

# Iot Based Smart Health Care Monitoring System Using Raspberry Pi

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**Abstract-** Health is one of the global challenges for humanity. The prime goal was to develop a reliable patient monitoring system so that the healthcare professionals can monitor the patients, who are executing their normal daily life activities especially elderly patient who are all alone at the home and some other cases. In the traditional approach the healthcare professionals play the major role. There are two basic problems associated with this approach. Firstly, the healthcare professionals must be present on site of the patient all the time and secondly, the patient remains admitted in a hospital, bedside biomedical instruments, for a period of time. In order to solve these two problems, the patients are given knowledge and information about disease diagnosis and prevention. Secondly, a reliable and readily available patient monitoring system (PMS) is required. Raspberry Pi board can be used as base (minicomputer) with different sensors like Heartbeat sensor, Temperature sensor, Respiration sensor, Accelerometer sensor etc. All this physical devices are connected over a network call internet so as to be call as internet of things. In the resent years use of IoT has been increased. In order to improve the above condition, we can make use of technology in a smarter way.

**Keywords-** Raspberry Pi board, Heartbeat sensor, Temperature sensor, Respiration sensor, Accelerometer sensor, Internet of Things.

## I. INTRODUCTION

The unexpected growth of the “Internet of Things” has changed the world and dropped the price for typical IoT components, which allow public to innovate new designs and products anywhere in the world. In recent years, health care sensors along with raspberry pi play a vital role in health care monitoring system. Remote monitoring can be done with the help of this sensors connected to the internet via a gateway. The connectivity between the doctor and patient can be through internet. Wearable sensors are in contact with the human body and monitor his or her physiological parameters. We can buy variety of sensors in the market today such as ECG sensors, temperature sensors, pulse monitors etc. The cost of the sensors varies according to their size, flexibility

and accuracy. The Raspberry Pi which is a cheap, flexible, fully customizable and programmable small computer board brings the advantages of a PC to the domain of sensor network. These sensors collected data i.e. biometric information is given to raspberry pi and then it is transferred to server. The patient’s family or doctors or we can say the one who logins the patient account will get the message when any abnormal activity is seen in patient health.

## II. LITERATURE SURVEY

Junaid mohammed et. al. [1] monitors patient’s ECG wave Anywhere in the world using IOIO- OTG Microcontroller. Android application is created for ECG Monitoring. IOIOOTG microcontroller is connected to android phone using USB cable (or) Bluetooth dongle. After collecting data, the wave is send to android application. Monitor and store ECG waves in that android based application.

Mohammed S. Jasses et. al. [2] focused on body temperature Monitoring using Raspberry pi board in cloud based system. In that paper, Raspberry pi monitors body temperature and then these parameters are transfer by wireless sensor networks (WSN). Then this data is added to the cloud based websites. Using this website we can monitor body temperature.

Hasmah Mansor et. al. [3] monitors body temperature using LM35 temperature sensor. The LM35 temperature sensor is connected to the Arduino uno board. After that creating a website in SQL database format. Arduino uno board is connected to that website. Then sensor output is send to the website. Using this website anybody can monitor body temperature in login process.

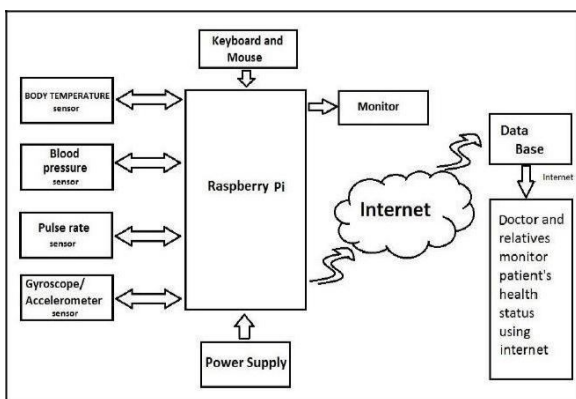
Rajeev Piyare et. al. [4] implement controlling and monitoring home appliances using android based smart phone. Arduino uno board is connected to home appliances (light, fan, etc.). Creating an android application for this smart home. Arduino uno board and android app is connected by internet.

Using this android app controlling and monitoring appliances anywhere in the world is possible.

**III. OBJECTIVES OF THE PROJECT**

- Internet of Things makes medical equipment more efficient by allowing real time monitoring of patient health, in which sensor acquires the data of patient and reduces the human error.
- Using Internet of Things patient's parameters get transmitted through medical devices via a gateway, where it is stored and analyzed.
- The significant challenges in the implementation of Internet of Things for healthcare applications is monitoring all patients from various remote places.
- Thus Internet of Things in the medical field brings out the solution for effective patient monitoring at reduced cost and also reduces the trade-off between patient outcome and disease management.
- Monitoring patient's body temperature, respiration rate, heart beat and body movement using Raspberry Pi board.

**IV. METHODOLOGY**



**Fig 1: Block diagram of Patient Monitoring system using Raspberry Pi**

In this paper we have temperature, blood pressure, Accelerometer / Gyroscope sensor and pulse rate sensors which are monitored using Raspberry Pi. These sensors signals are sent to Raspberry Pi via a inbuilt Wi-Fi module. As signal levels are low, the amplifier circuit is used along with signal conditioning unit (SCU) to transmit the signals using raspberry pi. Raspberry Pi is a Linux based operating system works as a small PC processor system. Raspberry Pi also has

inbuilt Wi-Fi module. Raspberry Pi creates a hotspot and all the body sensor connects to the Raspberry Pi.

Now the Raspberry pi will be receiving the body sensor data continuously. Raspberry pi is connected to internet. Raspberry pi has to be coded for two very important things. First, the data which is been received should be processed and pushed on the cloud or database (here we can use “thingspeak” it’s an open source IoT platform for cloud) this data can be monitored by the doctors and other patient’s caretakers. Second, the Raspberry pi has to check for any abnormality in the data for example heart rate sensor should give a reading between 70-100bpm that is a normal heart beat of a human, if the reading goes abnormal that is out this range then an alert message will be sent to the doctor, ambulance and the caretaker.

**V. EXPECTED OUTCOME OF THE PROJECT**

- Here patient body temperature, blood pressure, pulse rate and body movement is measured using respective sensor.
- Valid patient’s health information is monitored on the screen of computer using Raspberry Pi.
- Doctors and relatives can monitor patient’s health remotely with the help of Internet anywhere in the world as data is uploaded on cloud.

**VI. FUTURE WORK**

This project gives less data security, but it is not sufficient to meet the security requirements of medical data. Future scope include some encryption and decryption to the biomedical data.

Though the sensors power requirement is very low. Then to the supply battery is quit big in size so we have to work to provide compact battery and also they can be charged using body temperature of the patient wirelessly.

**VII. ACKNOWLEDGMENT**

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