International Journal of Science and Research (IJSR)
ISSN: 2319-7064
ResearchGate Impact Factor (2018): 0.28 | SJIF (2019): 7.583

A Raspberry Pi-based Safety System for Women Security using IoT

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Abstract: ***Every day, each girl, women, and those from different backgrounds of life struggle to be secure and rescue themselves from the quite disrespectful guy's roving eye that abuses girl's dignity each day. Its miles implemented within the form of a cleaver IoT tool and include Raspberry Pi, Heartbeat sensor, temperature sensor, GPS, Panic button, and camera. This device is extremely compact and may be triggered utilizing the sufferer just through clicking a button and additionally use to study human temperature and heart rate exceeds above the edge cost it without delay ship her cutting-edge location, and seize the attacker's photograph, through the raspberry pi camera. The location and connection of the captured picture and SMS can be sent to the selected contact numbers or police. We additionally use voice factor when the lady is not in that situation to press button, she uses to mention help then a message will be dispatched to the emergency contact numbers.***

Keywords: Camera, GPS, Heart Beat Sensor, Panic Button, Raspberry pi 3 models B, temperature sensor, women safety device.

1. Introduction

In the present scenario ladies stay aware of men inside and out of life, however tragically at the expense of being presented to harassing, viciousness and fierceness out in the open and even in their own homes. They cannot leave their homes whenever of the day they cannot wear garments as indicated by their will and cannot go to work in harmony. There is a shame towards ladies that pulverizes their feelings of opportunity, yet besides, sabotages their trust and dreams. Because of the above factors, it is quite clear that in the country there is a struggling need for women's safety [1]. This paper makes the strength of an insurance gadget that is planned simply to serve the reason for bestowing security to women so they never experience powerless while managing such social requesting circumstances. A propelled framework can be assembled that can help women when they are in harm's way. In this paper, we are using Raspberry pi which is a low cost and can be portable and we using a temperature sensor, Heart Beat Sensor, GPS, and Camera module [3]. In our paper using three ways of connecting to the concerned authorities.

In first when women in danger she can press a button then the SMS will send to the concerned contact number with the current location and image of the victim.

In second the existing device is redone to become familiar with the individual example of temperature, Heart Rate of the human body then find out the threshold. When these both are in the above threshold value then it automatically sends a message to concerned authorities [2].

In the third condition when women are in danger and she is unable to press the button in that situation voice data is using (for example the women is used to say HELP) then the message will send to the concerned number with location and image of the victim which is one of the major advantages of this paper.

For women safety and security purpose we made a device which is extremely compact and may be triggered utilizing sufferer just clicking the button and use of temperature and heart rate and voice data which integrated to the raspberry pi using python programming language it is integrated with sensors, camera, GPS module and buttons using python language whenever women feel she is in danger the data like her current location, an image of the victim, and SMS alert will be sent to the concerned people. And also using voice data integrated with raspberry pi women will say for example help them also the data will be sent.

The remaining part of the paper has been presented as follows: section II describes the literature survey, in section III, the theoretical background of the module of the system is analyzed, section IV describes the proposed module of the women safety device, section V explain the implementation which includes software used and working, section VI include the result. Finally, the paper has been concluded in section VII.

2. Literature Survey

Islam et al. [1] purposed "Design and Implementation of Women Auspice System by Utilizing GPS and GSM". In this system, they used a GPS module, three pushbuttons, PIC16F887 microcontroller. GPS is used to get to the area of the client quickly. Three press catches are executed to characterize the kinds of a mishap casualty is confronting. At the point when the client faces any issues wherever, it can press any of these three catches. At that point, the microcontroller will get it and send an SMS to the particular telephone number. The area of the client will be constantly followed until the client switch off the framework when saved. What's more, to control the entire framework they have utilized a PIC16F887A microcontroller fueled by four AA batteries.

Muskan et al. [2] Implemented "Women Safety Device Designed using IoT and Machine Learning". This study is going to design a device. For generating alarm, the device is customized to learn the individual pattern of temperature and heart rate and find out the threshold when both temperature and heart rate exceeds above the threshold it automatically

sends SMS and location to the emergency contact number to take action.

A. Priyadarshini et al. [3] suggested "Women Empowerment towards developing India". Women fortifying bases on empowering every woman in the country to make them self-ruling in all perspectives as a rule open, to be careful about the rights and cause them to get ready about physical security. This paper centers around portraying the issues that ladies are looking in their day by day life plans accessible for Women Empowerment in India and Self-Help Group which is effectively running in the province of Tamil Nadu, proposals on Self Help Group for future upgrade and a contextual investigation of Women Empowerment Cell.

Navya R Sogi [4] purposed "SMARISA: A Raspberry Pi based Smart Ring for Women Safety using IoT. They have actualized a wearable gadget for ladies as a savvy ring (SMARISA) and contain Raspberry Pi, camera, signal and catch to initiate the administrations and the gadget is very compact and can be enacted by tapping the catch that will bring her present area and catch the picture of aggressor employing Raspberry pi camera and send to the crisis contact number.

Prof. Sunil K Punjabi [5] designed the "Smart Intelligent System for Women and Child Security" A compact gadget that will have a weight switch. At the point when an assailant is going to ambush the women/kid or when they recognize any shortcomings from an increasingly unordinary, they would then have the option to press the device by pulverizing or pressing it. Promptly the weight sensor identifies this weight and an ordinary SMS, with the causality's zone will be sent to their folks/watchman telephone numbers set aside in the devices while getting it. Followed by a call. If the call is unanswered for a postponed time, a call will be conveyed to the police, and SMS will likewise be sent.

G C Harikiran et al. [6] Implemented "Smart Security Solution for Women based on Internet Of Things(IOT)" They proposed a gadget that is the blending of two or three contraptions, equipment fuses of a wearable "savvy band" which continually speaks with a sharp phone that has to get section to the web. The product is customized and stacked with all the necessary data which fuses human conduct and responses to unique conditions like displeasure, dread, and pressure. This creates a sign that is transmitted to the phone. The product has got right of passage to GPS and informing administrations which are prearranged in any such way that at whatever point it gets crisis signal, it can deliver help demand along with the spot co-ordinates to the nearest police headquarters, family members and people inside the near span who have utility

Nandita Viswanath et al. [7] purposed "Smart Foot Device for Women Safety" This shrewd gadget will be cut to the footwear of the client and can be enacted mindfully. On tapping one foot behind the other multiple times, an alarm is sent by methods for Bluetooth low vitality correspondence to an application on the causality's phone. Adjusted to create an SMS searching for help with the territory of gadget associated.

3. Theoretical Background

3.1 RaspberryPi

The Raspberry Pi is a little, modest, small PC on a solitary circuit board, and has been structured so that it expends less force than the normal PC. The raspberry pi comprises of the small-scale USB power, show port, miniaturized scale SD opening, HDMI, port, sound video jack, CPU, GPIO pins. Through the miniaturized scale USB power, the force flexibly for the raspberry pi is given. With the assistance of the SD card it can store mass stockpiling. The SD card of the advanced mobile phone that is utilized for the computerization and also can be embedded.

Figure 1: Raspberry Pi 3 Model B

3.2 DHT11

The advanced temperature and moistness sensor DTH11 are a composite sensor that contains an aligned computerized signal yield of temperature and dampness.

Figure 2: DHT11 Temperature Sensor

The innovation of a devoted computerized modules assortment and the temperature dampness detecting innovation are applied to guarantee that the item has high unwavering quality and astounding long haul soundness. Just three pins are accessible for use: VCC, GND, and Information.

3.3 Heart Beat Sensor

The yield of the heartbeat rate sensor is as advanced. That computerized yield can be joined with the microcontroller to figure the beats every moment (BPS) rate. The drove flashes for each heartbeat when the heartbeat indicator is working.

Figure 3: Pulse Rate Sensor

3.4 Pi Camera

Figure 4: Pi Camera

- The Raspberry Pi camera module can be utilized to take superior quality video, just as stills photos
- The module has a five-megapixel fixed-focus camera that bolsters 1080p30, 720p60, and VGA90 video modes, just as stills catch.
- It joins through a 15cm strip link to the CSI port on the RaspberryPi.

4. Proposed System

The main aim of this paper is women safety and security using raspberry pi. For this purpose, python programming is used. The raspberry pi is integrated with a temperature sensor, heart Beat sensor, GPS, camera module. When a woman is in danger the alert will send automatically, manually to the concerned authorities SMS alert will send to the concerned authorities. Furthermore, utilizing voice information this will help women in danger. and not in that situation to press the button that time she just uses to say help then SMS alert with location and captured image will send to the guardian's/police.

4.1 System Architecture

The system architecture comprises a Power supply, Temperature sensor, Heart Beat sensor, Raspberry pi module, GPS, Camera, voice data, and two buttons which act as an input.

Figure 5. shows the architecture diagram of women safety device which contains the raspberry pi is a low-cost single-board computer used for connecting raspberry pi camera and a button for sending an SMS alert to police and selected people, here we used two buttons one is for help and another one for that I am safe it depends on the condition of women a pi camera m that click the image of criminal and also using GPS for sending the current location of the women.

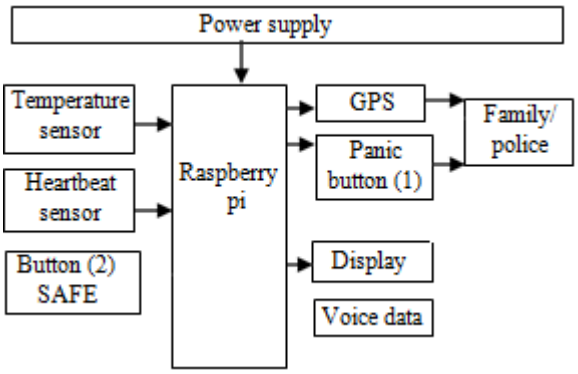

Figure 5: Block Diagram of Women Safety System

Here we are using a temperature sensor and beat sensor which is integrated with the raspberry pi. Where the normal temperature of the human body is 37^{o}C and the normal heartbeat rate of a healthy person is 60-100/minutes. When women are in danger then her body temperature and heartbeat rate will increase if both conditions exceed above the threshold level means the message will be sent automatically to the family/police/friends. In some cases when we see something happen unusually then also it exceeds the above threshold in this condition, we using another button to send the message that I am safe. That purpose we using two buttons in some case the above condition some time not work means we also using a button when women in danger, she press button then the SMS, image, and location will send to concerned authorities. Expect this sometime woman is not able to press the button if above two conditions will not do then we are using a voice data which is the major advantage for women when she in danger when she not able to press button she says just help then the message will send to the concerned authorities this is one of the major advantages of our paper.

5. Implementation

5.1 Software used

Python: Python is a deciphered significant-level programming language for universally useful programming. Made by Guido Van Rossum and first discharged in 1991, python has plan reasoning that underscores code intelligibility, and a sentence structure that permits software engineering to communicate ideas in fewer lines of code, outstandingly utilizing critical whitespace. It gives develops that empower clear programming on both little and huge scopes.

5.2 Working

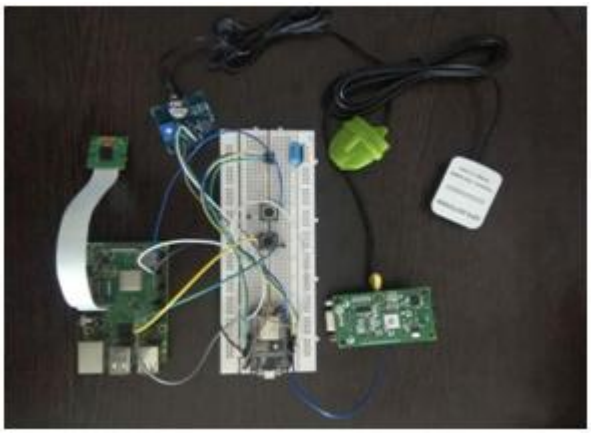

Figure 6: Prototype model of the women safety and Security system

The prototype model of women's safety and security system consists of a Raspberry pi board, temperature and heartbeat sensors, pi camera, GPS, panic button, and nodemcu controller using to interface with heart rate and GPS. A smart raspberry pi is charged by using a micro USB charger. A power supply of 12 volts is provided. Where temperature and heart rate sensors continuously monitor. In our project we are using three possible conditions to help women when she in danger.

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6. Result

This section represents the performance of the project model with the use of hardware raspberry pi and to obtain results we are using python as the programming language with the use of this software we get the outcome of our project.

As shown in figures 7, 8, 9, SMS alert, current location, and the captured image will send to concerned authorities. In our project we are using three ways for helping women first as automatically when temperature and heart tare exceeds above the threshold and second by pressing a button and also through voice. In all conditions, it sends alert to concerned authorities

Figure 7: The location of the victim

Figure 7 shows the current location of the victim. The raspberry pi is integrated with GPS, programing language used as python that can help by automatically and also manually, and trough voice data we can get a victim's current location.

Figure 8: Capture Image of a Victim

Figure 8 shows the captured image of the victim with the use of raspberry pi camera

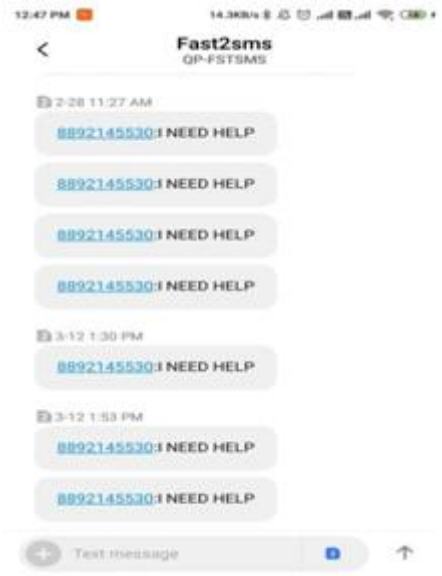

Figure 9: SMS alert

Fig 9 which shows sending an SMS alert to selected contact

numbers.

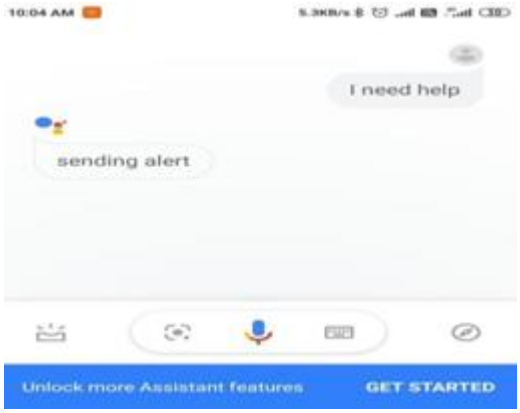

Figure 10: SMS Alert through Voice

Figure 10 which shows voice information through Google voice is programed to interconnect the raspberry pi to get the victim location, captured image, and SMS alert.

Figure 11: By Pressing Button2 SMS Will Send That I'm Safe

Figure 11 shows the use of button (2) when women not in danger some unusual seen then also it automatically sends alert to avoid this, we use to send SMS as I'm safe.

7. Conclusion

The current mechanisms are not robust enough to keep women from being criminalized. The system's main objective is to fast and low cost. This paper will allow women to immediately identify themselves with the authorities concerned when she is in danger. GPS monitoring, SMS alerting, image capture and even use of voice data is the purpose of the technique used. The warning will be sent both manually and automatically.

This model can be additionally evolved further to make a wearable gadget. The design can be made more compact and lighter in weight so that it can be easily portable and user friendly.

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