

Health Monitoring System using IoT using Arduino Uno Microcontroller

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Abstract—Health has major importance in our day-to-day life. Good health is necessary to do the daily work properly. This project aims at developing a system which gives body temperature and pulse rate respectively. These sensors are interfaced with controller Arduino uno board. Wireless data transmission done by Arduino through wifi module. ESP8266 is used for wireless data transmission on IoT platform i.e. thing speak. Data conception is done on Thing speak. So that record of data can be stored over period of time. This data stored on web server so that it can be seen to who logged.

Keywords—Health monitoring system, Arduino, pulse sensor, temperature sensor, IOT

I. INTRODUCTION

In the current era wireless technology has increasing for the need of upholding various sectors. In these, recent years IoT graphed the most of industrial area specially automation and control. Biomedical is one of recent trend to provide better health care. Not only in hospitals but also the personal health caring facilities are opened by the IoT technology. So having a smart system various parameters are observed that consumes power, cost and rise efficiency. In according to this smart system, this paper is reviewed.

In modern system, doctors play an important role in health check up. For this process needs a lot of time for registration, appointment and then check up. Also reports are made later. Due to this prolonged process working people tend to ignore the checkups or postpone it. This modern approach decreases time consumption in the process.

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Medical scientists are trying in the field of invention and research since many years to get better health services and contentment in human lives.

Their role in medical area is very important to us and cannot be ignored. Today's automotive structures have the root ideas coming from yesterday's fundamentals. Also Early finding of chronic diseases can be easy with these technology.[4]

The body temperature, heart rate, blood pressure, breathing rate are key parameters to diagnose the disease. This project gives temperature and pulse rate values using IoT.

II. MOTIVATION

In rural hospitals, the facilities for health concerned are limited. The lowly quality of health management enables issues in health care system. Everyone should get the information of own health as easy and early as possible. Also it should be worth for each. Newest report of The India Spend analysis of data says that the 500,000 doctors lack in India. WHO defines the doctor patient ratio will be 1:1000 which has been unsuccessful in India.

In emerging countries there is lack of resources and management to reach out the problems of individuals. A common man can't pay for the expensive and daily checkup for his health. For this purpose various systems which give easy and assured caring unit have been developed. These system decreases time with securely handled equipment.

III. RELATEDWORK

Modern health care system familiarizes new technologies like wearable devices or cloud of things. It offers flexibility in

terms of recording patients monitored data and send it remotely via IOT. For this connection, there is necessity of protected data transmission .To transmit the data with privacy is the Motive of this paper. The proposed system presents security of health care and cloud of things. System works in dual major parts viz. storage stage and data retrieving stage. In storage stage, data is stored, updated for future use. In data retrieving stage, regain data from cloud. The cloud server can share with genuine user as per request. A patient with wear able devices repeatedly updates his record every 4 or 5min. In emergency mode, it updates for every 30sec. The wearied device will refer results to phone using Bluetooth connection or NFC technology. This can able to give to cloud server using GSM.

At clouds, every patient is describes with unique address. So data at cloud can verify the right patient and provide the required request. [1]

Afef Mdhaftar, Tarak Chaari, Kaouther Larbi, Mohamed Jmaiel and Bernd Freisleben have clarified low power WAN network to perform study of monitored data in health caring system. They have recognized WAN network for communication up to the range of 33m² at around 12 m altitude. They have also verified that power consumed by Lora WAN network is ten times less than the GPRS/3G/4G.The IOT architecture has been given for step wise working for understanding of IOT .The main purpose of Lora WAN is the energy consumption. The power consumption in idle mode for Lora WAN is 2.8mA while in GPRS is 20mA. Hardware cost in Lora WAN is 10 dollar while in GPRS is 50 dollar. Maximum data rate in Lora WAN is 50kbps (uplink), 50 kbps downlink while in GPRS is 86.5 kbps (uplink, 14kbps (downlink).These results gives the overall efficiency of Lora WAN in the demonstration of IOT for health monitoring system. [5]

Mohammad M.Masud, Mohamed Adel Serhani ,and Alramzana Nujum Navaz had given the measurement of ECG signals at several intervals and at changed situations. They have considered energy awake, limited computing resources and lose network continuity challenges .For these challenges; mathematical model has been established to execute each task serially. There are three methodologies designed to work out the process .One is mobile based monitoring method, data mining and third is machine learning method [6]

Ayush Bansal, Sunil Kumar, Anurag Bajpai, VijayN. Tiwari, Mithun Nayak, Shankar Venkatesan, Rangavittal Narayanan emphases on development of a system which is capable of spotting critical cardiac events. Using an advanced remote monitoring system to spot symptoms which lead to fatal cardiac events [7]

Hamid Al-Hamadi and Ing-Ray Chen gives faith based health IOT protocol that reflects risk classification, reliability trust, and loss of health probability as design standards for decision making. Comparative analysis of trust based protocol and baseline protocols check viability.[8]

Muthuraman Thangaraj Pichaiah Punitha Ponmalar Subramanian Anuradha."Digital hospital "term is familiarized for hospital management. It permits automatic electronic medical records in standard. Also converses with the implemented real world setup of smart autonomous hospital management with IOT.[9]

Table 1: Comparison of sensors and technology used [1, 7, 5, 6, 9]

| Sr. No | Title of Paper | Sensors used | Technology used |
|--------|--|-------------------------------|--|
| 1 | Internet Of Things (IOT) Allowed Smart Autonomous Hospital Management System – A Real World Health Care Use Case with the Technology Drivers | Various types of sensors used | Digital Hospital |
| 2 | Remote health monitoring system for detecting cardiac disorders | 12-lead ECG probe | Mobile based algorithm deployment, Bluetooth sensor device |
| 3 | IoT-based Health Monitoring via Lora WAN | B.P, Temp., glucose | Lora network |
| 4 | Resource-Aware Mobile-Based Health Monitoring | ECG sensor | ECG processing analytics module |
| 5 | Internet Of Things (IOT) Enabled Smart Autonomous Hospital Management System–A Real World Health Care Use Case with Technology Drivers | ECG,EKG | IoT enabled data modeling |

IV. SYSTEM AND OVERVIEW

A. Objective

- To develop health monitoring system using IOT, including Pulse rate and body Temperature
- To design a system which store the patient data over a period of time using data base management.
- To do analysis of collected data of sensors via clouds.

B. Block Diagram

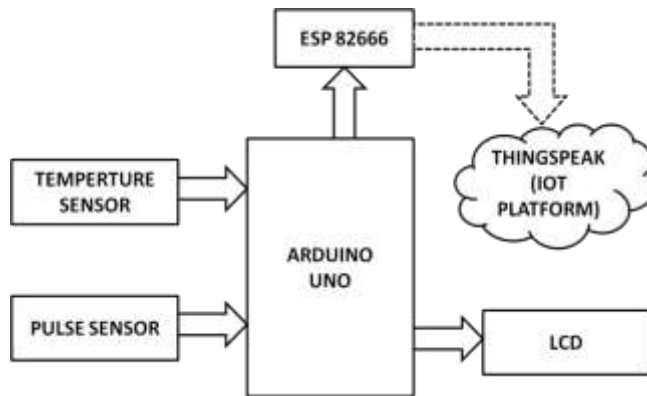


Fig 1: Block diagram of system

Fig1. Shows the proposed system .The health monitoring sensors are used to gather health related data i.e. for data acquisition. Communication can be done via controller for sending data on internet wirelessly. Data handling has been done at server. All data collected and gathered at server point. To get health related information in understandable for mat it can be shown on web page i.e. data management.

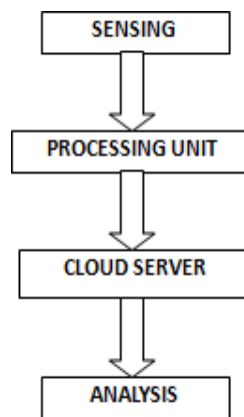


Fig 2: Working of system

Fig 2. Shows the working flow of system. The results collected from sensor are examined i.e. if abnormal behavior has been noticed, then emergency plan activated to inform the Doctor about patient's health .So it diminishes critical conditions in Hospital.

C. Components Used

Table 2 gives the modules used in the system and their essential specification. Following

1) Arduino uno:

Arduino uno is a micro controller based on ATmega 328. Simulation. It has a build in USB peripheral power cable



Fig 4: Setup of System

Fig 4 shows the Output on LCD of pulse sensor and temperature sensor.

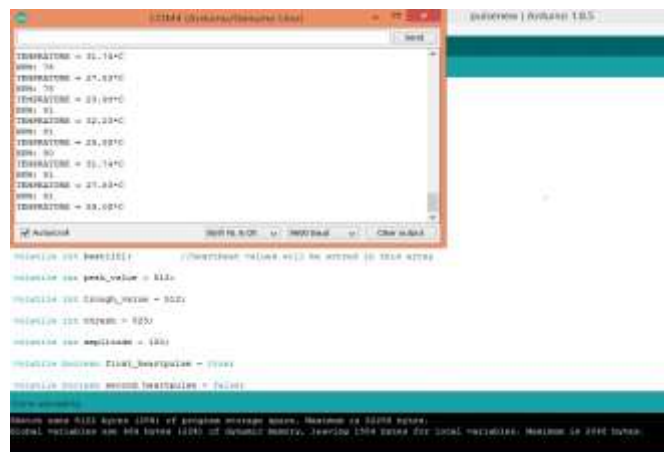


Fig 5: Simulation of system on Arduino IDE

Fig 5 is the simulation window of Arduino IDE of program.

Fig 6.gives parameters that are body temperature and pulse rate is shown online on IOT platform.



Fig 6: Graphs of sensor output

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