IOT Based Smart Health Monitoring Alert Device

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Abstract: ***The interconnection of the devices using network technologies form Internet of Things (IOT). IOT is the advanced technology useful for the medical health sector in many ways. In this paper, the proposed design is to find out the reading of the human pulse sensor and alert the system, if the heart beat of the victim is abnormal through a buzzer and also send the messages to the emergency contacts through Global system for Mobile (GSM) system. This system will also be connected to the Thing speak Cloud for the data processing with the help of Wi-Fi based microcontroller. The entire system can be used for easy evaluation of the doctor regarding the victim past medical heart beats. The data will be continuously active and stored in the cloud. The proposed system experimental values are reliable, user friendly and economical to use regularly.***

Keyword: ***Internet of Things, Thing speak Cloud, Microcontroller, Heart Pulse sensor, GSM.***

I. INTRODUCTION

The Internet of Things is the inter connection of the 'things' with the network connectivity that process the data from the sensor node to the end point. In the Health monitoring system, the constant care of observing the heart beat parameter is very important for the patients and can be a better solution with the technology use of Internet of Things (IOT) to maintain the patient previous medical history of the pulse rate. The 24 hours medical observation can help the patient for the better treatment also. This technology that provides better enhancement feature is hardly difficult to use in India due to its accessibility and affordability.

To Improve the feasibility of utilising, the smart Health Monitoring Device is controlled with the Microcontroller of Arduino Uno and Node MCU ESP8266. In this Paper the system is designed to gather the data by using heart beat pulse and the output of heart pulse are sent to the cloud 'Thing speak' for data storing purpose which can act as a medical history for the future.

Revised Manuscript Received on April 14, 2019.

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When the abnormality of heart pulse in the patient observed then the systems gets activated. The activation alerts the system by sending the messages through GSM module for the emergency contacts. As Monitoring the pulse condition is an important parameter in the medical sector.

The major aim applied in this smart health monitoring device is summarized as

- To Understand and get the output data of pulse rate in the real time environment with accuracy via IOT.
- Data Processing and Data storage of the patient Pulse rate from the processor to the Cloud
- To verify the system reliability of alert performance.

II. LITERATURE SURVEY

The literature survey is a progressive step to understand the work focused by number of researchers. The work is shown in the following as

Almotiri et.al., [1] proposed android based m-health monitoring system for collecting the device information with enabling of internet. This device is useful in the medical diagnosis for understanding the previous health report.

Barger et.al.,[2] proposed a smart facility in the house for tracking the movements of the patient. This system is mainly developed to understand the behavioural patterns of the patient.

Dwivedi et.al.,[3] proposed a framework to secure the data processing to the electronic health record by combining public key infrastructure, API, Biometric and smart card solutions.

Gupta et.al., [4] proposed a system to gather the ECG data and alert the family and relatives on the bases of the abnormality.

III. METHODOLOGY

The Methodology of the IOT Based Smart Health monitoring device is shown in the Fig.1.

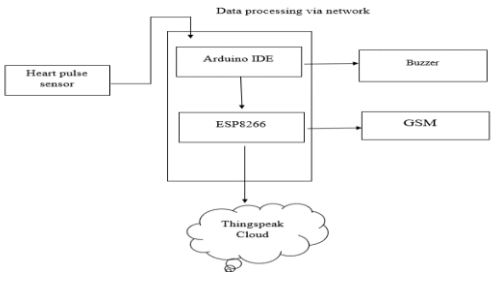

Fig. 1 Methodology of the system

IV. PROPOSED DESIGN

In this paper, we design the system for monitoring the pulse rate of the patient body. The advancement of the system is to store the parameter of pulse rate into the cloud and also helps to alert the patient's family, when the abnormality in the pulse rate is observed with the GSM and the Buzzer.

The proposed Implementation of data is observed in the below Fig.2.

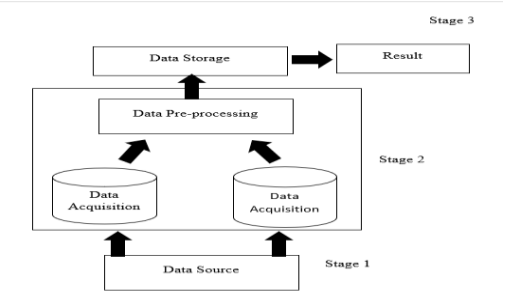

Fig. 2 Implementation of data

In the stage 1, the sensor is connected to the Microcontroller which acts as a source of the data. In the stage 2, the data is ready to measure and thus the data acquisition collect the data from the sensor node via Microcontroller. In the data pro-processing the data model obtained from the data acquisition are identified as a label and used to send the information to the cloud/database for the further purpose of utilised in data analysis and data mining.

In the stage 3, the data is stored which is collected from the pre-processing stage and used to observe the parameters for the future observation, predictions etc.

V. HARDWARE& SOFTWARE REQUIREMENTS

The Hardware and software used in the system is mentioned in brief as following

A. Arduino Uno

The Arduino is developed by the ATMEL consists of the typical features of the 1.8K bytes of Flash,256 bytes of RAM32 I/O line,16-bit timers/counter and ATMEGA 328. The Arduino Uno is shown in the Fig.3.

Fig. 3 Arduino Uno

B. ESP8266-01

The ESP8266 is a Wi-fi Based Micro controller and controlled Soc via ICP/IP protocol with 9 GPIO pins. The ESP8266 ESP-01 is shown in the Fig.4.

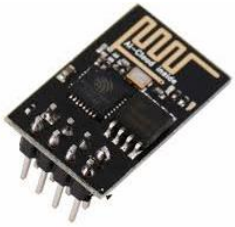

Fig. 4 ESP-01

C. Pulse Sensor

Pulse sensor provides the analog output of the heartbeat, by placing the finger. On the sensor. It is working effectively by sensing the heart beat count with the led blink. The principle of the sensor is dependent on the light modulation in the blood that flow through the nervous per each heart pulse. The pulse sensor is shown in the Fig.5.

Fig. 5 Pulse sensor

D. GSM

The GSM Modem acts as a mobile which accepts the SIM. When a GSM is connected to the computer, with the network feature GPRS the system gets connected to the network. The GSM SIM900A is a complete dual band GSM/GPRS module with the high performance of voice, SMS, data of frequency 900/1800MHz.

E. Extra features

The LCD 16X2 display is used to display the characters of heart pulse rate. The buzzer is an audio signalling device which can be piezoelectric, mechanical or electromechanical which alerts the system in the emergency.

The Arduino IDE is an integrated development environment used to compile the source code of embedded c for dumping into the Microcontroller.

IOT Thing speak: Thing speak is a HTTP cloud used to send and retrieve the data into the cloud through the Application programming interface (API)

VI. EXPERIMENTAL RESULTS

The experimental Results are shown in the Fig.6 and 7,8

Fig. 6 Data observed in the LCD Display

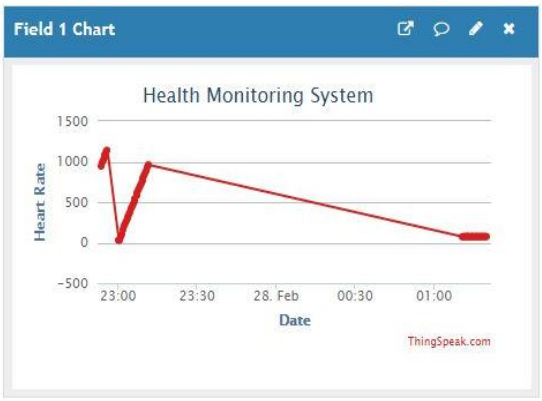

Fig. 7 Data storage in the cloud

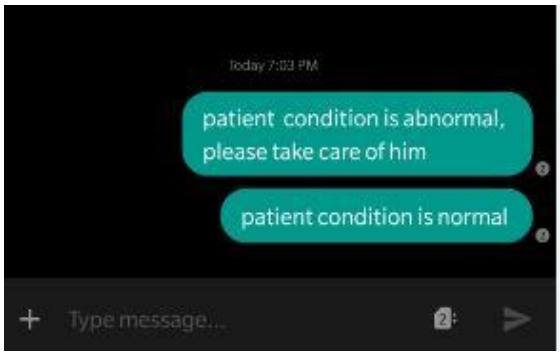

Fig. 8 Emergency messages

VII. CONCLUSION

In this paper, the prototypes provide the real time solution of observing the patient heart pulse rate with reliability. This system can be adopted in the general wards of the hospital to help the patients understand its performance and utilization. The processes of storing the data can be further used in many ways such as predicting the diseases, analysing etc. using this system can reduce the adverse emergency for a patient to occur with the heart disease.

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