International Journal on Future Revolution in Computer Science & Communication Engineering
Volume: 4 Issue: 3
ISSN: 2454-4248
132 – 133

IoT Enabled Health Monitoring System

Kalyani Pardhi *, Mohit Dasariya*, Vaibhav Chopade*
*Dept. of Information Technology
DMIETR
Wardha, Maharashtra, India
{pardhikalyani29, mohitdasariya77, vaibhavchopade33}@gmail.com

Guided by – Prof. Raj Chalse
Dept. of IT
DMIETR
Wardha, Maharashtra, India
rajchalse@gmail.com

***Abstract*—** This paper presents an architecture of an IoT enabled health monitoring system which will continuously read vital signs like heartbeat rate and outer body temperature of the patient while it is attached to patient's body. Most of the time it is not possible for a Doctor to observe vital signs of patients, this system will enable a Doctor to observe vital signs of one or more patients at any instance of time from anywhere while the doctor has access to Internet.

Keywords*—Internet of Things, Embedded Systems, Patient Health monitoring, Arduino, Sensors*

*****

I. INTRODUCTION

In the modern age it is being difficult to keep track of a patient's health conditions as monitoring vital sign by conventional means needs continuous attention and/or standing-by patient, which seems to be bit difficult in today's busy lifestyle. Lifestyle is increasing day by day and quality of one's health is decreasing too so an efficient method to effectively measure and monitor patient's health conditions is needed.

We are developing an IoT enabled health monitoring system which will continuously read vital signs like heartbeat rate and outer body temperature of the patient while it is attached to patient's body. Most of the time it is not possible for a Doctor to observe vital signs of patients, this system will enable a Doctor to observe/monitor vital signs of one or more patients at any instance of time from anywhere while the doctor has access to Internet.

This system takes input from the sensors attached to patient's outer body, process it then transmit it to the remote server which is in sync with an android app which will show the vital sign of a patient in the mobile screen. These readings will be shown in the main screen of the android application.

Heartbeat and body temperature are the major signs that are routinely measured by physicians after the arrival of a patient. Heart rate refers to how many times a heart contracts and relaxes in a unit of time (usually per minute). Heart rate varies for different age groups. For a human adult of age 18 or more years, a normal resting heart rate is around 72 beats per minute (bpm). The functioning of heart can be called as efficient if it is having lower heart rate when the patient is at rest. Babies have a much higher rate than adults around 120 bpm and older children have heart rate around 90 bpm. If the heart rate is lower than the normal heart rate, it is an indication of a condition known as bradycardia and if the heart rate is higher than the normal heart rate, it is an indication of a condition known as tachycardia. Like heart rate, normal body temperature also varies from person to person and changes throughout the day. The body temperature is lowest in the early morning and highest in the early evening. The normal body temperature is about 37° C or 98.6 ° F. However, it can be as low as 36.1° C (97°F) in the early morning and as high as 37.2° C (99° F) and still be considered normal. Thus, the normal range for body temperature is 97 to 100 degrees Fahrenheit or 36.1 to 37.8 degrees Celsius. Temperature can be measured by using different types of sensors.

In critical health conditions like hypothermia, hyperthermia, low or high pulse rate there will be an alert message shown to the doctor by the android app whether the doctor is using the application or not. The conventional way of monitoring these vital signs is attaching the parameter measuring devices to patient's body and wait in the patient's ward or ICU to see the results in the monitor provided in the device itself, while our project enables a doctor to quickly check the vital signs of a patient without being physically present in patient's ward or ICU.

When the heart pumps, blood pressure rises sharply, and so does the amount of infrared light from the emitter that gets reflected back to the detector. The detector passes more current when it receives more light, which in turn causes a voltage drop to enter the amplifier circuitry. The temperature sensor produces analog output voltage which is proportional to the temperature. Readings from the sensors are process which is then transmitted to the server database using Wi-Fi network.

II. WEARABLE BODY SENSORS

Wearable Body Sensors are sensors which are relatively smaller in size and can be worn on body. These sensors take input from the attached body part of a patient and transmit the readings to the microcontroller i.e. Arduino Uno R3 in this case. These sensors can be attached to patient's outer body parts like a finger (commonly for pulse rate) or in the armpit (commonly to measure core body temperature).

 ISSN: 2454-4248
132 – 133

III. Platform Introduction

This system consists of a sensing module, processing module, transmission module (wi-fi), data storage server, an Android application to monitor vital signs in real-time. The architectural block diagram of the system is as shown in fig.1.

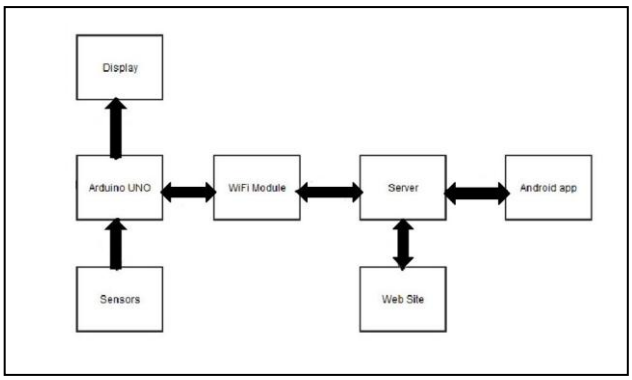

fig.1: block diagram health monitoring system

IV. Design Features

Health monitoring is done with wearable body sensors and Arduino Uno R3 which are processed in Arduino Uno itself and then transmitted to the database server using internet.

- It is an easy to use device, one only needs to power it on and attach to patient's outer part like fingertip.
- Doctor can track real-time vital signs of patient.
- A doctor can monitor health conditions of multiple patients from his desk, without being physically present at patient's ward.
- Additionally, patient's family members can also be given access to monitor their loved one's health condition by sharing a *unique device ID.*
- On critical health conditions alert will be sent to the doctor and/or family member (if device ID is shared and family member is registered with the server).

V. Conclusion

In this paper, we reviewed the current state and projected future directions for integration of remote health monitoring technologies into the clinical practice of medicine. Wearable sensors, particularly those equipped with IoT intelligence, offer attractive options for enabling observation and recording of data in home and work environments, over much longer durations than are currently done at office and laboratory visits. This treasure trove of data, when analyzed and presented to physicians in easy-to-assimilate visualizations has the potential for radically improving healthcare and reducing costs. We highlighted several of the challenges in sensing, analytics, and visualization that need to be addressed before systems can be designed for seamless integration into clinical practice.

References

[1] Ngo Manh Khoi, Saguna Saguna, Karan Mitra, "IReHMo: An Efficient IoT-Based Remote Health Monitoring System for Smart Regions," 2015 17th International Conference on E-health Networking, Application & Services (HealthCom).

[2] Moeen Hassanalieragh, Gaurav Sharma, "Health Monitoring and Management Using Internet-of-Things (IoT) Sensing with Cloud-based Processing: Opportunities and Challenges" 2015 IEEE International Conference on Service Computing.

[3] Vikramsingh R. Parihar , Akesh Y. Tonge , 'Heartbeat and Temperature Monitoring System for Remote Patients using Arduino" International Journal of Advanced Engineering Research and Science (IJAERS), May- 2017.

[4] Shivam Gupta, Shivam Kashaudhan, "IOT based Patient Health Monitoring System", International Research Journal of Engineering and Technology (IRJET), Mar -2017.