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Smart Patients Monitoring using IoT

Yati Singhal[1], Krishna murari rai[2], Amit Yadav[3], Aman kansal[4]

[1,2,3,4]*IMS Engineering College Ghaziabad*

Abstract : In today's scenario health play an Important role in economics of country but due to inadequate infrastructure of patient monitoring patient suffer from serious health issues. There are lots of IoT devices now days to monitor the health of patient over internet. Recently, use of IOT will help better result and accurate measure of patients, even in remote area of the country where is lack of availability of primary health care system. This paper presents the smart patient monitoring system. The input as (patient) is taken and then different sensor will act upon it, i.e., temperature sensor, heart beat sensor. Further the EEG data are monitored, display and stored by system for health report and future reference of the system. Moreover, it controls those objects remotely through the internet. As the patient monitoring system deals with the life and death of a patient and which is very critical and sensitive for the patient, hence a robust and secured system is very much required for this architecture to work.

Keyword: IOT, ECG, Heart beat sensors, IR sensor,Thingspeak

I. Introduction

According to World Health Organization standard of health is a fundamental right for a community. As we are truly inspired by this, we attempt to propose an innovative system that puts forward a smart patient health tracking system that uses sensors to track patient vital parameters and uses internet to update the doctors so that they can help in case of any issues at the earliest preventing death rates in order to reduce the death rate (morality rate). This can significantly improve an individual's quality of life. It allows patients to maintain independence, privacy and minimize personal costs. This system facilitates these goals by delivering care right to the home. In addition, patients and their family members feel comfort knowing that they are being monitored and will be supported if a problem arises. The increased use of mobile technologies and smart devices in the area of health has caused great impact on the world [1]. Health experts are increasingly taking advantage of the benefits these technologies bring, thus generating a significant improvement in health sector with the advantages of the M-Health applications and E-Health to improve, their health [2] . In this proposed work the vital parameters such as temperature, EEG [3] and heart beat readings [4] which are monitored using Arduino. Here patients body temperature, EEG and heart rate are measured using respective sensors and it can be monitored in the screen of computer using Arduino Uno connected to a cloud database system

II. Design aspects

In IOT based patient monitoring system has 2 sensors. There are temperature sensor (LM35) , Heart beat sensor and EEG This project is very useful since the doctor can monitor the patient health parameters by visiting website or URL to operate IOT based health monitoring system project .We need a Wi-Fi connection and the micro controller or the Arduino based connecter to the Wi-Fi network using a Wi-Fi module (ESP 8266) and we use things speak app one cloud service provider which can be used to view this data over internet .The Arduino board continuously reads input from there 2 sensors then it sends this data to the cloud by sending this data to a particular URL /IP address then this action of sending data to IP is repeated after a particular interval of time.

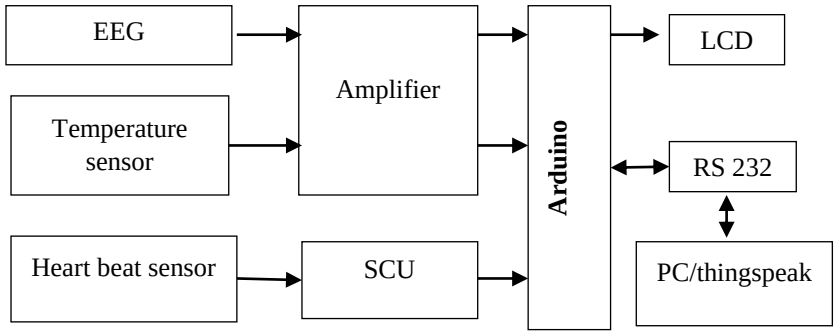

Figure 1: block diagram of patient monitoring system

III. Result analysis

After connecting and programming all the components with each other, we have performed the experiment. According to the proposed system, we have designed prototype Iot based Patient monitoring System. Arduino, GSM module and all the sensors are connected with lots of wires.

Age	Gender	Heartbeat output from BP machine	Date/Time	Heartbeat output from our system	Date/Time
12-22	Female	97	1-5-2021/ 11:00am	101	1-5-2021/ 1:00pm
22-29	Female	96	5-5-2021/ 1:00pm	97	5-5-2021/ 1:45pm
33-38	Female	94	25-5-2021/ 3:00pm	97	25-5-2021/ 3:20pm
40-46	Male	95	10-6-2021/ 1:50pm	98	10-6-2021/ 2:11pm

Table 1: Heartbeat Result Analysis

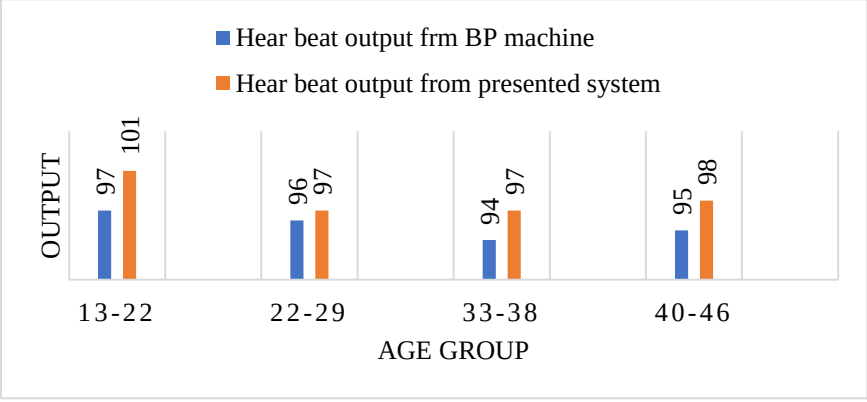

Figure 2: Comparison of results by the BP machine and Presented system

Heartbeat Result Analysis

To proceed with this thought, we have checked the data which is taken from 5 various people having specific age limit. The data is given below with specific date and time. Results are shown in table 1 and figure 2.

ECG Report Analysis

At first in our ECG sensor, we have 3 electrodes placed in the patient's chest. The red color electrode is placed in the right-side chest where the heart beat is producing. And the green color electrode place in left side chest and last one yellow electrode place in below green color electrode. Then we have to press ECG push button. The value will generate curve and upload in mobile application and website. Here we are presenting some ECG results (Figure 3):

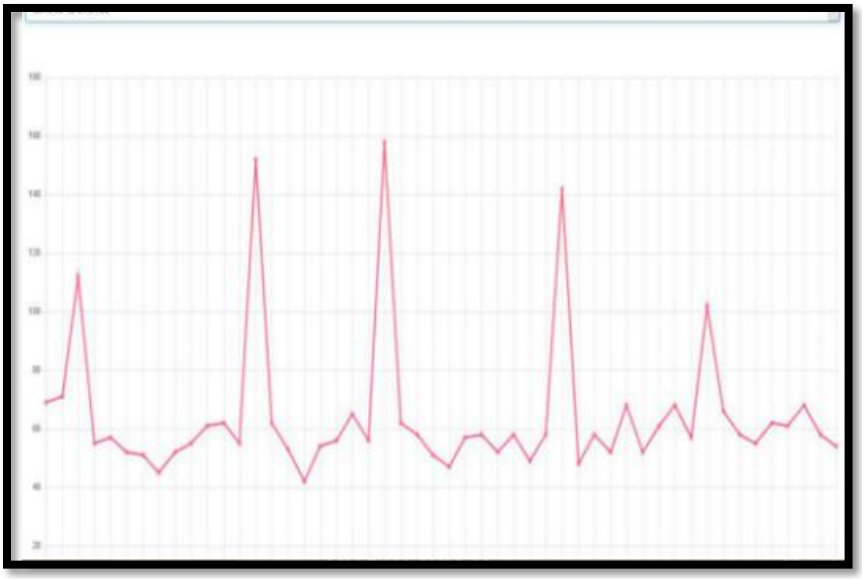

Figure 3: ECG Report Analysis

Advantages:-

- Minimize human error and effort
- Real time monitoring
- Reduce burden on hospital
- Accurate and definitely save time
- Promote telemedicinal
- reduce pocket out expenditure

IV. Conclusion

The system can be further improved further by adding artificial intelligence system components to facilitate the doctors and the the proposed system of patient health monitoring can be highly used in emergency situations as it can act as recorded and stored as a database. In future the IOT device can be combined with the IOT so that the database can be shared in all the hospitals for the intensive care and treatment future it will help in IR 4.0 in health sector. Due to the importance of observing medical state of patients who are suffering from acute diseases, especially cardiovascular diseases, a continuous remote patient monitoring is essential. Internet of Things is able to provide tools approximately in every sector

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