Design and development of wearable security jacket for women using IOT

1. N.S. Kothari 2. Pratiksha Bhosale 3.Kaveri Kadam 4.Komal Shinde

[1]Assistant professor, [2]Student, [3]Student, [4]Student

Deparment of Electronics and Telecommunications Engineering

Samarth Group of Institutions, College of Engineering, Belhe , Pune, India

ABSTRACT

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 capability to move frankly in the city even in odd hours without stressing over their security. Our task is a dare to determine this issue. This paper 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 receiver, shock circuit, buzzer, spray mechanism, Webcam, pulse rate sensor, Raspberry pi-3 module. Today there are many cases which are going on about women all over in the world. It was high time where 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 get the solution No. Henceforth executed Internet of Things based women tracking and security with auto-defender system which is interfaced with Raspberry pi 3 board that will track the location of the women also will auto defend in bad situation.

I. INTRODUCTION

Today in the current worldwide situation, the prime inquiry in each women 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, as these days ladies are being attacked, kidnapped and harassed by the drivers. As we cannot estimate the happening of incidents but still one can reduce the chances of sexual abuse, violence, assault by having all safety tools nearby and can easily vanish from the danger situations. This can make a protected domain and furthermore makes a decent help for the casualties. Long range informal communication is an integral part of our lives, any awful occurrences can be intimated in the blink of an eye to their companions, relatives, and control room and so on to get the assistance. We propose a thought which changes the way everybody considers women security. We need the need for a device which automatically senses and rescues the victim is the venture of our idea. In present day India, women have adorned high workplaces in India including that of the President, Prime Minister,

Leader of the Opposition and Speaker of the LokSabha. Be that as it may, 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, Webcam, Shock circuit, Buzzer, Spray mechanism 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 preprogrammed in such a

way that whenever it receives emergency signal, it can send help request along with the location coordinates 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.

II. RELATED WORK

We as a whole are living in present day India. Everything has changed from devices we utilize, education and Medical facilities that we get, the positions that women are holding however the main thing which has not changed is the picture and security of Indian women. Relatively consistently when we get the morning newspaper, we shudder perusing about the young lady who is physically attacked. This occurs in a nearby shopping center, a stopping or at school. This has occurred with a young lady of 9-10 years, an office running proficient or with 80 year old woman. Numerous terrible episodes have been occurring in women case. Individuals at home don't know of their arrival securely. In 2013, the occurrence in which a 23 year old paramedical understudy was gang-raped by 6 men inside a moving bus close to Delhi region and thrown off the bus is a soul shattering incident that can't even be imagined in dreams. Another incident that has occurred at Mumbai on account of lady who is abandoning her local place after Christmas occasions has been kidnapped and killed. These are a portion of the issues that have occurred in the everyday existence of women. Although it was a most heinous cases of cruelty, it is unexpected to take note of that such occurrences are not really uncommon in our nation.

Overview comes about shows "848 Indian Women Are Harassed, Raped, and Killed Every Day!!" That's a route past HUGE number! Likewise there are around more than 25000 bodies of evidence were enrolled against ladies crime and furthermore from the most recent 10 years, the crime against ladies measurements is expanding consistently. There is a noteworthy need of shielding women from disturbances, sexual manhandle, and violence by executing testing system with technological requirement, generally a day when media communicates a greater amount of women' accomplishments instead of harassment, it's an accomplishment accomplished! Since people can't react appropriately in basic circumstances. This worry as a top priority numerous engineers have thought of imaginative applications. Some of such applications in existing systems are,

III. EXISTING SYSTEMS

1.   Codes like *91# is utilized to give crisis administrations, which will alarm police control. Free versatile application 'Help me on mobile' to guarantee safety of women was launched to help the individuals who require crisis. These applications need a single click to do this task. But when a girl is in trouble, there can be times that the girl is not capable of taking the phone and pressing button.

2.   SHE (Society Harnessing Equipment): It is an article of clothing inserted with an electronic gadget. This article of clothing has an electric circuit that can produce 3800kV which can help the casualty to get away. In the event of numerous assaults it can send around 80 electric stuns

3.   ILA security: The prime supporters of this framework have planned three individual alerts that can stun and perplex potential aggressors and consequently safety measure the casualty from dangerous circumstances.

4.   AESHS (Advanced Electronics System for Human Safety) It is a gadget that helps track the area of the casualty when assaulted utilizing GPS office.

5.   VithU application: This is a crisis application started by a famous Indian crime TV arrangement "Gumrah" circulated on Channel (V). At the point when the power catch of the Smartphone is squeezed twice successively, it starts sending ready messages with a connection of the area of the client at regular intervals to the contacts.

6.   Smart Belt This framework is composed with a versatile gadget which looks like a typical belt. It comprises of Arduino Board, shouting caution and weight sensors. At the point when the edge of the weight sensor crosses, the gadget will be actuated naturally. The shouting alert unit will be enacted and send sirens asking help [4].

7.   AVR microcontroller based wearable coat for ladies security. In this mix of wearable coat and portable innovation for wellbeing of ladies in the general public [2].

8.   Smart Girls Security System, Creators, Basavaraj *et al.* Year of Publication -2014

This work concentrates on a security framework that is planned exclusively to effectively provide security to women with the goal that they never feel powerless while confronting such social difficulties. The framework comprises of different modules, for example, GSM shield (SIM 900A), Arduino ATMega328 board, GPS (GYGPS6MV2), shouting alert (APR 9600), an arrangement of weight sensors for actuation and power supply unit.

10.   Women Employee Security System utilizing GPS and GSM Based Vehicle Tracking. Creators, Poonam Bhilare, *et al.* Year of Publication- 2015

This work concentrates on the proposed show that can be utilized to manage the issue of security issues of ladies representatives utilizing GPS and GSM based vehicle following.

11.   A Mobile Based Women Safety Application Authors, Dr. Sridhar Mandapati, *et al.* Year of Publication- 2015

These are the systems which worked on women security previously are elaborated in existing systems. Thus, all the drawbacks which are occurred in existing systems are recovered in this proposed framework.

IV. METHODOLOGY AND COMPONENTS OF SYSTEM

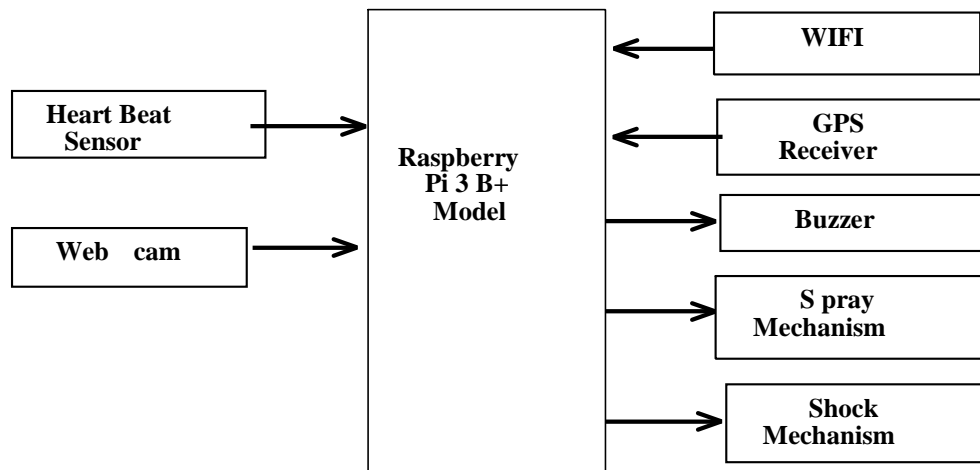In this system there are majorly the following sections shown in block diagram Figure 1.

Figure 1 Block diagram of women tracking and security with Auto Defender system

Raspberry Pi 3 B+ Model

The biggest modification that has been sanctioned with the Raspberry Pi 3 is advancement to a next generation main processor and enhanced connectivity with Bluetooth Low Energy (BLE) and BCM43143 Wi-Fi on board. Additionally, the Raspberry Pi 3 has enhanced power management, with an upgraded switched power source up to 2.5 Amps, to support more powerful external USB devices.

Raspberry Pi-3 has higher performance in comparison with other boards like arduino and ESP8266 in terms of its storage and computing speeds but at the cost of higher price. Raspberry Pi equipped with inbuilt Wifi and Bluetooth serves as an easy means to connect to internet and push the data to the cloud servers if required for further processing.
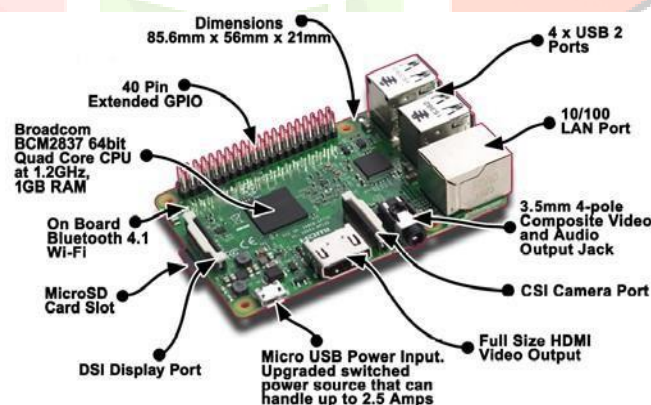

Figure 2: Raspberry Pi 3 B+ Model

The microcontroller raspberry Pi 3 B+ is the very important part of this paper. This plays a very important role to run allover programming of software as well as to control all the functions of hardware of the project.

Pulse rate sensor

Pulse rate sensor is designed to give digital output of heart beat when a finger is placed on it. When the heart beat detector is working, the beat LED flashes in unison with each pulse rate. This digital output can be connected to microcontroller directly to measure the Beats Per Minute (BPM) rate. It works on the principle of light modulation by blood flow through finger at each pulse. The features of given pulse rate sensor are heart beat indication by LED, instant output digital signal for directly connecting to microcontroller, compact Size, working Voltage +5V DC which is applicable in digital heart rate monitor, patient monitoring system, bio-Feedback control of robotics and applications.

Figure 3 Structure of pulse rate sensor

Figure 4 SIM28M GPS System

Global Positioning System

This modem provides longitude and latitude of the woman current exact location to track her in insecure situations. SIM28M is a stand-alone or GPS receiver with built-in LNA. SIM28M can relax antenna requirement and don't need of external LNA. SIM28M can track as low as 165dBm signal The GPS modem receives data from satellite. Then it supply this bunch of data to Raspberry Pi 3 B+ through serial communication. The GPS Transmit signals to equipment on the ground and make it possible for people with ground receivers to pinpoint their geographic location. The location accuracy ranges from 10 to 100 meters for most equipment's.
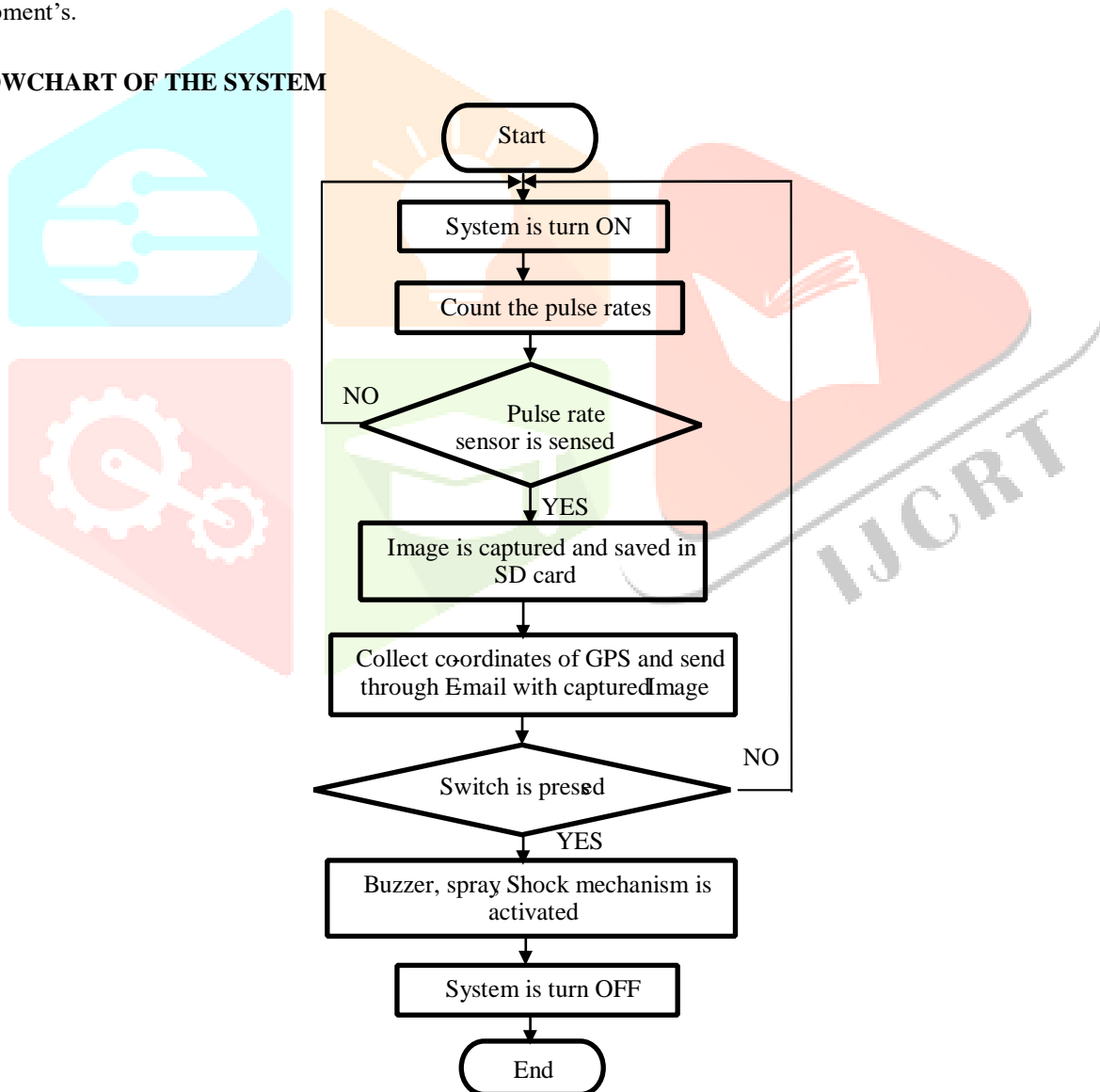
FLOWCHART OF THE SYSTEM

Figure 5 Flowchart of System

The IoT based system consist of the main part is Raspberry pi module gets the signs from GPS system which has introduce area data and after that the Raspberry pi controller permits to send the alert Message with the location of the women to the saved predefined numbers.

At the time of dangerous situation, we know that everyone's pulse rates get high, hence we are using a pulse rate sensor that will sense the pulse rates and send through message as well as E-mail with the location automatically. A webcam utilized for the

capturing picture of an attacker and outside memory card is utilized for the capturing picture is save on this card and send to the receiver so that police can catch culprit and punish him.

At the same time when she presses a switch button, automatically the auto defender system will start working. Auto defender system is consisting of the buzzer which will make sound so that someone in the surrounding can listen and help her, second is shock mechanism which will stun the attacker, third is the spray mechanism that will sprinkler the harmful, etching solvent like pepper powder solvent which will harm an attacker still she gets help. Thus the women can self-defense themselves.

V. ANALYTICAL SOLUTION

In this project, when the system get the required power supply. First it will automatically count the pulse rates of victim by using heart beat sensor present on the project. That sensor will be connected to the finger tip of victim. The pulse rates counting can be seen on command window of raspbian operating system. After that when pulse rate goes high, it will send that pulse rate

A. Analytical Solution for Health Parameters

As mentioned here using heart beat sensors to produce precise and accurate result of the women health, the operational framework has been given. Hence designed a correlation formula using the parameter, heart beat rate which is converted into a single variable. This cumulative value will intimate the condition of the women at the feared, insecure situation. To get this heart beat values, calculate mean value first by basic formula of mean with 10 samples given here as an example. This formula calculates range and then this calculates the variance and standard deviation with respect to mean as shown in Table I.

TABLE I. Health monitoring parameters with Mean and Standard Deviation

Parameter	1	2	3	4	5	6	7	8	9	10	Mean	Std. Deviation
Heart Beat BPM	60	61	65	69	70	69	63	65	71	69	66.2	3.93

The above TABLE I. shows the mean value and standard deviation of health parameter sensor. Using the mean value data, it is known that for heart beat increase of 10 bpm. Sample standard deviation is varies with respect to mean value. Variance is squared value of sample standard deviation. The following column chart shows the heart beat sensor value from the above Table with 10 samples are given and showing BPM.

When the heart beat sensor counts the pulses; simultaneously it will capture the image by using webcam and trace the locationof victim by using the GPS receiver and send latitude and longitudinal value on mail as well as SMS with high pulse rate by using IoT as shown in Figure 7.
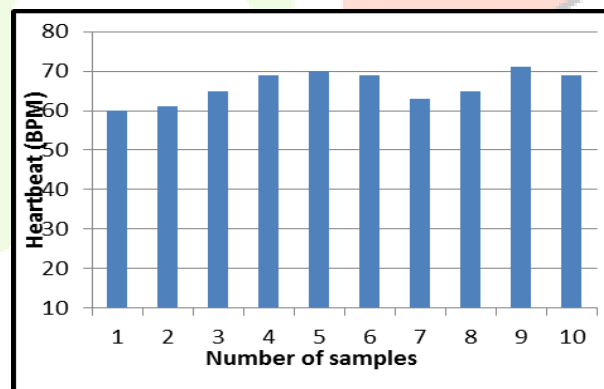

Figure 6 Heart beat sensor sensed value

In Parallel, the location along with the messages is sent to emergency contacts. The received contact persons open the IP which is fixed to the emergency contacts to view the captured image, high pulse rate and location, so that this will be helpful to get the right justice for the victim**.**

VI.RESULT AND ANALYSIS

The SMS text message on registered contact numbers and E-mail on registered E-mail Id is shown in below Figure 7,
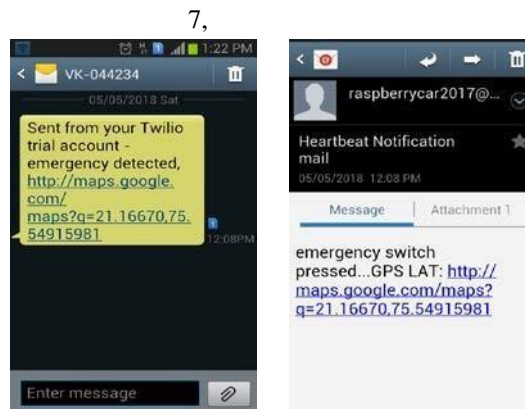

Figure 7 (a)SMS Text message (b)E-mail sent on registered contacts

The persons with registered emergency numbers in system may be Police, family, friends or relative receives the open IP which is fixed to view the captured image of culprit which gives right justice for the victim against culprit and location, so that this will be helpful to get the exact location of victim and tracing that location registered contacts can reach to the victim.

When the emergency contacts receive the SMS message and E-mail. The latitude and longitude values sent on those messages on clicking directly connect us on GOOGLE MAP. Hence it will very useful to catch culprit and help the victim by tracing exact location of the victim shown in Figure 8 and as discussed above.

Figure 8 (a) Satellite Map, (b) Road Map on Google Map

On other hand, when the pressing switch is pressed, the auto-defender system gets turn on. In that buzzer, shock mechanism, spray mechanism present on project kit as shown in Figure 6. That will defense the victim.

Figure 9 Internet of Things based Women Tracking Security with Auto Defender System using Raspberry Pi 3B+

VII.CONCLUSION AND FUTURE SCOPE

The intelligent women safety system has turned out to be an innovative idea which mainly focuses on women's security and safety during harassments or any type of violence's which makes use of GPS technology so that the location of the victim can be traced using latitudes and longitudes values and by clicking this values on text messages it can directly connects to GOOGLE MAP. The GOOGLE MAP traces the exact location of victim.

Second the image is captured by webcam and heart beat sensor senses pulse rate notations to send through e-mail and SMS. Also the system consisting of auto-defender system as mentioned above, defense the victim from culprit. The buzzer gets make a sound to get help from nearer people, the shock mechanism stun the attacker with high voltage for 5-10 minutes, and the last spray mechanism sprinkles some dangerous etching solvent to harm attacker and make her safe. All over, this concludes that; the system is very useful to resolve the major issue which is currently facing not only by India but also by all over world. The design can be further implemented in a more advanced way by introducing MIC sensors to record the audio conversations that can happen between culprit and victim also in advance it can more record the video.

In future, this system is especially used for the women that are working at odd hours of the day or who have to travel long distances at night. And also, as the school children safety are major concerns for parents as well as school management due to the recent incidents of child crimes like children missing, abuse, kidnapping etc. So this system can also applicable for the child safety when they are travelling in school buses.

VIII. ACKNOWLEDGMENT

REFERENCES

[1] A. Jatti, M. Kannan, P. Vijayalakshmi, S. Sinha. "Design and Development of an IoT based wearable device for the Safety and Security of women and girl children", IEEE International Conference on Recent Trends in Electronics, Information, Communication Technology, May 20-21, 2016, India 978-1-5090-0774-5/16/$31.00 © 2016 IEEE 1108.

[2] B. Chougula, "Smart girls security system," International Journal of Application or Innovation in Engineering & Management, Volume 3, Issue 4, April 2014.

[3] B. Chougula, A. Naik, M. Monu, P. Patil and P. Das,International Journal of Smart girls security systemApplication or Innovation in Engineering & Management (IJAIEM) ISSN:2319-4847 Volume 3, Issue 4, April 2014.

[4] Bamgloreglenson Toney, Dept of ECE, "Women safety arm band" IEEE papers on 2015 conference.

[5] "Electronic Jacket For Women Safety", International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056 Volume: 04 Issue: 05 May -2017 .