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Design and implementation of intelligent biosensor, personal defence device in smart watch for women sexual harassment

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Abstract

The crime against women is increasing at a higher rate. The world is becoming unsafe for women in all aspects. In this project, an attempt has been made to develop a smart device that can assist women when they feel unsafe. The motivation for this project came from, the women's and children's sexual abuses are increasing day by day. New advanced female safety devices were introduced in markets, but it's contains costly price and it takes a long time to prevent the particular persons. So we planned to develop a female safety watch for women's, and we also attached self-defence devices. The alarm and pepper spray are attached in these devices, it's used to fight against the victim. This smart device will be clipped to the hands of the user and can be triggered discreetly. On tapping one button, an alert is sent via GSM with current location that is gotten from the GPS seeking help and the fear and anxiety monitoring device providing the women health conditions.

Keywords: Female safety device; GPS; GSM; Heartbeat sensor; Pepper spray; GSR sensor

1. Introduction

More than half of the world population was occupied by women. The pathetic condition of women in society is itself an key indicator of the low value set on women's lives, and their suffering is very well in tune with the social system and their life pattern. Women are not found to be safe in the world today. At least 1 out of 3 females on earth has been physically or sexually abused [1]. Rape is a offense committed by the hyper action of sex organs. It is a heinous crime and points towards beastly nature of entire society. It is also considered as an violative of victim's most cherished of the fundamental rights, namely the Right to Life contained in Article 21 in Constitution of India [2]. Rape is a growing problem in today's society, becoming the fastest growing crime in India. According to the present data of the home ministry, India stands third, leaving behind countries like Sri Lanka, Jordan and Argentina, when it comes to rape cases [3]. In India crimes against women has increased day by day. Previously women dowry death increased 6787 to 8391, furthermore rape cases also significantly, mounting from 8391 to 22172 during 2005- 2010 [4]. Asifa Bano, an eight years old girl of Rasana village near Kathua in the Indian state of Jammu and Kashmir, was gang-raped and murdered by the culprits. This horrible incident occurred in between 10th to 12th January 2018[5]. According to WHO, 1 in 10 children are sexually abused at any given point of time. A study at TISS, Mumbai, revealed that 30% of girls and 10% of boys had been a victim of sexual abuse [6]. As per the previous data 92 women were raped every day in India, 4 in Delhi. In August 2013, a School Teacher in Arunachal Pradesh was arrested for raping fourteen underage girls in a hostel where he worked as a warden. In February 20, 2015 a 30 year old African woman was gang raped by four men in car and later pushed out of the moving vehicle in Delhi [7]. Children are more frequently raped compared to adults as they cannot offer much resistance, and also due to false belief that venereal diseases are cured by sexual intercourse with a virgin [8]. The word rape is created from a Latin word '*rapere*', which refers to 'unlawful sexual activity'. There are several incidents reported in our mythologies, from time to time and rape is considered as a heinous crime from the ancient times [9]. During the partition of India, some 100,000 women were claimed to be kidnapped and raped. A

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Russian national working in India claimed that she was raped by a Goa politician on 1 December 2009 after having dinner with him by that evening. Software engineer Nayana Pujari was raped and murdered by her driver in Pune by the year 2009. 23-year old student was gang raped in public bus, on 16 December 2012, sparked large protests across the capital Delhi. She was with a male friend who was severely beaten with an iron rod during that incident. This same rod was used to penetrate her severely so that the victim's intestines had to be surgically removed, before her death thirteen days after the attack. Some of the problems of women to be solved are Stop the custom of dowry! Make stronger laws, launch campaigns, do whatever it takes! Stop female infanticides! Stop discrimination in the wages, treatment and employment of daily-wage workers based on sex [7]. The best way to reduce probability of becoming a victim of violent crime such as rape is to recognize, defense and look up resources in helping out of hazardous situations. If a women is in dilemma or get split from friends, neighbours during night time or feels someone is following her with sexual assault or don't know how to find back residence the defense smart device will guard her by providing current location, health conditions and control center through SMS/call. Hence the present study was aimed to develop women's defence smart watches to protect and control female sexual harassments.

2. Proposed system

2.1. Characterization

GPS was used to find out the latitude and longitude sends the current locations with the help of GSM. The GSM was used to send an SOS message to another person. The heartbeat and GSR sensors using to find out the particular time crime against women's health conditions. Above 85 / minutes heartbeat and 750 GSR range values shown the women have fear/ anxiety or she got any other issues. The alarm and pepper spray was used to fight against the victim.

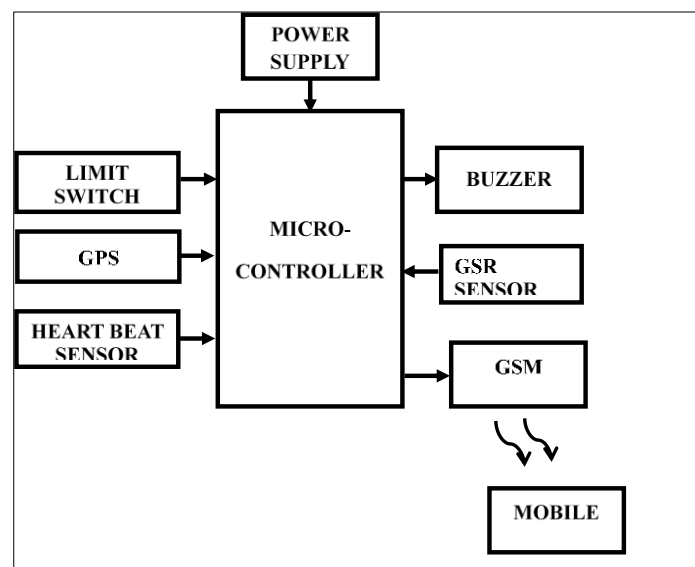


Figure 1 Block Diagram

2.2. Components

Arduino (micro controller), GPS module, GSM module, Heartbeat sensor, GSR Sensor, Buzzer, and Pepper spray.

2.2.1. Arduino

Arduino is a micro controller to which GPS/GSM modules and sensors are connected. There are several versions of arduino presented in the market. In this application ATMEGA328P Arduino board is used.

2.2.2. GSM Module

Global System for Mobile Communication (GSM) SIM card is a device to send the location obtained through GPS act just like a mobile phone with its own unique phone number. The GSM SIM card number is registered with the system. In this suggested device the GSM acts as a receiver while the GPS acts as a transmitter. The established values from the transmitter are sent as an SMS to the few predefined emergency numbers.

2.2.3. GPS Module

Global Positioning System (GPS) is used to determine the exact location of a device with the help of GSM. The location may be in either 2-D form or 3-D form generally used in the markets. In 2-D form Latitude and Longitude are calculated while in 3-D form Latitude, Longitude and Altitude all three are calculated. In this proposed project 2-D form was used. Once the exact location is found out the other information such as speed and exact distance can also be calculated.

2.2.4. Buzzer

A Buzzer is an audio signalling device, which is basically a tiny speaker that you can connect directly to an Arduino. It indicates audio signal when patient is in an abnormal state. The other types of buzzers have alarm devices with timers. 5 Volts buzzer is used in this device.

2.2.5. Heart Beat and GSR Sensor

In this heart beat sensor is used to continuously monitor patient heartbeat every sec. it is a non-invasive method using a light source and detector to measure variation in blood volume in tissues. The pulse rate is a heart rate and measurement of number of times the heart beats per minute. The normal pulse rate for adults is 60 to 100 beats per minute. Pulse rate increases when accident, sudden shock also running. Galvanic skin response (GSR) sensor used to find out the electrical conductivity of the skin and its help to classify the emotion of a person.

2.3. Working

When someone is harassing, she can just tap the button and the location information is sent as an SMS alert to a few pre-defined numbers in terms of latitude and longitude. The controller used is ATMEGA328P. It is interfaced with a limit Switch, a GPS module, a GSM modem, GSR and heartbeat sensor. If the switch is pressed, the controller takes the current location from the GPS module also the sensor's information and sends those data to the predefined no. using a GSM modem.

2.4. Advantages

Safety Device which can be carried by everyone – These devices will be used for safety purpose which will be easier for carrying from place to place. The device will be small in size, Easy and fast to install, Easy Maintenance, Low cost with high performance, Works round the clock, Fast response, Environmental friendly system.

3. Conclusion

This proposed design will help to solve critical issues faced by women in the near past with technologically sound equipment's and ideas. While the society may or may not change for the enhanced, the power to be autonomous, self-assured and truly free can come with arming oneself with the best possible device. The system will provide correct information as physical devices give guarantee for the same. Our major goal of this work is to ensure every woman in our society to feel safe and protected. The system will be portable, shock proof and cost effective.

Future work

We need the smart watch industries tie up / financial supports to conclude in the project only a few devices are used in these studies. Other programming devices video, audio automatic recorder and electric shocker also attached next processes of developing smart watch. Only after we launched the smart watch product in the markets.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare no conflict of interest.

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