Remote Patient Monitoring System for Chronic Illness and Habit Stabilization

N. Anusha[1], T. Senthil Kumar[2], M. Dharani[3], T. Kameshwaran[4], G. Thamil Selvan[5]

[1,3,4,5]*Student, Department of Information Technology, Hindusthan Institute of Technology, Coimbatore, India*
[2]*Assistant Professor, Dept. of Information Technology, Hindusthan Institute of Technology, Coimbatore, India*

Abstract: **In the recent technology, Internet of Things (IoT) makes all objects interconnected and it has been recognized as the technical revolution. Some of the applications of IoT are smart parking, smart home, smart city, smart environment, industrial places, agricultural fields and health monitoring process. One such application is in healthcare to monitor the patient health status where IoT makes medical equipment's more effective by allowing real time monitoring of patient health. We have designed a system which is very helpful in monitoring & updating the patient health status in a graph report format to the doctor via PC or desktop. We have implemented a pulse monitoring for continuous pulse rate measurement for an hour/day is done by blood pulse sensor. Likewise, body temperature, pressure, moisture, obesity has been noted using sensors. The sensor module picks up the sensor data and sends it to the network through WI-FI and hence provides health status of the patient to doctors. The proposed system of the project is to report a clear notification of patient database health status in graphical form to the doctor at any time.**

Keywords: **Internet of Things, Healthcare, Chronic diseases, Medical applications, Graph Report, Parameters.**

1. Introduction

Advances in information and communication technologies have led to the emergence of IoT. In the modern health care environment, the usage of IoT technologies brings convenience to physicians and patients, since they are applied to various medical areas. Hence it has become one of the important parts of our daily life.[1] The IoT is widely being recognized by researchers and analysts as one of the most refined technologies. It primarily consists of physical objects that are embedded with sensors, actuators, computing devices and data communication capabilities. These are linked to networks for data transportation. IoT is widely used in healthcare purposes. There is no need of moving from facility to facility to receive treatment [10]. Rather, the patient can get his dialysis done with the help of the designed system. Data gathered from this device is analyzed and stored to make informed decisions in a timely manner. Caregivers monitor the patient from any location and respond appropriately, based on the alert received. Advanced treatment of this nature can drastically improve a patient's quality of life.

2. Literature review

The main objective is to make Remote patient tracking and health monitoring system at low cost With Connectivity easy. In the modern health care environment, the usage of IoT technologies brings convenience of physicians and patients. The interconnected objects collect the knowledge at regular intervals, analyze and accustomed initiate needed action, providing associate intelligent network for analyzing, coming up with and deciding.[3] So we are outlining medicinal services framework where client information is gotten by the sensor and sent to the cloud through Wi-Fi and permitting only the approved clients to get to the information.

The system is conceptualized to provide an interface for the doctor to monitor and profile patients in an advanced and graphical method. The main purpose of the study is to facilitate the patients suffering from chronic diseases in getting appropriate diagnosis and awareness of their own habit patterns and overcome their illness. Also provide healthcare services which might not be possible otherwise due to low doctor-to-patient ratio. The developed monitoring system is then evaluated using wearable sensors while holding an android device. The performance analysis shows that the planned system is reliable and useful thanks to high speed. The analyses showed that the proposed system is convenient, reliable and ensures data security at low cost.

3. Heart beat monitoring and alert system

Health related issue and parameters are most important to man, and is essential to his existence and influence and thus he has sought for an improved system that would be able to capture and monitor the changes in the health parameter. This work presents a system that is capable of providing real time remote monitoring of the heartbeat with improving alert. In their project they monitor the heart beat rate of the user by pulse sensor and when the pulse rate reach above or below the given threshold value.[9] Then Heart rate is displayed in the LCD it then proceeds to alert by an alarm and SMS sent to the mobile phone of the medical expert or health personnel, if and as long as the edge worth of the heartbeat rate is maximally exceeded.

International Journal of Research in Engineering, Science and Management
Volume-2, Issue-3, March-2019
www.ijresm.com | ISSN (Online): 2581-5792

682

4. Smart and secured health care monitoring

Technology plays the most important role in tending not just for sensory devices however conjointly in communication, recording and display device. It is vital to watch numerous medical parameters and post operational days. Hence the latest trend in Healthcare communication method using IOT is adapted. Internet of things is a catalyst for the health care and plays distinguished role in wide selection of health care applications.[2] The sensors such as temperature sensor and pulse- oximeter sensor are connected to the microcontroller picks up the sensor data and sends it to the network through Wi-Fi and thus provides real time observance of the health care parameters for doctors.[5] The data are often accessed anytime by the doctor. But the most important issue in remote patient observance system is that the information on be firmly transmitted to the destination finish and provision is created to permit solely authorized user to access the data. The security issue is being self-addressed by transmittal the info through the password protected Wi-Fi module ESP8266 which can have encrypted by standard AES128 and therefore the doctor can access the data by logging to the html webpage. At the time of extremity state of affairs alert message is distributed to the doctor through GSM module connected to the controller. Hence fast provisionary medication is often simply by this technique [8]. This system is economical with low power consumption capability, easy setup, high performance and time to time response.

5. Benefits and applications

The key benefits and applications of IoT in healthcare are as follows,

- Care for the pediatric and the aged
- Chronic disease management
- Personal health and fitness management
- Lowered cost of care
- Improved patient outcomes
- Real time disease management
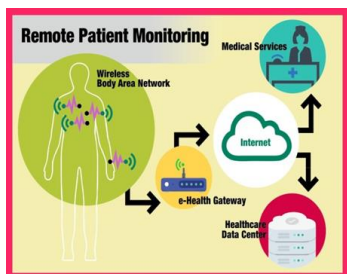- Improved quality of life
- Improved user experience

Fig. 1. Architecture of proposed system

6. Wireless sensor for handy based on patient monitoring system

In past patient suffering from any disease or physiological disorder is difficult to monitor patient health. Now a days patients are monitored unceasingly through wireless network. In ICUs nurses or other care taker may not be available for constant monitoring of patient health due to this patient health becomes critical condition. To avoid this continuous monitoring of patient health using wireless network this device is developed. Goal of this system is to monitor patient's blood pressure, heart beat rate, body temperature, body position [4]. These all health data continuously read by ARM cortex M3 Processor. Processor is connected to totally different detectors and these sensors worth unceasingly scan and show this health knowledge on LCD and Remote PC. If sensors worth of patient changes to abnormality level, then scan values of patient square measure messaged to doctors mobile via GSM. It helps to monitor patient continuously at anywhere and anytime.

The system used good devices like flex sensor, MEMS body sensor and eye blink sensor. Whenever person moves any finger, any eye lid and tilt the body towards right or left side, the flex sensor, eye blink sensor and MEMS sensor detects the movement respectively, and aware of the priority person through GSM.[7] It send message through the GSM modem to the concern person showing the status of the body detection at a different parametric values of a graphical notation format by performance analysis of body condition. The system monitors physically 24*7 for getting the improvement of comatose patient for further treatment [6].

A. Advantages

The main advantages of IoT applications are as follows

- Expansion capabilities
- Small form factors
- Huge Community Support
- Over clocking capability
- Media Streamer
- Small size
- Affordable

B. Challenges

The issues and challenges of IoT are discussed below

- Managing device diversity and interoperability
- Data integration
- Scale, data volume and performance
- Flexibility and evolution of applications
- Data privacy
- Need for medical expertise.

7. Conclusion

After connecting these sensors to the patient body and adding the health information to the website. Then the sensor senses the information which acts as a server. Then the server automatically sends patients health status to the website. Using this website link anybody can monitor patient's health status anywhere in the world. So it is very useful for patient's to give first aid at any time and to report a clear notification of patient

database health status in graphical form to the doctor side.

References

[1] DeepakVerma, Mahika Bhasin, "Real Time Optical Heart Rate Monitor", (IJCSIT) International Journal of Computer Science and Information Technologies, Vol. 5 (6), 2014.

[2] Dohr, R. Modre-Osprian, M. Drobics, D. Hayn, G.Schreier, "The Internet of Things for Ambient Assisted Living", Seventh International Conference on Information Technology, pp 804-809,2010.

[3] HasmahMansor, Siti Sarah Meskam,Nur Quraisyia Aqilah Mohd. Rusli, Nasiha Sakinah Zamery," Body Temperature Measurement for Remote Health Monitoring System" IEEE International Conference on Smart Instrumentation, Measurement and Applications (ICSIMA)26-27 November 2013.

[4] Karandeep Malhi, Subhas Chandra Mukhopadhyay, Julia Schnepper, Mathias Haefke, and Hartmut Ewald," A Zigbee-Based Wearable Physiological Parameters Monitoring System" IEEE Sensors Journal, vol. 12, no. 3, pp 423-430, March 2012.

[5] Matthias Wagner, Benjamin Kuch, Carlos Cabrera, Peter Enoksson, Arne Sieber, "Android Based Body Area Network for the Evaluation of Medical Parameters", 10th International Workshop on Intelligent Solutions in Embedded Systems, 2012.

[6] Mohammad S. Jassas, Abdullah A. Qasem, Qusay H. Mahmoud," A Smart System Connecting e-Health Sensors and the Cloud A Smart System Connecting e-Health Sensors and the Cloud" Proceeding of the IEEE 28th Canadian Conference on Electrical and Computer Engineering Halifax, Canada, pp. 712-716, May 3-6, 2015.

[7] Rajeev Piyare," Internet of Things: Monitoring System using Android based Smart Phone", International Journal of Internet of Things, Nov 2013.

[8] Shanzhi Chen, HuiXu, Dake Liu, Bo Hu, and Hucheng Wang, " AVision of IoT: Applications, Challenges, and Opportunities with China Perspective", IEEE Internet of Things Journal, Vol. 1, No. 4, pp 349-359, August 2014.

[9] Soumya Roy, Rajarshi Gupta," Short range centralized cardiac health monitoring system based on ZigBee communication", IEEE Global Humanitarian Technology Conference - South Asia Satellite (GHTCSAS) Trivandrum, pp. 177-182, September 26-27, 2014.

[10] Ufoaroh S. U, Oranugo C.O, Uchechukwu M. E, "Heartbeat Monitoring and alert system using GSM Technology", International Journal of Engineering Research and General Science Volume 3, Issuse 4, July-August, 2015.