# DESIGN AND IMPLEMENTATION OF HEALTH MONITORING SYSTEM

## K.PAPAYAMMA[1], Dr. S. PALLAM SHETTY[2]

[1,2]*DEPARTMENT OF COMPUTER SCIENCE AND SYSTEMS ENGINEERING, AU COLLEGE OF ENGINEERING (A), ANDHRA UNIVERSITY, VISAKHAPATNAM*

-------------------------------------------------------------***-------------------------------------------------------------

**Abstract -** *Now-a-days Health monitoring Environment has become technology oriented. So we are developing project to avoid such sudden death rates by using Body Health Monitoring System. The monitoring of the patient wirelessly is a major improvement in the medical domain. The micro sensors when integrated into a wireless communication network, helps to remotely collect physiological signals of patient and avoid monitoring using traditional medical instruments which makes the patient tether. In this project, the monitoring of the patient is done by the doctor continuously without actually visiting the patient. The values retrieved by the sensors are represented on "Thing Speak" portal with the help of graphs. So, the doctor can visualize the patient's data just by sitting in his cabin.*

*This paper aims for an automated Healthcare Monitoring System which uses sensors like pulse, ECG to check the health status of the patient and patient room temperature is monitored by temperature sensor. The patient's details are acquired by sensor and processed, recorded by using Arduino Uno and Octabrix boards. For real time monitoring, the patient's status and parameters were sent to the cloud using Thing Speak Server, it stores the patient health parameters and for easy accessible Thing View application is used to display the patient's parameters to the Health care expert.*

*Wireless transmission permits the examination of the physiological data of human under normal condition without any discomfort to a person under the investigation.*

***Index Terms – Arduino Uno Board, Internet of Things (IOT), Heart rate sensor, temperature sensor, Electrocardiogram Sensor (ECG).***

# 1. INTRODUCTION

A wireless sensor network has many applications like area monitoring industrial monitoring and most importantly health monitoring referred to as WBAN (Wireless Body Area Network). IOT makes every object addressable, accessible and actionable. The products developed based on IOT include embedded technology which allows them to exchange information, with each other or the Internet and it is assessed that about 8 to 50 billion devices will be connected by 2020. Since these devices come online, they provide better life style, create safer and more engaged communities and revolutionized healthcare. In the advanced technology enabled world, changes are rapid and the status-quo is constantly disrupted.

There are no standard definitions for the Internet of things. The IERC definition states that IoT is "A dynamic global network infrastructure with self-configuring capabilities based on standard and interoperable communication protocols where physical and virtual "things" have identities, physical the IoT allows people and things to be connected anytime, anyplace, with anything and anyone, ideally using any path/network and any service.

The following objects will be achieved here:

Building a device which would provide real time health parameters from a source (patient) to destination (family members/doctors) constantly over some distance.

The destination side of the device would be able to control the hardware/sensors/devices linked with the source side. The device would provide emergency alarm if any of the parameter deviate from its normal range.

# 2. RELATED WORK

[1] This was chosen to make medical bands to reduce the interference between the sensor device and other existing network devices. This was used to increase the operating range multi-hopping technique and a medical gateway wireless board has been used in this regard. Generally gateway has been used to connect sensor nodes to local area network or the Internet. The healthcare professionals can access patients' physiological data through internet from anywhere at any time. For example to measure body signals for server PC. A smart shirt has been designed in [2] The shirt can measure electrocardiogram (ECG) and acceleration signals for continuous and real time health monitoring of a patient. This mainly consists of sensors and conductive fabrics to get the body signal. To server PC the measured body

signals are transmitted to a base station via IEEE 802.15.4 network. They consume low power to wearable devices and they are small enough to fit into a shirt.[3] As we achieve remote monitoring and data gathering of patients to this we include six different sensors they are used to gather patient medical information without being injecting inside the body. Having this as advantage to mobility. To visit the patient periodically there is no need for doctor. Focus on Wireless Personal Area Network technologies, WiMAX, Wi-Fi, and ZigBee includes investigated standards in wireless medical applications in a healthcare system.[4] Over a wireless sensor network WSN-based mobile healthcare monitoring system with ECG and blood pressure measurement, where the mobile phone performs continuous data analysis and then transmits data. To this health monitoring they can include ECG leads that record cardiac rhythm and heart rate. In general this is mainly because these general parameters are the bone for the physician to know what to do.

## 3. PERFORMANCE EVALUATION

The proposed wireless sensor based Health care monitoring system has three modules.

**Module 1**: Sensing the patients Physiological parameters

In this module is to sense the patients' temperature and pulse.  The LM35 sensor has three pins, one for power and another for ground and the last for the output.  The pulse sensor is well designed plug and play heart rate sensor for Arduino.  A 24-inch colour Coded cable with (male) header connectors. The heart logo make contact with a skin. A small round hole for LED shines from backside of sensor.

These two sensors are connected to Arduino, or plugged into a breadboard.  The Arduino software which an open source helps to read the sensors and the results can be seen via the serial monitor/serial plotter of the Arduino. Octabricx esp8266, microprocessor is used to process the data from the Arduino and update the physiological parameters of the patient in the stored on the cloud.

**Module 2**: Retrieve the data from the sensors and store in the cloud server

The objective of this module a using esp8266 wifi module (Thing Speak server) is used to display the patient's physiological parameters.

**Module 3:** Display the health information in mobile

The healthcare scheme is focus on the measurement ad monitoring various parameters of patients' body like heart rare and temperature, ECG using through wifi and an ThingSpeak .for receiving the medical parameters and displayed on android mobile and atss a time uploaded on to the android web server. After opening the android app in mobile it shows the physiological parameters of a patient like temperature, pulse and body movement, ecg. And also the patient history will be stored on the thing server and doctor can access information whenever needed from anywhere and need not physically present.

## 4. RESULTS AND DISCUSSIONS

The Experimental results were shown below. The Figures connecting Arduino to Thing Speak as well as second figure is which sensor are used and how to get processing draw the diagram in figure[3].
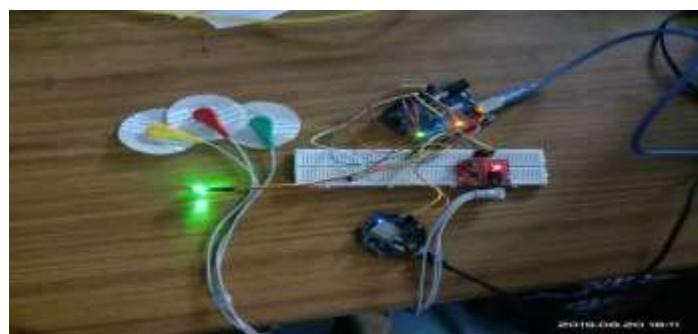


Figure 3: Health monitoring system are different sensors are connecting Arduino through pc.
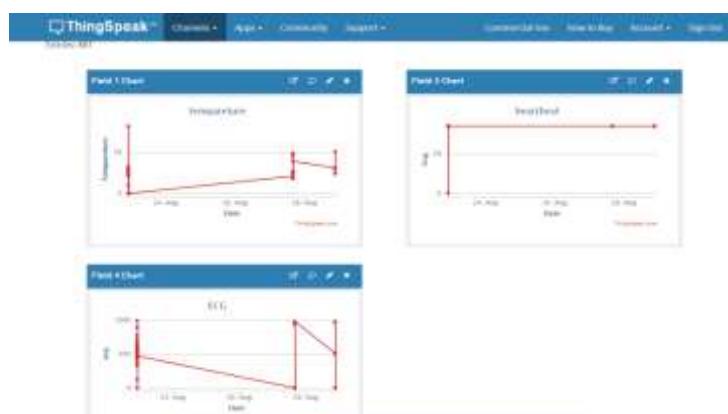


Figure 4: Thing Speak Graphs
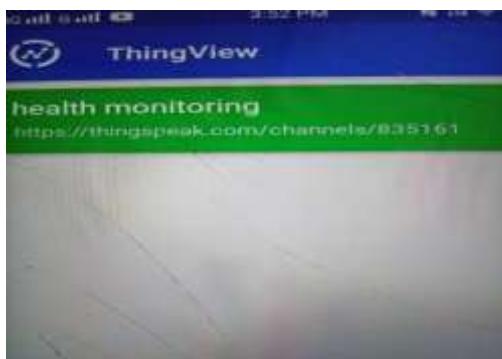
Figure 5: Thing View Health Monitoring
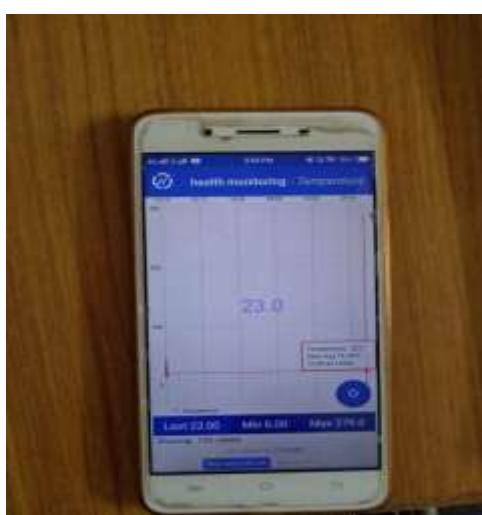


Figure 6: Thing View Patient values

## 5. CONCLUSION

From the above designed WSN healthcare monitoring system using cloud is able to transmit the data which is sensed from patient to the doctor's PC by using wireless transmission technology. The proposed system is able to monitor the temperature, heart pulse rate, ECG body movement with enough accuracy. By using the system the healthcare professionals can monitor their patients all the time. The physiological data are stored and published online. Hence, the healthcare professional can monitor their patients from a remote location at any time.

The system can be extended by adding more features like linking the ambulance services, leading doctor's list and their specialties, hospitals and their special facilities etc., Doctors can create awareness about diseases and their symptoms through the mobile application. From the evaluation and the result obtained from analysis the system is better for patients and the doctor to improve their patients' medical evaluation.

## 6. REFERENCES

[1]  Yuce , M.R(2010), "IMPLEMENTATION OF WIRELESS BODY AREA NETWORKS FOR HEALTHCARE SYSTEMS" , Sensor and Actuators A: Physical , Vol. 162, No.1 July , pp . 116- 129.

[2] Lee, Y.D and Chung W.Y.(2009) "WIRELESS SENSOR NETWORK BASED WEARABLE SMART SHIRT FOR UBIQUITIOUS HEALTH AND ACTIVITY MONITORNING" Vol.140,No.2 , July , Sensors and Actuators B: Chamecial pp 390-395

[3] S. Rajasekaran, P. Kumaran, G.Premnath, M. Karthick, " HUMAN HEALTH MONITORING USING WIRELESS SENSORS NETWORK(WSN)," in International Journal of Application or Innovation in Engineering and Management(IJMIEM) , December 2013.

[4]Moeen Hassanalieregh, Alex Page, Tolga Soyata, Gaurav Sharma, "Health Monitoring and Management Using Internet-of-Things (IoT) Sensing with Cloud-based

Processing: Opportunities and Challenges", IEEE International Conference on Services Computing, 2015

[5] Amna Abdullah, Asma, Asma Ismael, Aisha Rashid, Ali Abou-ElNour, and Mohammed Tarique. "  REAL TIME WIRELESS HEALTH MONITORING APPLICATION USING MOBILE DEVICES''. International Journal of Computer Networks & Communications (IJCNC) Vol.7, No.3, May 2015.