International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 06 Issue: 04 | Apr 2019 www.irjet.net p-ISSN: 2395-0072

Body Sensor Network using raspberry pi3: IoT

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Abstract- *As we know that, "health is wealth" and in this paper different sensors are used for checking different health issues. If checking our health frequently on common place then we are able to notice numerous completely different diseases by detecting them previously, Life is precious. According to survey, many diseases* affecting rural populations and young adults the most. This is because of their diet, age, less physical activity and many other factors. This system can detect pulse, temperature regularly with the help of sensor. Doctor can set the threshold for all parameters. If these parameters cross the maximum limit, System send notification on server through WiFi.

Keywords: IOT, Raspberry pi3B, Temperature sensor, Heartbeat sensor, PIR Sensor, IR Sensor

1. INTRODUCTION

Internet of Things (IoT) has become one of the most powerful communication paradigms of the 21th century.

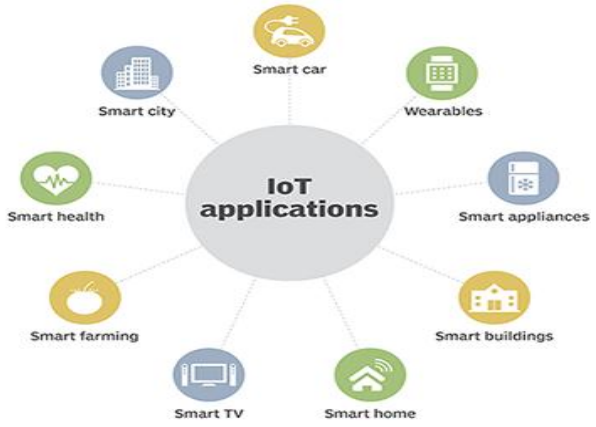

Fig 1.1 IoT Applications

In the IoT environment, all objects in our daily life become part of the internet due to their communication and computing capabilities IoT extends the concept of the Internet and makes it more pervasive. IoT allows seamless interactions among different types of devices such as medical sensor, monitoring cameras, home appliances so on hence IoT has become more productive in several areas such as healthcare system. In healthcare system, IoT involves many kinds of cheap sensors that enable aged people to enjoy modern medical healthcare services anywhere and anytime. Health is one amongst the world challenges for humanity.

2. LITERATURE SURVEY

[1] P. Gope and T. Hwang, "BSN-Care :A secure IoT-Based Modern Healthcare System Using Body Sensor Network," IEEE Sensors J., vol. 16, no. 5, Mar. 2016

Besides, once the LPU detects any abnormalities then it provides immediate responsive to the individual that sporting the bio-sensors. When the BDN-Care server receives data of a person (who wearing several bio sensors) from LPU, then it feeds the BDN data into its database and analyzes those data. Subsequently, supported the degree of abnormalities', it's going to move with the relations of the person, native doctor, or perhaps emergency unit of a close-by attention center.

[2] Shiyam Raghul M, Surendhar K , Suresh N, R. Hemalatha,"Raspberry-Pi Based Assistive Device for Deaf, Dumb and Blind People"conference paper 2016 IJSRSET.

In this paper the authors describes the issues of People with Visual, Hearing and Vocal Impairment through a single aiding system is a tough job. Many modern day researches focus on addressing the issues of one of the above challenges but not all. The work focuses on finding a novel technique that aids the visually impaired by rental them hear what's diagrammatic as text and it's achieved by the technique that captures the image through a camera and converts the text available as voice signals. The paper provides a way for the people with Hearing impairment to visualize / read which is in audio form by speech to text conversion technique and we also provides a way for the vocally impaired to represent their voice by the aid of text to voice conversion technique. All these three solutions were modulated to be in a single unique system.

There will be a large chance for businesses to produce a range of bespoke merchandise and services, the distinguished ones being vehicles, healthcare, home management systems, setting protection, and producing.

[3] A.arun rajaa *, R.Naveedhab, G.Niranjanadevic and V.Roobinid,Internet of Things (IoT) based security alert system using Raspberry pi",Journal paper, Asia pacific international journal of engineering science,2016.

In this paper, a security alert system which records a video when a motion is detected and uploads it to the external server and notifies the user via text message is reported. This application can be used to view the remote activities and notifications can be received whenever the motion is detected. Internet of Things basically deals with transferring of useable data without involving human interferences. Raspberry Pi camera module is used for detecting and capturing the motion. Raspberry Pi (Model B+), a credit card sized computer is used for processing the captured video.

EXISTING SYSTEM

Existing system consists of individual sensor concept to monitor patient details, but it is not efficient mechanism. Since it is not integrated with real time application, like IOT technology, different sensor activity integrated with hardware component like raspberry pi.

The existing system maintenance and monitor the patient information by using arduino microcontroller, other controllers, other microprocessors, zegbee communication, Bluetooth communication etc technologies.

Drawbacks of Existing systems are no real time updation of patient details with web application, not providing patient real time information to the respective user simultaneously like doctor, family member and emergency unit.

PROPOSED SYSTEM

The body detector or sensor network (BDN) is a technology in which the foremost imperative technologies utilized in IoT-based fashionable health care system. It is basically a collection of low-power and lightweight wireless sensor nodes figure 1, that are used to monitor the human body functions and surrounding environment.

The main **Advantages** of our proposed system are that the application is user friendly and secure. It updates the patient details according to real time with web application and sends the information through SMS to the doctor, family member and emergency unit.

3. SYSTEM ARCHITECTURE

The design process translates requirements into a representation that can be accessed for quality before coding begins. Architectural design provides an insight to the designers of the system as to how the required modules of the system have to be implemented.

BLOCK DIAGRAM

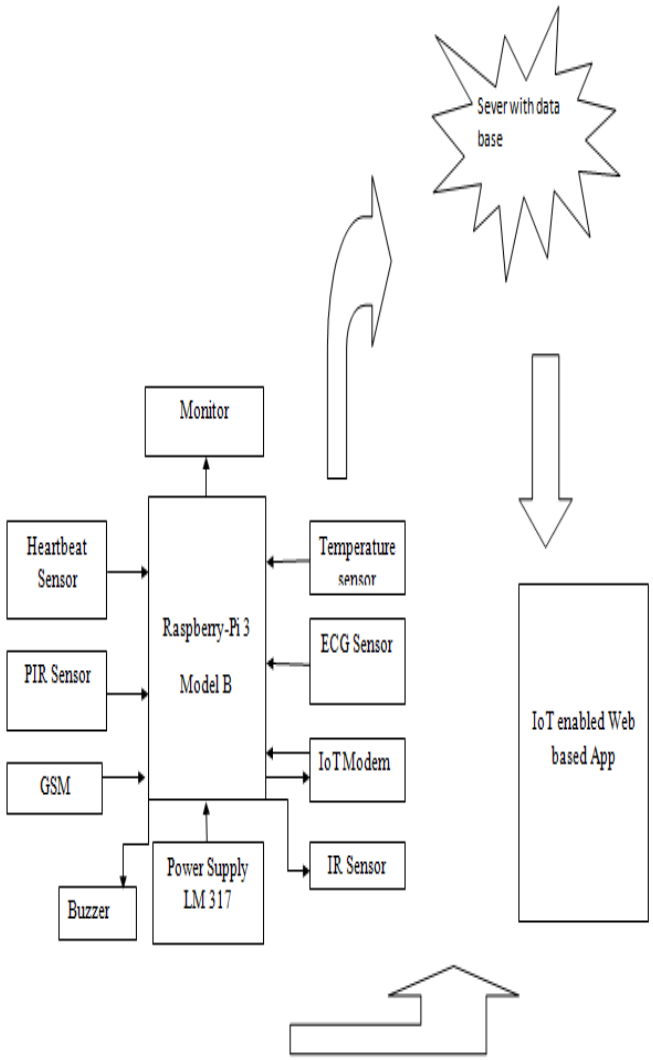

Figure 2.1: Block diagram

Here, the roughly block diagram is made where sensors are connected through the raspberry pi3 B.
Screen is also connected, where the result is shown and through cloud computing the data is saved to the web and if sensors get any changes then it update to the web.
If emergency found then it sends the notification through GSM model to the relatives and near about hospital and buzzer actives.

4. COMPONENT DESCRIPTION

Hardware Requirements

I. **Raspberry Pi 3 Model B:** The Raspberry Pi 3 provides with the same Pi as before but now with double the ram and a much faster processor. The biggest change that has been enacted with the Raspberry Pi 3 is an upgrade to the main processor and an increase of ram from 512MB to1GB. The RPi3 still utilizes a microSD card to hold the system volume meaning most Linux distributions for the Pi 3will happily live on a 8GB microSD card but larger cards are supported.It supports the Python language.

Fig 3.1 Raspberry pi 3 B model

II. **Sensors**: Here, we uses different sensors and these are:

Heart beat sensor: It measures the change in volume of blood through any organ of the body which causes a change in the light intensity through that organ (a vascular region).

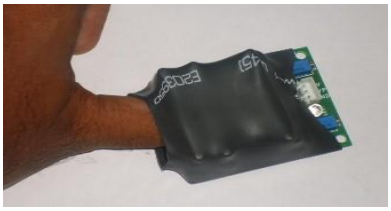

Fig 3.2 Heart beat sensor

Temperature sensor: The normal human body temperature range is typically stated as 36.5–37.5 °C (97.7–99.5 °F)

Fig 3.3 Temperature sensor

ECG sensor: Blood pressure varies depending on situation, activity, and disease states. It is regulated by the nervous and endocrine systems. Blood pressure that is low due to a disease state is called hypotension, and pressure that is consistently high is hypertension.

Fig 3.4 ECG sensor

PIR sensor: It encountered in household motion sensing devices and is designed to turn on a light only when motion is detected and when the surrounding environment is sufficiently dark.

Fig 3.5 PIR sensor

IR sensor: Infrared Sensor which is used as Obstacle detector is to transmit an infrared signal, this infrared signal bounces from the surface of an object and the signal is received at the infrared receiver.

Fig 3.6 IR sensor

III. **GSM model:** Global System for Mobile communication (GSM) is an architecture used for mobile communication for the users. GSM enables higher data transmission rate.

Fig 3.7 GSM model

Software Requirements

Operating System: Raspbian Operating System is used for the raspberry model, which is installed using memory card.

Coding Language: Python, which is advance and easy to learn language. It is a LINUX distribution.

Web Application: HTML (Hyper Text Markup Language) is used for the creating web pages and web applications. CSS (Cascading Style Sheets) used for describing the presentation of a document written in a markup language like HTML.

4. FLOW OF CONTROL

In the flow of control or algorithm, the steps are involved which are followed in project.

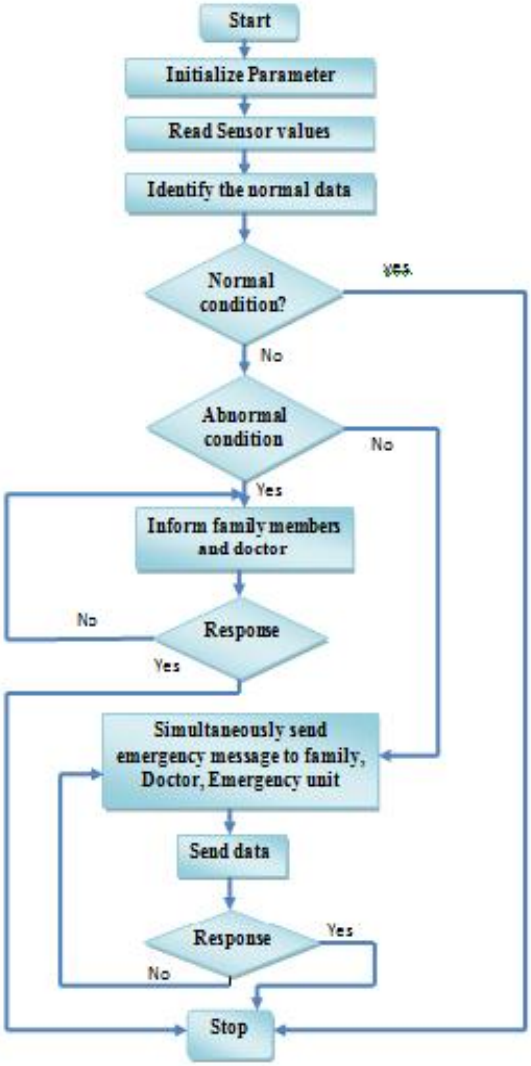

Figure4.1: flowchart

Step 1: Read the sensor output.

Step 2: Check the sensor output with the normal value.

Step 3: If the sensor output is normal nothing to do.

Step 4: If the sensor output is abnormal and severe.

Step 5: Inform to family members, doctor, emergency unit simultaneously.

Step 6: Send the data to all.

Step 7: If response from any one is not get repeatedly send the data to the person until get the response.

5. CONCLUSION

The security and also the privacy problems in health care applications exploitation body detector or sensor network. Subsequently, even though most of the popular BSN based research projects acknowledge the issue of the security, but they fail to embed strong security services that could be preserve patient privacy. Finally, hence proposed technique of a secure IoT based healthcare system using BSN, called BSN-Care, which can efficiently accomplish various security requirements of the BSN based healthcare system.

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