



## WIRELESS IOT BASED SOLUTION FOR WOMEN SAFETY

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**Abstract :** paper proposes a system, by creating a wireless network using GSM and GPS technology with a portable device for alerting the concerned authorities to prevent any mishap. Women will be provided with a beacon device consisting of a help button. In case of any emergency, the beacon information will reach the central stations and an alarm will be triggered at the prominent places of the village

**IndexTerms**–IOT,Arduino,

### I. INTRODUCTION

Even though we live in the 21st century with much technological advancement and social awareness, women face the problem of harassment of any form and get abused physically or mentally. Areas like streets and public spaces have been the territory of such violence. This issue worsens for women living in remote and rural areas, where they might not be aware about these crimes or hesitate to report these crimes to the concerned authorities. There are many existing applications and devices for women security through smartphones. Though the smartphones have increased rapidly, it is not possible that the smartphones and cellular network will be available all the times in rural areas. Also, many people in the village do not have smartphones which can assist them in contacting the concerned authorities, otherwise. Literacy rate of villages is low and parents do not send girls to schools due to the fear of sexual harassment.

In this system, women safety is based on BLE (Bluetooth Low Energy) Beacon device due to their low cost, ease of deployment, ease of accessibility to the users and superior interior localization as described in . Kang EunJeon, James She, Perm Soonsawad, and Pai Chet Ng specify that BLE has low energy requirements and battery life of BLE Beacon devices can be extended upto 2-3 years on a single coin cell battery if broadcast intervals are set appropriately based on the application. BLE is 60 – 80% cheaper than traditional Bluetooth and is compatible with a wide range of IoT(Internet of Things) boards, mobile phones, tablets and computers. It is ideal for the proposed system which requires small periodic broadcast of data at regular interval of 1 – 1.5 seconds.

### II. EXISTING SYSTEM

#### 2.1 Existing system for Women Safety

As the number of crimes increased against women that has growing as a planted seeds of fear and security in the minds of Indian people and other countries people ,because of these fears ultimately end point in the imposition of restrictions and strict rules every women has compromise with, willingly, unwillingly to win their goals and achievements . Instead of bringing the confidence in a young women and children, these restrictions normally and again turn them into meek beings dare less and uncap able of facing in front of the world. To get rid of the fear of family members and to help a woman and child move around with confidence and encouragement, many developers have made up with of many applications and some security devices

#### 2.2 Femme

It is used by the women in the time of emergency and distress for the security. It is designed like an applicationthat can used by everyone who would have installed and thisand make use of this in their mobiles and devices. The basicapproach of this device is that the victim wants to trigger(single click) by that it can trace the location of the personand the emergency message .

#### 2.3.Eyewatch SOS for Women

Eye watch SOS are specially made for women that captures the video and can record the audio of the surroundings near the women and sends an alert through message to the special contacts (**Advanced ElectronicsSystem for Human Safety**) this application can be used at the high locations like mountain, hills and without GPRS thus we can receive a safety confirmation message clicking button I am safe button.

## 2.4.Smartbelt

Design of this system is similar like normal belt and this system is also portable. The main parts of this system are Arduino Board, screaming alarm and pressure sensors. The device will be automatically activated when the sensor crosses the threshold of the pressure for asking help, to send sirens, the activation of screaming alarm should be done

## III. PROPOSED SYSTEM DESIGN TECHNOLOGY

### 3.1Sensing Units

The women safety device senses the emergency situation with the help of sensing unit that consists of three elements: 1) Heartbeat Sensor – Working on the principle of IR reflection by blood, this sensor keeps a count of woman's heartbeat. Fig. 1 shows the heartbeat sensor. 2) Temperature Sensor – This sensor keeps a track of woman's body temperature and sends the generated analog data to controller. 3) Push Button – It's a simple Dual Port Double Throw (DPDT) switch that the woman presses when she is in an emergency situation and needs help.

### 3.2 Controller Unit

ATmega8L is an 8-bit high performance microcontroller of Atmel's Mega AVR family with low power consumption. ATmega8L is based on enhanced RISC architecture with 130 powerful instructions. Most of the instructions execute in one machine cycle. ATmega8L can work on a maximum frequency of 16MHz. ATmega8L devices are available in 28-pin.

### 3.3 Location Tracking Unit

Current location of woman is fetched by this unit with the help of GPS module. GPS Module comes with a POT (Patch on Top) ceramic antenna which makes it a small and complete solution for enabling GPS navigation to various embedded devices and robots. Module comes with a standard 2mm DIP pin headers which provides easy interface to your device

### 3.4 Cellular Messaging Unit

Location of women along with an emergency Short Message Service (SMS) is sent to police and relatives by GSM module. GSM/GPRS module is used to establish communication between a computer and a GSM-GPRS system. Global System for Mobile (GSM) is an architecture used for mobile communication in most of the countries. GSM/GPRS module consists of a GSM/GPRS modem assembled together with power supply circuit and communication interfaces (like RS-232, USB, etc) for computer

### 3.5. Display Unit

Location of women along with an emergency SMS is sent to police and relatives by GSM module. GSM/GPRS module is used to establish communication between a computer and a GSM-GPRS system. Global System for Mobile communication (GSM) is an architecture used for mobile communication in most of the countries. GSM/GPRS module consists of a GSM/GPRS modem assembled together with power supply circuit and communication interfaces (like RS-232, USB, etc) for computer.

### 3.6 Alerting Unit

A simple, but powerful and effective way to raise an alarm is through a loud siren and bright lights. And this is achieved with the help of a bright LED flash light and an electronic siren. Thus, when the women safety device senses the emergency situation of a woman, it triggers its alerting unit which alerts the nearby people about the crime by loud noises and bright flashes of lights.

### 3.7 Self-Defense Unit

In a situation where less or no people are nearby, a woman must be able to protect and defend herself as well as create some trouble for the abuser by some very easy means. The self-defense unit consists of a shock generator devices that produces an instant electric shock which when used by the woman can immobilize and hurt the attacker Some other ideas that can be implemented in device are – As the technological changes or new requirement from user to enhance the functionality of product may requires new version to introduce. Although the System is complete and working efficiently, new modules which enhance the system functionality can be added without any major changes to the entire system. By keeping this ability of the product in mind, an incremental process model has been used to design and develop the system. Among the various modules few are identified, which couldn't be included in the last increment due to time constraints.

### 3.8 Primary School Children Safety

As the school children safety are major concerns for parents as well as school management due to the recent incidents of child crimes like children missing, abuse etc. This module can be used to monitor the child safety when they are travelling in school buses. Once they have reached the school they press button and message is sent to the parents that, "the child reaches the school safely". The device can further be extended as capability of audio recording when activated that can be listened by the parents or authorize person.

### 3.9. Vehicle Safety System Module

The Safety of four and two wheeler car is also a major concern in the society due to the increase in the crime rate of stolen car. The location tracking and sensing module can be modified according to the requirement of vehicle safety system module.

### 3.10 Mobile and other valuables Safety System Module

The missing rate of mobiles is high while travelling from bus, train or crowded public area. The area zone module functionality further enhances to provide safety. A small device needed to keep either in same pocket or within the range of few centimeters. As you kept the mobile and forget to pick up or someone has stolen it then for small range the siren of mobile as well as device gets ON for user attention. Also the same device can attach to our luggage, hence in case of forgetting to pick back or tried to be stolen by someone can be easily noticed by the module and make the attention of user through the siren alarm. Apart from this in future this module can be moulded in form of a jewellery piece like pendant or earring, which will be unknown to others, having it more fashionable appearance. Wristwatch can also be realised using this. A shot gun can be added as a future defense mechanism. Further an Android app can be developed for woman safety and security purpose. Hence, the advance technology makes the system more robust and reliable. As the new modules provide the functionality which enhance the safety and security.

## IV. BLOCK DIAGRAM OF PROPOSED TECHNOLOGY

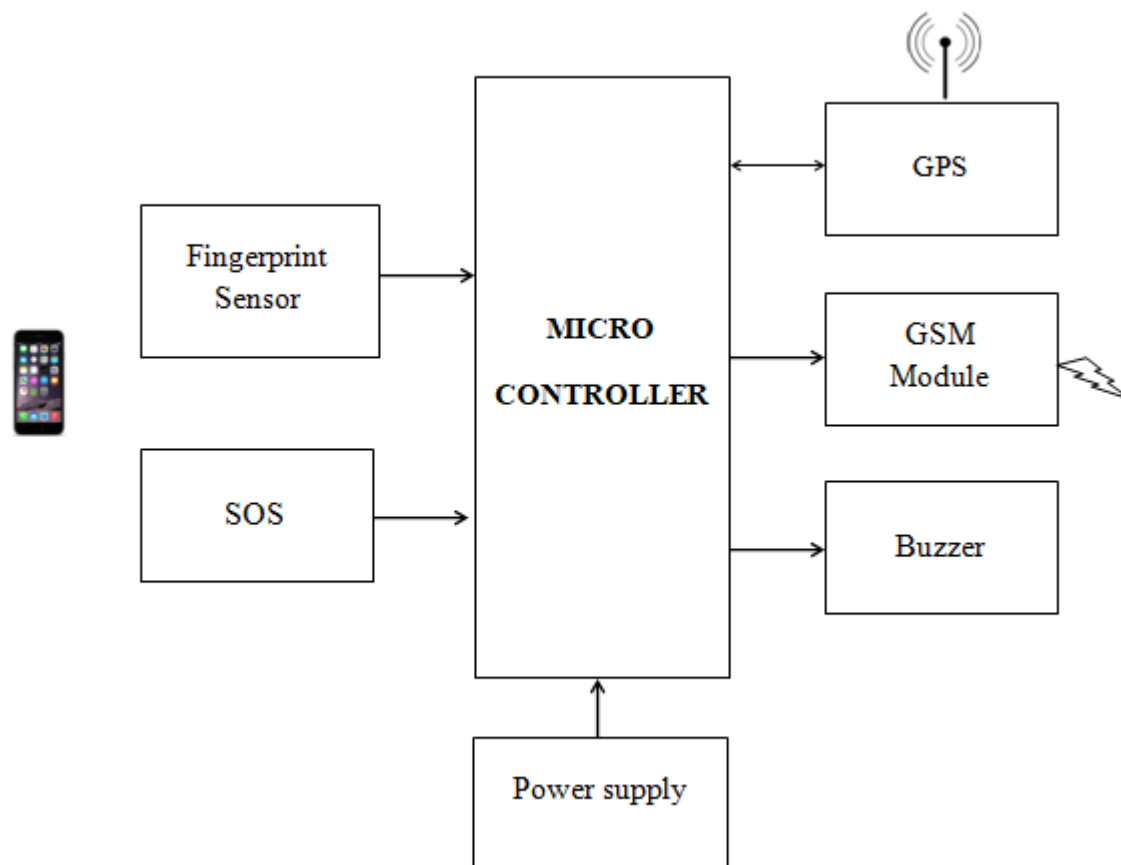


Figure 1. Block diagram of Proposed Technology

## 4.1 Arduino:

This development board provides small plate with the same powerful microcontroller like Arduino Uno. The Arduino Nano is small in size that uses ATMEGA328P Microcontroller. It lacks only a DC Power jack so its work with a Mini-B USB Cable instead of standard one. It operates on 5V DC supply. Remaining all component interface with this device. The RX and TX pin of this device is connected to the TX and RX of the GSM modem of SIM800 Module. D10 Pin is connected to the TX of The GPS module. D2 to D7 Pin is connected to the LCD Display. Then by given a proper power supply and system ground the Arduino is ready to do their job.

## 4.2 LCD Display (16×2)

This display contains two internal byte wise registers, One for the commands (RS=0) and second for character to be displayed (RS=1). It also contains a user programmed RAM area (the character RAM) that can be programmed to generate any desired character that can form using a dot matrix. To distinguish between these two data areas. The display takes varying amounts of time to accomplish the functions. D4-D7 pin is connected to the D2-D5 Pin of Arduino. RS and EN Pin of display is connected to the D6, D7 Pin Respectively also by giving a proper supply and system ground LCD is ready to display the data. [3]

## 4.3 GSM Module (SIM 800A)

The GSM module can accept any GSM network operator SIM card and act just like a mobile phone with its own unique phone number. GSM/GPRS modem is a class of wireless modem devices that are designed for communication of a computer with the GSM and GPRS network. It requires a SIM Card just like a mobile phones to activate communication with the network. Also they have an IMEI (International Mobile Equipment Identity). Similar to a mobile phones for their identification. The module can perform following operations. [4]

1. Receive, send or delete SMS messages in a SIM.
2. Read, add, search phonebook entries of the SIM.
3. Make, receive or reject a voice call.

The TX, RX, GND Pin of this module is connected to the respective pin of Arduino and is supplied by the 12volt, 2AMP Adaptor. [4]

## 4.4 GPS Model

It consists of six wires out of which three wires are used for connection. The TX pin of this module which is connected to the D10 pin of the microcontroller. Voltage supply is about 3.3V to 5V. When Push button is pressed, GPS starts receiving signals from 4 satellites out of the 24 satellites in the orbit. Once if the connection is established the latitude and longitude values of the current location are obtained. The GPS acts as a transmitter. The 5V supply is given to the GPS from the controller. [4]

## 4.5 Power Supply

To make the DC power supply of 5volt we used step down transformer, bridge circuit, filter circuit and finally fixed voltage regulator. In this system we used step down transformer in which primary voltage is greater than secondary voltage. In this system we used 9-0-9 step down transformer. So at the transformer output we got 9volt AC. Then we used bridge circuit whose job to perform to convert AC into pulsating DC. Then filter is used to remove the noisy pulses and convert pulsating DC into pure DC. Then IC7805 Regulator is used which provides fixed positive 5V DC Output. This voltage is required to work the Arduino.



#### 4.6 Push key

When it is pressed then it will send GPS signal to the controller, then controller will send the GPS co-ordinates via GSM to the pre-defined numbers.

### V. HARDWARE IMPLEMENTATION

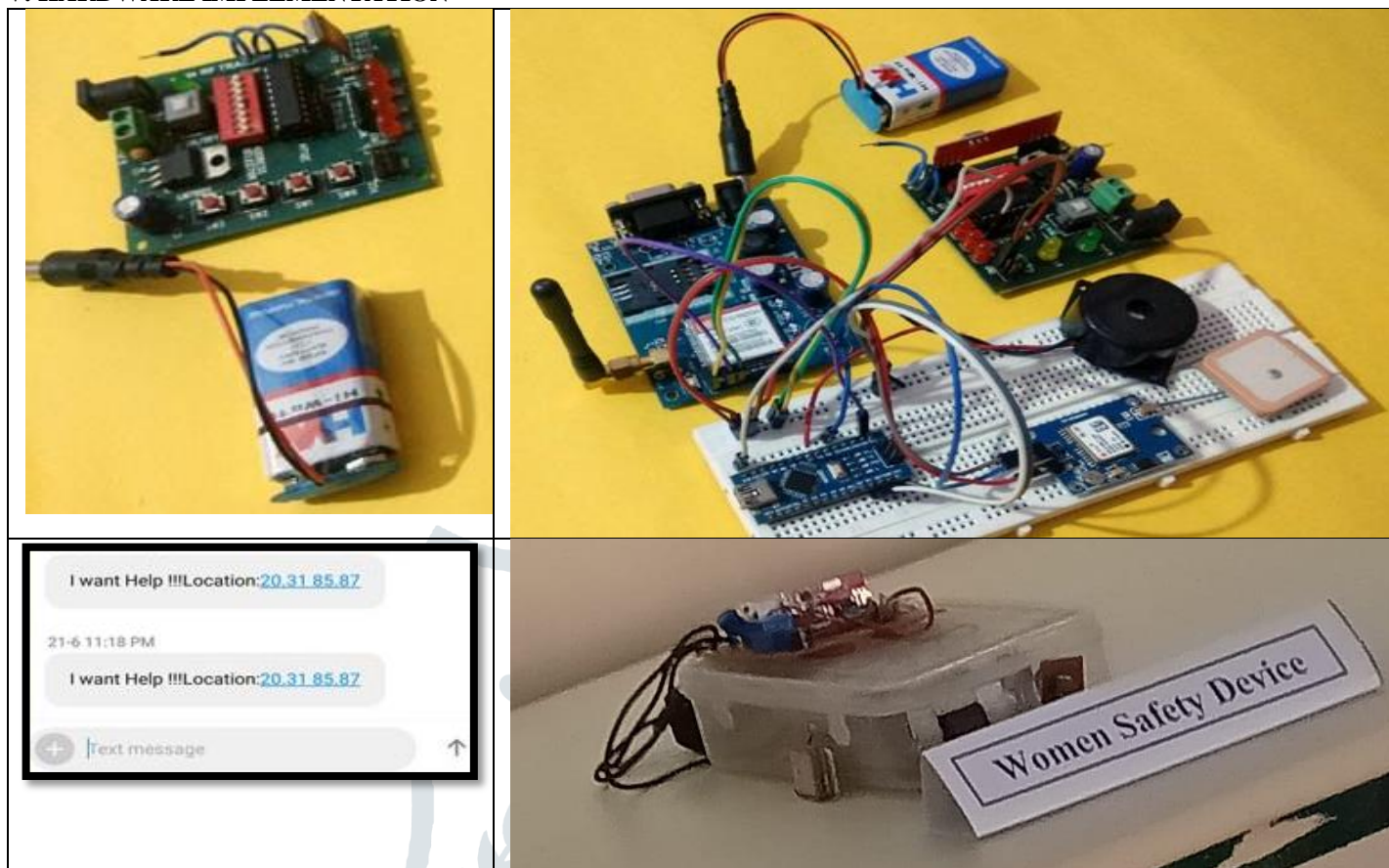


Figure 2. Hardware Implementation

When the user will turn on the device, all modules will be launched simultaneously. The band will check whether the emergency switch has been pressed twice within five seconds or not. If the switch is not pressed or pressed for a single time, the band will not take any further action. But if the band user is in danger and presses the emergency switch on her band twice within five seconds, an emergency SMS will be sent immediately to the nearest police box, volunteers and her family. The location update will be done by the GSM module. We divided each road into several branches where one kilometer was taken for one branch. It is created with the values of latitude and longitude. Police boxes and some volunteers' mobile number of each branch will be provided to the system in advance. When the emergency switch will be pressed, the emergency message will be sent to the police and volunteers of that zone in which the user will be in.

If a user presses the button from a vehicle, the emergency SMS will be continuously sent with her updated location after every thirty seconds to the police until she presses the emergency button four times. As vehicle can go from one area to another in a very short time, if the vehicle enters the next zone then the system will send SMS to the previous zone volunteers and also to the new zone volunteers. Fig. 2.Zone search. In Fig. 2, a 3D simulation of how a smart band searches zone and sends emergency messages is shown. Here different colors.

The user can trigger the app in two ways. One is through the emergency switch in the app. Another one is the emergency button with Smart band, which transmits signals using Bluetooth support. When the emergency switch is pressed, the system will see if the GPS is ON. If not, the app will turn on GPS location service. The system will be informed about the current location of victim through Google Geo location Service. The app will then send a notification via the Fire base Notification Service to the closest active user of the victim. As a result, the volunteers will reach out to help her and the attacker will not have enough time to harm the victim.

### VI. CONCLUSION

The proposed design will conclude, the frequent occurrence of threats to Women leads to development of many security applications and devices. This research broadcasts the involvement of various sensors and techniques which are used in applications and smart devices to ensure the women safety. The proposed design will be helpful in very critical and unusual situation that all women and child fear to face. and there are many types of sensors. Are use in this proposed model. With further future research and innovation, this project can be implemented in every aspect of the world for security and surveillance.

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