IMPLEMENTATION OF PATIENT MONITORING SYSTEM REMOTELY USING WIRELESS SENSOR NETWORKS

[1]*Prof. C. S. Patil,* [2] *Pranali A. Kharche*
[1]*Head of Department, Electronics and Telecommunication, S.G.D.C.O.E.,Jalgaon.*
[2] *Student, Shri. Gulabrao Deokar College of Engineering Gate No.56, Shirsoli Road, Jalgaon, Maharashtra*
.

Abstract: *In this system, simple, low-cost controller based patient health monitoring system. Heart rate of the subject is measured from the thumb finger using IRD (Infra Red Device sensors and the rate is then averaged as message). This instrument employs a simple Op to electronic sensor, conveniently strapped on the finger, to give continuous indication of the pulse digits. The Pulse monitor works on battery or power supply. It is ideal for continuous monitoring in operation theatres, I.C. units, biomedical/human engineering studies and sports medicine. Here we are using IOT module to transmit all the details of the patient. This project uses ARM7 TDMI (LPC2148) MCU as its controller in the transmitter section. By reading all the values of temperature and heart rate, those will be updated in the web server. All these details will be displayed on PC. Here we are also using a mems sensor to detect the position of a patient i.e whether he/she is stable or not. This project uses regulated 3.3V, 500mA power supply. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac output of secondary of 230/12V step down transformer.*
Keywords— ECG, sensors, health monitoring, Measurements, base station, C4.5 algorithm

I. INTRODUCTION

In current system patient want to go in hospital for check up when they have some problems or some diseases. And mostly It's not possible for older persons because and sometimes it's dangerous for them because sometimes get late in that all processes. Hence, In order to overcome this problem we are going to develop an application to overcome all these problems. The goal of Wireless Health Monitoring System is to develop a low cost, low power, reliable, non-intrusive, and noninvasively vital signs monitor which collect different type of body parameters are wireless transmitted to a health care professional. The main part of our project is to take a sensing data conditioning system to acquire accurate heart rate, ECG, blood pressure, and body temperature measurement. After processing of data we have to find a proper method of transmission and signal display. Even though the patient is not in dangerous situation, the doctors would need to confirmation of their health. In recent times, the expenses for hospitalization and medical care are unimaginably high and expensive for some persons. Wearable health monitoring systems allow an individual to closely monitor changes in her or his Measurements and provide feedback help to maintain an optimal health status of patient. If integrated into a tele-medical system, these systems can even alert medical personnel when life-threatening changes occur. In this Wireless health monitoring system there are many sensors are use to take a different measurement of body like heart rate, ECG, blood pressure, and body temperature readings etc. in this system we are use microcontroller for transmit all these data or measurements to web application by using wireless transmission. Which may then be displayed on a user interface or transmitted to a medical center? All these data received by doctor or specialists and then doctors check record and take decision like witch medicines are required to patients. Check the status of patients and send decision or other important information to the patient for that we are using different algorithms for signal processing, ECG for Health monitoring. In this wireless health monitoring we are use cyclic algorithm for to convert voltage to analog signal and automatically alert health-care personnel when an emergency occurs. In addition, they are also able to alert the individual in case of possible imminent health threatening conditions.

II. METHODOLOGY

In this architecture, three different sensors are used for monitoring the patient healthcare such as pulse counting sensor, Temperature sensor, MEMS sensor which can directly communicate with microprocessor is shown in Figure.
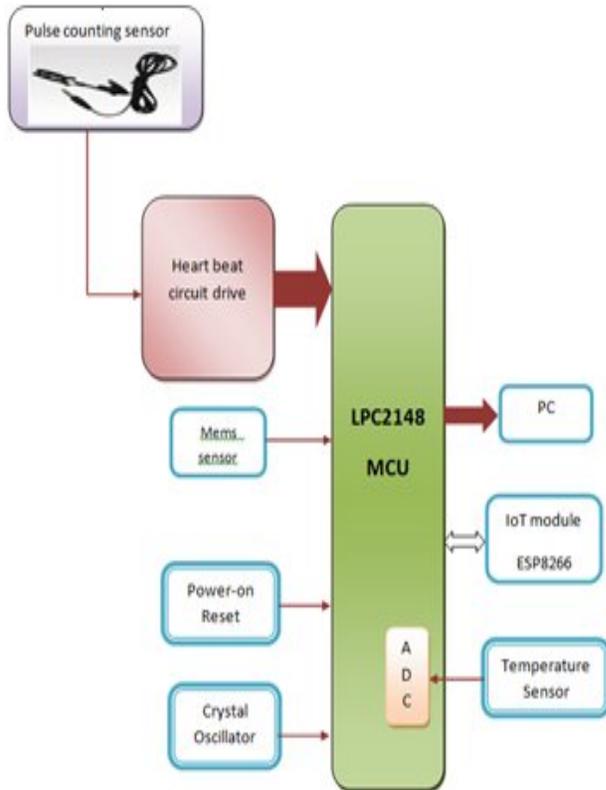
Figure 1: Block diagram of system

Here Arduino Uno acts as microprocessor in healthcare monitoring, which is used to control multiple devices such as communication devices and sensor devices. RS232 is used for serial communication which is connected to the devices.

III. RESULTS

Depending on the proposed system and design platform, this project is implemented using ARM7 processor, sensors, IoT, UART. The complete system helps to solve the problem of daily check up of older patient and emergency condition as well as it cans helps to create communication between patient and doctor.

When the power is switched on, the system is started and on the LCD display, the name is displayed "Health Monitoring System" is as shown in figure 2.

- *A sensor connected to patient's body, senses the body parameters like Temperature and Heart rate and gives analog output to the microcontroller (LPC2148).*
- *LPC2148 consist of inbuilt analog to digital convertor therefore the analog values are converted into digital values using analog to*

digital convertor. Digital values display on the LCD screen.

Figure 2: System name displayed in LCD

Figure 3: Digital output displayed on LCD

- *The microcontroller gives the digital values of sensed parameters. If the given values are below threshold level then microcontroller normally transmits the output through IoT transmits to the doctor's PC or via SMS.*
- *On patient side, the reading of heartbeats and temperature of patient displayed continuously on PC by using web technology as shown in figure 4.*
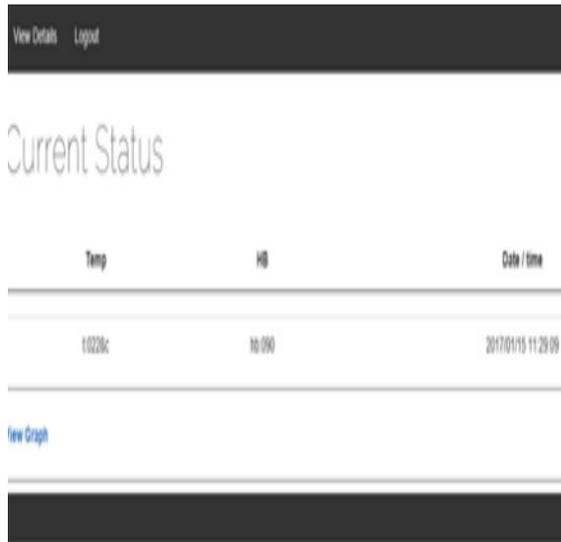
Figure 4: Patient reading in PC.

When the doctor wants to see the data of the patient he/she can see all databases using www.thingspeak.com site on his Smartphone or on the PC like as shown in figure 5.
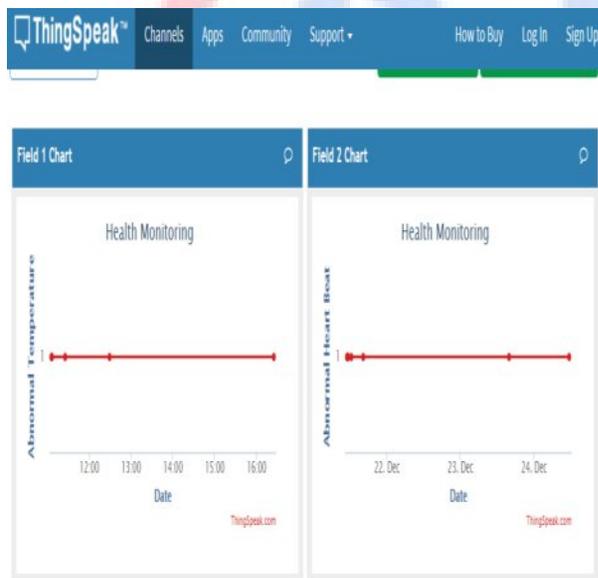

Figure 5: Graph on www.thingspeak.com

- *In emergency case, if the heartbeats or temperature of patient exceeds above the threshold level, then doctor receive emergency SMS.*

- *After that doctor can give the prescription to patient via SMS. Doctor can take any other decision according to patients reading.*

IV. CONCLUSION

We have examined our implemented system, the wireless patient health monitoring system of temperature and heartbeat of humans using Sensors, controller and IoT technology. Any critical condition in health conditions are informed via SMS to the indicated mobile number through web application. This system deals with finding the technical and advance solution to a major problem at hospital like monitoring the patient conditions online. This project is explained to elaborate wide awareness on how technology can be used in emergency cases. It is portable, real time system. This implemented project deals with finding solution of taking patient's body reading like heart rate of Body and temperature using pulse rate sensor and Temperature sensor. These readings are sent to doctors in emergency cases. This implemented project provides solution for older patient and emergency condition by sending an SMS alert to Doctor's Smartphone.

FUTURE SCOPE

We can add multiple parameters like blood pressure, retinal size, age and weight can be included as controlling parameters. This system also developed by using advanced GSM and GPRS technology in future. Furthermore if the devices are battery powered, regular charging is required or batteries need to be replaced from time to time. Wireless based technology has shown to improve the lifestyle of people by providing early detection, convenience and flexibility. Hence people who live far from hospitals, immediate and quick treatment during an emergency can be obtained

REFERENCES

[1]M.P.N irmala, Rampriya Mahendran," Home Based Wireless Health Monitoring System", Volume 2014,pp. 13207- 13211

[2] Amna Abdullah, Asma Ismael, Aisha Rashid, Ali Abou-ElNour, and Mohammed Tarique ," Real Time Wireless Health Monitoring Application Using Mobile Devices", Volume 2015,pp.65-70.

[3] Rajasekaran.S, Kumaran.P, Premnath .G, Karthik.M," Human Health Monitoring Using Wireless Sensor Network(WSN)", Volume 2013,pp. 323-330.

[4] Manisha Shelar, Jaykaran Sing H, Mukesh Tiwari," Wireless Patient Health Monitoring System", Volume 2013,pp.1-5.

[5] K.C. Kavitha, A.Bazila Banu," Wireless Health Care Monitoring", Volume 2014,pp. 2417- 2422.

[6] Ms. Poonam Agrawal,Prof. S. P. Hingway,, Prof. B. P. Dharaskar," Innovative Approach for Wireless Health Monitoring System Using Client-Server Architecture", Volume 2013,pp. 1343- 1348.

[7] Hsu Myat Thwe, Hla Myo Tun," Patient Health Monitoring Using Wireless Body Area Network", Volume 2015,pp. 364- 368.

[8] Mrunali M. Lambat, Santosh C. Wagaj," Health Monitoring System", Volume 2013,pp. 247- 250.

[9] R.Suji Pramila, Shajin Nargunam," A Survey On Effective in-Home Health Monitoring System"Volume 2013,pp. 15-19.

[10] Harshavardhan B, V.M. Umale.," Wireless Biomedical Parameter Monitoring System", Volume 2015,pp.46-48.

[11]P.Karthick, C.Sureshkumar, P.Arunprasad, S.Pusparaj,M.Jagadeeshraja, N.Suthanthira Vanitha," Embedded Based Real-time Patient Monitoring System",Volume 2014,pp.773-777.

[12] Ms.Amruta Nagarkar, M.N.Kakatkar," Zigbee Basedwireless Patient Monitoring",Volume 2013,pp. 304-308.

[13] Alumona T.L, Idigo V.E, Nnoli K.P," Remote Monitoring of Patients Health using Wireless Sensor Networks (WSNs)", Volume 2014,pp.90-95.

[14] Sunil L. Rahane, Ramesh S. Pawase," A Healthcare Monitoring System Using Wireless Sensor Network with GSM", Volume 2015,pp. 6330- 6335

[15] Media Aminian and Hamid Reza Naji," A Hospital Healthcare Monitoring System Using Wireless Sensor Networks", Volume 2013,pp.1-6.

[16] Gokarna Pandey,Peter Karsmakers, Guy A. E. Vandenbosch, "Analysis of an Indoor Biomedical Radar-based System for Health Monitoring", 2013,pp.1-8.

[17] Seyyed Mohammad ,Reza Farshchi," fuzzy logic expert system",2011,pp.2106-2110

[18] Mayuri Malke, Asst. Prof.Sheeja S. Suresh," Result and Analysis of Implemented Real Time Wireless Health Monitoring System Using Sensors",2014,PP.68-72.