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Iot Based Patient Monitoring System Using Raspberry Pi 3

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***Abstract*—** Now-a-days many lives are affected because the patient are not observed and properly treated. Due to these problem time to time health monitoring is very essential. It is the measure development in medical area. Iot is change the normal human life to smart life with new technology level. Iot is used for monitoring all patient in any level. Thus paper based on monitoring of the patient that is done by the doctor continuously without actual visiting the patient. Health professions have developed a brilliant and inexpensive health monitoring system for provide more comfortable living to the people suffering from various disease using leading technology like wireless communication and portable health monitoring device. This project is design to monitor the temperature, heartbeat of patient using Raspberry Pi through these we can easily send the real time information to the user or doctor over internet in critical condition. By these we can save many lives by providing a quick service.

Keywords- *Raspberry pi Board, Aurdino, Heartbeat sensor, Temparature sensore, Intetnet of things.*

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I. INTRODUCTION

Internet of things is a new and fast growing technology in which everything are connected to the internet for effective communication between these connected things. Internet of things serves as a catalyst for the healthcare and plays a very important role in wide range of healthcare monitoring application. Patient monitoring is healthcare technology which allows the healthcare practitioners to monitor outside conventional healthcare setting such as at home or in the workplace. Patient monitoring technology have greatly change the way of delivering and providing healthcare with the emerging technology or connected tools, patient, are not required to visit hospital to premises for checkup. It help in monitoring the patients medical condition and avoid the medical emergencies and hospital readmissions. Patients are facing a problem situation unforeseen demise due to the specific reason of heart problem and attack which is because the non existence of good medical maintenance to participant of the needed time. So we are proposing innovative project to dodge such sudden death rates by using patient health monitoring that uses sensor technology and uses internet to communicate to the loved once in case of problem.

Raspberry Pi and internet connection is a new innovative technology in healthcare systems. After connecting the internet to the Raspberry Pi it act as a server. Then the server is automatically sends data to the webpage. Then these parameters heart rate, Body temperature are monitored. If these parameters are goes to abnormal it will automatically sends alert message to the doctor and relative.

II. KEY FEATURES OF PATIENT MONITORING SYSTEM

It is obvious that ordinary people cannot always feel how close a heart attack is. Doctor and nurses are not able to care for patient while the person is at home. One solution to this dilemma is a patient monitoring system.

1] Better Patient experience

For being connecting to the health care system through IoT, doctors can improve the diagnosis accuracy as they getting all the necessary patient data at hand. We can say that it allows monitoring patient continuously.

2] Easy to use

It will be vary handy tool as it shows all the data collection and information by using just only the internet. So, it reduces the workloads and stress of the relatives of the patient who work outside.

3] Provide an accurate detection

By using this system, we can get approximate result based on patient health. Moreover it will be less error, collect data in less time and more accuracy than any human performances.

4] Reduce costs

When a patient gets health service at home on a real time basis, there is no need for unnecessary doctor or nursing visit. In particular, this project helps to cut down cost for hospitals stays and readmissions.

5] Bridging the gap between doctor and patient

Health care is all about the patient so the need of patient is always comes first but it is matter of fact that most of the patient feel uncomfortable to g to hospital or visit doctor's

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chamber. In this way this system creates a communication between patient and doctor by providing the data.

5] Giving a quality Life for old aged people

Most of the people at their old age, like to stay at home with their dear ones rather than visiting or passing time in hospitals. But due to hectic lifestyle people are suffering from many diseases at their early age and older people becomes very weak. Additionally this project will be beneficial to ICU patient.

6] Non expensive

This project total cost will be less expensive than any other machines which are used in the hospitals. Moreover, it is compact, lightweight and easy to use.

III. LITERATURE SURVEY

1] Kartikee Uplenchwar, Aditi Vedalakar proposed Iot based health monitoring system using Raspberry pi and Arduino in which a complete and integrate healthcare models is described enabling chronic heart failure patients to daily collect vital sign at home and sending them using (Iot).

2] Sangle Sagar D, Deshpande Niranjan R, Vadane Pandurang M, Dighr M.S proposed Iot based care system using raspberry Pi in which the system present a monitoring system that has the capability to monitor physiological parameters from patient body at every 10 second.

3] Megha Koshti, Prof. Dr. Sanjay Ganorkar proposed Iot based health monitoring system using Raspberry Pi in which the system can analys the signal, extract feature from it, detect the normal or abnormal conditions like with the help of Raspberry Pi, the result of the ECG signal is sent to the web server.

4] Pradnvavant Kalamkar, Pooja Patil, Triveni Bhongal, Megha Kamble proposed Human Montoring system using Iot and Raspberry Pi in which the paper confer about, Human Monitoring long-suffering temperature, central point beat, Accelerometer sensor via Raspberry Pi and Iot.

5] Laxmi Bhaskar, Prof. Prabhakar Manage proposed Iot based Patient heath Monitoring System using Raspberry Pi 3 in which the system designed to monitor the temperature and heartbeat of the patient using Iot.

6] Akash Vaibhav Imtiaz Ahmad proposed Iot Based patient Monitoring System to designed Implementation of a wireless Biomedical parameters monitoring system using various sensors.

7] Amir-Mohammad Rahmani et al [3] monitor ECG wave using panda board. Ethernet connectivity is used for connecting internet to the panda board. In my paper monitor body temperature, heart rate using Raspberry Pi board. Panda board is very difficult to operate compare to Raspberry Pi board. Ethernet connection is also very short distance. So I use USB modem for connecting internet to the Raspberry Pi board.

8] M. Wcislik et al [2] monitors patient's body position using ARM cortex M4F micro controller. Android app is created for monitor these values. Bluetooth connection is used for connecting microcontroller and Android phone. In my paper monitor's patient body temperature, heart rate using Raspberry Pi board and sensors. Android app is support only android phones. Bluetooth is very short distance for communication. It support only within 100meters. In my project webpage is created. Using IP address anybody can monitor patient's health status anywhere in the world.

IV. PROPOSED METHODE

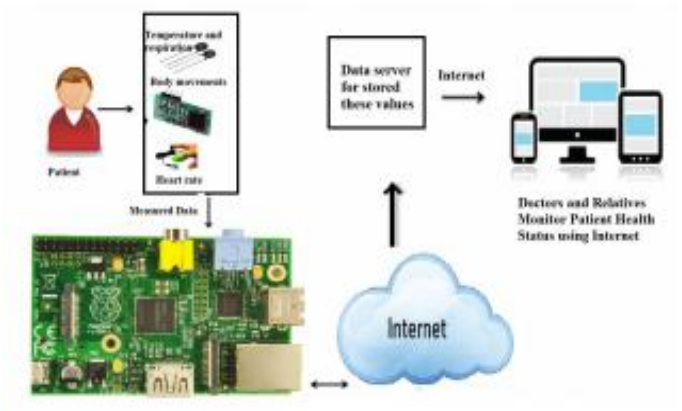

Fig 1. Architecture for Patient monitoring System using raspberry Pi

The Proposed methods of health monitoring system is to monitor patient's body temperature, heart rate using Raspberry Pi 3. The temperature sensor senses the temperature for patient body and send information to Raspberry Pi. The heart rate sensor collect the heart beat from the patient, and send information to Raspberry Pi3. Raspberry Pi also stores the data to the cloud with the help of Internet. Any authorized person can analyze the Patient's health status from anywhere in the world. The output obtained from raspberry Pi 3 is displayed at the HDMI display which is again send to twilio through Wi-Fi. After connecting internet to the Raspberry Pi it acts as a server. Then the server is automatically sends data to the website. Using IP address any body can monitor the patient's health status anywhere in the world using laptops, tablets and smart phones. If these parameters are goes abnormal it will send aleart message to the doctors and caretakers through Twilio, so that the doctors can instantly take the action on these abnormalities.

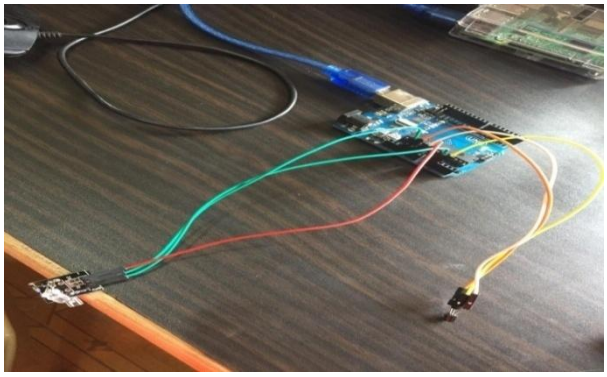

Fig 2. Hardware Connection setup for Patient monitoring system using Raspberry Pi

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For power on, 12volt adapter is using with Raspberry Pi board and 5volt input signal provided to sensors. Patient will touch the heart beat sensors and temperature sensor and count the temperature and heart beat of human body, When the heart beat and temperature is measured Twilio helps to update message in mobile message, web and App server.

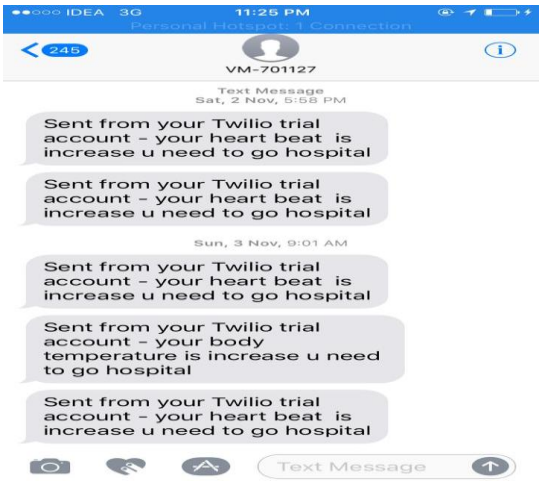

Fig 3. Abnormal Values are send to Mobile

Our project is comprised both hardware and software. I have done hardware side only and got output from the sensors. Now here we got output by monitoring output through internet and if these values go abnormal it will automatically send alert message to doctors and relatives mobile phone.

V. CONCLUSION

In general IoT based health care platform which connects with smart sensors attack with human body for health monitoring for daily checkup. With the wide use of internet this work is focused to implement the Internet technology to established a system which would communicate through internet for better health. Internet of things is expected to rule the world in the various fields but more benefit would be in the field of healthcare. In this paper we discussed about IoT based patient monitoring system. The system technology being used by smart phones or gadgets in present time where we also mentioned about advantages, challenges and opportunities. Due to the important of observing medical patient, continuous patient monitoring is necessary. Our project work is giving the opportunity to monitor patient continuously by using the web and apps service along with live monitor or mobile message service. This paper also compared the early aged medical system between present time health monitoring. The present time represent the time reducing, reduced health care cost especially for rural area people.

$$x_c = \frac{1}{N}\sum_{i=1}^{N} x_i \quad , \qquad y_c = \frac{1}{N}\sum_{i=1}^{N} y_i \quad .$$

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