

# Arduino and Iot Based Patient Health Monitoring System Using Wi-Fi Module

Lakireddy Bali Reddy College Of Engineering (Autonomous)

K V Ravi Chandra , K Koti Reddy , Sk. Mastan Sharif

Email-ravichandrakurapati17@gmail.com ,Email-kudumulakotireddy@gmail.com

K V S Ashok , Ch Sameer , Associate Professor

Email-kvsashok5@gmail.com , [Email-jayaraochatl@gmail.com](mailto:Email-jayaraochatl@gmail.com), Email-mastanshariff@yahoo.com

## Abstract:

*Now a days the medical sector has become highly complicated and list of people who have need of medical services increasing day by day. Because of these increasing these medical services the popularity of Internet of Things is increasing day by day in the area of remote monitoring system. The main objective of this project is to implement a portable, low cost, low-powered, and accurate system is used to monitor the parameters of patient continuously.*

*The parameters like heartbeat and temperature of the patient is monitor through sensors by using Wi-Fi module. The system is more intelligent is helpful to find the critical condition of the patient by processing sensors data and instantly provide notification to doctors as well as relatives. By, sending a critical condition of patient through a push notification becomes more benefited to doctors.*

## General Terms

*Remotely accessing patient's health using Wi-Fi and saving patient's health statics in the form of data logs.*

## Keywords

**Patient Monitoring, Wi-Fi, Data Logging System, Remotely access patient's health.**

## 1. INTRODUCTION

The main objective is to design a patient monitoring system to diagnose the health condition of the patients. Giving care and health assistance to the bed ridden patients at critical stages with advanced medical facilities have become one of the major problems in the modern hectic world. In hospitals where a large number of patients whose physical conditions have to be monitored frequently as a part of diagnostic procedure, the need for a cost effective and fast responding alert mechanism is inevitable.

Proper implementation of such systems can be provide timely warnings to the doctors as well as relatives. Present day systems uses sensors that are hardwired to a Pc next to the bed. The use of sensors

detects the condition of the patient and the data is collected and transferred using Arduino board. Doctors and nurses need to visit the patient frequently to examine the patient condition. In addition to this, use of Arduino board based intelligent system provide high level applicability in hospitals where a large number of patient have to be monitored frequently. For this, here we use a idea of network technology with wireless applicability, providing each patient Unique-ID which the doctor can easily identify the patient and his/her current status health parameters. Using the proposed system, data can be sent wirelessly to the central patient monitoring system, allowing continuously monitor of patient. Contributing accuracy in measurements and providing security proper alert mechanism give this system a higher level of the customer satisfaction and a low cost implementation in hospitals. Thus the patient can engage in daily activities in a comfortable atmosphere where distractions of hardwired sensors are not present.

Physiological monitoring hardware can be easily implemented using simple interface of sensors with a Arduino board and can effectively be used for healthcare monitoring. This will allow development of such low cost devices based on natural human computer interface. The system we proposed here is efficient in monitoring the different physical parameters of many number bed ridden and then in alerting the concerned medical authorities if these parameters bounce above its predefined values.

## 2. LITERATURE SURVEY

In recent years, researchers have developed a variety of health monitoring technologies to assist elder citizens and patients. Jay Karan Singh et.al [01] represents the microcontroller based wireless health monitoring system for measurement of body temperature and heartbeat. The system is designed and implemented, in which physiological signals are directly measured from the patient body and converted into discrete pluses and the parameters are displayed with the help of LCD at the transmitter side, which increases the complexity of the circuit.

Through Zig bee the information is relay to the receiver wirelessly. The received signal is analysed with predetermined value in the receiver side. If an abnormality is detected, the SMS is sent to the doctor. The distance between the transmitter and receiver is within the range of about 10m.

Niraj et.al [02] discussed the sensor networks which have great potential to impact many aspects of medical care. The real-time physiological data from the respective patient is collected by using wearable sensors, which play a very significant role in medical sector. The use of medical sensor provides a highly reliable, secure data communication, in combining with a large range of data rate and support multicast routing protocols. For better utilization of the proposed system, data distribution and its limited operational bandwidth, the designed system provide the possibilities to improve the system performance by adding additional scope to the current implementation. The designed system is energy efficient along with that it take advantage of self-dependent wireless sensor network which would promote the classification of wireless sensor network in more different scenarios.

Avijit Mathur et.al [03] presented that in the recent methods it is difficult to assist in medical monitoring applications. The demand of medical staffs to monitor every individual patient is consistently becomes necessary. The need to monitor the patient's health at home and hospital/clinical surrounding is possible by using a wireless sensor network (WSN), which meet the medical demands for continuous health monitoring of the patient. The WSN would necessarily focus on the data security and communication protocols related to the medical service. These specifications will be correlated, contrasted and the main components necessary to form an ideal medical WSN was highlighted. Ananda Mohan Ghosh et al[04] has demonstrated a health care system for hospital management to allow relatives and doctors to remotely monitor the health condition of a patient via internet using Arduino Uno connected with E-health sensor shield kit and Phi gets interface kit. But unlike our solution, it does not provide any App and complete analysis by using graphical representation. Vishal.T et.al [05] presents an integrated biomedical wireless sensor network which is based on ARM processor that uses a tele-healthcare technology to transfer sensed biomedical signals to the base station. The physiological parameters are measured, stored and forwarded to remote location where a clinician is stationed. This will enable a nurse or rehabilitation specialist to view and assess a patient with chronic conditions in the home. These

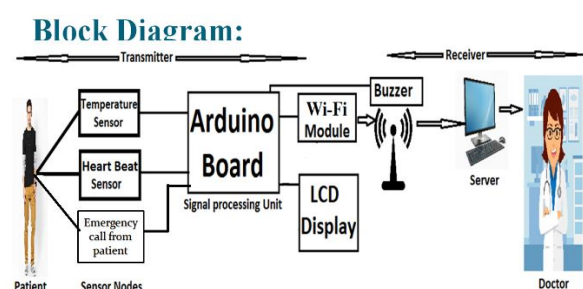
biomedical parameters are analysed by using personal computer

The literature survey reveals that most of the work is done on designing the wireless body sensors and its application. Few years ago a person's heartbeat was generally measured personally by connecting patch cord on their chest. This created a problem to keep a tab on patient's health and provide treatment in case of emergency. So for ICU patients and also for post-operative patients the continuous monitoring is required. For continuous monitoring there is large power consumption. This has motivated us to design and develop the integrated wireless instrument for biomedical parameters.

To have continuous monitoring and also for more physiological parameters data acquisition and signal conditioning with low cost, less power consumption, miniature instruments are needed in the biomedical field. To overcome these limitations the paper has proposed a system to enable remote access of statistical representation of any patient's biological parameters. Here the Wi-Fi is used for the hospital communication for monitoring the patient.

### 3. METHODOLOGY

The block diagram of proposed system is represented in below figure 1. It consists of temperature sensor and heart rate sensor. Both sensors are attached to Wi-Fi via Arduino board, which measures the body temperature and heart rate using an infrared LED and photodiode. These sensed data is transferred to the Arduino board for further processing before transmitting through wireless Wi-Fi network.

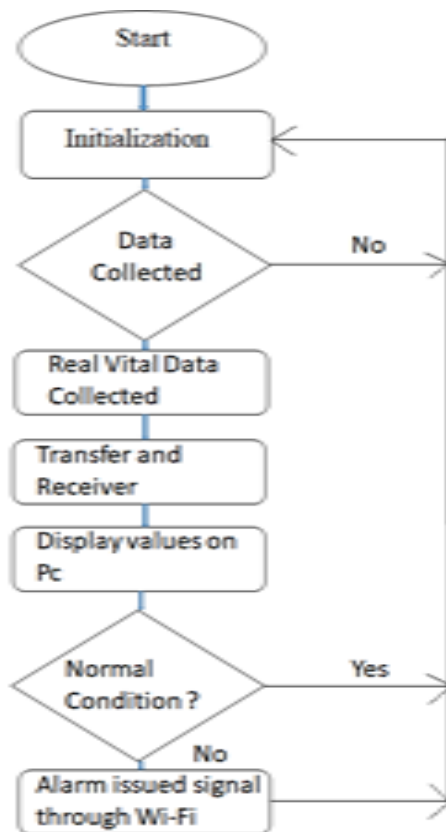


After initializing sensor nodes, each of the sensors will continuously check for the data. Every node after obtaining the real time data, it will send the data to Wi-Fi via Arduino UNO board.

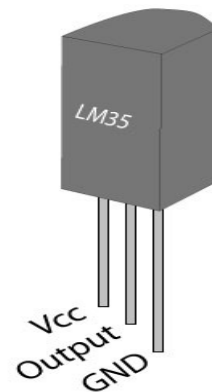
The proposed system hardware design is classified into two parts: transmitter and receiver sections. The transmitter will be placed near the patient. At the receiver side medical staff as well as doctor will take care the status of patient continuously by using an application. By using an application the patient

condition is judged by the supervisors after analysing the limits of medical data. If the tested data is more or less than the predefined level alert system comes in to action by sending a message to doctor via Wi-Fi module.

**Flow Chart:**



The LM35 is an integrated circuit sensor that can be used to measure temperature with an electrical output proportional to the temperature (in Centigrade) .You can measure temperature more accurately than a using a thermistor. The LM35 generates a higher output voltage than thermocouples and may not require that the output voltage be amplified.



**Pin Description:**

Pin No	Function	Name
1	Supply voltage; 5V (+35V to -2V)	Vcc
2	Output voltage (+6V to -1V)	Output
3	Ground (0V)	Ground

#### 4. HARDWARE DETAILS

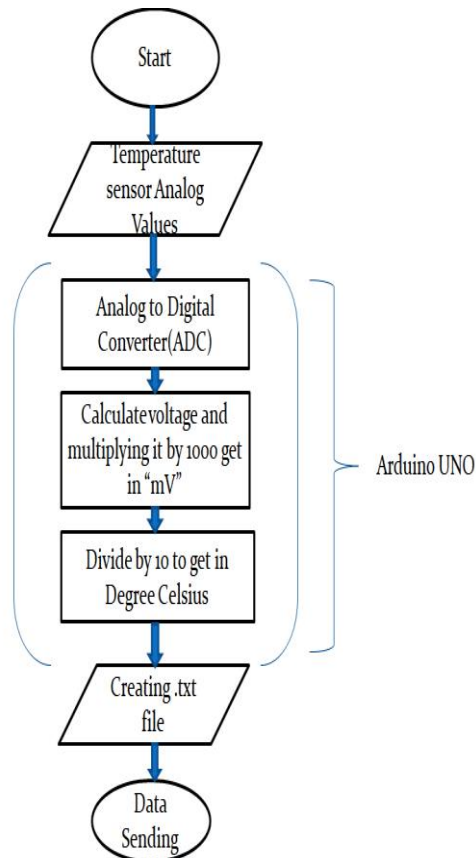
##### Arduino

Arduino is a prototype platform (open-source) based on an easy-to-use hardware and software. It consists of a circuit board, which can be programed (referred to as a microcontroller) and a ready-made software called Arduino IDE, which is used to write and upload the computer code to the physical board.



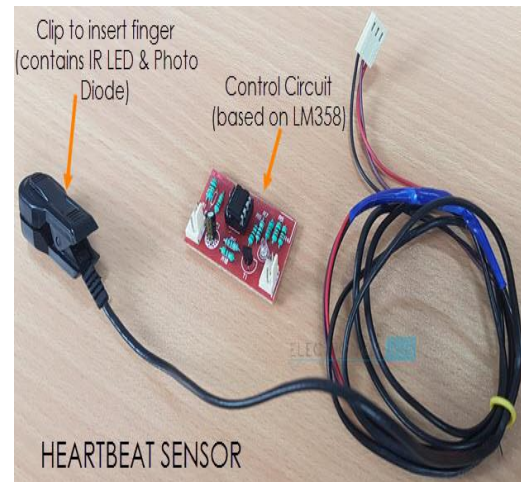
**Temperature Sensor(LM 35):**

#### Flow Chart:



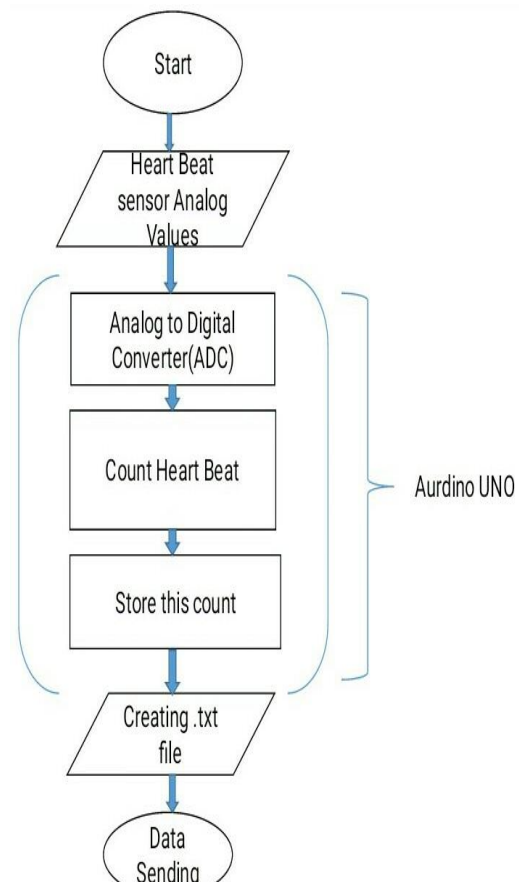
#### Heart Beat Sensor (LM 358):

Heart beat sensor is designed to give digital output of heart beat when a finger is placed on it. When the heart beat detector is working, the beat LED flashes in unison with each heartbeat. This digital output can be connected to microcontroller directly to measure the Beats Per Minute (BPM) rate. It works on the principle of light modulation by blood flow through finger at each pulse.



#### Flow

#### Chart:



#### Liquid Crystal Display:

A liquid crystal display or LCD draws its definition from its name itself. It is combination of two states of matter, the solid and the liquid. LCD uses a liquid crystal to produce a visible image. Liquid crystal displays are super-thin technology display screen that are generally used in laptop computer screen, TVs, cell phones and portable video games. LCD's



technologies allow displays to be much thinner when compared to cathode ray tube (CRT) technology.



### 5. CONCLUSION

The proposed system will increase the doctors work efficiency in the field of medicine. The system is able to transmit and receive data for an immediate action to be taken according to the simulation results obtained. So a new system is used to monitor the overall patient's health, which needs constant and continuous care. This system provides effective solution to upgrade the existing health system by using different kind of sensors mounted on a single system.

### References:

- [1] Jaykaran Singh, Mukesh Tiwari and Manish Shelar, "Zigbee Based Patient Monitoring System", International Journal of Computer Applications, Vol. 51, Issue 22, PP 17-20, Aug. 2012.
- [2] Niraj Patil and Asip Mulla, "Medical Application Based on Wireless Sensor Network", International Journal of Computer Science and Communication Engineering, Vol. 2, Issue 2, PP 43- 46, May 2013.
- [3] Avijit Mathur and Thomas Newe, "Comparison and overview of Wireless sensor network systems for Medical Applications", International Conference on Sensing Technology, PP 272-277, Sept. 2014.
- [4] Ananda Mohon Ghosh; Debashish Halder; S K Alamgir Hossain, Remote health monitoring system through IoT, 5th International Conference on Informatics, Electronics and Vision (ICIEV).
- [5] Vishal T.Patil and C.C. Dakave, "Wireless Health Monitoring System Using ARM and Zigbee" International Journal of Advanced Scientific and Technical Research, Vol. 2, Issue 4, PP 173-183, April 2014.
- [6] Bandana Mallick and Ajit kumar patro, "Heart rate Monitoring system Using Finger Tip Through Arduino and Processing Software", International Journal of Science, Engineering and Technology, Vol. 5, issue 1, PP 84-89, Jan. 2016.
- [7] C.K. Das, M.W Alam and M.I Hoque, "A Wireless Heartbeat And Temperature Monitoring System For Remote Patients", International Conference on Mechanical Engineering and Renewable Energy, May 2013.
- [8] Deepak Verma and Mahika Bhasin, "Real Time Optical Heart Rate Monitor", International Journal of Computer Science and Information Technologies, Vol. 5, Issue 6, PP 7265-7269, 2014.



K.V.Ravi Chandra, BTech ECE, Final Year, Lakireddy Bali Reddy College of Engineering.

K. Koti Reddy, BTech ECE, Final Year, Lakireddy Bali Reddy College of Engineering.

K.V.S.Ashok, BTech ECE, Final Year, Lakireddy Bali Reddy College of Engineering.

Ch.Sameer, BTech ECE, Final Year, Lakireddy Bali Reddy College of Engineering.