

Patient Health Monitoring Using IoT

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Abstract—The rapid increasing evolution of communication technologies of modern smart objects brings a dawn of application development for Internet of Things (IoT)-based networks. The main objective of this proposed system is to transmit the patient's health parameters such as temperature, heartbeats etc., through wireless communication to doctors or to their family member. These input data are uploaded in cloud server and transmitted to the computer and mobile so that patient's family and doctor's may get informed. Ever increasing development and changes in information and communication technologies have lead to the emergence and enhance the use of Internet of Things (IoT).

In this system we used raspberry pi as a controlling purpose. ECG sensor, temperature sensor, heart beat are used as input purpose. Output side we used LCD for display purpose. And also show on cloud i.e. thing speak.

Index Terms— Raspberry Pi, TEMP Sensor, H.B Sensor, ECG Sensor, Internet of Things

I. INTRODUCTION

Recently, these patient health monitoring systems is one of the major achievement because of its improved technology. Currently, there is need for a modernized approach in medical field. In the traditional as well as in advance healthcare systems approach the physicians or doctors play the major role. But in traditional approach they need to visit the patient's ward for necessary diagnosis and advising.

In day to day life, many lives are having adverse effect because the patients are not treated at particular right time. Sometimes it becomes difficult for doctors or physicians to check the health parameters of patient frequently, also continuous monitoring of patients in the ICU which is very essential is not possible. Sometimes we hear that certain person passed away due to less attention of family member as family member is unaware of that person's condition. So to deal with these types of situations, our system very is beneficial. Our system is designed to be used in hospitals and also in home environment for measuring and monitoring various health parameters like temperature, ECG, heart beat etc.

The result will be measured using various sensors which are interfaced with Raspberry Pi and for displaying it we are using a LCD display. Doctors have to login to website and then they will be able to view those results. In the last few decades the healthcare has drawn considerable amount of attention as some health issues are ever increasing problem due to the impurity in whatever we eat or drink for nutrition. The primary aim was to

develop a reliable patient monitoring system so that the physicians can monitor the patients in easy way, who are either hospitalized or executing their normal daily life activities.

II. LITERATURE SURVEY

In Harvard Sensor Network Lab a BSN based research book is developed named as CodeBlue. In this various body sensors are used to measure certain health parameters wireless medium. But there were certain security issues. After that in the university of Virginia one network architecture called Alarm-Net was designed to monitor the health parameters in home environment. But there are threat of leaking resident's location due to fact that it is influenced by some confidentiality attacks.

At the computer department of Imperial College, London proposed system named UbiMon to solve the problems of related to wearable sensors. Then a system named Median at Johns Hopkins University. It consist of physiological monitors designed for patient monitoring in disaster events or in hospitals.

III. MOTIVATION

- Recently, due to this modern lifestyle many disorders related to heart, BP is evolving rapidly.
- Monitoring of physiological parameters of person suffering from such health problem is essential.
- In this project we are using RPI as a controller.
- The sensor monitor the person health and when value of Heart beat or temperature of patient exceeds above a set value the sensor send data through mail.
- Which will display on LCD.
- The buzzer will on.

IV. BLOCK DIAGRAM

Block Diagram description

- In this Project Raspberry pi is heart of system. Controller continuously takes value from sensors.
- This controller checks value with normal person health parameter.
- Temperature sensor sense body temperature.
- Pulse sensor count Heart beat pulse of patient.
- If any abnormality happens Buzzer alert for indication to Doctor.
- Also show display on LCD

- We upload these values on cloud i.e. thingspeak.

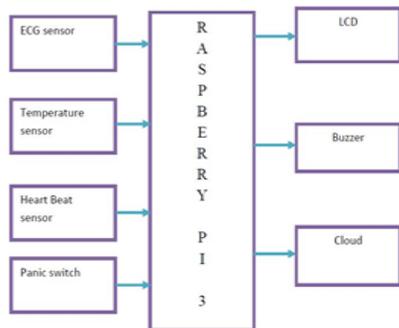


Fig. 1. Block diagram

V. HARDWARE

- Raspberry Pi
- ECG Sensor
- Temp Sensor
- Heart beat sensor
- Buzzer
- LCD
- Panic switch

Some of the sensors and raspberry pi is explained as follows.

A. Raspberry Pi

Raspberry Pi Model, is having a nice black plastic case : The Raspberry Pi is a pocket friendly , ATM card sized computer that plugs into a monitor or TV to display output and uses a standard keyboard and mouse as input . It has the ability to interact with the outside world, and has been used in real time applications. By using raspberry pi we can play the games and can be also stored. It is having main processing chip, memory, power supply HDMI Out, Ethernet port, USB ports and essential global interfaces.

B. ECG Sensor

Our heart do certain electrical and muscular activities to supply the blood to the body. This electrical activity can be depicted as an ECG. This module is used to measure the electrical activities of the heart and it is very pocket friendly also.

C. Temperature Sensor (LM35)

The LM35 is exact and accurate temperature measuring devices with an output voltage linearly proportional to the Centigrade temperature. The LM35 device has an advantage that to get the appropriate output there is no any need of subtracting a large constant voltage from the reading.

D. Heart Beat Sensor

Heart rate data is very useful whether you are planning an exercise schedule or checking your activity or anxiety levels. The problem is that heart rate can be difficult to measure.

It is having Operating Voltage +5V DC regulated , Operating

Current 100 mA , Output Data Level 5V TTL level Heart Beat detection Indicated by LED and Output High Pulse Light source 660nm Super Red LED.

E. Panic Switch

A "switch" is used to open and close an electric circuit. This turns on or off, or used to select one of several options. Basic electronic components don't get much simpler than a switch, but there are wide collection of different switches out there, for every possible need and application.

F. LCD Display

It is a flat rectangular in shape display. It is an electronic modulated optical device that uses the light-modulating properties of liquid crystals. Liquid crystals do use reflector to produce images in colour or monochrome both.

G. Buzzer

It is an audio signaling device which is of three types they are mechanical, electromechanical, or piezoelectric. The buzzers and beepers are used in the timers and where there is need of user's input such as a pressing electronic monometers, microwave ovens or in joy buzzers.

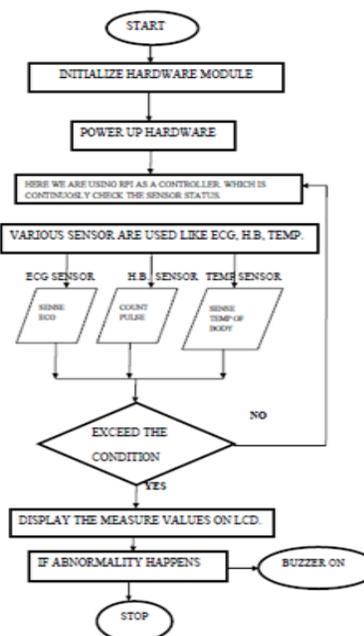


Fig. 2. Flow chart

VI. ADVANTAGE

Ease of operation. (Old age patients and children with heart problems should be periodically monitored. Our proposed system uses sensors that allow to detect heart rate of a person using temp and heart beat sensor.) Track patient easily (Thus it reduces doctors work load and also gives more accurate results). The user may set high levels as well as low levels of

heart beat limit. Low cost hardware unit and user friendly.

VII. RESULT

We design and implement the raspberry pi based secure iot based modern health care system using rpi we get the result like quick and accurate results. Panic switch for if patient need any help. Easy and efficient to detect the pulses using heart beat sensor, also detect an ECG, temp. Helpful for patient and provides an automatic safety systems. The values sensed by sensors are uploaded on thinkspeak in graphical form.

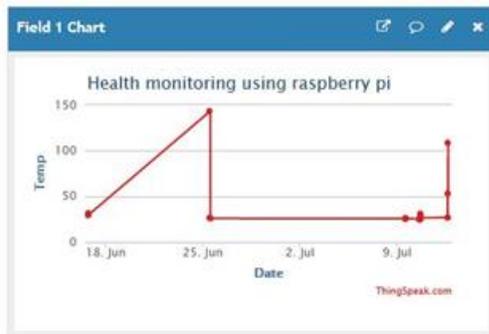


Fig. 3. Temperature graph

The Fig. 4, shows the temperature graph. In this the values of temperature are plotted with respect to time. The normal human body temperature is 37 degrees Celsius.

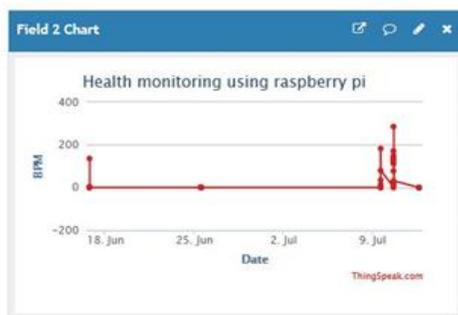


Fig. 5. Heart beats graph

The Fig. 5, shows the heart beat graph. In this the values or count of heart beats are plotted with respect to time. The normal resting heart rate is between 60 to 100 beats per minute

VIII. CONCLUSION

So here we are designed a simple, pocket-friendly controller based health care system using rpi (heart beat), blood pressure and body temperature for personal health monitoring. All sensors should be calibrated properly for precise measurement of parameters and in order to take an immediate action. This system can also be setup at the patient's own house with the assistance of the family. As the modern lifestyle becomes more stressful and hence acute diseases appear, prolonged treatments become more essential. The same can occur for the old or handicapped patients. So by keeping all these parameters in mind we are designing such useful system.

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