Modern Health Monitoring System Using IOT and Raspberry Pi

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Abstract—Health is the one of the most important part of human life for that we are focusing on our good health. This paper is review paper, which is IoT base modern health care monitoring system. The main aim of this review paper is to transmit the patient's health monitoring through wireless, the output data of patient's is uploaded on cloud server and transmitted to the computer and mobile and to the doctor for reference. Our system is designed to deal with the patients in hospitals,it is very difficult to frequently check patients health status.To deal with the situation our system isvery advantageous touse in hospital for measuring and monitoring various parameter like temperature,EEG,ECG ,blood pressure etc.if any parameter of particular patient goes beyond or above the threshold value an automated notification will send to doctor.

Keywords-Raspberry pi, GSM,Sensor,Aurdino

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I. INTRODUCTION

Now a days health related problem are increases day by day .Those patients having heart related problem like blood pressure, heart attack or brain related problem like convulsions ,epilepsy ,seizures for that extra precaution of patients must needed. But many time it occurs that the patient suddenly suffers from that attack and at that time that he will be alone or no one with him, it may causes dangerous problem for patient or if the patients is in critical condition or in ICU then Many time in hospital ,it is difficult to frequently check patient condition for that we find one technology which monitorize the patients health parameter ,in that technology body Sensor network provides very large portability to patients to detect abnormalities in patient and used to avoid critical situations and gives proper treatment on right time. Henc*e*,IoT concept used along with raspberry pi and sensor .The raspberry pi is small credit card size CPU that plugs into your computer and keyboard and the sensor like EEG and ECG sensor are used .The ECG sensor(sparkFun Single Lead Heart Rate Monitor-AD8232) which is cost effective-board used to measure the electric activity of heart ,this electrical activity can charted s an ECG or Electrocardiogram and EEG sensor (NeuroSkyMindwave) which is wireless and lightweight EEG sensor are connected to human body with well managed wireless network. For measurement EEG, brain activity ,ECG, heart bit rate, Temperature etc. can be monitored this by sensors and results can be recorded using Raspberry Pi displayed on a LCD display. a system is designed to continuously monitor the Electrocardiogram (ECG) and other vital parameters. This data is stored in a database and can be displayed in a website that can be accessed only by authorized personnel. Also the results can be sent to server using GSM module. Doctors can login to a website and view those results, if the doctor is busy and he can't see this result then it will forward to the nurse and action will be taken**.**
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II. SYSTEM OVERVIEV

Architecture Diagram

The connection between different sensor and raspberry pi is explain using architecture of the system .The sensors are connected to the body of the patient and other end of the sensor is connected to the raspberry pi through PIC or Aurdino .The analog signal from the sensor is converted to digital by using PIC.The data acquired by the sensor is stored in the raspberry pi ,if the data values exceeds the threshold value then alarm get triggered and at the same time data uploaded to the sever using GSM,that uploaded data can be access by doctor by certain ID and password.
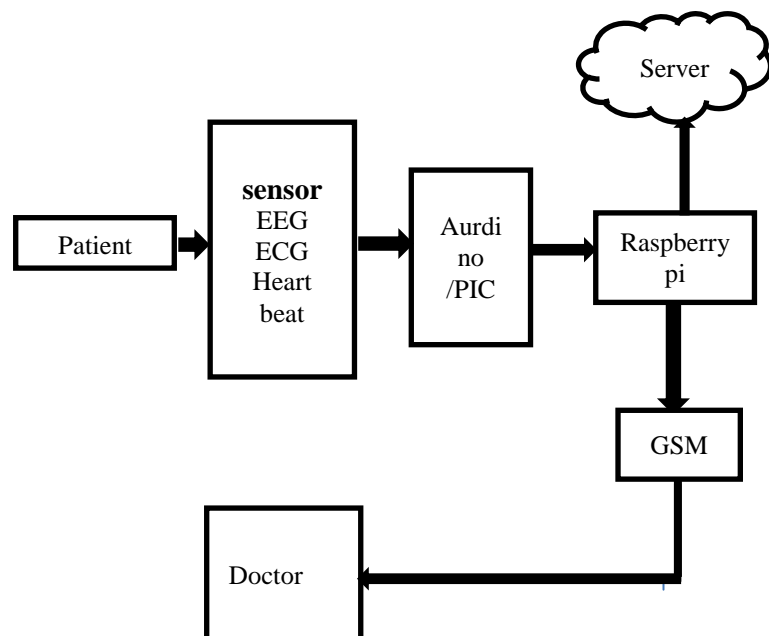

Fig 1: Architectural block diagram

Raspberry pi:

Raspberry Pi is a processor is used in many IoT applications. The raspberry pi is low cost credit size computer that plug into a computer monitor or tv and uses standard keyboard and mouse. It is capable little device that enables people of all ages to explore computing .the sensors are connected to the GPIO pins of raspberry pi. When internet is connected to raspberry pi it act as server. Than server is automatically send data to the cloud. So the parameters like heart rate, electrical activity of brain, temperature etc. are monitored. If this parameter goes above or below the threshold value then it will automatically send alert message to the Doctor and buzzer will ring.

Fig 2: raspberry pi kit

EEG (electroencephalogram) sensor

An EEG is a electrophysiological monitoring method to find the problems related to electrical activity of brain. It tracks and record the brain wave pattern. It is used to diagnose and monitor seizure ,tumors, convulsion and epilepsy disorders.
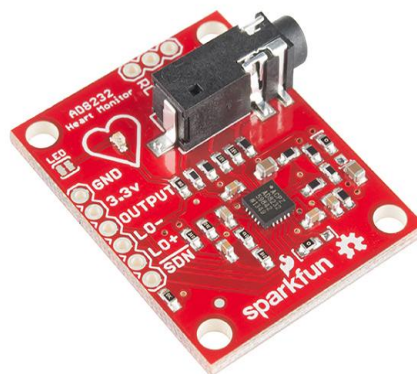

Fig 3: EEG sensor

The EEG sensor is based on electroencephalography. And designed by Neurosky. It is used to record brain waves. EEG measures voltage fluctuations resulting from ionic current

within the neurons of the brain. The brainwave signal is transmitted to the raspberry pi through the Bluetooth.

ECG sensor

The electrocardiography is the process of recording the electrical activity of the heart over a period of timing using electrode placed on the skin. ECG electrode sticks to chest to pickupECGsignals. Then wires are connected to AD8232

Fig 4 : ECG sensor

the AD8232 is a neat little chip used to measure the electrical activity of the heart .. The five pins you need are labeled **GND**, **3.3v**, **OUTPUT**, **LO-**, and **LO+**
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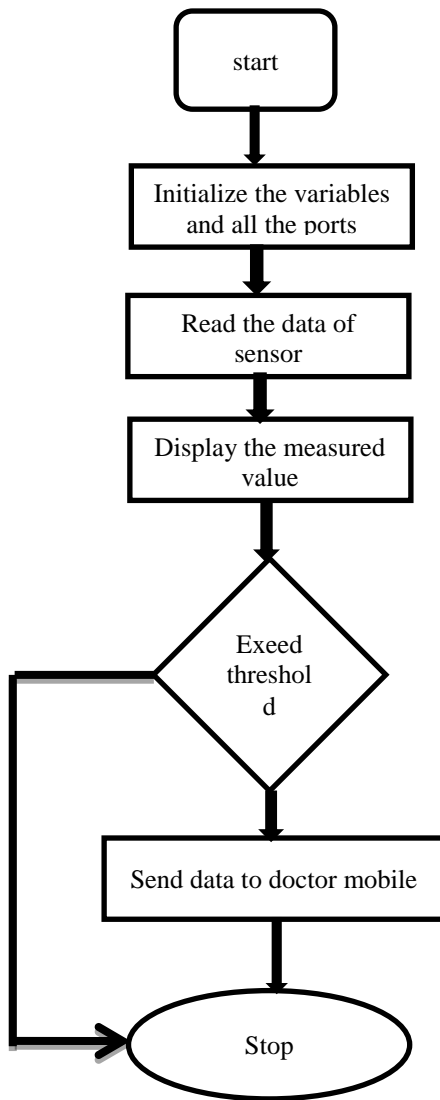| Board Label	Pin Function	Arduino Connection
GND	Ground	**GND**
3.3v	3.3v Power Supply	**3.3v**
OUTPUT	Output Signal	**A0**
LO-	Leads-off Detect -	**11**
LO+	Leads-off Detect +	**10**
SDN	Shutdown	**Not used**

Heart beat sensor

The heart beat sensor gives the digital output of heat beat when a finger is placed on it. When the sensor starts, the LED flashes in unison with beat. The output generated is in Beats per Minute (BPM) rate.

Fig 5 Heart beat sensor

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Flow chart :

```
        ┌──────────────┐
        │    start     │
        └──────┬───────┘
               │
    ┌──────────▼──────────┐
    │ Initialize the      │
    │ variables and all   │
    │ the ports           │
    └──────────┬──────────┘
               │
    ┌──────────▼──────────┐
    │ Read the data of    │
    │ sensor              │
    └──────────┬──────────┘
               │
    ┌──────────▼──────────┐
    │ Display the         │
    │ measured value      │
    └──────────┬──────────┘
               │
           ◇ Exeed
             threshold ◇───────┐
               │               │
    ┌──────────▼──────────┐    │
    │ Send data to doctor │    │
    │ mobile              │    │
    └──────────┬──────────┘    │
               │               │
           (   Stop   )◄───────┘
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Conclusion:

Internet of Things has many applications in different areas. It has been developed for health monitoring of patient. IOT (Internet of Things) play a vital role in communicating between the critical condition of patint and doctor. The health monitoring services are important part of our society, automating these services lessen the burden of doctor ,patient and his family.it is difficult to take continuous watch on patient's health, if any of the parameter like (EEG,ECG,Temperature) exceed above or below the threshold ,so we can avoid that critical situations by smart health monitoring using raspberry pi and can be able to give treatment on time to patient in ICU.

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