SAFELET: A WOMEN SAFETY DEVI CE USING IOT

PROJECT REPORT

submitted by

JEENA MARY KURIAN (CML16CS025)
JINI THOMAS (MBC16CS027)
NIKHIL SAM NINAN (MBC16CS043)
PRINCE MATHEW (MBC16CS048)

to

APJ Abdul Kalam Technological University
in partial fulfilment of the requirements for the award of the Degree

of

Bachelor of Technology

in

Computer Science and Engineering

Department of Computer Science and Engineering

MAR BASELIOS CHRISTIAN COLLEGE OF ENGINEERING AND TECHNOLOGY, PEERMADE

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DECLARATION

I hereby declare that this report entitled “SAFELET: A WOMEN SAFETY DEVICE USING IOT” is a bonafide record of the project work carried out by me under the supervision of Ms.Jyolsna Mary P in the Department of Computer Science and Engineering, MBCCET, Peermade. The project proposal presented in this report has not been presented for the award of any other degree(s).

Place: Peermade

Date:

JEENA MARY KURIAN(CML16CS025)

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

MAR BASELIOS CHRISTIAN COLLEGE OF ENGINEERING AND TECHNOLOGY, PEERMADE

CERTIFICATE

This is to certify that the project report entitled "**SAFELET: Women Safety Device using IOT**" submitted by **Jeena Mary Kurian(CML16CS025), Jini Thomas(MBC16CS027), Nikhil Sam Ninan(MBC16CS043), Prince Mathew(MBC16CS048)** to APJ Abdul Kalam Technological University in partial fulfilment of the requirements for the award of the Degree of Bachelor of Technology in Computer Science Engineering is a bonafide record of the project work carried out by her under our guidance and supervision. This report in any form has not been submitted to any other University or Institute for any purpose.

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ABSTRACT

Women security is need of the hour now-a-days. In India, there are many cases of women harassment and molestation. Safety of women matters let be whether at home, outdoor or it be their work place.

In India, most educated womenfolk and entrepreneurs among and but the security and protection, provide to women within city doesn't do justice to this heritage. Roads and public transport are not at all safe for women and travelling alone at night in the city is a nightmare. Sexual harassment and other forms of sexual violence occur every day for women and girls globally. It happens on streets, in and around schools and workplaces, in parks, and neighbourhoods.

When the user press on the ON button, the device becomes active and GPS (Global Positioning System) module calculates the distance from the satellite to the ground station for identifying the location of the user. The corresponding location is then transferred of the contacts as SMS by GSM (Global System for Mobile Communications) module and a call is forward to the important contacts. Here OLED display is used for display the current time. The receiver receives the call and SMS then they can take necessary actions.

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ABBREVIATIONS

AC	Alternating Current
BPM	Beats Per Minute
CCTNS	Crime and Criminal Tracking Network and System
DC	Deputy Commissioner
GPS	Global Positioning System
GPRS	General Packet Radio Service
GSM	Global System for Mobile
ICE	Information and Content Exchange
IDE	Integrated Development Environment
IoT	Internet of Things
LTE	Long Term Evolution
MCU	Multipoint Control Unit
MEO	Medium Earth Orbit
ML	Machine Learning
NFC	Near Field Communication
OLED	Organic Light-Emitting Diode
PCB	Printed Circuit Board
PIC	Peripheral Interface Controller
PIN	Personal Identification Number
PWM	Public Works Department
RFID	Radio Frequency Identification
SIM	Subscriber Identity/Identification Module
SMS	Short Message Service
SOS	Si Opus Sit *(emergency signal)*
UI	User Interface
USB	Universal Serial Bus

NOTATIONS

GHz	GigaHertz
kB	Kilobyte
kohms	Kiloohm
mA	Milliamps
MHz	MegaHertz
V	Volt

CHAPTER 1
INTRODUCTION

1.1 GENERAL

The Internet of Things (IoT) refers to the use of intelligently connected devices and systems to leverage data gathered by embedded sensors and actuators in machines and other physical objects. IoT is expected to spread rapidly over the coming years and this convergence will unleash a new dimension of services that improve the quality of life of consumers and productivity of enterprises, unlocking an opportunity that the GSMA refers to as the 'Connected Life'.

- For consumers, the IoT has the potential to deliver solutions that dramatically improve energy efficiency, security, health, education and many other aspects of daily life.
- For enterprises, IoT can underpin solutions that improve decision-making and productivity in manufacturing, retail, Agriculture and other sectors.

Objects around us have been connected for decades. Devices like TV remote controls and garage door openers have been part of our domestic landscape for generations. Industrial applications of these technologies—for example, through remote monitoring and control of production—are also nothing new. In fact, even the phrase "Internet of Things" is not a recent invention; it was coined around twenty years ago.

However, recent developments in both networks and devices are enabling a much greater range of connected devices and Internet of Things (IoT) functionalities. Today, the phrase "Internet of Things" refers to the world of smart connected objects and devices. Gone is the remote control, replaced by an intelligent device that will automatically fulfill its task based on its analysis of user behavior. All of this is made possible by the miniaturization of electronic devices, accompanied by a huge increase in the availability of internet connectivity.

IoT describes a system where items in the physical world, and sensors within or attached to these items, are connected to the Internet via wireless and wired Internet connections. These sensors can use various types of local area connections such as RFID, NFC, Wi-Fi, Bluetooth, and ZigBee. Sensors can also have wide area connectivity such as GSM, GPRS, 3G, and LTE. As the Internet of Things evolves, we can see an increase of smart connected devices supported by mobile networks, providing seamless connectivity, will unlock opportunities to provide life enhancing services for consumers while boosting productivity for enterprises.

1.2 OBJECTIVE

IoT is related with our research. We have made use of this new technology in our research in such a way that it helps the women or a girl while she is in trouble. It deals with hardware as well as the software. The prototype is a combination of both which makes it special.

The IoT is the network of physical devices, vehicles, and other items embedded with electronics, software, sensors, actuators, and network connectivity which enable these objects to collect and exchange data. Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the existing Internet infrastructure. Experts estimate that the IoT will consist of about 30 billion objects by 2020.

The vision of the Internet of things has evolved due to a convergence of multiple technologies, including ubiquitous wireless communication, real-time analytics, machine learning, commodity sensors, and embedded systems. This means that the traditional fields of embedded systems, wireless sensor networks, control systems, automation (including home and building automation), and others all contribute to enabling the Internet of things.

The Internet of Things holds great promise but also brings significant concerns. First, every connected device will be collecting a considerable amount of data. As data storage is becoming cheaper, indexing the data effectively for analytics may be a greater need. IoT will continue to thrive because of the many benefits it will bring to the various segments of business s, only to improve with time.

The future of IoT has the potential to be limitless. Advances to the industrial internet will be accelerated through increased network agility, integrated artificial intelligence (AI) and the capacity to deploy, automate, orchestrate and secure diverse use cases at hyperscale.

CHAPTER 2
LITERATURE SURVEY

1.Nishant Bhardwaj and Nitish Aggarwal, Design and Development of "Suraksha"-A Women Safety Device 2014. [1]

The paper explains the basic idea underlying suraksha which is to flash a warning giving an instant location of the distressed victim to the police so that the incident could be prevented and the culprit apprehended. This would help reduce crime against women. The paper also summarises other significant works in this field and hence forth discussed suraksha device in a greater detail.

The device, named as "Suraksha" is a security system specially designed for women in distress. It is a simple and easy to carry device with magnanimous functionality. The basic approach is to intimidate instant location and a distress message to the cops and registered number, so that unfortunate incidents would be averted and to provide real time evidence for swift action against the perpetrators of crime against women.

The device can be actuated y three ways namely, voice, switch and shock. The device when not in use will be locked so that unnecessary signals are not sent. For unlocking it, a simple voice command is sufficient. When the device is thrown with force, using force sensor, it

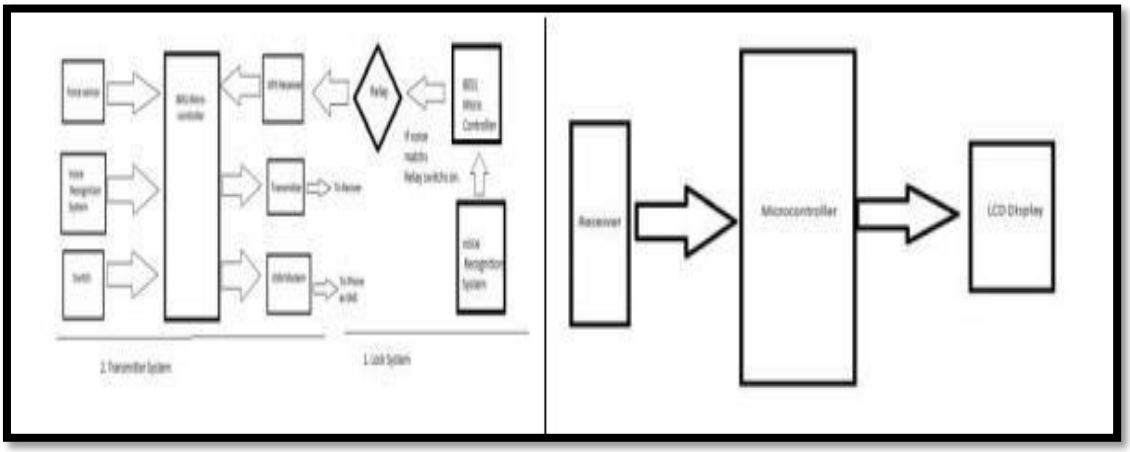

Fig 2.1**:** shows the conceptual design (transmitter) of suraksha

Fig 2.2: It shows the conceptual design (Receiver) of suraksha

will start functioning i.e. it will send location to the police and distress message to the registered mobile number through a GSM module, and same will be achieved by a voice

command in case the device is not in the vicinity of the user. A mere press of a switch will also send location as well as distress message, via the transmitter module to the police control room and to the other registered mobile numbers, via GSM module.

2.Premkumar.P, Cibi Chakkaravarthi.R,One touch alarm system for women's safety using GSM-2015.[2]

It describes about an one touch alarm system for women's safety using GSM. In the light of recent outrage in Delhi which shook the nation and woke us to the safety issues for women, people are finding up in different ways to defend. Here we introduce a device which ensures the protection of women. This helps to identify protect and call on resources to help the one out of dangerous situations. Anytime you senses danger, all you had to do, is hold on the button of the device.

The device consists of a PIC microcontroller, GSM module, GPS modules. The system resembles a normal watch which when activated, tracks the place of the women using GPS (Global Positioning System) and sends emergency messages using GSM (Global System for Mobile communication), to sos contacts and the police control room. The main advantage of this system is that the user does not require a Smartphone unlike other applications that have been developed earlier. The use of sophisticated components ensures accuracy and makes it reliable. The watch provides with all the features which will leave no stone unturned to help the dupe in any kind of emergency situations.

In today's world, women safety has become a major issue as they can't step out of their house at any given time due to physical/sexual abuse and a fear of violence. Even in the 21st century where the technology is rapidly growing and new gadgets were developed but still women's and girls are facing problems. Women are adept at mobilizing diverse groups for a common reason. They often work across ethnic, religious, political, and cultural divides to promote liberty. We are all aware of importance of women safety, but we must analyze that they should be properly protected. Women are not as physically fit as men, in an emergency stuation a helping hand would be assistance for them. The best way to curtail your probability of becoming a dupe of violent crime (robbery, sexual assault, rape, domestic violence) is to recognize, defence and look up resources to help you out of hazardous situation.

3. Dr. Sridhar Mandapati , Sravya Pamidi , Sriharitha Ambati "A Mobile Based Women Safety Application (I Safe Apps)"2015.[3]

Many unfortunate incidents have been taking place in woman's case. Problems may come from any direction such as women walking on the road after the work, going to super market or many other reasons for which they go alone. People at home are not sure of their return safely. Another factor is woman die without knowing the reason as they attend excursions and industrial trips conducted by the organizations.

It happens due to attacks on woman but not suicides. In 2013 there happened an incident which is a gag rape in New Delhi in the case of 23year old woman in bus at 9:30 PM. Another incident that has taken place at Mumbai in the case of woman who is leaving her native place after Christmas holidays has been kidnapped and killed. These are some of the problems that have taken place in the day to day life of women. In order to overcome such problems faced by women the I Safety (women security apps) mobile based application is not only necessary to use but also plays a pivotal role with android software. An app is a small, specialised software program, easily downloadable and installed onto mobile devices such as Smartphones or tablet computers. The use of „apps" has been popularised by the Apples App Store and also by Googles Play Store.

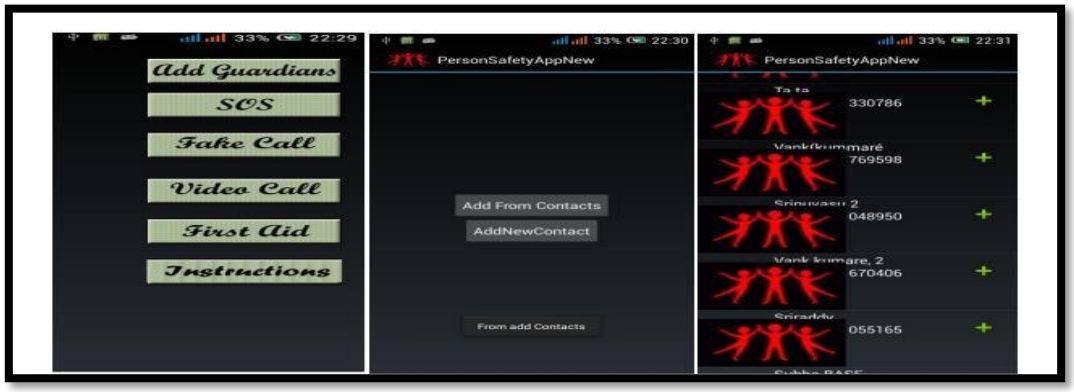

Fig 2.3: Application view of I Safe app

Some apps created to know whether a woman is safe or not? Which indicates the present state of affairs of the woman by touching the option, which also indicates the location of the endangered woman they gave a phone call, video forwarding, fake calls, and location of the person, first-aid details, and application having the instructions that is the way to use the application.

4. D. G. Monisha, M. Monisha, G. Pavithr Women Safety device and Application 2016.[4]

This device is a security system, specially designed for women in distress. Method/Analysis: Using ARM controller for the hardware device is the most efficient and it consumes less p ower. We use radio frequency signal detector to detect hidden cameras. Findings: We analysed that there are no security y device for our total safety. The user has to carry multiple devices. We found an ALL-IN-ONE security device which has all the features in one click.

It uses ARM controller and android application in which both the device and the smart phone are synchronized using Bluetooth, hence both can be triggered independently. We can record audio for further investigation and can give an alert call and message to the pre-set contacts with the instant location every 2 minutes and can be tracked live using our application. Hidden camera detector is also a distinct feature using which we can ensure our privacy. Introduction of our "FEMME" is a security device specially designed for women in emergency and in distress. It is simple and easy to use and carry with various functionalities. The numbers of smart phone users are turning into greater in amount all over the world.

A smart phone has many applications which is useful to people in which our "FEMME" will become one of those. It is a personal safety product designed to keep you and your friends safe 24/7. It is packed with features for both everyday safety and real emergencies, making it an ultimate tool for all. This user-friendly application can be accessed by anyone who has installed it in their smart phones as well as who has our device. Our intention is to provide you with fastest and simplest way to contact your nearest help. The basic approach (single click) is to intimidate the instant location and a distress message to the cops and the preset numbers, so that unfortunate incident can be averted and to provide real time evidence for the action against the perpetrators of crime against women.

5.Umesh A. Nikam,"Suraksha Yantra: Self Defense System for Public Safety with Location Tracking and Sms Alerting through GSM Network."2016.[5]

The people living on this planet are working hard for a comfortable life style and wants to safe their investment that they has made in day to day work. Eventually, at the end we all need is security of life for proper lifestyle and our belongings. The most important problem is to ask your self is we really living good secure life .The globe is not secured and we are victimized to the dangers that exist in our nearest environment hence the need to feel protected and safe is fulfilled by the use of "SURAKSHA YANTRA: SELF DEFENSE SYSTEM FOR PUBLIC SAFETY WITH LOCATION TRACKING AND SMS ALERTING THROUGH GSM NETWORK ". The globe in which people live, faces lots of problems and goes through as a

challenging super problems and an economic distress, are still under in the problem of various issues evils like molestations, dowry, crime against women, worst among all is Rape.

The main issues against the women can be now brought to an end with the help of a device called suraksha.Suraksha Yantra paper explains the basic idea over viewing suraksha yantra which is to give a warning to an instant location of the distressed victim to the police so that the incident could be prevented and the offender captured. This globe helps to reduce crime against women. Suraksha Yantra also summaries other significant works in this field and hence forth discussed suraksha device in a greater detail.

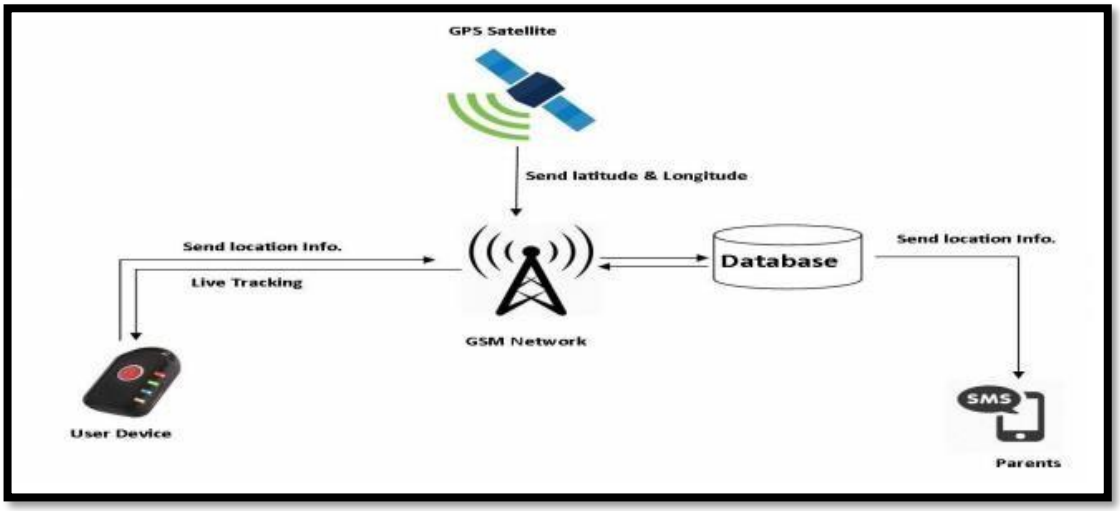

Fig 2.4: Suraksha yantra system architecture

6.Madhura Mahajan1,KTV Reddy2,Manita Rajput "Design and Implementation of a Rescue System for Safety of Women" in "IEEE WiSPNET 2016 conference".[10]

The main contribution of the paper is to develop a wearable arm band for safety and protection of women and girls. This objective is achieved by the analysis of physiological signal in conjunction with body position. The physiological signals that are analyzed are pulse rate sensor, vibration sensor and if there is any fault it additionally uses a fault detection sensor.

Acquisition of raw data makes the Arduino controller function by activating the GPS to send alert messages via GSM and the wireless camera captures images and videos and sends images to the pre-decided contacts and also shares video calling to the family contact. The alarm is employed to alert the surroundings by its sound and meanwhile, she can also use a TAZER as a self-defense mechanism.

7. Akash Wadhawane , Priyanka Ghodke, Shital Thokal,"IoT based Smart System for Human Safety"2017.[6]

The paper have come up with an idea which will change the mind set of every person about Human safety. A day when media broadcasts more of women's achievements rather than harassment, it's a feat achieved! Since we (humans) can't respond aptly in critical situations, the need for a device which automatically senses and rescues the victim is the venture of our idea in this paper. It built a smart device, which is having combination of multiple components, basically a wearable Smart Device which continuously communicates through the internet with a Smart phone. The application is programmed and all the health related data of the user. This generates a signal which is transmitted to the smart phone.

The software or application has access to GPS and Messaging services which is pre-programmed in such a way that whenever it receives emergency signal, it can send help request along with the location coordinates to the nearest Police station, relatives and the people in the near radius who have application. This action enables help instantaneously from the Police as well as Public in the near radius who can reach the victim with great accuracy.

In most of the countries innocent women are brutally harassed by some of the people. Women are facing such a problem very oftenly. The day by day increase in such situation women are 9 afraid of leaving the house at night. So basically women are bounded to such situation in some of countries women doesn't feel safe at night. Harassment is not only the issue. In most of countries children are threaten and get kidnapped. Now a days this is one of the major issue. The smart device is integrated with micro controller which is small in size and cheap in price. The micro controller supports minimum three sensors, those sensors are pulse rate sensor, temperature sensor and Bluetooth sensor to form BSN. The smart band then communicates with the smart phone through mobile application. The smart device having trigger button on it, which is used to send the message to the smart phone application through Bluetooth.

8. Jismi Thomas, Maneesha K J. Touch Me Not-A Women Safety Device2018.[7]

The idea to develop a smart device for women is that it's completely comfortable and easy to use as compared with already existing women security solutions such as a separate garment, bulky belts and in famous mobile apps that are just very abstract and obsolete. If a woman is subjected to attack by an adversary, then a switch has to be pressed by her, manually, (which will be ideally located at a convenient location on the body), which in turn will trigger the microcontroller to activate the on body.

GPS Tracker and simultaneously capture the image/video of the attacker, and transmit it via an RF module to another section where it will be stored. Here we are attempting to make to develop a method by which this image can be transferred on a web server, ideally on the police server. Next, the Global Positioning System (GPS) receiver will acquire the location co-ordinates of the woman subjected to attack, and will send these to the pre-decided cell phone numbers (typically the family and the police), via GSM module A hidden camera or spy camera or security camera is a still or video camera used to record people without their knowledge.

The camera is "hidden" because it is either not visible to the subject being filmed, or is disguised as another object. Hidden cameras can be built into commonly used objects such as television sets, smoke detectors, clock radios, motion detectors, ball caps, plants, and mobile phones.

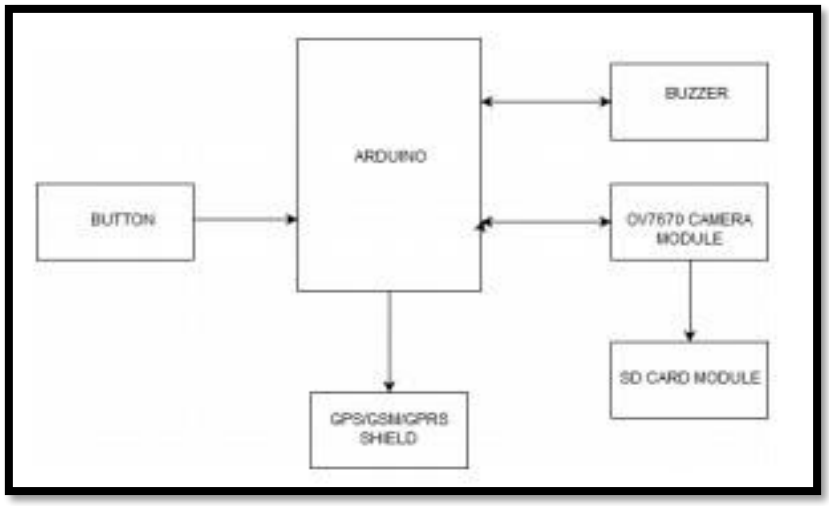

Fig 2.5 :Design of the System

For the location tracking system using Arduino, the software approach is given in figure below. The software used is the Arduino Integrated Development Environment (IDE) which provides a smooth platform for programming the microcontroller and the programming sequence is shown in figure The delays are included in order to allow the respective modules to initialize and synchronize with the networks.

9. Shivani Ahir, Smit Kapadia, "The Personal Stun- A Smart Device For Women's Safety" 2018.[14]

A smart band which gets activated by tapping on the screen twice. Once the device is activated it starts sending the GPS location to the ICE contacts and police control rooms. There is a pulse

rate sensor embedded in the device that senses the pulse rate of the person and a temperature senor that senses body temperature of the person. The band when thrown with force the force sensor will get activated and sends the current location of the victim.

A Piezo buzzer siren will get activated after 1-2 mins of the actual device getting turned on. The range of the buzzer is of 80-110 dB which can be heard from a distance of 50 feet long. An electric shock circuit is designed that emits electric current. On the top of the band screen there are two metal points that generates the shock when the two metal points come in contact with any surface or anybody. The device supports a micro usb charging.

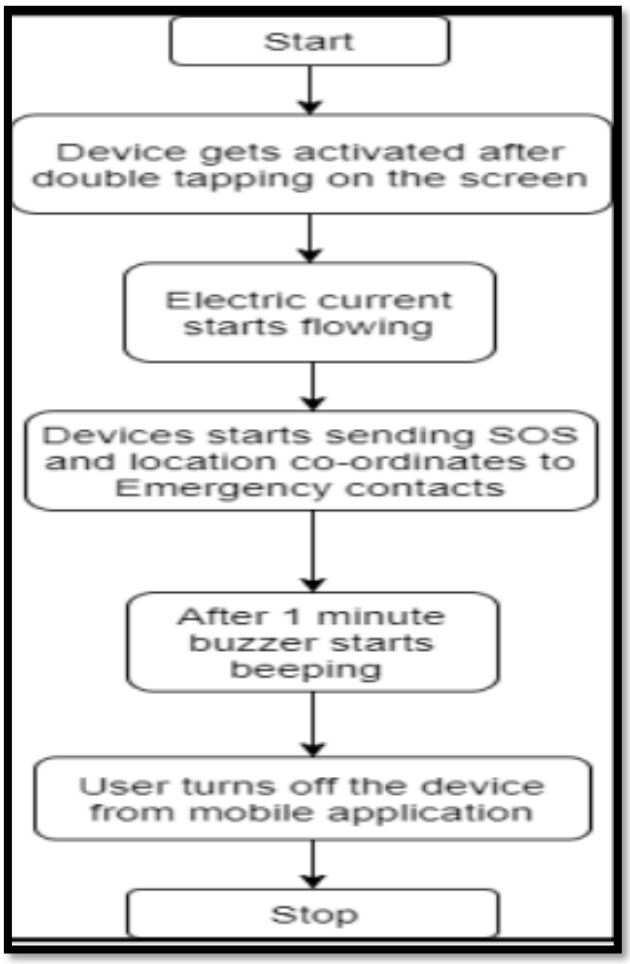

Fig 2.6: Flow Chart

A smart application will be developed on the android platform which is connected with the device via bluetooth interface that shows the sensed data of the subject to the ICE contacts. Until the device is turned off it will send the location on the interval of 5 mins and will keep on beeping continuously.

10.Muskan , Teena Khandelwal "Women Safety Device Designed using IoT and Machine Learning "2019[8]

The device are customized to learn the individual pattern of temperature and heartbeat and then it finds out the threshold for generating alarm. Thus this paper deals to design a wearable women safety device that automatically reads and create patterns such as body temperature and pulse rate during running.

If readings are higher than the normal readings then it will automatically call and message more 12 than one person along with the location so that actions can be taken. We have used temperature and pulse sensors that will detect the activity of the woman and that data of sensors will be sent to cloud where machine learning algorithm is applied to analyse the data generated. The data is first collected by sensors in non-danger conditions to train the algorithm, after that data is used for testing to gauge the accuracy and how close it is to our trained data. More is the accuracy more is the surety of danger and the emergency alarm will be there on emergency.

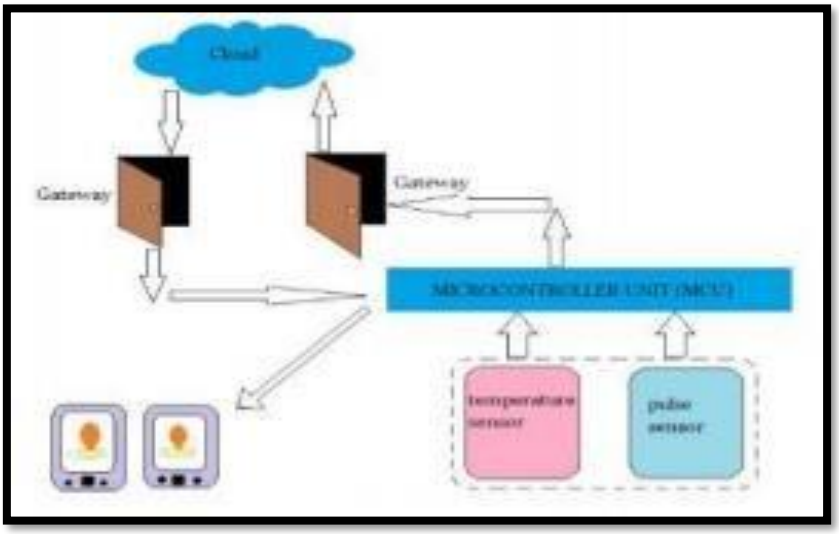

Fig2.7 Architecture Of The System

This system will predict whether a women is in danger or not on the basis of her pulse rate and temperature. If she is in danger then it will automatically call to the necessary contacts. We came up with idea to reduce human interaction with the mobile phones. For prediction part, the paper used Machine learning algorithm - Logistic Regression.

The machine learning algorithm will take parameters like pulse rate and temperature from excel sheet which is directly linked with Arduino. For taking parameters from Arduino to excel, the paper have used teraterm software. Then algorithm will perform computation and will plot the graphs of training data set and testing data set.

CHAPTER 3
PROPOSED WORK

3.1 EXITING SYSTEM

The device are customized to learn the individual pattern of temperature and heartbeat and then it finds out the threshold for generating alarm. Thus this system deals to design a women safety device that automatically reads and create patterns such as body temperature and pulse rate during running. If readings are higher than the normal readings then it will automatically call and message more than one person along with the location so that actions can be taken.

It uses temperature and pulse sensors that will detect the activity of the woman and that data of sensors will be sent to cloud where machine learning algorithm is applied to analyse the data generated. The data is first collected by sensors in non-danger conditions to train the algorithm, after that data is used for testing to gauge the accuracy and how close it is to our trained data. More is the accuracy more is the surety of danger and the emergency alarm will be there on emergency contacts.

3.2 LIMITATION OF EXITING SYSTEM

Main drawback of these devices and applications is that all of them come under no automated systems and therefore in situations like sudden unconsciousness due to fear, weakness or when you are sleeping if someone attacks on you, you won't be able to protect yourself with these things neither anyone will aware of your trouble but our body temperature and pulse rate will definitely undergo some changes indicating any attacks. That is the reason we come up with this idea. Earlier solutions were not capable of working both in internet and non-internet conditions.

Also the earlier devices involved more human involvement for initiating the emergency alarm whereas in our solution we have tried to make the device self-capable of taking decision for the user. Our device can be trained by the user with its own individual data i.e. it is a customized solution which will work differently for different people.

- The systems are bulky and are not portable where in these cannot be carried easily anywhere, any time .
- Requires more hardware, which in turn increases the implementation cost.
- The systems doesn't provide a complete kit solution to the existing problem .

- As we can see above the entire systems are separated with each other and lack the feature of one stop solution to problem of women safety.
- The main drawback of the 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.

3.3 PROPOSED SYSTEM

We focus on developing a prototype that is a smart band that can be worn by any individual on their hand. The band is active when the victim needs to press on the SOS button when she feels the need of it or she feels someone is abusing her.

After pressed on the button, the device will start sending the current latitudinal and longitudinal co-ordinates to the contacts as SMS and an important call.

When the user press on the ON button, the device becomes active and GPS module calculates the distance from the satellite to the ground station for identifying the location of the user. The corresponding location is then transferred of the contacts as SMS by GSM module.

Here OLED display is used for display the current time. Organic Light Emitting diode is a display technology offer brightness and high quality color with low power and fast response. The main component used in OLED is OLED emitter that emits the light when a voltage is applied. When the button is not pressed the system is defective.

3.4 REQUIREMENT ANALYSIS

3.4.1 HARDWARE

3.4.1.1 LILYPAD:

The LilyPad Arduino Simple is designed for e-textiles and wearable. The LilyPad Arduino Main Board is based on the ATmega168V (the low-power version of the ATmega168) or the ATmega328V.

The LilyPad Arduino can be programmed with the Arduino Software (IDE). The ATmega168V or ATmega328V on the LilyPad Arduino comes preburned with boot loader that allows you to upload new code to it without the use of an external hardware programmer. The LilyPad Arduino can be powered via the USB connection or with an external power supply.

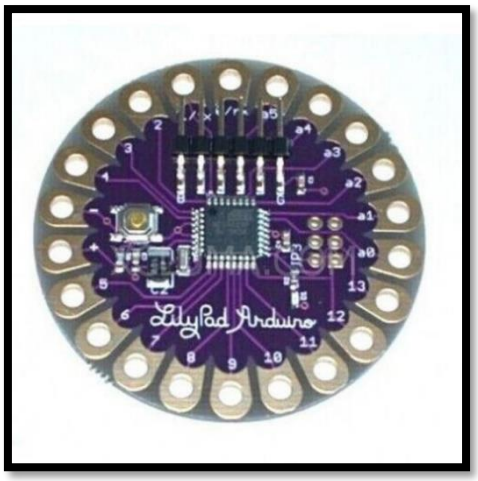

Fig 3.4.1 LilyPad Arduino Board

If an external power supply is used, it should provide between 2.7 and 5.5 volts. This can come either from **an** AC-to-DC adapter (wall-wart) or battery. Again, don't power the LilyPad Arduino with more than 5.5 volts.

Microcontroller	ATmega168 or ATmega328V
Operating Voltage	2.7-5.5 V
Input Voltage	2.7-5.5 V
Digital I/O Pins	14
PWM Channels	6
Analog Input Channels	6
DC Current per I/O Pin	40 Ma
Flash Memory	16 KB
SRAM	1 KB
EEPROM	512 bytes
Clock Speed	8 MHz

Table 3.4.1 Technical specifications of LilyPad.

3.4.1.2 GPS MODULE:

Global **P**ositioning **S**ystem (GPS) is a satellite-based system that uses satellites and ground stations to measure and compute its position on Earth. GPS is also known as Navigation System with Time and Ranging (NAVSTAR) GPS. GPS receiver needs to receive data from at least

satellites for accuracy purpose. GPS receiver does not transmit any information to the satellites. This GPS receiver is used in many applications like smartphones, Cabs, Fleet management etc.

Fig 3.4.2: GPS Module

GPS receiver uses a constellation of satellites and ground stations to calculate accurate location wherever it is located. These GPS satellites transmit information signal over radio frequency (1.1 to 1.5 GHz) to the receiver. With the help of this received information, a ground station or GPS module can compute its position and time.

GPS receiver receives information signals from GPS satellites and calculates its distance from satellites. This is done by measuring the time required for the signal to travel from satellite to the receiver.

GPS receiver module gives output in standard (National Marine Electronics Association) NMEA string format. It provides output serially on Tx pin with default 9600 Baud rate. This NMEA string output from GPS receiver contains different parameters separated by commas like longitude, latitude, altitude, time etc.

3.4.1.3 GSM MODULE:

GSM is a mobile communication modem; it is stands for global system for mobile communication (GSM). It is widely used mobile communication system in the world. MINI GSM is an open and digital cellular technology used for transmitting mobile voice and data services operates at the 850MHz, 900MHz, 1800MHz and 1900MHz frequency bands.

GSM system was developed as a digital system using time division multiple access (TDMA) technique for communication purpose. A GSM digitizes and reduces the data, then sends it down through a channel with two different streams of client data, each in its own particular time slot.

The digital system has an ability to carry 64 kbps to 120 Mbps of data rates. The security strategies standardized for the GSM system make it the most secure telecommunications standard currently accessible. Although the confidentiality of a call and secrecy of the GSM subscriber is just ensured on the radio channel, this is a major step in achieving end-to- end security.

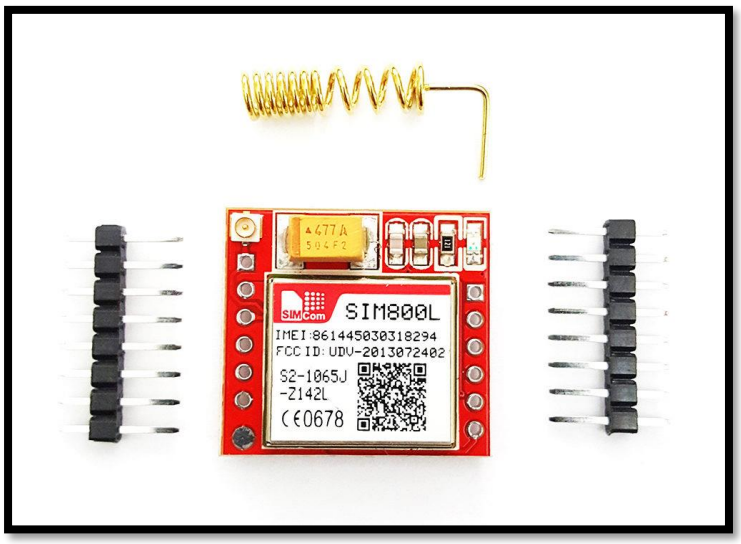

Fig 3.4.3: GSM module

GSM modem is a device which can be either a mobile phone or a modem device which can be used to make a computer or any other processor communicate over a network. A GSM modem requires a SIM card to be operated and operates over a network range subscribed by the network operator.

3.4.1.4 LITHIUM ION (BATTERY):

A lithium-ion battery or Li-ion battery (abbreviated as LIB) is a type of rechargeable battery. Lithium-ion batteries are commonly used for portable electronics and electric vehicles and are growing in popularity for military and aerospace applications.

Life of a lithium-ion battery is typically defined as the number of full charge-discharge cycles to reach a failure threshold in terms of capacity loss or impedance rise. Manufacturers' datasheet typically uses the word "cycle life" to specify lifespan in terms of the number of cycles to reach 80% of the rated battery capacity. Batteries gradually self-discharge even if not connected and delivering current. Li-ion rechargeable batteries have a self-discharge rate typically stated by manufacturers to be 1.5–2% per month.

Fig 3.4.4: Lithium ion battery 3.7v

If a lithium-ion battery is damaged, crushed, or is subjected to a higher electrical load without having overcharge protection, then problems may arise. External short circuit can trigger the battery explosion. If overheated or overcharged, Li-ion batteries may suffer thermal runaway and cell rupture.

In extreme cases this can lead to leakage, explosion or fire. To reduce these risks, many lithium-ion cells (and battery packs) contain fail-safe circuitry that d isconnects the battery when its voltage is outside the safe range of 3–4.2 V per cell or when overcharged or discharged.

3.4.1.5 BOOSTER:

A booster was a motor-generator (MG) set used for voltage regulation in direct current (DC) electrical power circuits. The development of alternating current and solid-state devices has rendered it obsolete. Boosters were made in various configurations to suit different applications.

Fig 3.4.5: Booster 5v/2A

A boost converter (step-up converter) is a DC-to-DC power converter that steps up voltage (while stepping down current) from its input (supply) to its output (load). It is a class of switched-mode power supply (SMPS) containing at least two semiconductors (a diode and a transistor) and at least one energy storage element: a capacitor, inductor, or the two in combination. To reduce voltage ripple, filters made of capacitors (sometimes in combination with inductors) are normally added to such a converter's output (load-side filter) and input (supply-side filter).

3.4.1.6 OLED DISPLAY:

(Organic Light Emitting Device, Organic Light Emitting Diode) A display technology that offers bright, colourful images with a wide viewing angle, low power, high contrast ratio and fast response time for sports and action movies. The OLED technology differs greatly from the screens in plasma and LCD/LED TVs. OLEDs are solid-state devices composed of thin films of organic molecules that create light with the application of electricity.

Fig 3.4.6: OLED display

OLEDs can provide brighter, crisper displays on electronic devices and use less power than conventional light-emitting diodes (LEDs) or liquid crystal displays (LCDs) used today. An OLED display is created by sandwiching organic thin films between two conductors. When an electrical current is applied to this structure, it emits a bright light. Because OLED displays don't require backlighting, they can be thinner and weigh less than other display technologies.

An OLED display has the following advantages over an LCD display: Improved image quality - better contrast, higher brightness, fuller viewing angle, a wider colour range and much faster refresh rates. Lower power consumption. Simpler design that enables ultra-thin, flexible, foldable and transparent displays.

3.4.1.7 BUTTON:

The SOS button is used for activating the device. When a user needs the help of a device the can, press on the button. Here, SOS ON button is used for its. While button is pressed the system become active and corresponding action takes place.

Fig 3.4.7: SOS button

3.4.2 SOFTWARE

Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards ('shields') or breadboards (for prototyping) and other circuits. The boards feature serial communications interfaces, including Universal Serial Bus (USB) on some models, which are also used for loading programs from personal computers. The microcontrollers can be programmed using the C and C++ programming languages, using a standard API which is also known as the "Arduino language". In addition to using traditional compiler toolchains, the Arduino project provides an integrated development environment (IDE) and a command line tool (arduino-cli) developed in Go.

The Arduino integrated development environment (IDE) is a cross-platform application (for Windows, macOS, and Linux) that is written in the programming language Java.

It originated from the IDE for the languages Processing and Wiring. It includes a code editor with features such as text cutting and pasting, searching and replacing text, automatic indenting, brace matching, and syntax highlighting, and provides simple *one-click* mechanisms to compile and upload programs to an Arduino board. It also contains a message area, a text console, a toolbar with buttons for common functions and a hierarchy of operation menus. The source code for the IDE is released under the GNU General Public License, version 2.

3.5 SYSTEM DESIGN

3.5.1 BLOCK DIAGRAM

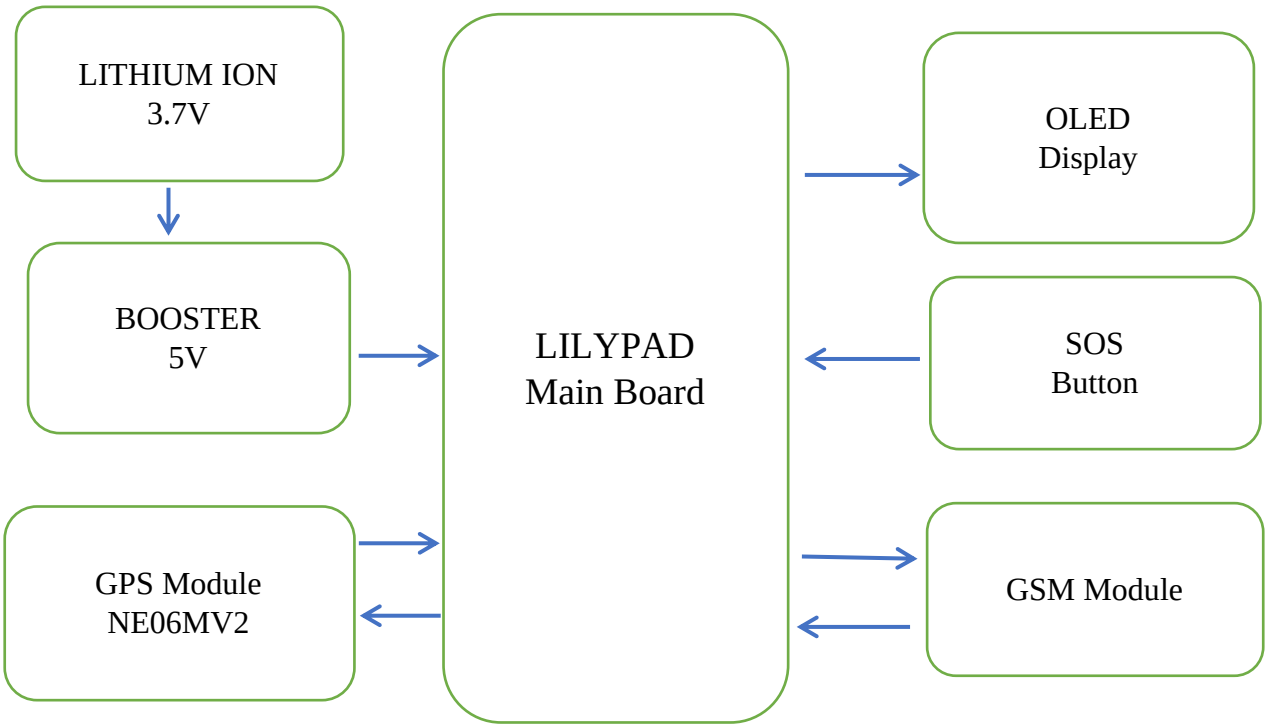

Fig 3.5.1 System Architecture

The figure shows the system architecture of the device . The main component in the SAFELET is LilyPad, it work same as Arduino board.In LilyPad 14 digital I/O pins, 6 PWM channels and 6 analog input pins are used and it look like circle shape, also it is light weight compare to Arduino. Here lithium ion is used for supply power to the device and it supply 3.7volt power. But the device need5volt supply to work, for that an extra booster is used here. The booster boost the voltage to 5v and pass. Another main component is GPS and GSM module. GPS is a satellite based system that uses satellites and ground stations to measure and compute its

position on Earth. GPS receiver does not transmit any information to the satellites. GPS find the location of user by GPS satellite. GPS receiver receives information signals from satellites and calculates its distance from satellites. GPS module gives output in standard format. GSM module is a mobile communication modem. Here GSM send the location of the user to saved contacts as SMS and call.

SOS button is the initial step, that is while user need the help of others in some danger situation. User can press on the button. Here using SOS ON button, just user press on the button the system start it procedures like finding the user location by google map, sending the location to the contacted person as first as SMS then after 20 second delay call is forward the that person for their attention. OLED display is used to display the time. In normal days the user can wear as a band for display the time. The system is always active and start working only the user press on the button moment. For developing SAFELET device IOT technology is using.

3.5.2 SYSTEM FLOW

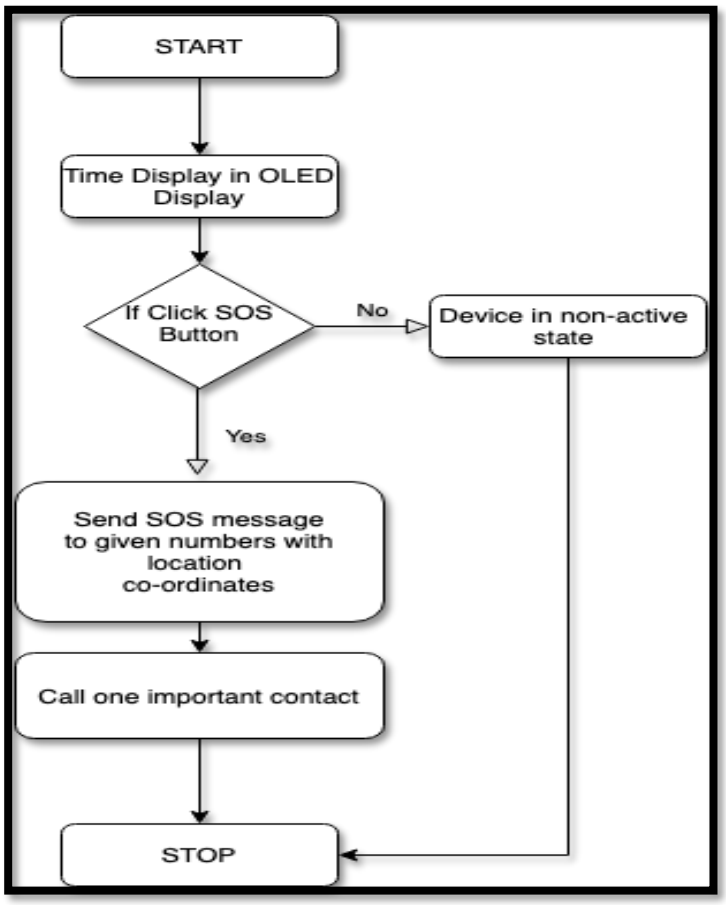

Fig 3.5.2 Flow Chart

The working of the device is as follows:

Initially, when the system starts, time is displayed on the OLED screen. When a user needs the help of device, they can press on the SOS button. At that time the device became active and corresponding action takes place. In SAFELET we using SOS ON button.

when user press on the button GPS module start tracking the location by calculating the distance of satellite and ground station in radio frequency. Then an SMS is sent to contacts by GSM module and a call is forward to the important contacts. The receiver receives the call and SMS then they can take necessary actions. When SOS button is not pressed then the device become inactive.

3.6 CODE:

```
#include <SoftwareSerial.h>
#include <TinyGPS.h>
#include <OLED_I2C.h>
#include <DS3231.h>

// Declare which fonts we will be using
extern uint8_t Sinclair_M[];

int state = 0;
const int pin = 2;
float gpslat, gpslon;
OLED myOLED(a4, a5);
DS3231 rtc(a2, a3);
Time  t;

int clockCenterX=31;
int clockCenterY=31;
int oldsec=0;

TinyGPS gps;
SoftwareSerial sgps(7, 6);
SoftwareSerial sgsm(10, 11);
```

```
void setup()
{
  sgsm.begin(9600);
  sgps.begin(9600);

  myOLED.begin();
  myOLED.setFont(Sinclair_M);

  rtc.begin();

  Serial.begin(115200);
  Serial.println("Send any character to enter serial mode...");
  Serial.println();

  t = rtc.getTime();

}

void loop()
{
  while (sgps.available())
  {
    int c = sgps.read();
    if (gps.encode(c))
    {
      gps.f_get_position(&gpslat, &gpslon);
    }
  }
    if (digitalRead(pin) == HIGH && state == 0) {
      sgsm.print("\r");
      delay(1000);
      sgsm.print("AT+CMGF=1\r");
      delay(1000);
```

```
      /*Replace XXXXXXXXXX to 10 digit mobile number &
        ZZ to 2 digit country code*/
      sgsm.print("AT+CMGS=\"+918289835752\"\r");
      delay(1000);
      //The text of the message to be sent.
      sgsm.print("I am in trouble pls help me out    ");
      sgsm.print("https://www.google.com/maps?q=loc:");
      sgsm.print(gpslat, 6);
      sgsm.print(",");
      sgsm.print(gpslon, 6);
      delay(1000);
      sgsm.write(0x1A);
      delay(20000);
      updateSerial();
      sgsm.println("ATD+918289835752;"); //  change ZZ with country code and
xxxxxxxxxxx with phone number to dial
      updateSerial();
      delay(20000); // wait for 20 seconds...
      sgsm.println("ATH"); //hang up
      updateSerial();

      state = 1;
    }
  if (digitalRead(pin) == LOW) {
      state = 0;
    }
  }
void updateSerial()
{
  delay(500);
  while (Serial.available())
  {
    sgsm.write(Serial.read());//Forward what Serial received to Software Serial Port
  }
```

```
  while(sgsm.available())
  {
    Serial.write(sgsm.read());//Forward what Software Serial received to Serial Port
  }
}

void drawDisplay()
{
  // Clear screen
  myOLED.clrScr();

  // Draw Clockface
  for (int i=0; i<2; i++)
  {
    myOLED.drawCircle(clockCenterX, clockCenterY, 31-i);
  }
  for (int i=0; i<3; i++)
  {
    myOLED.drawCircle(clockCenterX, clockCenterY, i);
  }

  // Draw a small mark for every hour
  for (int i=0; i<12; i++)
  {
    drawMark(i);
  }
  t = rtc.getTime();
}

void drawMark(int h)
{
  float x1, y1, x2, y2;

  h=h*30;
```

```
  h=h+270;

  x1=29*cos(h*0.0175);
  y1=29*sin(h*0.0175);
  x2=26*cos(h*0.0175);
  y2=26*sin(h*0.0175);

  myOLED.drawLine(x1+clockCenterX, y1+clockCenterY, x2+clockCenterX,
y2+clockCenterY);
}

void drawSec(int s)
{
  float x1, y1, x2, y2;

  s=s*6;
  s=s+270;

  x1=29*cos(s*0.0175);
  y1=29*sin(s*0.0175);
  x2=26*cos(s*0.0175);
  y2=26*sin(s*0.0175);

  if ((s % 5) == 0)
    myOLED.clrLine(x1+clockCenterX, y1+clockCenterY, x2+clockCenterX,
y2+clockCenterY);
  else
    myOLED.drawLine(x1+clockCenterX, y1+clockCenterY, x2+clockCenterX,
y2+clockCenterY);
}

void drawMin(int m)
{
  float x1, y1, x2, y2, x3, y3, x4, y4;
```

```
  m=m*6;
  m=m+270;

  x1=25*cos(m*0.0175);
  y1=25*sin(m*0.0175);
  x2=3*cos(m*0.0175);
  y2=3*sin(m*0.0175);
  x3=10*cos((m+8)*0.0175);
  y3=10*sin((m+8)*0.0175);
  x4=10*cos((m-8)*0.0175);
  y4=10*sin((m-8)*0.0175);

  myOLED.drawLine(x1+clockCenterX, y1+clockCenterY, x3+clockCenterX,
y3+clockCenterY);
  myOLED.drawLine(x3+clockCenterX, y3+clockCenterY, x2+clockCenterX,
y2+clockCenterY);
  myOLED.drawLine(x2+clockCenterX, y2+clockCenterY, x4+clockCenterX,
y4+clockCenterY);
  myOLED.drawLine(x4+clockCenterX, y4+clockCenterY, x1+clockCenterX,
y1+clockCenterY);
}

void drawHour(int h, int m)
{
  float x1, y1, x2, y2, x3, y3, x4, y4;

  h=(h*30)+(m/2);
  h=h+270;

  x1=20*cos(h*0.0175);
  y1=20*sin(h*0.0175);
  x2=3*cos(h*0.0175);
  y2=3*sin(h*0.0175);
```

```
  x3=8*cos((h+12)*0.0175);
  y3=8*sin((h+12)*0.0175);
  x4=8*cos((h-12)*0.0175);
  y4=8*sin((h-12)*0.0175);

  myOLED.drawLine(x1+clockCenterX, y1+clockCenterY, x3+clockCenterX,
y3+clockCenterY);
  myOLED.drawLine(x3+clockCenterX, y3+clockCenterY, x2+clockCenterX,
y2+clockCenterY);
  myOLED.drawLine(x2+clockCenterX, y2+clockCenterY, x4+clockCenterX,
y4+clockCenterY);
  myOLED.drawLine(x4+clockCenterX, y4+clockCenterY, x1+clockCenterX,
y1+clockCenterY);
}

void printDate()
{
  Time t_temp;

  t_temp = rtc.getTime();
  myOLED.print(rtc.getDOWStr(FORMAT_SHORT), RIGHT, 0);
  if (t_temp.date<10)
    myOLED.printNumI(t_temp.date, 96, 16);
  else
    myOLED.printNumI(t_temp.date, 88, 16);
  myOLED.print(rtc.getMonthStr(FORMAT_SHORT), RIGHT, 32);
  myOLED.printNumI(t_temp.year, RIGHT, 47);
}

void loop()
{
  int x, y;
  int prevSec;
```

```
  drawDisplay();
  drawSec(t.sec);
  drawMin(t.min);
  drawHour(t.hour, t.min);
  printDate();
  myOLED.update();

  prevSec = t.sec;
  while (t.sec == prevSec)
  {
    if (Serial.available()>0)
      serialMode();
    delay(100);
    t = rtc.getTime();
  }
}
void serialClrScr()
{
  if (VT100_MODE)
  {
    Serial.print (char(27));
    Serial.print ("[2J");
    Serial.print (char(27));
    Serial.print ("[H");
  }
}

boolean serialValidateDate(byte d, byte m, word y)
{
  byte    mArr[12] = {31,0,31,30,31,30,31,31,30,31,30,31};
  boolean ok=false;

  if (m==2)
  {
```

```
   if ((y % 4)==0)
   {
     if ((d>0) and (d<=29))
       ok = true;
   }
   else
   {
     if ((d>0) and (d<=28))
       ok = true;
   }
  }
  else
  {
    if ((d>0) and (d<=mArr[m-1]))
      ok = true;
  }

  return ok;
}

void serialSendDOW(byte dow)
{
  char* str[] =
{"Monday","Tuesday","Wednesday","Thursday","Friday","Saturday","Sunday"};

  Serial.print(str[dow-1]);
  Serial.print(", ");
}

void serialSendMenu()
{
  serialClrScr();
  Serial.println ("------------------------------------------------------------");
  Serial.println ("T : Set time");
```

```
  Serial.println ("D : Set date");
  Serial.println ("R : Read current time and date");
  Serial.println ("? : Print menu");
  Serial.println ("Q : Quit Serial Mode");
  Serial.println ();
}

void serialSetTime()
{
  char buf[6];
  char tmp;
  int  cnt=0;
  int  h,m,s;

  Serial.print("Enter time in 24-hour format [hhmmss]: ");
  while (cnt<6)
  {
    while(Serial.available()==0) {};
    tmp = Serial.read();
    if ((tmp>='0') and (tmp<='9'))
    {
      buf[cnt]=tmp;
      cnt++;
      Serial.print(tmp);
    }
  }
  Serial.println();
  h = ((buf[0]-'0')*10) + (buf[1]-'0');
  m = ((buf[2]-'0')*10) + (buf[3]-'0');
  s = ((buf[4]-'0')*10) + (buf[5]-'0');
  if ((h>23) or (m>59) or (s>59))
    Serial.println("ERROR: Invalid time");
  else
  {
```

```
    rtc.setTime(h,m,s);
    Serial.print("New time set to ");
    if (h<10)
      Serial.print("0");
    Serial.print(h,DEC);
    Serial.print(":");
    if (m<10)
      Serial.print("0");
    Serial.print(m,DEC);
    Serial.print(":");
    if (s<10)
      Serial.print("0");
    Serial.print(s,DEC);
    Serial.println("...");
  }
}

void serialSetDate()
{
  char buf[8];
  char tmp;
  int  cnt=0;
  int  d,m,y;

  Serial.print("Enter date [ddmmyyyy]: ");
  while (cnt<8)
  {
    while(Serial.available()==0) {};
    tmp = Serial.read();
    if ((tmp>='0') and (tmp<='9'))
    {
      buf[cnt]=tmp;
      cnt++;
      Serial.print(tmp);
```

```
    }
  }
  Serial.println();
  d = ((buf[0]-'0')*10) + (buf[1]-'0');
  m = ((buf[2]-'0')*10) + (buf[3]-'0');
  y = ((buf[4]-'0')*1000) + ((buf[5]-'0')*100) + ((buf[6]-'0')*10) + (buf[7]-'0');
  if ((y<2000) or (y>2099))
    Serial.println("ERROR: Invalid time");
  else
    if ((m<1) or (m>12))
      Serial.println("ERROR: Invalid time");
    else
      if (!serialValidateDate(d,m,y))
        Serial.println("ERROR: Invalid time");
      else
      {
        rtc.setDate(d,m,y);
        rtc.setDOW(calcDOW(d,m,y));
        Serial.print("New date set to ");
        serialSendDOW(calcDOW(d,m,y));
        if (d<10)
          Serial.print("0");
        Serial.print(d,DEC);
        Serial.print(".");
        if (m<10)
          Serial.print("0");
        Serial.print(m,DEC);
        Serial.print(".");
        Serial.print(y,DEC);
        Serial.println("...");
      }
}

void serialReadTimeDate()
```

```
{
  Serial.print("Time: ");
  Serial.println(rtc.getTimeStr());
  Serial.print("Date: ");
  Serial.print(rtc.getDOWStr(FORMAT_SHORT));
  Serial.print(", ");
  Serial.println(rtc.getDateStr());
}

void serialMode()
{
  boolean quitMode = false;
  char    cmd;

  myOLED.clrScr();
  myOLED.print("SERIAL", CENTER, 16);
  myOLED.print("MODE", CENTER, 32);
  myOLED.update();

  while (Serial.available()>0)
    Serial.read();

  serialSendMenu();
  Serial.print ("> ");

  while (quitMode==false)
  {
    if (Serial.available()>0)
    {
      cmd = uCase(Serial.read());
      Serial.println(cmd);
      switch (cmd)
      {
        case 'T': serialSetTime();
```

```
                break;
        case 'D': serialSetDate();
                break;
        case 'R': serialReadTimeDate();
                break;
        case '?': serialSendMenu();
                break;
        case 'Q': Serial.println("Exiting serial mode...");
                Serial.println();
                quitMode = true;
                break;
        default:  Serial.println("ERROR: Unknown command");
                break;
      }
      if (quitMode==false)
        Serial.print("> ");
    }
  }
  while (Serial.available()>0)
    Serial.read();
  Serial.println("Send any character to enter serial mode again...");
  Serial.println();
}
```

CHAPTER 4

RESULT AND ADVANTAGES

4.1 CIRCUIT DIAGRAM

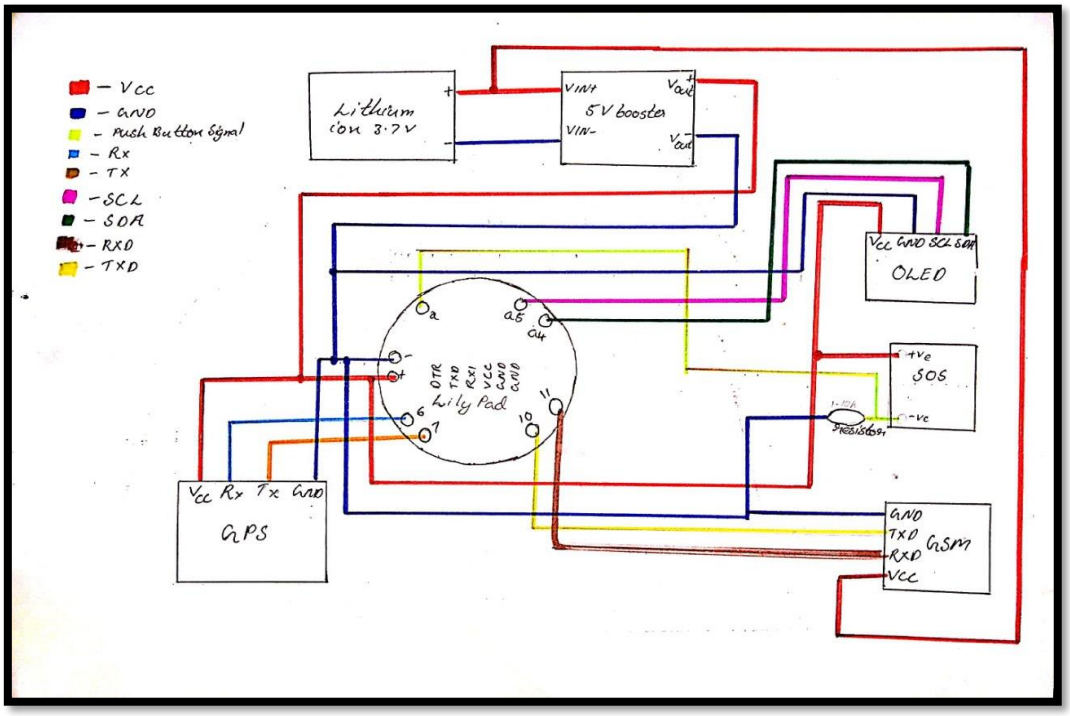

Fig 4.1 Internal Circuit Diagram

In the above figure, main hardware components are Lilypad, Lithium ion 3.7V, 5V Booster, OLED, SOS, GSM, GPS.

Lilypad : Upload the program.

Lithium ion 3.7V : DC to DC conversion, When the battery is charging up.

5V Booster : Balanced voltage.

OLED : Display the screen.

SOS : Emergency message connect to the necessary contact.

GSM : Communication purpose.

GPS : Track the loaction.

Main part or brain part of the system is lilypad. Many pins are available in the lilypad. Using the pins, connecting to the each of hardware modules.

Pin 11 connect to GSM RXD

Pin 10 connect to GSM TXD

Pin 7 connect to GPS TX

Pin 6 connect to GPS RX

Pin 5 connect to OLED SCL

Pin 4 connect to OLED SDA

Pin 2 connect to SOS -ve

Maximum input voltage to receive (RXD) pins of GSM module is 3 volt and maximum output voltage of transmit (TXD) pins of GSM module is about 2 volt. But the voltage at transmit (TXD) and receive (RXD) pins of pic microcontrollers is about 4 to 5 volt.

GPS module is powered, NMEA data (or another message format) is sent out of a serial transmit pin (TX) at a specific baud rate and update rate, even if there is no lock. To have your microcontroller read the NMEA data, all that is needed is to connect the TX pin of the GPS to the RX (receive) pin on the microcontroller. To configure the GPS module, you will need to also connect the RX pin of the GPS to the TX pin of the microcontroller.

SDA (Serial Data): SDA is used to transmit data between master and slave. The data and acknowledgement are sent through SDA.

SCL (Serial Clock): It is a clock signal. This pin transmits clocks to slave, SCL. Data will be sent to other devices on clock tick event. Only master device has control over this SCL line.

GND: This is Ground pin. Connect ground of supply to this pin.

VCC: This is power supply pin. +3.3V supply is required. More than 3.3 V supply can damage the display.

VIN: Power input.

VOUT: Boost converter output.

Each of the 14 digital I/O pins on the LilyPad Arduino can be used as an input or output, using pinMode(), digitalWrite(), and digitalRead() functions.

They operate at 5V volts. Each pin can provide or receive a maximum of 40 mA and has an internal pull-up resistor (disconnected by default) of 20 kOhms.In addition, some pins have specialized functions: PWM: 5, 6, 9, 10, 11 Provide 8-bit PWM output with the analogWrite() function.Analog Inputs: A0-A5. The LilyPad Simple Arduino has 6 analog inputs, labeled A0 through A5, all of which can also be used as digital I/O. Each analog input provide 10 bits of resolution (i.e. 1024 different values).

By default the analog inputs measure from ground to 5 volts, though is it possible to change the upper end of their range using the analogReference() function.

4.2 HARDWARE CONNECTIONS

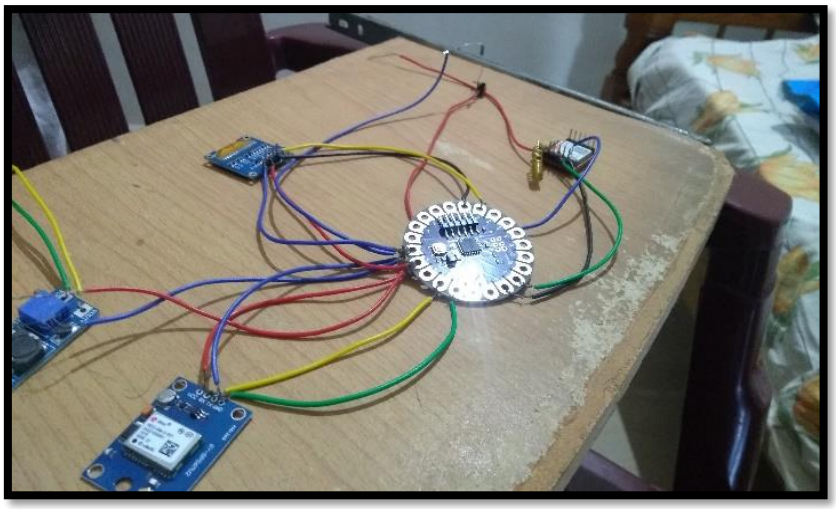

Fig4.2.1 HC 1

Fig 4.2.2 HC 2

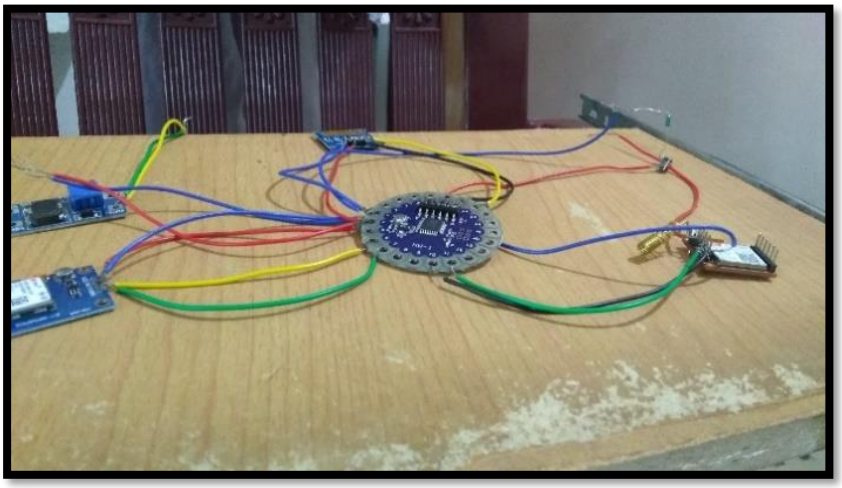

Fig 4.2.3 HC 3

4.3 OUTPUT

In world many rule are updating for the safety of women, but still the crime against them are not reducing. Because the victims can't get any help in that crustal time. Many device are developing but they are not fully helping them like traveling problem, size, weight, parameters. The SAFELET is developed by reducing these problems and make the user more comfortable and safe at any time, any were. The device is developed as wearable smart band model and is always with the user in every place.

Fig 4.3.1 Message Notification

In Fig4.3.1 a message notification is received.When the user is in danger situation, she press on the SOS button. The device is always active and continuously updating the user location by GPS module. When button become ON the location of user is transmitted to the user saved contacts.

Fig 4.3.2 The Received Message, With Google Map Location

In fig 4.3.2 the detail message that the receiver/saved contact persons can get/delivered. A trouble notification message “I’m in trouble please help me” is passing. With this notification message the victim’s current location is also passing in standard format. The google location is delivered to the receiver.

In Fig 4.3.3 shows that the receiver seen the message then he/she just go through the google location link. When the receiver go through it, the google map find the location that the victim send can identified. The distance and travelling path is also can find by the google map. The receiver can pass the message to any nearest police stations for helping the victim.

Fig4.3.3 Location Of The User

When the user press on button at first the location is passing with a message. After 20 second delay a call is also forward to the saved contacts, for their attention. The device ensure safety of the user in any situation that they need other help. The design of SAFELET give the user more comfort to take any were. The size, weight are reduced and the design making the user attention. The device is developed as band model so in dress combination design can be implemented.

Fig4.3.4 Received Call

4.4 ADVANTAGES

The device is simple and low cost compared to other woman safety device. It is easy to wear because we are developing a band model. The band is developed by using low cost hardware, so it can useful to all level customers. The hardware such as SOS button, GSM, GPS lithium ion battery, Lillypad are used in it there by we can reduce the overall size of the system. Human interaction with this device is very low compared to other. By using the GSP system the correct location can be tracked very quickly. The device itself has a GSM module so, that the message can be send to contacts easily. In this band is simple and easy to use.there by reducing the human effort.

In normal situation the user can wear it as a band and also as a watch to know the time. The design of the device is simple and light-weight, so they can carry easily. If someone forcefully tries to remove the band from the person, they can't do it because it is a band and fits in the user's hand tightly . Today crime against women is increasing some this device helpful to the society.

CHAPTER 5
CONCLUSION

Our primary goal of this project is to ensure every woman in our society to feel safe and secured. According to the survey in India 53% of working women are not feeling safe - Women is working in night shift (Bangalore-56%, Chennai-28%, Hyderabad-35%, Mumbai-26%). In Overall 86% of working women in India, women facing hurdles are high in Delhi, Mumbai, Hyderabad, Kolkata and Pune comparatively to other places.

FEMME can play a major role by providing women a safe environment in all situations for example (detecting hidden camera, physical threatened, harassed, robbery, stalked). Implementing real time application and a device, we can solve the problems to an extent. With further research and innovation, this project is used as a small wearable device like watch, pendent etc.

The women's safety device is the most economical solution for the problems faced by women in India. It provides the trusted contacts with real time location which in turn is a distress message that makes it possible to prevent major casualties. Replacing the used Arduino Uno with an Arduino Lilypad that can be sewn onto fabrics can help downsize the device. Since it uses low power, rechargeable batteries can be used to make the device more portable.

REFERENCES

[1]. Nishant Bhardwaj and Nitish Aggarwal, Design and Development of “Suraksha”-A Women Safety Device 2014.

[2].Premkumar.P, Cibi Chakkaravarthi.R,One touch alarm system for women’s safety using GSM-2015.

[3]. Dr. Sridhar Mandapati , Sravya Pamidi , Sriharitha Ambati “A Mobile Based Women Safety Application (I Safe Apps)”2015

[4]. D. G. Monisha, M. Monisha, G. Pavithr ”Women Safety device and Application”2016

[5]. Umesh A. Nikam,“Suraksha Yantra: Self Defense System for Public Safety with Location Tracking and Sms Alerting through GSM Network.”2016

[6]. Akash Wadhawane , Priyanka Ghodke, Shital Thokal,”IoT based Smart System for Human Safety”2017.

[7]. Jismi Thomas, Maneesha K J. Touch Me Not-A Women Safety Device2018.

[8].Muskan , Teena Khandelwal “Women Safety Device Designed using IoT and Machine Learning ”2018

[9]. G C Harikiran, Karthik Menasinkai, Suhas Shirol, “Smart Security Solution for Women based onInternet Of Things(IOT)”, in “International Conference on Electrical, Electronics, and Optimization Techniques (ICEEOT) - 2016”, 978-1-4673-9939-5/16/2016 IEEE

[10]. Madhura Mahajan1,KTV Reddy2,Manita Rajput “Design and Implementation of a Rescue System for Safety of Women” in “IEEE WiSPNET 2016 conference”.

[11]. Shreyas R.S, Varun.B.C, Shiva Kumar.H.K, Punith Kumar B.E, Kalpavi.C.Y," Design And Development Of Women Self Defence Smart watch Prototype", International Journal of Advanced Research in Electronics and Communication Engineering (IJARECE) Volume 5, Issue 4, April 2016 .

[12]. Vaibhav A. Alone, Ashish Manusmare," A Study Based On Women Security System", International Journal of Science, Engineering and Technology Research (IJSETR) Volume 6, Issue 8, August 2017, ISSN: 2278 -7798.

[13]. J.K.Thavil, V.P.Durdhawale, P.S.Elake," Study on Smart Security Technology for Women based on IOT", International Research Journal of Engineering and Technology (IRJET) Volume: 04 Issue: 02 | Feb -2017.

[14] Shivani Ahir, Smit Kapadia, "The Personal Stun- A Smart Device For Women's Safety" 2018.