ISSN:2320-0790

COMPUSOFT
An International Journal of Advanced Computer Technology

Women Anti-Rape Belt

Sainath B Gadhe[1], Ganesh Chinchansure[2], Amar Kumar[3], Mritunjay Ojha[4]

[1]Sainath B Gadhe, Student Fr. C. R. I. T, Navi Mumbai

[2]Amar Kumar, Student Fr. C. R. I. T, Navi Mumbai

[3] Ganesh Chinchansure, Student Fr. C. R. I. T, Navi Mumbai

[4]Mritunjay Ojha, Lecturer, Fr. C. R. I. T, Navi Mumbai

Abstract: Rape is fourth most common and frequently happening crime against women in India. Among metro cities, has more number of rape cases and compare to developed countries like Latin America developing countries like India has less number of such incidences, where very good security facilities are provided by government and ratio of education is higher. So it proves that illiteracy or security is not major reason behind such assaults but the unawareness about self-protection and inefficient self-protection weapons currently available like Ninja key chain , pepper spray, handgun etc. It is also revealed that in 98% rape cases, culprit is someone close to victim like neighbour or relative, where bureaucrats can't do much to control as it is not possible to keep watch on each house every time. This paper summarizes current safety weapons available for women self-protection in situations like rape, assaults and adds new perspective of using GPS system and android smartphones for women safety. By implementing and using our proposed system, not only safety of women but also of valuable things will be just a click away at very cheap price and that don't need to be carried separately.

Keywords: Arduino, Bluetooth Module, GPS, Current Loop, Android

I. INTRODUCTION

The Global Positioning System (GPS) is a space-based satellite navigation system which provides location and time information in all weather conditions. At current time GPS receivers are extremely accurate. Latest Garmin GPS receivers with WAAS (Wide Area Augmentation System) capability improves accuracy to less than 3 meters on average. GPS is used in vast number of field, many more applications. Like everywhere on land, at sea and in the air. So by using latest devices like Bluetooth Arduino microcontroller, Bluetooth modem as modulator-demodulator for connection and standalone android application we can have a very effective safety device which work automatically and can be triggered manually as well .This will be digitalized future device for safety of all valuable things.

II. EXISTING WOMEN SAFETY WEAPONS

We have studied pre-existing safety weapons for women. Given below are some of them which generally used for self-protection.

A. Ninja Spike Key chain (kubotan)

Ninja Spike Keychain is basically a normal keychain which is weaponed with Ninja Spike. Ninja Spike is sharp pencil size device which can be used by women under attack to harm person attacking. This keychain fits perfect in between our finger as to make a fist, but not easy to use. This keychain comes under self defense weapon for women.

Honeycomb Hairbrush is another similar kind of weapon in which 3 1/2" dagger is hidden under comb. Dagger is meant for stabbing, so you need to have enough strength to thrust this into an attacker. It is easy to carry and use. Also it is dangerous weapon which sometimes used against law.

B. Handgun

This 'Handgun' is introduced by Indian government. It is lightweight handgun designed for women to protect themselves from situations such as rape and sexual assault. This 32-caliber pistol is named "Nirbheek," a synonym for "Nirbhaya ".

Special titanium alloy body, the wooden handle. The six-shot bullet gun is easy to handle and it can hit its target accurately up to 15 meters [49 feet]

But this is very costly weapon which can't make available to all– the gun is priced at 122,360 rupees (about $2,000).

C. Safety Electric Sandal

Sandals that deliver electric shock after hitting with it. Such safety devices that don't need to be carried

separately. The moment you hit someone with this sandal. It will also give a current shock to the criminals and immobilize them for a few seconds as small battery is fitted in sandal for this purpose.

D. Pepper Spray

Pepper spray, also known as OC spray (from "Oleoresin Capsicum"), OC gas, and capsicum spray, is a lachrymatory agent (a chemical compound that irritates the eyes to cause tears, pain, and temporary blindness) used in policing, riot control, crowd control, and personal self-defense. Pepper sprayers are available in market to the public in 5% and 10% concentration. It is condensed in plastic deo shape bottle and we can carry in our bag .But if you attacked suddenly by someone then paper spray may not help you at moment. Also if you miss-aimed or at windy conditions it is not effective.

III. DRAWBACKS OF CURRENT AVAILABLE WEAPONS

After some research we come to know that those have certain disadvantages. As there are several drawbacks of above mentioned self-defense weapons.

1. Handgun is very costly device which is unaffordable to common man.
2. Ninja kitchen ,Handgun are not easily usable things .You need to take some training and need muscles and tactics to use properly otherwise can cause serious harm.
3. Pepper spray is not effective in situation like high wind ,rainy season and if you miss the target then it could turn out as harm to use from person against you are using.
4. Main backlog is these all are comes under non-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. That is the reason we come up with this idea.

IV. OUR PROPOSED SYSTEM

Location tracking system to prevent crime aims at helping women from any type of assaults, which uses modern technologies of communication.

1. In this we are proposing a system consisting of a Conductive waist belt in which continuous flow of electricity will be present using normal AA sized 9 volts battery is required connected with standalone Android application which will work manually as well as automatically
2. This project will be based on developing a location tracking system where the user can send the alert automatically as well as manually. Also can be used as a locker system for security purpose of many other things like for laptops, vehicles, office etc.
3. A standalone android mobile application is to be implemented that informs the predefined numbers about the safety and location of the user and to keep track of location of the user with the help of GPS. A Smart phone with minimum Android version at least 2.3(Gingerbread) will be needed.
4. This belt basically works on the principle of a closed loop circuit. The Arduino, Bluetooth module(We are using arduino nano and HC-05 respt.) can be used to achieve this purpose.
5. The connectivity between the Arduino and the mobile will be maintained through the Bluetooth modem.
6. The moment anybody presses the key their location will be traced and an alert message with the location will be sent to the predefined numbers. Also it will send an SMS packet automatically to predefined numbers in case of any emergency. In case if he/she is unable to press the key and is unconscious due to any reason, on opening the belt the same process will be carried out.
7. Also the user will be allowed to open the belt by entering the password on mobile phone android application.
8. The mobile phone continuously communicates with Bluetooth Arduino with the help of Bluetooth modem. It also keeps track of the location of the user with the help of GPS.
9. To improve this system we can call local police through our modem. As if we track nearest police station and send alert message to station then we can achieve our aim more effectively. Also using hidden camera we can click pictures of culprit as loop breaks and that too send to the predefined numbers. This way we can catch culprit easily.
9. The application we could be developed in java language with support of Android SDK and concerned Android APIs (such as OpenCV). The .apk file generated will be installed Android based devices. Also for arduino using Arduino software coding can be done.

V. ARCHITECTURE OF PROPOSED SYSTEM

Design of our proposed system is given below, where every module is properly explained. The closed loop is tied around the arduino, which continuously send the output to android app(i.e. mobile) via Bluetooth Module.

Fig. 1 Shows Architecture of Proposed System

after loop break and it stops giving input to mobile through serial transmitter port. So our application starts tracing current location of user , hence basically it is trigger to application.

Android application then sends location request to GPS service and sends that location in form of alert message to the predefined numbers stored inside the Android application by user.

VI. CASE STUDY

A. The Global Positioning System (GPS)

The Global Positioning System (GPS) is a space-based satellite navigation system that provides location and time information in all weather conditions, anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites.

GPS providing critical capabilities to military, civil and commercial users all over world. It is managed by the United States government. It is available free of cost to every receiver.

GPS was created and realized by the U.S. Department of Defense (DoD) and at that time it was running with 24 satellites. Transmitter power is only 50 watts or less.

1. Working

A GPS receiver calculates its position by precisely timing the signals sent by GPS satellites high above the Earth. Each satellite continually transmits messages that include:

-The time the message was transmitted and Using
- Satellite position at time of message transmission.

Using the messages it receives, use triangulation to calculate the user's exact location, receiver determines the transit time of each message and computes the distance to each satellite using the speed of light. Essentially, the GPS receiver compares the time a signal was transmitted by a satellite with the time it was received. The time difference tells the GPS receiver how far away the satellite is. Each of these distances and satellites' locations defines a sphere. The receiver is on the surface of each of these spheres when the distances and the satellites' locations are correct. Navigation Equations are used to compute location of receiver on basis of these obtained distances and locations of satellite

Location is calculated perhaps moving map display or latitude and longitude; elevation or altitude information may be included, based on height above the geoid (e.g. EGM96).

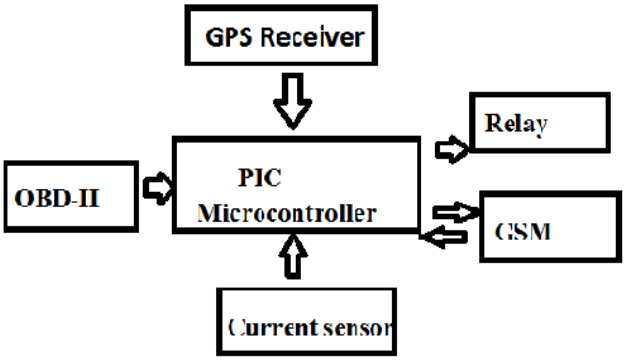

Fig. 2. Working Of GPS system

2. GPS Screens

A GPS receiver should be locked on to at least 3 satellites' signal for gaining 2D position(latitude and longitude) and track movement.

By using 4 satellites in view, the receiver is able to determine the user's 3D position (latitude, longitude and altitude). After obtaining the user's position , the GPS unit can calculate other information, such as speed, bearing, track, trip distance, distance to destination, sunrise and sunset time and more.

3. How accurate is GPS?

At current time GPS receivers are extremely accurate, It is because their parallel multi-channel design. Garmin's 12 parallel channel receivers are quick to lock onto satellites when first turned on and they maintain strong locks, even in dense foliage or urban settings with tall buildings. Some atmospheric factors and other sources of error can affect the accuracy. On an average Garmin® GPS receivers are accurate up to 15 meters. Some expensive systems are available that can provide accuracies to within a centimeter.

GPS Signals

Latest Garmin GPS receivers with WAAS (Wide Area Augmentation System) capability improves accuracy to less than 3 meters on average. With same equipment and at same cost WAAS can be used. More accuracy with Differential GPS (DGPS), which corrects GPS signals to within an average of 3-5meters. The U.S. Coast Guard operates the most common DGPS correction service. This system consists of a network of towers that receive GPS signals and transmit a corrected signal by beacon transmitters. For getting the corrected signal, users must have a differential beacon receiver, beacon antenna with their GPS.

The GPS module supports up to a 10Hz update rate. Then Bluetooth Arduino microcontroller is the main operational unit of the tracking device. The GPS receiver collects the latitude, longitude and speed information and forwards them to the microcontroller.

The GSM module communicates with the microcontroller to send the information package to another GSM Module at the recipient station, all information appears on Google Earth after processing.

4. Applications

GPS is used in vast number of field, many more applications. Like everywhere on land, at sea and in the air, except inside most buildings, in caves and other subterranean locations, and underwater where it's impossible to receive the signal.

Anyone who needs to keep track of their location, to find his or her way to a specified location, or know what direction and how fast he or she is going can utilize the benefits of the global positioning system.

B. Bluetooth Arduino

It is very small size microcontroller based on the Atmel ATmega328 (Arduino Nano 3.0).It has almost same functionality of the Arduino Duemilanove(2009), but in a different package. It operates at Voltage 5V, input voltage 7-12 V and Built with 14 Digital I/O pins of which 6 provide PWM outut . Also consist of 8 analog input pins.ATmega328 provide UART TTL (5V) serial communication, available on digital pins 0 and 1.The Arduino Nano can be programmed with the Arduino software.

Pins with special functions:

Serial RX and TX : Used to receive (0-RX) and transmit (1-TX) TTL serial data. These are connected to the corresponding pins of the FTDI USB-to-TTL Serial chip.

External Interrupts: 2 and 3. These pins can be configured using attachInterrupt() function to trigger an interrupt on a change in value or low value or a rising or falling edge.

PWM: 3, 5, 6, 9, 10, and 11. Provide 8-bit PWM output with the analogWrite() function.

1. Bluetooth Communication

We are using Bluetooth Transceiver Module with TTL Outputs-HC05 for communication between Arduino and Mobile application.

. It is used as UART RS232 serial Converter Module. It can transfer the UART data through the wireless Bluetooth. +3.3VDC 50mA power supply and 2.4GHz ISM band frequency

C. Programming Language

1. Android Application

Android is an operating system that is currently owned by Google. Android app can be developed using Eclipse/ Android Studio. Eclipse is an integrated development environment (IDE).In our case we are using studio. For developing an interface for an app an xml file has to be created in studio. Drag and drop options are available in studio so it becomes easy to create interfaces. Once the interface is created then a Java file is create to perform input and output functions. So this can be done by setting the Content view of java file to xml layout. Also Android SDK tools available for simulation.

In our project Eclipse can be used for coding and implementation purpose.

2. Arduino

The Arduino BT can be programmed with the Arduino software. It has its own programming language which is very easy and also can be coded with java, c ++. It

uses STK500 protocol to communicate (which reference to the C header files).

VII. ADVANTAGES

1. This application will be accessible automatically as well as manually.
2. Very cheap system compare to currently available safety devices in market.
3. Easy to carry, no need of extra efforts as can be attached with waist belt only for woman safety.
4. Very effective as useful all over the globe where range is available at any time with high accuracy and efficiency.
5. Totally secure and reliable, using which we help to catch culprit at the place of crime only.
6. Also can be used as safety device for vault, automobiles, home, office etc.
7. This weapon will help in controlling assaults from close persons of victim which contributes about 98% in such incidences.

VIII. DISADVANTAGES

1. Internet connection is necessary to use GPS or sending alert messages. Sometimes to send messages SIM balance may be required.
2. Physical motion can sometimes break the connections in circuit.
3. Network or range is mandatory to complete action.

IX. CONCLUSION

As stated earlier in our proposed system we overcome many restrictions and drawbacks of currently available safety weapons in market. It can be manufactured and sold at very cheap rate, therefore it will become a revolutionary and innovative device in reducing crimes against women in our society. It is seen that in 98% cases women are assaulted from someone who is close to them like neighbor or relative, where police can't help. This weapon can make considerable contribution in controlling such cases.

As well as to secure other valuable things also, this device can be implemented by making physical changes in structure of it. This is very effective system if exploited judiciously.Also using camera we can make it more effective by clicking photos as soon as loop breaks and is here to stay.

X. REFERNCES

[1] http://www8.garmin.com/aboutGPS/
[2] http://www.xojane.com/fashion/pretty-weaponry-girly-warfare
[3] http://en.wikipedia.org/wiki/Global_Positioning_System
[4]http://en.wikipedia.org/wiki/Global_Positioning_System
[5] http://en.wikipedia.org/wiki/Pepper_spray
[6]http://arduino.cc/en/Main/ArduinoBoardBT?from=Main.ArduinoBoardBluetooth