

IoT based Smart Health Care

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Abstract- The paper introduces a new method of monitoring a patient condition and serving him according to his/her condition even from the remote areas using IOT which can provide support to emergency medical services like intensive care units. The main objective is to implement biomedical applications using IOT technology by monitoring the patient condition and sending the monitored data to doctor. Some basic parameters like temperature, heart beat, blood glucose level, ECG, EEG are monitored in this project. The patient condition is examined by using sensors and the data is analysed by using system hardware and software. At the doctor's side we have a monitor in which we program with flash magic software to observe the patient's data that was received through the zigbee device. Based on these measured values using the sensors we or doctor take care about the patient. The measured data is stored in internet using embeddedspot/iot website and can be used when we need. This mechanism aid the patients in an effective way and mitigates time in treating the victim by sending alert to the doctor about patient condition in case of emergency with his current status and full medical information.

Keywords: Internet of things (IoT), Sensors, Health Monitoring.

I. INTRODUCTION

The main objective of this project is to implement biomedical applications using IOT technology by monitoring the patient condition and sending the monitored data to doctor. To monitor the patient condition the doctor should need the presence of the patient or the doctor should reach the patient. But by using this technique doctor can monitor the patient condition who is in ICU or some where through his desktop. In case of danger condition the doctor will get alert about patient condition. The examined patient data can be stored in internet and can be retrieve when ever need using IoT. The healthcare services are getting better and less costly by collecting, recording, analyzing and sharing new data packets in real time and efficiently. Also, as the world is adopting this ever growing technology of IOT, many of the inefficiencies in healthcare will be reduced. For example, various medical devices like fitness bands, health monitoring systems, medication boxes has smart sensors embedded into them that allows to collect the raw data, store it, analyze it, and conduct tests which are further used by medical experts to take proper decisions. Iot known as Internet of things refers to the devices or objects that are connected to the web and capable of exchanging and collecting data. It connects electronic devices to a public or private cloud to capture or monitor data and enables them to automatically trigger certain events. In healthcare, Iot plays a vital role in maintaining thousands of patients data computerized and helps them to capture their data anytime they want. To keep tabs on the location of medical devices, patients, and personnel, many hospitals uses Internet of things. The patient condition is studied by using different sensors and the sensed data is processed using system hardware and software to produce results. The results are

displayed and send to doctor using wireless data transmission and placed in the internet using embeddedspot/iot website for further utilization.

II. PROPOSED MODEL

The mechanism we introduced is an automatic way of monitoring patient condition and analyzing the monitored data and sending an alert to doctor in case of danger or emergency using system hardware and software. In hardware we used arduino to process the inputs and produce output, sensors to sense the person condition and to send data to arduino for further processing, zigbee to transfer the processed data to receiver. In software we used arduino software to convey instructions to arduino board, flash magic software to display results at doctor's monitor. We use to store data in internet.

Arduino uno is open source hardware and software and is a microcontroller board based on ATmega 328 having 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs. It plays an important role as it receive the data from the sensors and process it according to the instructions given to it using programming arduino software and produces output and displays on LCD. Arduino board is able to read inputs light on a sensor, finger on a button, or a twitter message and turn it into an output by activating motor, turning on LED, publishing some thing online.

We used lm35 sensor to sense temperature. It is a type of resistor used to measure temperature changes, relying on the change in its resistance with changing temperature. It contains 3 pins (VCC, output, GND). When temperature given as input to sensor is high the resistance inside the sensor increases thus decreasing the input voltage. Output

voltage varies from input voltage as per the sensed temperature data. According to the difference between input and output voltage the temperature value is produced. We used heartbeat sensor to sense heartbeat. It is based on Photoplethysmography. It works based on light modulation. The heart beat pulses causes a variation in the flow of blood to different regions of the body which causes change in volume of blood. The sensor senses the change in the volume of blood through any organ of the body which causes a change in the light intensity through that organ. The LED in the sensor senses the flow of blood through the finger when finger is placed on the sensor, the change in volume of blood changes the light intensity. The sensor measures the heart rate according to the change in light intensity.

Like temperature and heart rate we can measure ECG, EEG, blood glucose and some more parameters by applying different sensors as input to arduino board.

The measured parameters are displayed on the LCD (liquid crystal display). The LCD is used for the purpose of displaying the output data by processing the inputs and instructions given to arduino board through programming.

Zigbee is a new wireless technology that has applications in different fields. Zigbee technological standard based on IEEE 802.15.4 specification for low data rates in the Industrial, Scientific, and Medical (ISM) radio bands. In medical field it is used to connect unlimited number of health monitoring devices and many more. It has two bands of operation 868/915MHz and 2450MHz. 868/915 band provides about 20-40Kb/s and 2450MHz band provides about 250 kb/s data rates. In this project Zigbee is used at both transmitting and receiving side to transfer and receive data wirelessly. The output produced by arduino is given to Zigbee which transfers to another zigbee at receiver side. Zigbee at receiver is connected to MAX232 which is connected to system. MAX232 is used to establish communication between zigbee module and system. It is a voltage level converter. MAX232 converts signals from TIA232 serial port to signals suitable for use in TTL compatible logic circuits. It pumps voltage to desired level. It is widely used in RS 232 communication systems in which the conversion of voltage level is required to make TTL devices to be compatible with PC serial port and vice versa. It is a dual transmitter /dual receiver that typically is used to convert the RX, TX, CTS, RTS signals.

The results are displayed on the monitor at the doctor using flash magic software. Flash Magic is Windows Software from the Embedded Systems Academy that allows easy access to all the ISP features provided by the devices. Flash magic is a PC tool used for programming flash based microcontrollers from NXP (next experience) using a serial or Ethernet protocol while in the target hardware. It works on windows XP, Vista, 7, 8 and 10. 10Mb of disk space is

required. Flash magic only works on those microcontrollers which have serial ports or support serial programming. It can't burn the microcontrollers like AT89C51 or others which do not support serial programming. The results are placed in the internet using embeddedspot/iot. Embeddedspot/iot is the developer platform to rapidly connect your things with internet and interact with them. Embeddedspot/iot is free for prototyping purposes. The stored data can be retrieved any time for use.

III. RESULTS

The Detection and Analysis of Temperature of a person are monitored using Arduino software and displayed using LCD display. The LCD displays the results as per the instructions given to it by programming the arduino board.



Fig 1: Temperature Reading displayed on LCD

The input is given to LM35 Sensor as heat and the output is displayed on the LCD display as shown in the above figure. The Detection and Analysis of Heartbeat of a person are monitored using Arduino software and displayed using LCD display. The LCD displays the results as per the instructions given to it by programming the arduino board.



Fig 2 : Heart beat Reading displayed on LCD

The finger is placed on the Heartbeat sensor as input and the result is displayed on the LCD as shown in the above figure. The Doctor examine the results using Flash Magic software. In our project we are displaying two patients results. The Doctor will get the alert only when the patient is in danger condition.

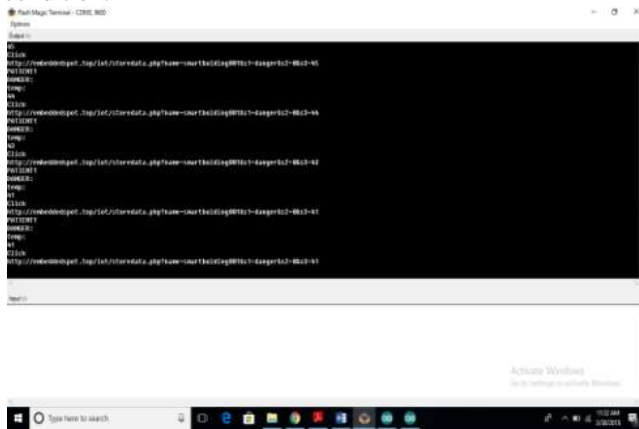


Fig 3 : Patient condition displayed using Flash Magic software

Flash magic displays the results using the program given in the Arduino board and also IoT link is displayed below the readings of the heartbeat and temperature. Doctor can examine the patient condition from anywhere as the results are placed in internet using IoT. We are displaying the results in the



Fig 4: Results are displayed in Embeddedsport/iot

The results will be placed in the website only when the patient is in danger condition. The graph is also displayed in this website. The above figure shows the results in the website wh

IV. CONCLUSION

The main idea of the proposed system is to provide better and efficient health services to the patients by implementing a networked information cloud so that the doctors could

make use of this data and provide fast and efficient solutions. The final model will be well equipped with the features where doctor can examine his patient from anywhere and anytime. Emergency scenario to send an emergency mail or message to the doctor with patient's current status and full medical information can also be worked on

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