Women Tracking Using Auto Defender System

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Abstract: In worldwide situation, the prime inquiry in each woman mind is about her safety and the badgering issues. Women everywhere throughout the world are confronting much deceptive physical provocation. The main idea frequenting each woman is the point at which they will have the capacity to move uninhibitedly in the city even in odd hours without stressing over their security. Our task is a dare to determine this issue, Describes about a smart intelligent security system for women. This venture concentrates on a security for women so they will never feel vulnerable. The system comprises of different modules, such as GPS, memory card, stun circuit, buzzer/hooter, sprinkler, Webcam, pulse rate sensor, Raspberry pi-3 module. Today there are many cases which are going on about ladies. It was high time where we women required a change. This task depends on women security where women feel ensured. This venture portrays about safety electronic system for women, worked out in the open transport vehicles such as, car, buses and auto-rickshaws as these days women are being at molested, kidnapped and badgering by the drivers. In each field there is an uncommon effect of women like games, dance, training, business, in legislative issues moreover. Women are driving in each field. The question arises that, Are the women in India are extremely secured? Always we get the answer “No”, Henceforth executed electronic women security system which has GPS, Camera, Shock circuit, Buzzer, Led Light, Switch, memory card which are interfaced with Raspberry pi 3 board that will track the location of the women also will auto defend in bad situation.

Keywords: Heart Beat Snsor, sweat sensor, tilt sensor, buzzer, LED light, shock mechanism, GPS, camera, raspberry pi 3 pi+ module

CHAPTER 1
INTRODUCTION

1.1 GENERAL:

Today in the current worldwide situation, the prime inquiry in each woman mind, considering the regularly rising increment of issues on women provocation in later past is for the most part about her wellbeing and security. The main idea frequenting each woman is the point at which they will have the capacity to move uninhibitedly in the city even in odd hours without stressing over their security. This task recommends another viewpoint to utilize innovation for women safety.

This undertaking depends on women security where women feel ensured, This venture portrays about security electronic system for women, worked out in the open transport vehicles, for example, autos, transports and auto rickshaws as these days ladies are being attacked,kidnapped and harassed by the drivers, As we cannot estimate the happening of incidents but stillone can reduce the chances of sexual abuse, we need the need for a device which automatically senses and rescues the victim is the venture of our idea. Ladies in India keep on facing social difficulties and are often victims of abuse and violent crimes and, as indicated by a worldwide survey directed by Thomson Reuters, India is the fourth most unsafe nation on the planet for ladies, and the most exceedingly bad nation for ladies among the G20 nations. Women are driving in each field. Are the young women in India are extremely secured? Continuously we find the solution “No”. Consequently, actualized electronic system which has GPS, pulse rate sensor, Camera, Shock circuit, Buzzer/hooter, memory card which are interfaced with Raspberry pi-3 board to control the majority of the above.

The device is the integration of multiple devices, hardware which continuously communicates with Smart phone that has access to the internet. The application is programmed and loaded with all the required data. 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 co-ordinates 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.
1.2 LITERATURE SURVEY:

Survey on Self Defense Watch for Women Safety


Women's safety is a very important issue due to rising crimes against women these days. Presently there is indeed no good solution to this problem. The existing applications and devices are not much effective as they need a lot of human interaction to operate. These existing devices use to read the body temperature and heartbeat to generate an alarm in case of an emergency. When a person runs, every human may have different body temperature and heartbeat patterns and thus keeping a fixed threshold for finding out the emergency situation and then generating alarm is not the correct way and this is where the existing devices are failing to correctly generate alarm in case of emergency. In this paper, the devices are customized to learn the individual pattern of temperature and heartbeat and then it finds out the threshold for generating an alarm. Thus this paper deals to design a wearable women safety device that automatically reads and creates 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. We have used temperature and pulse sensors that will detect the activity of the woman and that data of sensors will be sent to the cloud where the machine learning algorithm (logistic regression) is applied to analyze 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. Thirdly, this paper deals with scenarios where there is no internet facility. To overcome the problem of the internet we have used the ZigBee mesh network, which helped the device to send the data to multiple hop distance.

2. [2019] Analysis of Women Safety in Indian Cities Using Machine Learning on Tweets, Deepak Kumar and Shivani Aggarwal

Women and girls have been experiencing a lot of violence and harassment in public places in various cities starting from stalking and leading to sexual harassment or sexual assault. This research paper basically focuses on the role of social media in promoting the safety of women in Indian cities with special reference to the role of social media websites and applications including the Twitter platform Facebook and Instagram. Tweets on Twitter which usually Youth Culture and educate people to take strict action and punish those who harass women. Twitter and other Twitter handles which include hashtags messages that are widely spread across the whole globe, sir as a platform for women to express their views about how they feel while we go out for work or travel in public transport and what is the state of their mind when they are surrounded by unknown men and whether these women feel safe or not?


Every day, every woman, young girls, mothers and women from all walks of life are struggling to be safe and protect themselves from insensitive men who molest, assault and violate the dignity of women on a daily basis. Due to these women are subjected to in the present scenario, a smart security wearable device for women based on the Internet of Things is proposed. It is implemented in the form of a smart ring (SMARISA) and comprises of a Raspberry Pi Zero, Raspberry Pi camera, buzzer and button to activate the services. This device is extremely portable and can be activated by the victim being assaulted just by the click of a button that will fetch her current location and also capture the image of the attacker via Raspberry Pi camera. The location and the link of the image and helped us developing a dense sensing approach based on traces of suspicious activities. There is a situation-based analysis for relative modeling based on face recognition as well as the fuzzy labeling of verbal conversations, captured will be sent to predefined emergency contact numbers or police via smartphone of the victim thus preventing the use of additional hardware devices/modules and making the device compact.

1.3 OBJECTIVE:

The system consists of the standard five main modules: Image Capturing through webcam, taking

Live Location using GPS and send this data to people plus even we have alarming system that can make noise on spot so people around can hear, in case of heavy rain or wind sometimes we can hear sound so for that we have used emergency light so it can start blinking continuously, but if the unknown guys try to accuse us we have Shock Mechanism so he/she can get shocked by just touching us. Finally all this work by clicking on switch.
CHAPTER 2
METHODOLOGY

2.1 Methodology of the Proposed System

Switching on the shock generator (it will be the shock of low voltage i.e. 50-60 volts). Pressing the emergency key will further send the location of the victim to the family Members and the nearest police station through the GSM module. The victim’s location can be tracked through GPS.

The camera is activated to capture the attacker’s image.

On pressing a button, a message regarding the threat can be sent to the nearest police station and the family members whose contacts have been preloaded.

Even System takes photo of the person and sends e-mail to nearest police station.

Along with the message, the user can also capture and send the image of the assailant to the police station with the help of a miniature camera in the device.

Fig 2.1.1: The Proposed System for Women Safety

2.2 WORKING PRINCIPLE:

The proposed device consists of a system that ensures security and real time notification to the near and dear in case of emergency. As soon as the emergency button is pressed the device ensures continuous monitoring of location as well as security. The emergency key is directly connected to the device. This activates the device and sends alerts to other devices interfaced with it.

The location coordinates of that instant will be collected and will be sent via text message mode. The LCD connected to the device will display a message. Here, a pulse sensor is an expandable device. In this case, as soon as the main switch is pressed, the pulse rate will be calculated. For more protection our kit includes two more parameters viz., a buzzer and shock circuit. These two components are having separate buttons. In that case, to alert nearby people by pressing a button the buzzer will produce a continuous beeping sound and with that the location will be sent. And by this process the whole circuit will work in accordance.
CHAPTER 3
SOFTWARE DEVELOPMENT

3.1 Software Requirement:

- NoobS OS
- Python

3.2 Flow Chart:

CHAPTER 4
HARDWARE DEVELOPMENT

4.1 HARDWARE REQUIREMENT:

- Raspberry pi 3 B+
  - Buzzer
  - Camera
  - GPS
  - Shock Device
  - LED Lights
  - memory card
  - power supply
  - Switch

4.2 Raspberry Pi 3board:

Pi is a credit-card sized computer that connects to a computer monitor or TV and uses input devices like keyboard and mouse. It is capable of performing various functionalities such as surveillance system, military applications, surfing internet, playing high-definition videos, live games and to make databases.

Fig 4.2.1: Specification of Raspberry pi
The device is implemented using a Raspberry pi 3B board and their specifications are as follows. Raspberry Pi is a credit card sized computer manufactured and designed in the United Kingdom by the Raspberry Pi foundation with the intention of teaching basic computer science to school students and every other person interested in computer hardware, programming and DIY Do it Yourself projects. The Raspberry Pi is manufactured in three board configurations through licensed manufacturing deals with Newark element14 (Premier Farnell), RS Components and Ego man. These companies sell the Raspberry Pi online. Ego man produces a version for distribution solely in China and Taiwan, which can be distinguished from other Pis by their red coloring and lack of FCC/CE marks. The hardw are is the same across all manufacturers. The Raspberry Pi has a Broadcom BCM2835 system on a chip (SoC), which includes an ARM1176JZF-S 700 MHz processor, Video Core IV GPU and was originally shipped with 256 megabytes of RAM, later upgraded (Model B & Model B+) to 512 MB. It does not include a built in hard disk or solid state drive, but it uses an SD card for booting and persistent storage, with the Model B+ using a Micro SD. The Foundation provides Debian and Arch Linux ARM distributions for download. Tools are available for Python as the main programming language, with support for BBC BASIC (via the RISC OS image or the Brandy Basic clone for Linux), C, Java and Perl. As of February 2014, about 2.5 million boards had been sold. The board is available online in India at a price of Rs.3000.

- Quad core 64-bit processor clocked at 1.4GHz
- 1GB LPDDR2 SRAM
- Dual-band 2.4GHz and 5GHz wireless LAN
- Bluetooth 4.2 / BLE
- Higher speed Ethernet up to 300Mbps
- Power-over-Ethernet capability (via a separate POE HAT)

<table>
<thead>
<tr>
<th>Spec</th>
<th>Raspberry Pi 3 B</th>
<th>Raspberry Pi 3 B+</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU type/speed</td>
<td>ARM Cortex-A53 1.2GHz</td>
<td>ARM Cortex-A53 1.4GHz</td>
</tr>
<tr>
<td>RAM size</td>
<td>1GB SRAM</td>
<td>1GB SRAM</td>
</tr>
<tr>
<td>Integrated Wi-Fi</td>
<td>2.4GHz</td>
<td>2.4GHz and 5GHz</td>
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<tr>
<td>Ethernet speed</td>
<td>10/100 Mbps</td>
<td>300Mbps</td>
</tr>
<tr>
<td>POE</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Bluetooth</td>
<td>4.1</td>
<td>4.2</td>
</tr>
</tbody>
</table>

4.3 EMC Compliance:
One feature included with the Raspberry Pi 3 Model B+ is a wireless dual-band LAN that comes with modular compliance certification. For those who are unaware, electronic products cannot be constructed and then released to the market without having some tests done to them (see CE and FCC), and many of these tests look for interference. Testing for interference (also known as EMC) can be incredibly costly and difficult to isolate, but thanks to the WLAN’s modular compliance certification, you can expect significantly lower EMC issues when integrating the Pi into a product.

Fig 4.3.1: EMC Compliance
4.4 Physical Features:

While the mechanical layout of the Pi has not changed (GPIO location, drill holes, etc.), the PCB itself has clearly undergone some physical changes. The main processor is no longer housed in a plastic package. Instead, it has a metal package, which may be beneficial for those who want to keep the temperature of the Pi as low as possible (with the aid of a heat sink). The top side also shows fewer components, and a four-pin header (used for PoE) has been included in the top right of the PCB.

![Comparison of the Raspberry 3 and 3 B+](image)

It is a small board computer, introduced by Raspberry Pi foundation in 14th March 2018 and is the most recent version of the Pi boards. It is a modified form of its predecessor Raspberry Pi 3 B that was introduced with CPU, GPU, USP ports and I/O pins. Both versions are almost same in in terms and technical specifications; however, there are some exceptions in 2016 and came of functionality the B+ model as with USB boot, networking boot, and Power over Ethernet option that are not present in model. Comes the B Technology has been evolved over time with the purpose of making lives easy and convenient. This device was a major development in the technology that made computer learning too easy that anyone with little effort can make their feet wet with the process. In this tutorial, I’ll discuss each and everything related to Raspberry Pi 3 B+ its main functions and features, benefits and everything you need to know, so you find all information in one place without wrestling your mind on the web surfing. Let’s dive right in.

![Introduction to Raspberry Pi 3 B+](image)

4.5 Raspberry Pi Pin Diagram:

40 Pin headers is used to develop an external connection with the electronic device. This is the same as the previous versions, making it compatible with all the devices where older versions can be used. Out of 40 pins, 26 are used as a digital I/O pins and 9
of the remaining 14 pins are termed as dedicated I/O pins which indicate they don’t come with alternative function. Pin 3 and 5 comes with an onboard pull up resistor which 1.8 kΩ and Pin 27 and 28 are dedicated to ID EEPROM. In B+ model the GPIO header is slightly repositioned to allow more space for the additional mounting hole. The devices that are compatible with the B model may work with the B+ version; however, they may not sit identically to the previous version.

4.6 Hardware Specifications:
**CPU:** The CPU is a brain of this tiny computer that helps in carrying out a number of instruction based on the mathematical and logical formulas. It comes with a capacity of 64 bit. **Clock Speed and RAM:** It comes with a clock speed of 1.4 GHz Broadcom BCM2837B0 that contains quad-core ARM Cortex-A53 and RAM memory is around 1GB (identical to the previous version).

**GPU:** It stands for graphics processing unit, used for carrying out image calculation. Broadcom video core cable is added in the device that is mainly used for playing video games.

**USB Ports:** Two more USB ports are introduced in this new version, setting you free from the hassle of using an external USB hub when you aim to join a number of peripherals with the device.

**Micro USB Power Source Connector:** This connector is used for providing 5V power to the board. It draws 170 to 200mA more power than B model.

**HDMI and Composite Connection:** Both audio output socket and video composite now reside in a single 4-pole 3.5mm socket which resides near HDMI. The power connector is also repositioned in new B+ model and lives next to HDMI socket. All the power and audio video composite socket are now placed on the one side of the PCB, giving it a clean and precise look.

**USB Hard Drive:** The USB hard drive is available on the board that is used to boot the device. It is identical to the hard drive of regular computer where windows is used to boot the hard drive of the computer.

**PoE:** B+ model comes with a facility of Power over Ethernet (PoE); a new feature added in this device which allows the necessary electrical current using data cables. Other Changes: The B+ version comes with little improvement in the features and poses slightly different layout in terms of location of the components. The SD memory slot is replaced by a micro SD memory card slot (works similar to the previous version). The status LEDs now only contain red and green colour and relocated to the opposite end of the PCB.

![Raspberry Pi 3 B+](image)

**Fig 4.6.1:** Raspberry Pi 3 B+

4.7 Web Camera:
Web Camera feeds or streams its image in real time to or through a computer to a computer network. Unlike an IP camera (which connects using Ethernet or Wi-Fi), a web cam is generally connected by a USB cable, or similar cable, or built into computer hardware, such as laptops.

**Fig 4.7.1:** Web Cam

USB Cameras are imaging cameras that use USB 2.0 or USB 3.0 technology to transfer image data. USB Cameras are designed to easily interface with dedicated computer systems by using the same USB technology that is found on most computers.

4.8 Relay:
A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and they are double throw (changeover) switches. The relay’s switch connections are usually labeled COM(POLE), NC and NO. In order to trigger the laser we use driver relay.
4.9 Raspbian OS:

Although the Raspberry Pi’s operating system is closer to the Mac than Windows, it’s the latter that the desktop most closely resembles. It might seem little Alien at first glance, but using Raspbian is hardly any different to using Windows (barring Windows 8 of course). There’s a menu bar, a web browser, a file manager and no short age of desktop shortcuts of pre-installed applications. Raspbian is an unofficial port of Debian Wheezy arch with compilation settings adjusted to produce optimized “hard float” code that will run on the Raspberry Pi. This provides significantly faster heavy use of floating point arithmetic operations. All other applications will also gain some performance through the use of advanced instructions of the ARMv6CPU in Raspberry Pi. Although Raspbian is primarily the efforts of Mike Thompson (mpthompson) and Peter Green (plugwash), it has also benefited greatly from the enthusiastic support of Raspberry Pi community members who wish to get the maximum performance from their device.

4.10 Shock Generator:

The circuit supplying the required high voltages to the above mesh in fact becomes the heart of the circuit is basically made up of three stages viz. the power supply stage, the oscillator stage and the voltage booster stage. The rectified voltage from the above power supply circuit is used to trickle charge an inbuilt rechargeable battery as long as the indoor electric mosquito zapper is not in use. When the battery gets fully charged, it just needs to be switched ON for the required function. The switched ON voltage from the battery is applied to the next oscillator stage comprising a transistor T1/transformer Tr1 coupled oscillator configuration.

The accompanied transformer steps-up the oscillating frequency at its secondary winding and functions like a smaller version of an inverter. The stepped-up AC at the output of the transformer is further boosted up through a diode/capacitor (D3, D4, C5, C6) ladder network; the concept has been thoroughly explained in one of my previous article titled “Air Ionizer.” The boosted voltage ranging several thousand volts gets stored inside an output AC capacitor C7 across the output HOT ends which are finally terminated to the bat meshes and becomes ready to “shoot.” The moment a mosquito or any bug comes in contact with the meshes, the stored high voltage in the capacitor discharges violently through the body of the entangled bug creating a big spark and electrocuting it instantly.

4.11 Buzzer:

Applications:
- Computer and peripherals
- Communications equipment
- Portable equipment
- Automobile electronics
- POS system
- Electronic cash register

Specifications:
- Rated Voltage: 6V DC
• Operating Voltage: 4 to 8V DC
• Rated Current*: ≤30mA
• Sound Output at 10cm*: ≥85dB
• Resonant Frequency: 2300 ±300Hz
• Tone: Continuous Operating
• Temperature: -25°C to +80°C
• Storage Temperature: -30°C to +85°C
• Weight: 2g *Value applying at rated voltage (DC)

![Buzzer Image]

**Fig 4.11.1: Buzzer**

### 4.12 Tilt Sensor:
A tilt sensor is an instrument that is used for measuring the tilt in multiple axes of a reference plane. Tilt sensors measure the tilting position with reference to gravity and are used in numerous applications. They enable the easy detection of orientation or inclination. Similar to mercury switches, they may also be known as tilt switches or rolling ball sensors.

**Specifications of Tilt Sensors**
The functionality of tilt sensors is influenced by factors such as gravity, vibration, temperature, zero offset, linearity, cross-axis sensitivity, acceleration/deceleration, shock, clear line of sight between the user and the measured point, and calibration of tilt sensors. The key specifications of tilt sensors include:

- **Number of axes**: The number of axes is an important factor as it varies from application to application. In robotics, a dual axes tilt sensor is used. In video game controllers and joysticks, a three axes tilt sensor is required. In some smart phones, four axes sensors are used.

- **Resolution**: The minimum inclination detected by the sensor.

- **Sensitivity**: The sensor's ability to react to small changes.

- **Measuring range**: The range of inclination that can be handled by the sensor. Some sensors are capable of measurements of up to 10° while others can cover a range of up to 60°.

- **Noise tolerance**: Noise tends to cause harmonic distortions in the function of the sensor, resulting in output variation and a reduction of system efficiency. Manufacturer's guidelines regarding noise levels should be adhered to.

- **Vibration**: Vibrations can disrupt the sensor's functionality, and hence vibration resistance measures are required, especially when the sensors are used in harsh conditions; for example in off-road vehicles or construction sites.

**Benefits of Tilt Sensors**
- High resolution and accuracy
- Very cost-effective
- Low power consumption
- Can be read by industry standard data loggers

### 4.13 Working Principle
A tilt sensor has a metallic ball that is designed to move the two pins of the instrument from the 'on' to the 'off' position, and vice versa, if the sensor reaches a pre-determined angle. Tilt sensors are the environment-friendly version of a mercury-switch.

**Applications**
- To detect the position of hand-held game systems and in game controllers
- To indicate the roll of boats, vehicles and aircraft
- To measure the angle at which a satellite antenna 'looks' toward a satellite
- To estimate the height of a tree or building

### 4.14 Sweat Sensor:
Sweat can be more easily sampled than say tears, saliva or intestinal fluids. By measuring the concentration of biomarkers such as glucose, cortisol and sodium present in the sweat, sensors can derive information on diseases, dehydration, fatigue or stress in an individual. In fact, there are actually dedicated sweat test centers, but in this case, collecting the sweat and sending the samples for testing is an even more laborious process than a blood test. The patient has to sit still for as long as it takes for the sampling vial to fill up with sweat, which can take up to half an hour. The process is particularly wearisome for children. The challenge is to miniaturise the testing apparatus. Some of the approaches being used include wristbands, armbands and stickers. The advancements needed to make viable sweat sensors that are sensitive enough while working with tiny power supplies, flexible electronics, and advancements in micro fluidics, which involve precisely handling small amounts of liquids using the tineist of pipes. All of these are coming together in research institutions around the world, and viable sweat sensors are being realised. The sweat sensors can
capture the sweat using absorbent pads. A variety of materials can be used to embed the flexible electronics, including plastics, fabrics and elastomers.

Fig 4.14.1: Sweat Sensor

4.15 Heartbeat Sensor

The heartbeat sensor is based on the principle of photoplethysmography. It measures the change in volume of blood through any organ of the body which causes a change in the light intensity through that organ (a vascular region). In the case of applications where the heart pulse rate is to be monitored, the timing of the pulses is more important. The flow of blood volume is decided by the rate of heart pulses and since light is absorbed by the blood, the signal pulses are equivalent to the heartbeat pulses.

Working of a Heartbeat Sensor

The basic heartbeat sensor consists of a light-emitting diode and a detector like a light detecting resistor or a photodiode. The heartbeat pulses cause a variation in the flow of blood to different regions of the body. When tissue is illuminated with the light source, i.e. light emitted by the led, it either reflects (a finger tissue) or transmits the light (earlobe). Some of the light is absorbed by the blood and the transmitted or the reflected light is received by the light detector. The amount of light absorbed depends on the blood volume in that tissue. The detector output is in the form of the electrical signal and is proportional to the heartbeat rate. This signal is a DC signal relating to the tissues and the blood volume and the AC component synchronous with the heartbeat and caused by pulsatile changes in arterial blood volume is superimposed on the DC signal. Thus the major requirement is to isolate that AC component as it is of prime importance. To achieve the task of getting the AC signal, the output from the detector is first filtered using a 2 stage HP-LP circuit and is then converted to digital pulses using a comparator circuit or using simple ADC. The digital pulses are given to a microcontroller for calculating the heartbeat rate, given by the formula BPM(Beats per minute) = 60*f, Where f is the pulse frequency.

Fig 4.15.1: Heartbeat sensor

4.16 LED Lights

In the simplest terms, a light-emitting diode (LED) is a semiconductor device that emits light when an electric current is passed through it. Light is produced when the particles that carry the current (known as electrons and holes) combine together within the semiconductor material. Since light is generated within the solid semiconductor material, LEDs are described as solidstate devices. The term solid-state lighting, which also encompasses organic LEDs (OLEDs), distinguishes this lighting technology from other sources that use heated filaments (incandescent and tungsten halogen lamps) or gas discharge (fluorescent lamps). Different colors Inside the semiconductor material of the LED, the electrons and holes are contained within energy bands. The separation of the bands (i.e. the bandgap) determines the energy of the photons (light particles) that are emitted by the LED.

The photon energy determines the wavelength of the emitted light, and hence its color. Different semiconductor materials with different bandgaps produce different colors of light. The precise wavelength (color) can be tuned by altering the composition of the light-emitting, or active, region LEDs are comprised of compound semiconductor materials, which are made up of elements from group III and group V of the periodic table (these are known as III-V materials). Examples of III-V materials commonly used to make LEDs are gallium arsenide (GaAs) and gallium phosphide (GaP). Until the mid-90s LEDs had a limited range of colors, and in particular commercial blue and white LEDs did not exist. The development of LEDs based on the gallium nitride (GaN) material system completed the palette of colors and opened up many new applications.

Main LED materials

• The main semiconductor materials used to manufacture LEDs are:
• Indium gallium nitride (InGaN): blue, green and ultraviolet high-brightness LEDs

• Aluminum gallium indium phosphide (AlGaInP): yellow, orange and red high-brightness LEDs

• Aluminum gallium arsenide (AlGaAs): red and infrared LEDs

• Gallium phosphide (GaP): yellow and green LEDs

Fig 4.16: LED'S

4.17 GPS

GPS Tracking refers to a Global Positioning System. It entails a network of 24 satellites in orbit and devices on the ground that can establish a person or object’s location on Earth with astonishing precision. GPS Tracking tracks three separate data sets: positioning, navigation, and timing. You may not realize it, but this technology has been around for a long time. GPS was originally created for military use in the 1960s. In 1983, GPS became available for public use, and the technology has only grown from there. Today, it’s used for everything from precision military maneuvers in foreign lands to kids playing mobile phone games in your neighborhood.

How Does GPS Tracking Work?

GPS requires the use of many satellites orbiting the Earth. These satellites continually broadcast their locations and status above us. This is continually monitored by the GPS Master Control Station, as well as other tracking and monitoring stations here on the ground, to ensure accuracy and proper function. The Master Control Station is also responsible for maintenance and correction, should anything go wrong. A GPS device on Earth receives these signals, interpreting each one’s unique data. By mapping the locations of four or more satellites in relation to the tracking device, it can triangulate its exact position in three-dimensional space. More satellites are often used to validate.

Fig 4.17: GPS

CHAPTER 5

5.1 RESULT: Complete Project Module:

Overall view of our Project
5.2 CONCLUSION

A portable self-defense device with a Camera, GPS, LED Lights, Shock Mechanism Raspberry PI module, an alarm system and interfaced together with a single switch control, culprit image was captured sent to the current geographic location with the image through MAIL, simultaneously generating alarm and Blinking Lights. This setup was obtained for the security of the women. Supports the gender equality by providing safe environment to women reducing the crime rate against the women. Lastly fulfilling our main aim to spread this project in the whole world that is large scale production.

5.3 FUTURE SCOPE:

As the main aim in the world is to ensure women’s security so by this model we can achieve our aim also slowly it would reach the rural areas and the women in can benefit themselves at a low price and women can leave their houses without any worries. This system can be more advanced by adding calling feature also the location can also be send to the nearest police station. Images can be clicked in the advanced system.

APPENDIX:

```python
import time
import speech_recognition as sr
import os
import spidev
import serial
import RPi.GPIO as GPIO
# import IoTSend
import numpy
import numpy as np
import sys
import cv2
import os
import pytesseract
from gts import gTTS
from PIL import Image
```
import attachment

##from twilio.rest import Client

##account_sid = "AC45593a2dcf8160a2012c0b83758d7910"

##auth_token = "c8063ac09f58c600edcfff5b4bb2c2ae"

##

##client = Client(account_sid, auth_token)

GPIO.setmode(GPIO.BCM)

cap = cv2.VideoCapture(0)

sample = 0;
error = 0

sw = 19

RELAY = 2

BUZZER = 26

mic_name = "USB Device 0x46d:0x825 : Audio (hw:1, 0)"

# Sample rate is how often values are recorded

sample_rate = 48000

# Chunk is like a buffer. It stores 2048 samples (bytes of data)

# Here.

# It is advisable to use powers of 2 such as 1024 or 2048

chunk_size = 1024 #2048

# Initialize the recognizer

r = sr.Recognizer()

# Generate a list of all audio cards/microphones

mic_list = sr.Microphone.list_microphone_names()

# The following loop aims to set the device ID of the mic that

# We specifically want to use to avoid ambiguity.

for i, microphone_name in enumerate(mic_list):
    if microphone_name == mic_name:
        device_id = i

        device_id = 2

GPIO.setup(sw, GPIO.IN)

GPIO.setup(RELAY, GPIO.OUT)

GPIO.setup(BUZZER, GPIO.OUT)

GPIO.output(RELAY, False)
GPIO.output(BUZZER,False)
count=0
def SPEECH():
    while True:
        print('SPEECH MODE')
        with sr.Microphone(device_index = device_id, sample_rate = sample_rate,chunk_size = chunk_size) as source:
            #wait for a second to let the recognizer adjust the
            #energy threshold based on the surrounding noise level
            r.adjust_for_ambient_noise(source)
            print("Say Something")
            #listens for the user's input
            audio = r.listen(source)
            try:
                text = r.recognize_google(audio)
                print("you said: " + text )
                if text == 'help'or text == 'Help' or text == 'save'or text == 'Save':
                    print('help')
                    GPIO.output(RELAY, True)
                    GPIO.output(BUZZER, True)
                    break else: break
            except sr.UnknownValueError:
                print("Google Speech Recognition could not understand audio")
                break
            except sr.RequestError as e:
                print("Could not request results from Googlespeech Recognition service: {0}".format(e))
                break
        while True:
            SPEECH()
        if(GPIO.input(sw)==False):
            print('Switch DETECTED')
            GPIO.output(RELAY,True)
            GPIO.output(BUZZER,True)
while(cap.isOpened()):
    ret, img = cap.read()
    if ret:
        error = 1
        gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
        cv2.imwrite('frame.png', img)
        cv2.waitKey(1)
        sample = sample + 1
        if (sample == 2):
            break
    cap.release()
if error == 0:
    print('Camera is interrupted
Please execute the script again')
cv2.destroyAllWindows()
if error == 1:
    print('image is caputured')
    im = Image.open("/home/pi/Desktop/SELF_DEFENCE_WATCH/frame.png")
text = pytesseract.image_to_string(im, lang='eng')
GPIO.output(RELAY,False)
## client.api.account.messages.create(
## to="+91-9036088667",
## from_="+13305376030" , #+1 210-762-4855"
## body=Emergency at
http://www.google.com/maps/?q={},{}
##).format(13.0379,77.6190))
atttachem.sendMail(['ashoktechnoflycode2020@gmail.com'],
"PERSON VICTIM IMAGE",
"this is the body text of the email",
["frame.png","text.txt"])
print('email send. ...... ')
#################################################################
##print(text)
cv2.destroyAllWindows()
REFERENCES:

6. Prof. Basavaraj Chougula1, Archana Naik2, Monika Monu3, Priya Patil4 and Priyanka Das5, SMART GIRLS SECURITY SYSTEM, 1,2,3,4&5KLE’s College of Engineering and Technology, Dept. of Electronics & Communication, Belgaum, IJAIEM, ISSN 2319 4847, Volume 3, Issue 4, April 2014.