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Anti-Rape System – A Wearable Smart Watch for Women Safety

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Abstract - These days' rape cases are increasing rapidly, and women's safety is in threat. Nepal is a small territory in terms of area, but rape cases are growing briskly. The Himalayan Times reported the data by the National Crime Records Bureau unveiling six women being raped in Nepal every day. Rape culture has become one of the significant issues in developing countries like Nepal and has affected women's empowerment.It is estimated that approximately 35% of women worldwide have experienced sexual harassment in their lifetime. This model's objective is to design and develop a technology (Anti-rape system) to minimize rape cases. This replica employs the ability of IoT that can trace the physical location of the victim. The model consists of a watch where all circuits are integrated, and a button is placed in it. Whenever an individual presses the button system gets activated & alert message is sent to the rescue team with the physical location of the sufferer. Data communication takes place with the help of the GSM module fitted inside it. Emergency squads are provided with the physical location of the sufferer with the help of a GPS module integrated inside the watch. Neuro Stimulator will produce non-lethal electric shock in emergencies during the assault.

Keywords- Anti-rape, Women Safety, Smart Watch, IoT, Anti Assault

I. INTRODUCTION

The Internet of things (IoT) is a system of interrelated computing devices, mechanical and digital machines provided with unique identifiers (UIDs) and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction [1].One can monitor every device with the right access by using the internet. The evolution of IoT is rapid & flexible to work with. Along with advanced data analytics, IoT-enabled devices and sensors are helping us reduce air pollution in some of our world's biggest cities, improve agriculture, and even detect deadly viruses. Anti-rape System is an IoT based project whose central idea is to provide security for people facing sexual harassment. The model is a wearable technology (anti-rape watch) that is used to defend the harassment. Neuro Stimulator will produce non-lethal electric shock in emergencies during the assault. This model is designed to advocate harassment without harming the victim with high accuracy. When an individual feels unsafe, one can click the button on the watch to send alerts to the nearest police station with the location coordinates. Once the button is pressed, the rescue team is there to assist the victim. That is why it is highly efficient, accurate & easy to use.

II. LITERATURE SURVEY

Social crimes and harassment are increasing these days rapidly. The system proposed for protecting an individual at the time of violence is arranged on the methodologies that they are used to conquer the issues. The objective of the proposal under this category is to design a defence mechanism using which sufferer can defend themselves from the attackers with an inbuilt shock circuit. The ANTI-ASSAULT CLOTHING [2] is a wearable technology that comes in the form of a jacket or straps. The body of the victim is covered with an insulating layer, so it protects the victim from being shocked. The outer layer of cloth is the conductive layer & delivers harmful shocks to the attackers. Another proposal made under the same category suggests the bra designed to shock attackers [3]. The bra is fitted with a pressure sensor connected to an electric circuit. When pressure is applied on the bosom, the channel gets activated & delivers 3800KV of electric shock to the attacker. If the system is triggered, it accesses the physical location of the sufferer and sends a text message to the family.

The other proposal is a Smart Foot Device [4] which has an accelerometer placed in the footwear which sends data to mobile application. If an individual feel unsafe, tapping footwear with the other leg activates the system & send emergency alerts to the respective authorities. In this model supervised learning is applied to data received from accelerometer to predict whether it is a tap or a walk.

This proposal uses an audio-video recording. The objective of the project that falls under this category is to collect proof of sexual harassment. A system named ProTecht [5] records the audio & video recordings when the model is triggered & sends alerts to trusted contacts. Trusted contacts are programmed on the device & message is sent during the assault. One of the exciting features of this system is that system can be triggered with the voice command. This system also has a shock circuit for attackers.

III. PROPOSED SYSTEM

This model is designed to reduce sexual harassment. The system consists of two main parts, a chargeable watch intended for the sufferer & server station to receive alerts to rescue the victim. When an individual clicks the button placed on the outer layer of the watch data is send in the form of character. When the receiver module gets data from the transmitter, the system is triggered & the message is sent to the rescue team with the help of the GSM module. One can simply add the contact of family, relatives to send alerts. Buzzer & LCD is used to indicate emergency alert which is located on the stations. Along with the message sufferer, the location coordinate is sent with the help of a GPS module. The message is sent to the rescue team with the help of the GSM module integrated into this model. Neuro Stimulator is used to shock the attacker in case of emergency. Neuro Stimulator produces voltage around 1200mv & current of 3 microamperes. The block diagram of the proposed system is mentioned above.

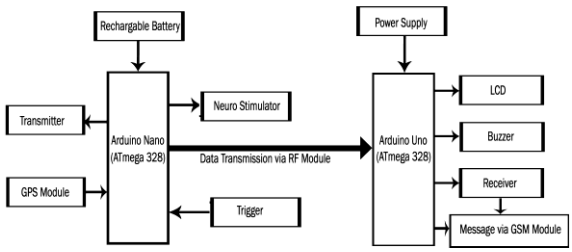

Fig.1. Block Diagram

A brief of components used in the block diagram:

1. Arduino Nano

It is the smallest, complete, and breadboard-friendly microcontroller that consists of a serial monitor. It can be powered through the Mini-B USB connection. The Arduino Nano may be programmed with the Arduino software, which we can download through the official website. It includes computerized & manual reset. It consists of 22 Digital I/O Pins and 8 Analog I/O Pins. The microcontroller has a flash memory of 32 KB, out of which 2 KB used by the bootloader and 2 KB SRAM.

2. Neuro Stimulator

An implantable neurostimulator is a surgically placed device about the size of a stopwatch. It delivers mild electrical signals to the epidural space near your spine through one or more thin wires, called leads. The neurostimulation system does not make any noise. It may be felt as a small bump under your skin, but does not usually show through your clothes. In this electric shock generator is an electronic device that produces voltage around 1200mv & current of 3 microamperes.

3. RF Module 433 MHz

The module helps to communicate with Arduinos wirelessly. It is mainly used to transmit and receive the data in wireless calling, burglar alarm, and many more. It has a high volume of applications than IR. RF signals travel in the transmitter and receiver even when there is an obstruction. It operates at a specific frequency of 433MHz.

4. NEO-6M GPS Module

The Global Positioning System (GPS) is a satellite-based navigation system made up of at least 24

satellites. GPS works in any weather conditions, anywhere in the world, 24 hours a day, with no subscription fees or setup charges. GPS modules contain tiny processors and antennas that directly receive data sent by satellites through dedicated RF frequencies. With the help of the GPS Module, the exact location coordinates of the victim are addressed.

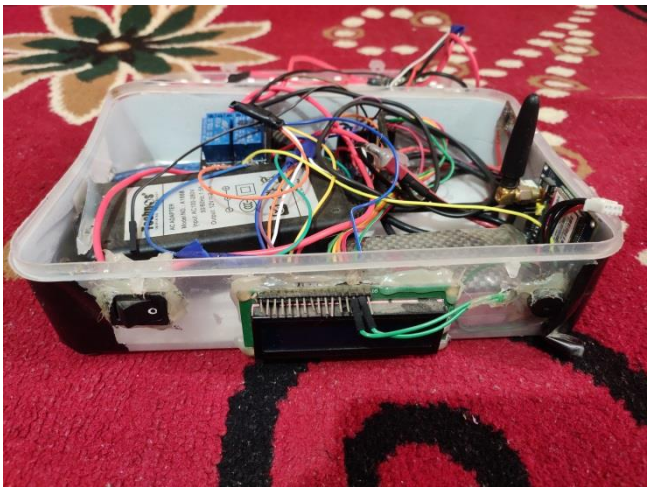

Fig. 2. Server Station to Receive Alerts

Fig. 3. Anti-rape Watch

5. Two Channel Relay Module

The two-channel 5V Relay module board is used to control two applications with the same board, and it has high voltage and current load, such as a motor lamp. It is useful in safety with a wide range of controllable voltage. It is ideal for a single-chip microcomputer, household appliance control, and many more. It has led indicators for power and status in-built. In this, when the jumper is connected to a low pin, the low level is a trigger, and when compared to a high pin high level is trigger.

6. Arduino Uno R3 Board (ATmega328)

Arduino R3 is an open-source hardware and software program used for roboticists, and lighting led, motors, etc. It contains a variety of I/O pins, including analog, digital, PWM, and more.ATmega328 has 14 Digital I/O Pins (Of Which 6 Provide PWM Output) and 6 Analog Input Pins. It is simply connected with a computer with a USB cable or powers it with an AC to DC adapter or battery to get started.

7. 16*2 LCD Module

It is 16 characters wide & 2-row character displays made of high-quality material. It consists of 16 connector pin with a blue blacklight. It can be easily controlled by MCU and can be used in any embedded systems, industrial device, and handheld equipment. It consists of a command register which stores the command instructions given to the LCD. A command is an instruction given to LCD that will do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling the display, etc.

8. Buzzer

This Buzzer is suitable for PCB mounting and producing audible tones and frequencies. It can be directly connected to a microcontroller pin. It can be used with Arduino as well. It can be used for making DIY robots. This Buzzer has loud sound output with low power consumption. It is used for system alerts and has an operating voltage of 3-5 volt.

9.GSM Sim 900A Module Big

The GSM/ GPRS SIM900A Module is a breakout board with dual frequency. This module has on board two set power supply interface, SAM female socket and IPX mini antenna interfaces. This module has

selectable interfacing voltage which allows connecting 5V and 3V microcontroller directly. It has in built GPRS multi slot class 10/8 and mobile station class B. It has serial port circuit with protection and supports power on and reset. This module is mostly used to send and read SMS, data transfer application in M2M interface.

IV.WORKING METHODOLOGY

The working methodology of the proposed system is explained below.

Step 1: Start

Step 2: The emergency button is pressed.

Step 3: Transmitter transmits the character and whenever the receiver receives, the character signals system gets triggered.

Step 4: After the system gets activated GPS module will track the current latitude and longitude of the sufferer and sends SMS to the registered mobile numbers.

Step 5: Neurostimulator is turned ON to apply shock to the attacker.

Step 6: Buzzer is turned on, and the message is shown in LCD to alert the rescue team.

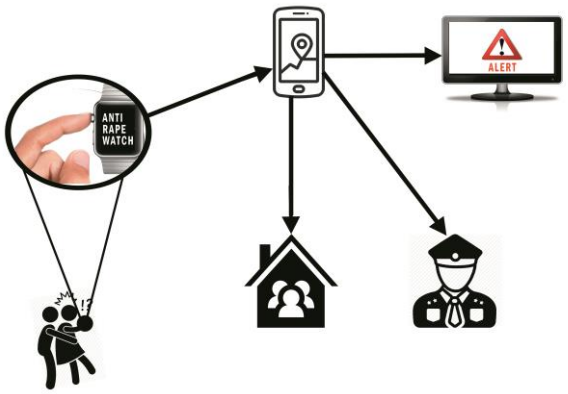

Fig. 4. System Architecture

V. RESULTS AND DISCUSSION

The model is designed to provide safety & security to women. After the button pressed by the victim GPS Module will calculate the location coordinates of the sufferer. GSM module placed inside the watch will send SMS alerts to the registered number in the microcontroller. Buzzer and LCD display notify the rescue team about the victim which helps to trace the assault location to assist the victim. Neuro Stimulator will produce non-lethal electric shock in emergencies during the assault.

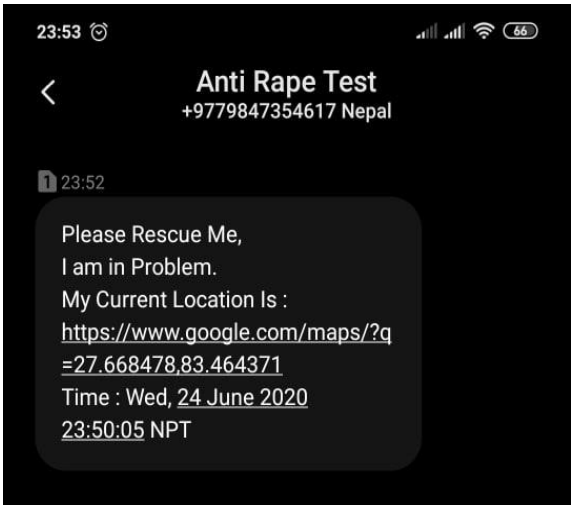

Fig. 5. SMS Alerts

Fig. 6. Display Alert

VI.CONCLUSION AND FUTURE WORKS

The Anti-Rape watch is one of the varieties of devices to prevent human abuse and rape. In the form of a simple wearable watch, this device is easy to handle and operated with a single click. A single button click forwards the victim location and alerts the message to the registered number in the microcontroller. At the same time, the immediate action is shown by an electric shock to the abuser. Thus prioritizing individual security, this device has huge scope in mitigating the assaults, harassments & related social

crimes. A more optimized wearable version of the system can be developed as future work. Complete circuitry can be mounted in a single PCB board, and the size of the watch can be made compact so that the attackers won't suspect. Instead of using RF technology, we can use WIFI technology to cover a wide range of areas for transmission of data to activate the system.

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