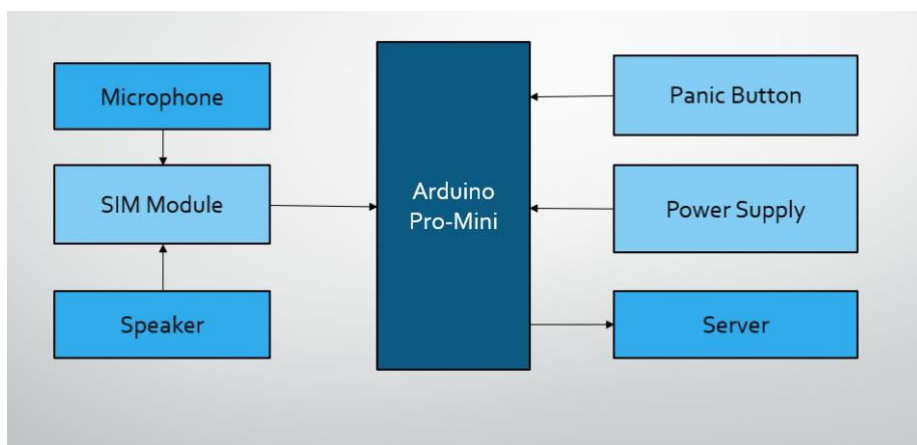


Fig. 2. The Block diagram of IOT Based women’s Safety Device.

The main heart of this device is the Arduino Pro-Mini Micro-controller to handle the entire mechanisms. A localhost server is proposed for keeping the track of every SMS and deliver it to the adjacent police stations. A power supply is needed to power up the device. We have used Li-Poly (Lithium-Polymer) battery as a power supply. The block diagram also contains a panic button to operate the entire device. A SIM800L module has been used for taking



advantage of the GPRS and GSM functionalities. We have used a condenser microphone and a speaker to communicate with the pre-saved emergency numbers. All those components are integrated with the Arduino Pro-Mini Microcontroller.

1). Arduino Pro-Mini:

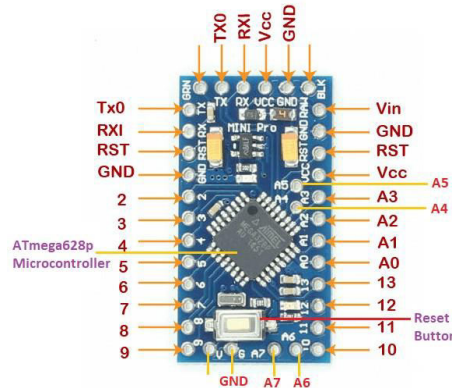


Fig.3(a) Arduino pro-mini

The Arduino Pro mini is a small Arduino board based on ATmega328P or Microcontroller. The connectivity and functionality are the same as other Arduino boards. It is preferred by advanced users for greater flexibility and small size. The board comes in different variants. If we want to use the operating voltage of 3.3V, we need to use the Arduino Pro Mini 3.3V board. For 5V, we are required to use the Arduino Pro Mini 5V board. It is primarily used in compact size projects due to its small size. The Arduino Pro Mini is organized using the Arduino (IDE), which can run on various platforms. Here, IDE stands for Integrated Development Environment.

2). SIM 800L Module

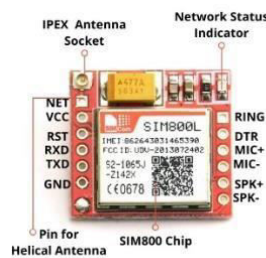


Fig.3(b)SIM 800L Module

SIM800L (fig. b) is a miniature cellular module which allows for GPRS transmission, sending and receiving SMS and making and receiving voice calls. Low cost and small footprint and quad band frequency support make this module perfect solution for any project that require long range connectivity. After connecting power module boots up, searches for cellular network and login automatically. On board LED displays connection state (no network coverage - fast blinking, logged in - slow blinking).

3). Panic Button: We have used a panic-button to perform “Plug & Play” features. The panic-button regulates two functionalities like single press and long-press.

4). GPS: GPS (Global Positioning System) technology is used to find the location of any object or vehicle to monitor a child continuously using satellite signals. Three satellite signals are necessary to locate the receiver in 3D space and



fourth satellite is used for time accuracy. GPS will give the information of parameters like longitude, latitude and attitude. With the help of these parameters one can easily locate the position of any object. In this GPS technology, the communication takes place between GPS transceiver and GPS satellite.

5). GSM: GSM (Global System for Mobile communications) is the technology that underpins most of the world's mobile phone networks. The GSM platform is a hugely successful wireless technology and an unprecedented story of global achievement and cooperation. GSM has become the world's fastest growing communications technology of all time and the leading global mobile standard, spanning 218 countries. GSM is an open, digital cellular technology used for transmitting mobile voice and data services. GSM operates in the 900MHz and 1.8GHz bands GSM supports data transfer speeds of up to 9.6 kbps, allowing the transmission of basic data services such as SMS.

6). LCD Display: This system has a LCD display module for displaying various prompts and status information of the system. It is also used display the title messages and other messages while communicating with the system. A 2-line, 16-character type LCD display module is used. The microcontroller sends the signals to LCD module through its port pins. D. Power Supply Unit: The power supply unit has to provide a regulated

7).C supply to all sections of the system. As it is essential to operate the instrument on batteries since it is used with the person while moving. It consists of rechargeable batteries, filter capacitors and voltage regulators.

8) Condenser Microphone and Speaker: We have used a condenser microphone and a speaker to transmit the voice through the safety device so that the law enforcement agency can hear the sounds around the prey.

6) Resistance and Some wires: We used a 10KΩ resistance for voltage regularization. Moreover, some wires were used for making connections to the entire peripherals.

### V. IMPLIMENTATION DETAILS

First of all, we need the Arduino Pro-Mini Microcontroller to connect all peripherals because it is the heart and only one thing that can operate all other hardware. Here, in the SIM800L has several pins and the SIM RXD pin connects with Arduino's digital Input-Output (I/O) 10 pin for serial communication. The SIM RXD is the receiver pin. The SIM TXD is the transmitter pin and connects with the Microcontroller's Master Out Slave In (MOSI) pin for sending data to the peripherals. We have used a rechargeable 3.7V Li-poly battery to power up the whole device.

Fig. 4 shows the dissection view of the entire device and Fig. 5b shows the developed view of the device.

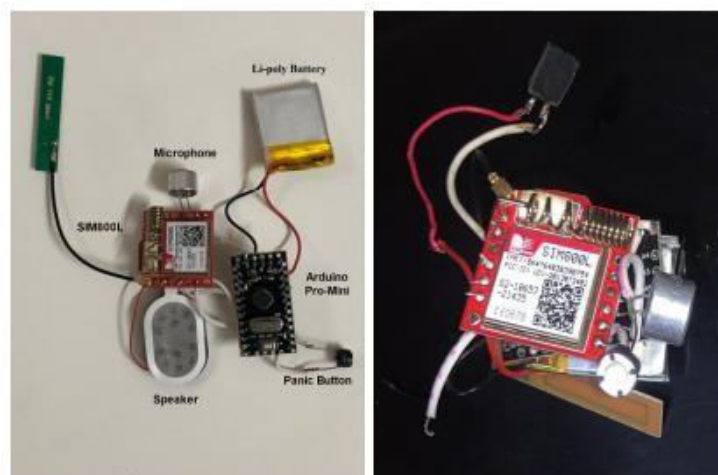


Fig.4 IOT Based women's safety device system.

The positive wire of the battery is connected with the Microcontroller's VCC pin, and the negative wire is connected to the GND pin. The Microcontroller has the Master In Slave Out (MISO), and RAW pins are serially connected with



the switch S1 to on-off the device. A 10K $\Omega$  resistor is also used for the voltage regulator. The SIM800L module has the MIC pin to connect the condenser microphone and the SPK pin to connect the speaker. To build this device, we have spent some money to buy the necessary components. The total cost of developing the “IOT Based women’s safety device” safety device is approximately 400 BDT or 4.42 USD. Here, the pictorial view of Fig. 4 illustrates the overall view of the Anti-Molestation safety device.

## V.APPLICATION

- It will be used for safety of women.
- It will be used for child tracking during school time.
- It will be used in vehicle tracking and safety system.
- It will be used for safety of elderly aged people.
- It will be used for safety of physically challenged people.
- Live location tracking.

## VI. RESULT

In this section, we have discussed the methodology and result of our IOT Based women’s safety device. When a prey presses the panic button, the SIM800L module call to the “100” law enforcement agency number through the cell phone tower, and by GPRS technology, the device sends SMS with his/her current location and update it in the application server. The authority notifies the nearby police station to rescue the prey. Fig. 5 illustrates the form factor of our device which is too small in size to carry anywhere easily. The device can send location continuously. If the law enforcement agency or police try to make a call to the device number, the device automatically discard the call and again send SMS with victim’s current location. Here, Fig. 6 shows the calling mechanism, location sending mechanism, and location traced in map of our safety device accordingly. Moreover, our device is so much power and cost efficient. The device runs a long with a single hour charge. Our safety device has shown a significant result among previous devices with the small form factor.

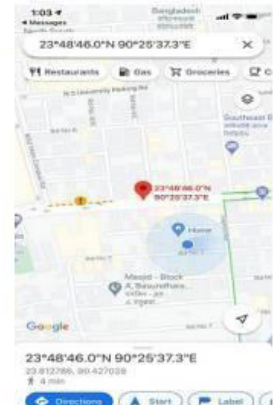
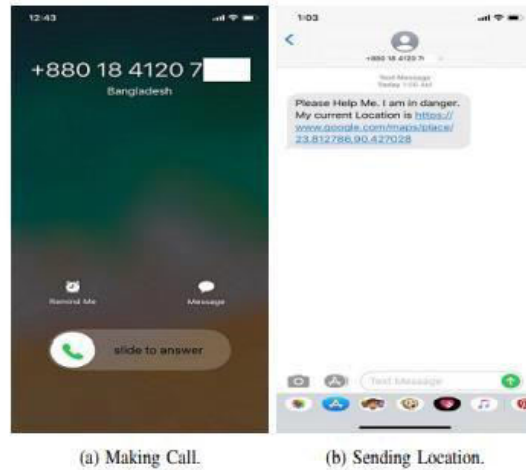


Fig 6. Result Mechanism

**VI.CONCLUSION**

This safety device aims to help women and children from being harassed in any situation. The device can directly inform law enforcement agencies to take legal actions against the culprits. Also, the device can send the victim’s current position to the nearest police station to rescue the victim. our primary goal of this project is to ensure every woman in our society to feel safe and secured.

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