

The Design and Implementation of Advanced Safety System for Women

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Abstract: *In the current scenario, in every way of life, women keep up with men, but sadly at the cost of being subjected to abuse, harassment, and brutality in public and even in their own homes. At any time of the day, they can't leave their homes, and they can't even go to work in peace. There is some kind of stigma toward women that not only destroys their sense of freedom, but also undermines 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. The benefits of current technology can now be intelligently implemented to address societal issues. The goal is therefore to apply the current trend in technology, i.e., the Internet of Things (IoT) to eradicate the fear-filled lifestyle of women. IoT is usually expected to offer advanced computer, network, and service connectivity that extends beyond machine-to-machine (M2M) communications and encompasses a range of protocols, domains, and applications. The interconnection of these embedded devices (including smart objects) is expected to implement automation in almost all areas. As a matter of grave concern on women's safety, this plan presents a wearable device based on Raspberry-Pi, called the Smart wearable device, which is positive for women at risk and allows them to overcome these odds.*

Keywords: IoT, M2M, Raspberry-Pi, smart wearable devices, embedded devices.

1. Introduction

The human life is repercussion with Web of things deliberately or inadvertently. Presently a day's most of the machines are self-restraint with web. Furthest of the women are kept to their homes by reason of barren security [1]. Badgering, attack and assaults over the women are equally rising. The violations opposite to women may be executed either by family individuals or the person who is new. In India, wrongdoing contra to women is boosting with the financial development. The ladies in the utmost cities with plentiful populace still conflict within the manner of security. To defend the women the accomplishment of technology could be a must. Based on the raised argumentation there may be a fight for encouraging security for ladies. To persuade security for ladies in their comparing work places the Government has taken tireless measures in laws to decay the rate of atrocity [2].

The Web of things is an environment of physical entities which commute over the web. The gadgets and systems with the ease of web encourage exchange of information over a associated arrange. IoT is commonplace to bid connectivity in the midst of gadgets and frameworks and facilitates services so as to impact the execution. The developed women assurance framework guarantees the ladies within the aspects

of following, recording and self-defence. Society within the day by day tries has gotten to be so subordinate on computerization. It is more troublesome to assume life without such a robotization building in current environment.

The framework with expansion to the mechanical generation with which it is famously related. Presently it covers a number of unforeseen regions in framework inquire about. In later natural security building, activity designing, secure framework, farming, building building, and therapeutic designing are but a few of the zones where computerization is playing a crucial part as well application. In modern approach of computerization designing may be a cross sectional teach where it primarily requires correct, corresponding information in equipment and program investment improvement and their applications in specific field.

Automation engineering was previously thought to be primarily defined as control engineering including a variety of electrical and electronic components. Some programmes are designed to collect and transfer data to a server via a modem. Wireless based industrial automation is a prime concern in our day-to-day life. Nowadays, the approach to Wireless Network for Industrial Applications has been standardised.

Intelligent and low-cost automation of industrial processes is critical for increasing process efficiencies, delivering quality products, and ensuring system timeliness and accuracy. Wireless is expected to be one of the most rapidly growing technologies in the process automation sector. Industrial automation systems are made up of a variety of field devices and technologies that work in tandem. These devices are in charge of a variety of instrumentation, control, supervision, and operational management system functions.

2. LITERATURE REVIEW

“Women Empowerment towards developing India”[2016]: Women Empowerment focuses on empowering each and every woman in the country to make them independent in all aspects in the society, to be aware on the rights and to make them equip about physical security. This paper focuses on describing the issues that women are facing in their daily life, schemes available for Women Empowerment in India and Self Help Group which is successfully running in the state of Tamil Nadu, suggestions on Self Help Group for future enhancement and a case study of Women Empowerment Cell [2]

“Raspberry Pi based Global Industrial Process Monitoring through Wireless Communication” [2015]: This paper is focused on design & implementing a secured wireless communication system of ARM embedded IOT server based on Raspberry Pi. For effective designing & implementing a system we use wireless technology. This wireless technology along with router makes the system Accessible from anywhere in the world. Various Sensors are interfaced with microcontroller. Parameters like Temperature, gas, motion, distance, humidity are measured & real time sensed data is available on the remote pc as well as on the android Smartphone.[3]

“Study on Smart Security Technology for Women based on IoT”[2017]: A device which is the integration of multiple devices, hardware comprises of a wearable “Smart band” which continuously communicates with Smart phone that has access to the internet. The application is activated and loaded with all the required data which includes Human behavior and reaction. This generates a signal which is transmitted to the smart

phone. The application has access to GPS and Messaging services which is pre-programmed in such a way that whenever it receives emergency signal, it can send help request along with the location co-ordinates to the nearest Police station, relatives. This action enables help instantaneously from the Police [4].

“Smart Intelligent Security Sytem for Women”,[2016]: The system resembles a band on the wrist incorporated with pressure switch as an input which when activates shows the result Screaming alarm and tear gas mechanism are imposed for self-defensing purpose and send location and messages to the emergency contacts and also figure out the attacker using live streaming video. Tear gas mechanism and live streaming video using webcam is incorporated in the spectacles that act as a weapon of the smart technology[5].

“A Smart Watch for Women Security based on IoT Concept [2017]”: When a women or child wearing this `watch me' is exposed to sexual or vulnerable attack, the sensor present in it detects the heart beat rate of a person which will be high. this will not only provide a alarm sound to the attention of nearby people, it will automatically make an call to our registered contact and also through GPS/GSM it will detect the nearby police station and make an ring there so it will be helpful for police to arrive soon at the spot by tracking the GPS, such a system will lead to safer and better environment[6].

“Child Safety Wearable Device” [2017]: The purpose of this device is to help parents locate their children with ease. on the wearable device which when activated by the parents via SMS text should display the SOS signal brightly and sound an alarm which a bystander can easily spot as a sign of distress. Hence this paper aims at providing parents with a sense of security for their child in today's time[7].

“HearMe: A Smart Mobile Application for Mitigating Women Harassment ”[2016]: The modules of HearMe application can be accessed through hardware buttons in order to facilitate quick access to the victim woman. Another important feature of HearMe is to blow a loud siren at the receiver device even if the mobile is in silent mode, increasing the reliability of getting help from the family members or hospital/police station personnel[8].

She (Society Harnessing Equipment): It is a garment embedded with an electronic device. This garment has an electric circuit that can generate 3800kV which can help the victim to escape. The garment delivers an electric shock to attackers strong enough to cause severe burns, protecting the victim from any of the electricity. The development of the garment was made with the capabilities of providing the electric shock when it is squeezed forcefully, so sharing a hug or embrace wouldn't be enough to trigger the voltage.

Smart Belt: This system is designed with a portable device which resembles a normal belt. It consists of Arduino Board, screaming alarm and pressure sensors. When the threshold of the pressure sensor crosses, the device will be activated automatically. The screaming alarm unit will be activated and send sirens asking help.

3. SYSTEM IMPLEMENTATION

A Smart Wearable Raspberry Pi based device that aims to help women in distress is integrated with panic button, GPS module, buzzer, Camera, temperature sensor, oximeter, Accelerometer, shock module and motion sensor.

When a woman is in danger, she presses panic button that triggers the Raspberry Pi that enables the camera module to capture an image of the incident. The buzzer connected

to Raspberry-Pi is activated and it generates a high frequency screeching alarm to seek the attention of the people in that vicinity and also serves as a warning to the intruder. The electrical shock module gets activated and it disorients the intruder. The captured image is stored in a local host server that is run on a machine. A help message along with the current GPS location of the victim is sent to the emergency contact. Email is sent to the email id of parent along with the GPS location and images of intruder or surrounding place images. The motion sensor detects the motion status and notifies the parents through the smart phone if no motion is detected for long time. Oximeter monitors the pulse rate and oxygen level of the victim, if the values are not normal (above threshold values) then it gives notification in smart phone. The Accelerometer checks the axis with respect to victim and it notify if the victim is fell down in any axis.

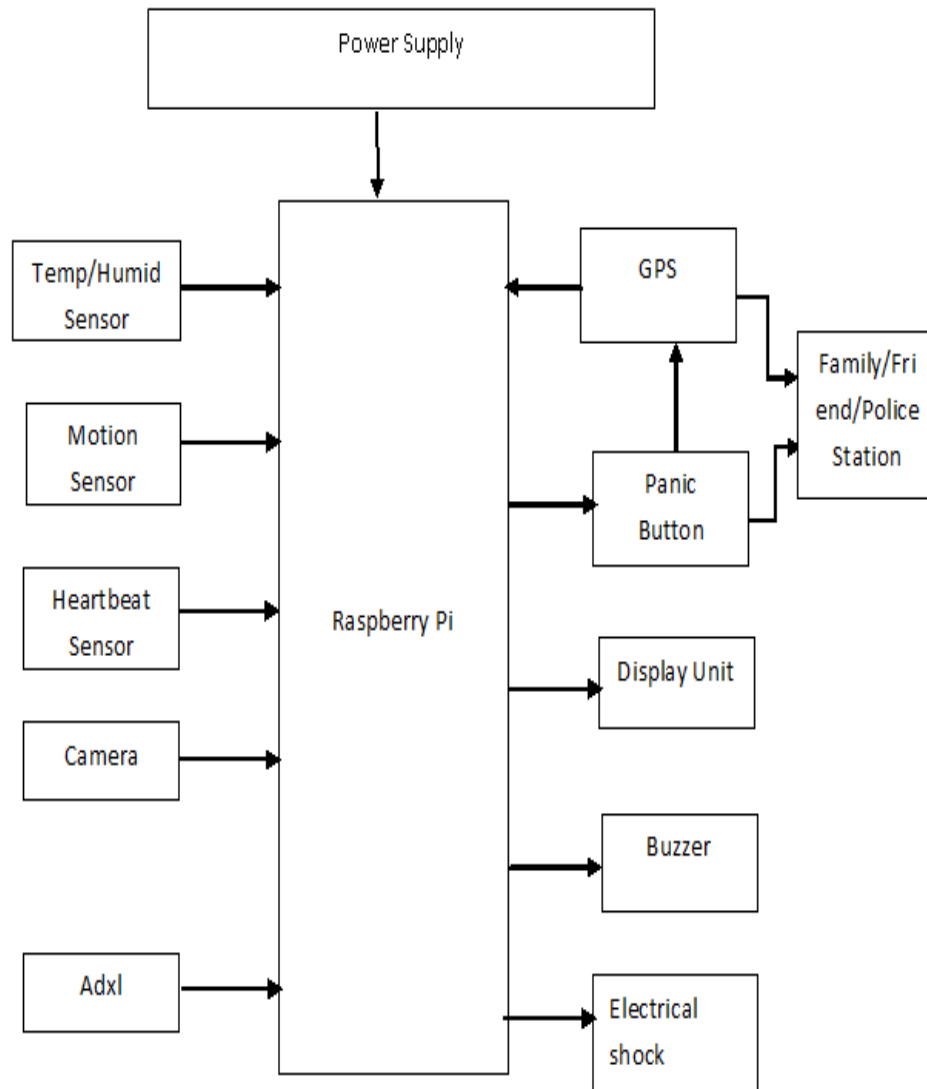


Fig.1: Block Diagram of experimental setup

4. RESULT AND DISCUSSIONS

The outcomes of the innovated Women protection system is elucidated in this section. When the victim press the panic button , the camera capture the image and GPS module detect the location. An email is sent to parent/guardian of the victim along with image of intruder or surrounding area image and location of the victim.

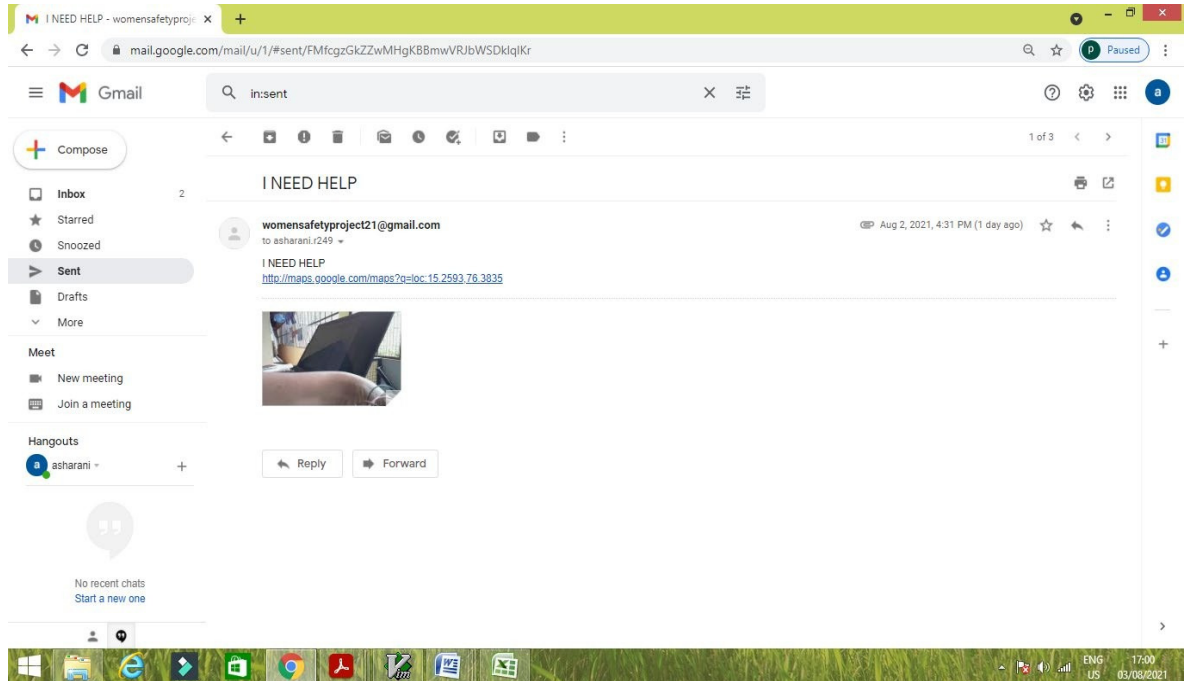


Fig 2: Email Sent from Victim Email when panic button is pressed.

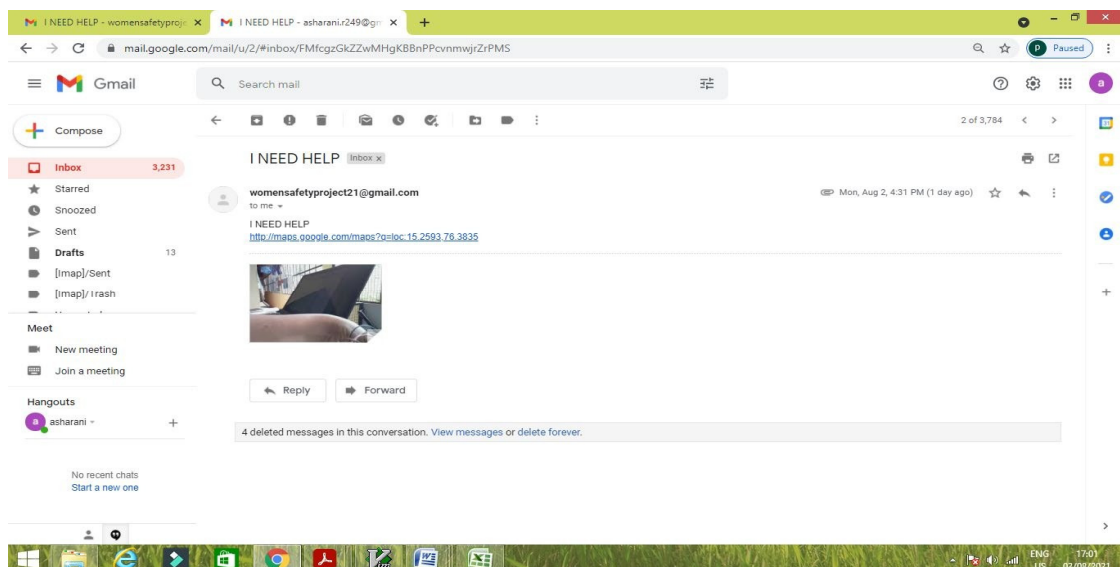


Fig 3: Parent/guardian email box-Received message.

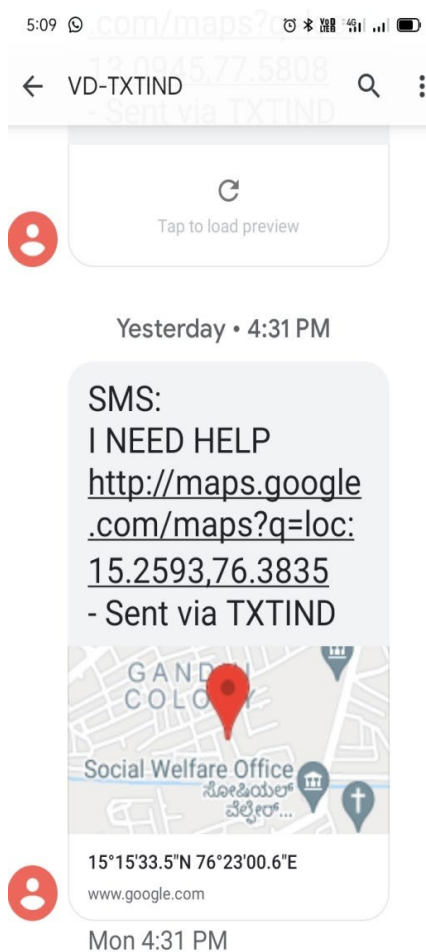


Fig 4: SMS Received by the parent/Guardian

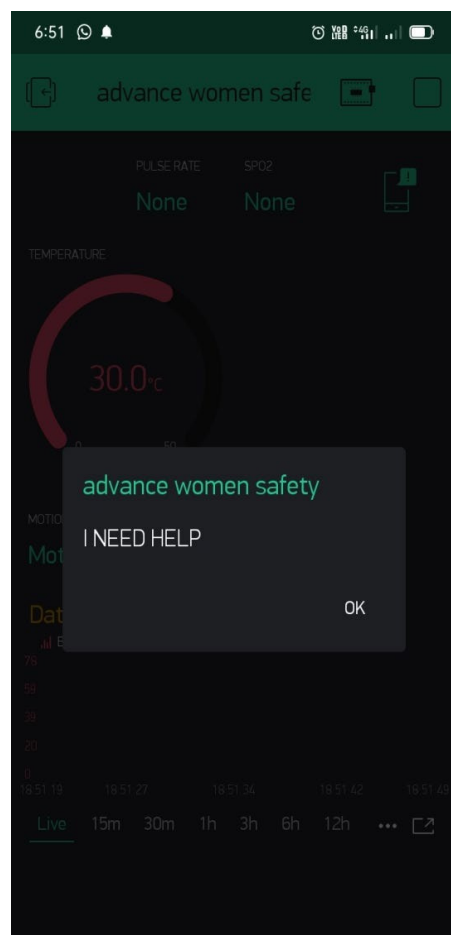


Fig 5: Alert message or notification to parent/Guardian

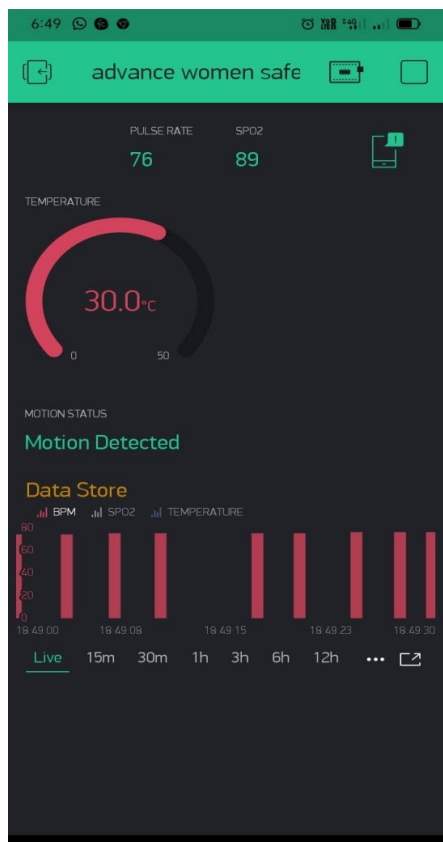


Fig 6: Values of pulse rate, spo2, temperature, motion status and data store chart in blynk app.

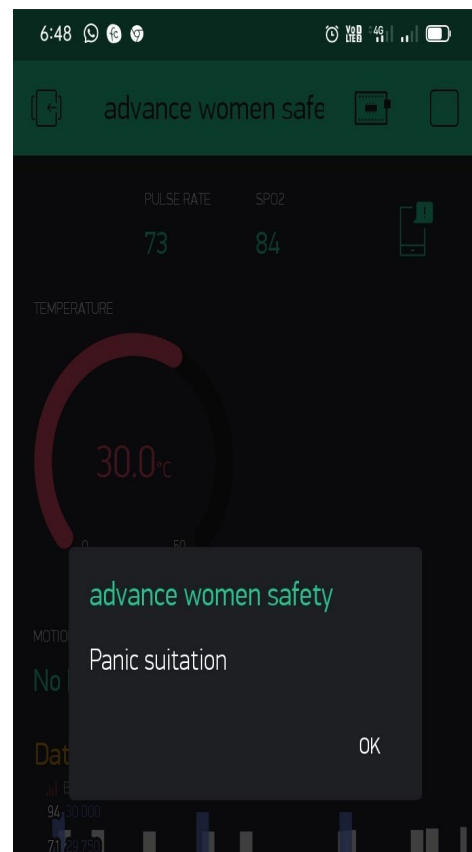


Fig 7: When the values of pulse rate and spo2 are crosses threshold

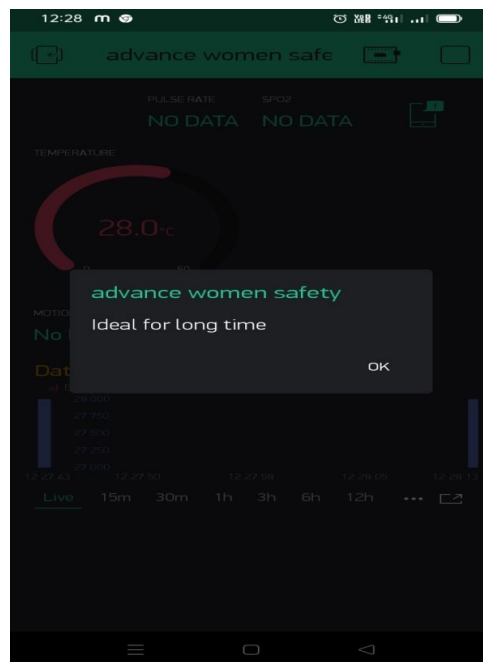


Fig 8: Alert message if no motion is detected for the set threshold value

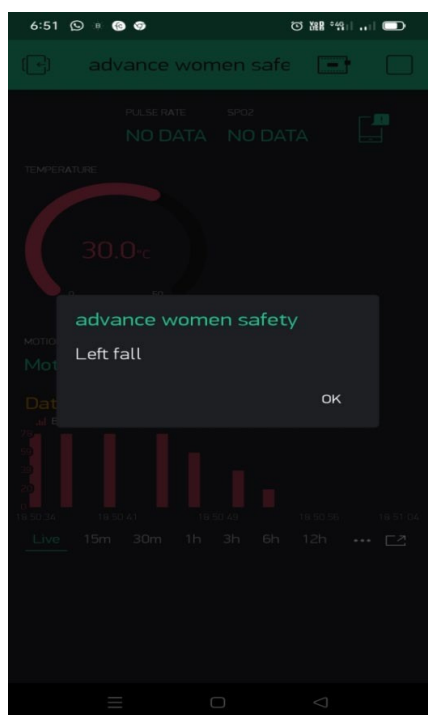


Fig 9(a)

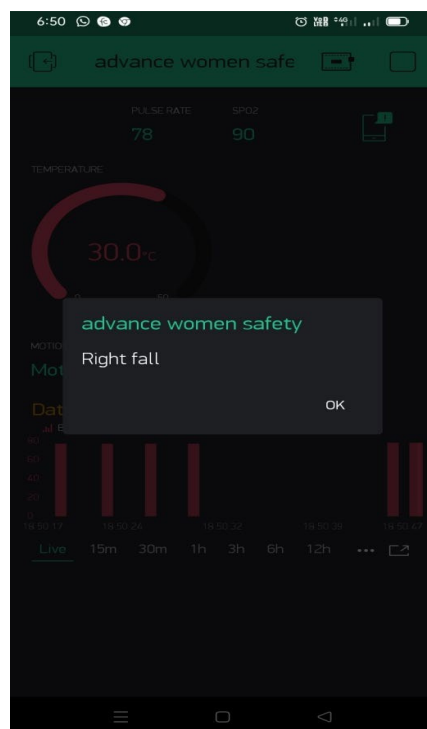


Fig 9(b)

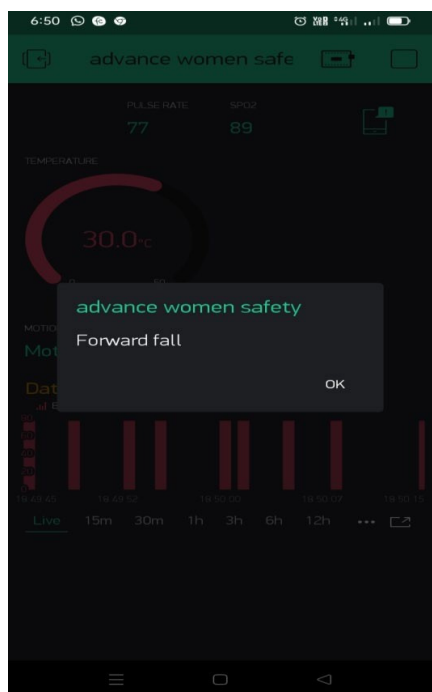


Fig 9(c)

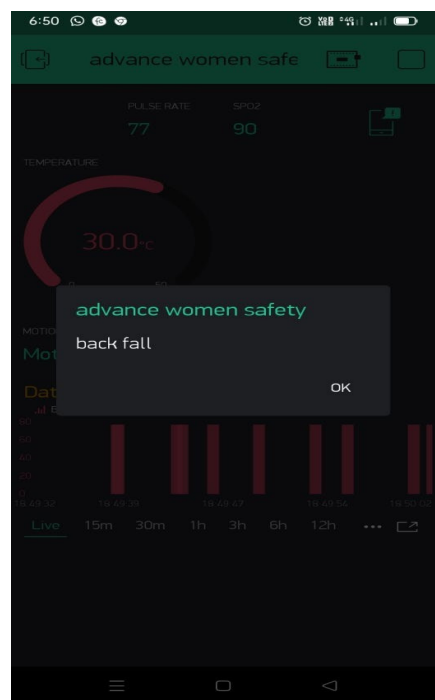


Fig 9(d)

Fig 9: Axis of the women victim: accelerometer reading gives alert if victim fall left(Fig 9(a)), right(Fig 9(b)), front(Fig 9(c)) and back(Fig 9(d))

	A	B	C
1	86.6875	1.6279E+12	02/08/2021 15:35
2	98.05128205	1.6279E+12	02/08/2021 15:36
3	44.66666667	1.6279E+12	02/08/2021 15:37

Fig 10(a):Pulse rate reading stored

	A	B	C
1	29	1.6279E+12	02/08/2021 15:34
2	29	1.6279E+12	02/08/2021 15:35
3	29	1.6279E+12	02/08/2021 15:36
4	29	1.6279E+12	02/08/2021 15:37
5	29	1.6279E+12	02/08/2021 15:38

Fig 10(b): Temperature reading stored

5 CONCLUSION

The developed women protection system ensures the intention of accomplishing security and safety to the women. With the inclusion of this developed system as it ensures protection they can travel, work unaccompanied. The refined system assures a safeguard for women in the aspects of tracking, recording and self-defense. Through Raspberry pi, sensors, panic button, GPS and camera module the system attains its task. This system with blynk application provides real time information supervising. The enrolled contact and email id also receive SMS and email in troublesome situation. The victim location can be coordinated via latitude and longitude positions therefore requisite actions will be taken place. The system is economical and it is not only intended to project setup but can also adhere to real time scenarios.

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