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Handheld Electrical Weapon with GPS and GSM for Self Defence System

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Abstract
Safety and theft prevention has become one of the prominent fields in the current scenario. Women's security is at stake. Harassment has taken a toll in today's world. Harassment doesn't include only the physical abuse it also covers a wide range of an offensive behavior and molestations. Protection has become a necessity not an attribute. To furnish a full-fledged protection for women from being harassed and to prevent robbery, we are proposing an equipped electrical weapon. This project aims at designing an electric gun through which the attacker experiences stimulation of his sensory and motor nerves, resulting in strong involuntary muscle contractions. This resists their movements for a period of time. It consists of a RFID module to provide an authorized usage. It works in such a way that only when the information in RFID matches and also prohibits the illegal use of the weapon by unauthorized person. Using GPS module the location can be tracked and monitored, the information gathered will be sent through a GSM modem to the manufacturer and to the nearest police station for immediate recovery and to avoid the unnecessary use of weapon.

Keywords
Electrical weapon, Radio Frequency Identification module (RFID), Global Positioning System (GPS), Global System for Mobile Communications (GSM).

I. Introduction

Humiliation, Harassment, torture and exploitation of women are everywhere throughout the world. Sexual harassment is bullying of a sexual nature or the unwelcome or inappropriate promise of rewards in exchange for sexual favors [1].

Where laws surrounding sexual harassment exist, they generally do not prohibit simple teasing, offhand comments, or minor isolated incidents, that is, they do not impose a "general civility code" [2].

In workplace, it may be considered illegal when it is so frequent or severe that it creates a hostile or offensive work environment or when it results in an adverse employment decision (such as the victim being fired or demoted, or when the victim decides to quit the job). The legal and social understanding of sexual harassment, however, varies by culture [3].

We often have the chance of seeing the newspapers that flamed with headlines like theft, robbery, snatching personal belongings like cell phones, jewels, money, etc. The major problem is, victims are losing out from justice system that too often prioritises putting the perpetrator behind bars rather than returning people's stolen property.

To avoid those illegal actions, we are using an handheld electric shock weapon [4] which is an incapaciting weapon.

It delivers an electric shock aimed at strangers. It uses a temporary high-voltage, low-current electrical discharge to override the body's muscle-triggering mechanisms. Many types of these devices exist like stun guns[5], belts and tasers.

Apart from the gun mechanism, we are including the RFID tag and receiver for authorization of user and a GPS and GSM module for communicating with their colleagues, relatives along with the police station and manufacturer.

II. Statistics

Many of them are kidnapped, raped, and even killed for no reason. Every three out of five women in India are under this serious threat. The survey found that 84 per cent of the women who experienced harassment were in the age group of 25-35 years, 82 per cent of them were full-time workers and 68 per cent were students. The situation has become alarming for the government and official persons to take actions immediately [6].

Projected rapes in India - Highest incidence

Rank	State	2013	2014	2015	2016	2017	2018
1	Madhya Pradesh	4730.44	4832.02	4933.6	5035.18	5136.76	5238.34
2	Uttar Pradesh	3382.26	3529.39	3676.52	3823.65	3970.78	4117.9
3	Maharashtra	2511.76	2570	2628.25	2686.49	2744.74	2802.98
4	West Bengal	2309.88	2386.16	2462.43	2538.71	2614.98	2691.26
5	Assam	1753.44	1813.52	1873.6	1933.68	1993.76	2053.84
6	Andhra Pradesh	1777.17	1825.17	1873.17	1921.17	1969.17	2017.17
7	Rajasthan	1662.24	1728.31	1794.37	1860.43	1926.49	1992.56
8	Odisha	1461.95	1523.37	1584.79	1646.2	1707.62	1769.03
9	Kerala	1022.76	1070.12	1117.48	1164.84	1212.2	1259.56
10	Chattisgarh	1210.64	1218.93	1227.22	1235.51	1243.8	1252.09

Fig.1 Projected rapes in India that grows at alarming rate from the year 2013 to 2018

Fig. 2 : Crime Statics on murder, robbery, motorcycle snatching and kidnapping

III. Existing Methodology

In the existing method, the electric gun is categorized mainly into two types: Tasers and stun guns that uses cartridges.

A. Electrictasers

Tasers use short pulses of high voltage electricity carrying little energy, which produce a painful shock with a lesser tendency to disrupt muscular or cardiac function [7]. Contact with a DC source can result in disturbances in cardiac rhythm, depending on the phase of the cardiac cycle at the moment of delivery of

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electricity. The stranger went into respiratory arrest followed by cardiac arrest 25 minutes after being shot with the Taser. The Taser barbs are 4 mm in length and are designed to stick in skin or clothing and not fall out [8].

B. Stun Guns with Cartridges

It is a stun-baton gun with a built-in torch and charger. It is the best torch like hand gun, can also be used during night time for self-defense against intruders. It fires two small dart-like electrodes, which stay connected to the main unit by conductive wire as they are propelled by small compressed nitrogen charges [9]. The cartridges contain a pair of electrodes and propellant for a single shot or to a certain number of shots and is replaced after each use. There are number of cartridges designated by range, with the maximum at 35 feet(10.6m) and are also limited to 15 feet(4.5 m). There is wide variety of guns with different models under this section.

IV. Proposed Methodology

In our proposed idea, we are including the following materials:

Table I : Materials For Electric Gun

Serial no	Materials
1	MICROCONTROLLER-PIC16F877A
2	RFID MODULE
3	DC GUN
4	GPS AND GSM MODULE
5	9 VOLT BATTERY
6	CIRCUIT COMPONENTS (RESISTORS, CAPACITORS, RELAY)
7	FLASHLIGHT

A. Materials

1) Microcontroller: The PIC microcontroller PIC16F877A is one of the most renowned microcontrollers in the industry. This controller is very convenient to use, the coding or programming is also easier. One of the main advantages is that it can be write-erase as many times possible because it use FLASH memory technology. It has a total number of 40 pins and there are 33 pins for input and output. Electrically Erasable Programmable Read-Only Memory is also featured in it which makes it possible to store some of the information permanently like transmitter codes and receiver frequencies and some other related data. It can be used in areas where there is need for flexibility.

There are 5 input and output ports namely PORTA, PORTB, PORTC, PORTD and PORTE, which can be digital as well as analog. In analog mode, the pins and ports can only act as inputs. But in digital mode, there is no restriction. We can configure the ports as output or as input. This can be done through software like MPLAB for programming according to the necessity [10].

2) RFID: RFID systems consist of three components: an RFID tag or smart label, an RFID reader and an antenna. RFID tags contain an integrated circuit and an antenna, which is used to transmit data to the RFID reader (also called as interrogator). The reader then converts the radio waves to a more usable form of data. Information collected from the tags is then transferred through a communication interface to a host computer system, where the data can be stored in a database and analyzed at a later time [11], [12].

In this method, we are using passive RFID tags, which comprised of three elements: integrated circuit, an antenna and a substrate. This passive tag performance is strongly dependent on the antenna's size. The larger the antenna, the more energy it can collect and then send back out. Therefore, it has high read ranges (although not as high as those of active tags).

Antenna shape is also important and here we are using low and high frequency antennas because those frequencies are predominantly magnetic in nature.

3) GPS and GSM Tracking: A GPS tracker utilizes minimum 3 Global Positioning System satellites to indentify the location. The modem communicates only in single way with the microcontroller. This means that it can only transmit data to microcontroller and does not receive any data from it. And at the same time, it receives data from satellite and does not send any data to satellite. Then GSM modem is used to send the information to the required number of people belongs to user. And as it is a weapon, location can be sent to the nearest police station [13], [14].

4) DC Gun: The probes from the gun are 5cm apart. The electric pulses of (5-30) pulses can be produced each of 20,000 volts over the stranger for a very short duration. The effect is varied by the duration of attack [15], [16].

B. Function of Electric Gun

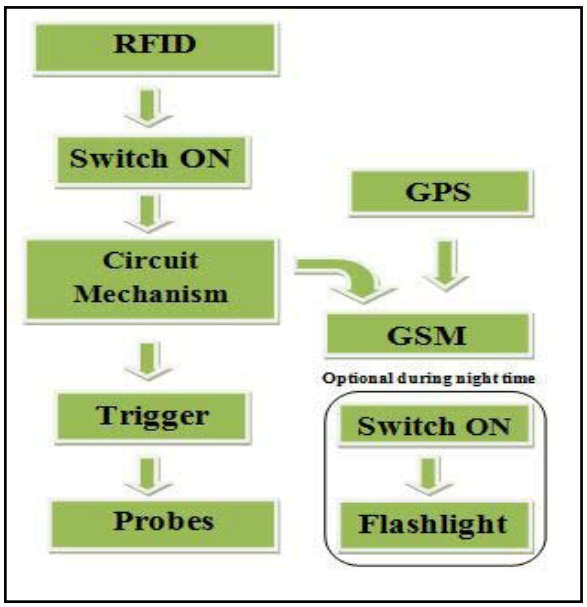

Fig 3. Block Diagram

This method includes the materials that are used for safety purpose on both sides i.e. user and also for the victim who gets affected. This is because, if the person is weak, he/she cannot withstand the voltage supplied through the gun. This may leads to cardiac arrest and cause death hence the supply should be minimized. And also to prevent this usage from children and from stranger against the user RFID is used. Once the information in tag matches the controller will get turned ON to trigger and activate the gun. Simultaneously, GPS will track the location and sends the message containing information along with the location through GSM module.

V. Conclusions

In this paper, we are introducing the additional features for safe usage of the weapon. The existing gun mechanism is standardized that includes flashlight, laser, etc. Similarly, the smart watches

include GPS and GSM for personal safety. We are combining those features along with RFID. Though we the working model is ready, with the enabling technologies, we are trying to bring it to a compact size.

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