

IoT Based ICU Patient Monitoring System Using Arduino

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Abstract- The main focus of the method is to implement a standard model for the real time patient monitoring system. The proposed method is used to measure the physical parameters like body temperature, heart beat rate, and oxygen level monitoring with the help of biosensors. Inconventional manner there are number of practical methods available for the ICU patient's health monitoring system with wired communication technology. In the original system the patient health is continuously monitored and the acquired data is transmitted using Wi-Fi wireless sensor to networks. Embedded processor supports for analyzing the input from the patient and the results of all the parameters are stored in the database. If any abnormal physical condition felt by the patient, indications will send to the medical officials. The implementation of the system is achieved by the advanced ARDUINO microcontroller and simulation results are obtained.

Keywords- Arduino, monitoring system, IOT, Sensors, LCD.

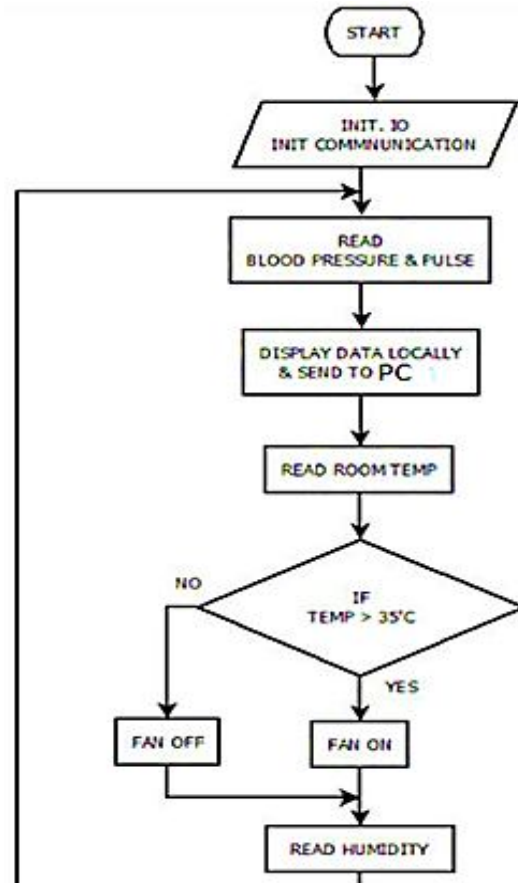
I. INTRODUCTION

In recent years, the growth of internet is extraordinarily large and has been further extended to connecting things through internet. All devices are connected to one another with many different kind of smart technologies to create worldwide present at everywhere on network called Internet of Things (IoT). The applications of IoT can be grouped into particular environment like Transport and logistics, Health care, Smart Environment, Personal and Social. The roles of IoT in all these environment are unusually high. In Transport and logistics vehicle identification, vehicle to vehicle communication, traffic communication etc. are of greater encouragement of the progress in the field of IoT. Each and every person is confined on all sides by smart devices, which is used to connect to the 3G/4G network, social networks and other intelligent technologies. The strength of IoT is its high impact on every person's day to day life such as entertainment, work, communication and so on. Patients are not well condition with manual treatment which doctors normally use for tracking the total number counted of heartbeat.

II. METHODS AND MATERIAL

A. Proposed Methodology

Power on the system to initialize the communication. An analog signal is given to the blood pressure and heart beat sensor. Arduino read the output of sensor. The logical value is displayed on LCD and also it sends to the doctors monitor by using wifi module. All the data is given continuously to the doctors. Simultaneously the environmental parameters also controlled, one of them is room temperature; if the room temperature is greater than 35 c then fan will turn on otherwise it is in off condition. One more parameter is controlled that is humidity in environment; if it is greater than 55% then the exhaust will on otherwise it is in off condition. Similarly CO2 level can also be controlled by turning the air pump on.



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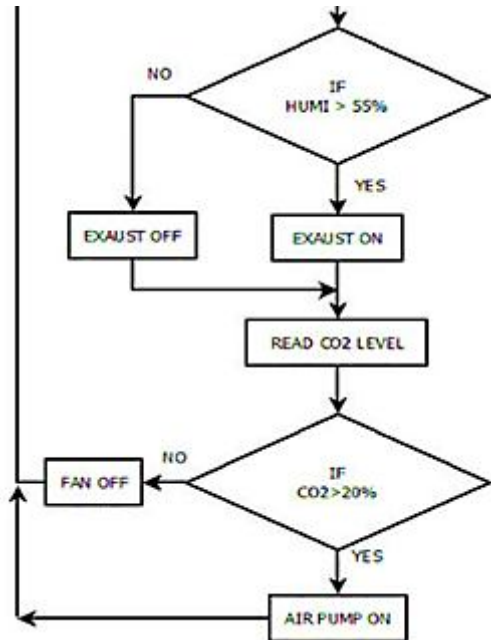


Fig 1. Proposed Methodology flowchart

B, Working

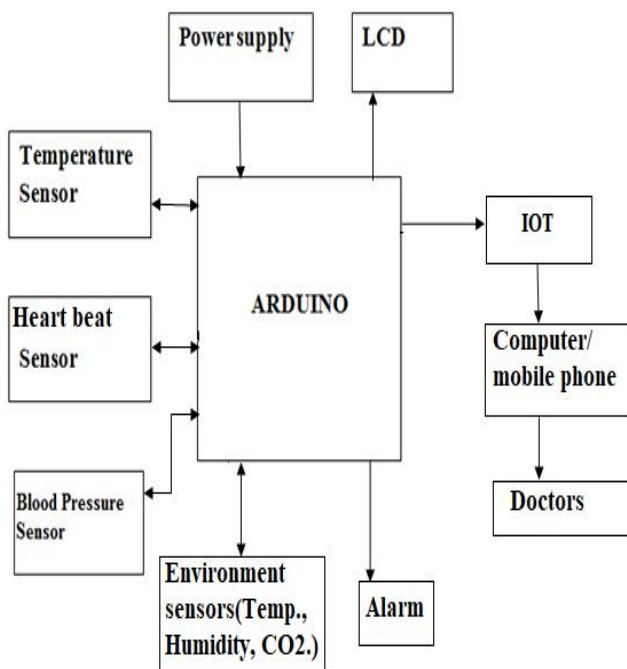


Fig 2. Block Diagram

We have used 2 types of sensors in our project

1. Environmental Sensors
2. Bio Medical Sensors

Environmental Sensors are DHT11 for Humidity and Temp, MQ2 for CO2 measurement respectively the environmental parameters are measured to control the Dehumidifier, Heater and Oxygen Valve purpose of this is to maintain the best environment for patient to avoid the fungal or bacterial infection and speedup the healing process. Biomedical sensors are Body temperature by LM35 and Blood pressure and Pulse rate by blood pressure sensor we choose these parameters because these are keen parameters that are monitored for any drastic changes in health of patient so we have set a particular safe window for these parameters if any of these parameter drops or overflow the safe zone the buzzer will sound to alert the doctor about patients health changes.

we also send the sensors data to remote computer over wi-fi for logging so if doctor needs previous data to study the patient health it should be available. a local display is provided to interact with system and to let know what process is going on.

Arduino is heart of system which collects the data, analyze it and takes the action according to program and finally sends the data to computer to connect to wi-fi network we need a wi-fi module so we used ESP8266 module which is cheap and low power as compared to other esp8266 converters serial data into wifi tcp/ip packets and sends to a IP address we want to send.

III. RESULTS AND DECLARATION

This is the working prototype of our developed system. We have also tested our system. The results of the same is shown below.

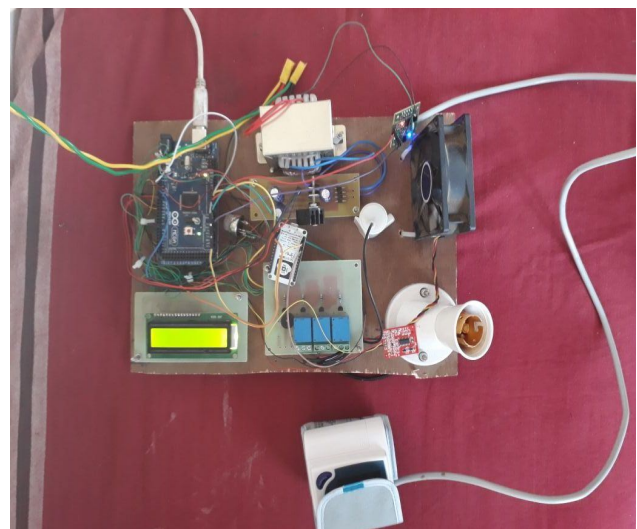


Fig 3. Patient Health Monitoring System.

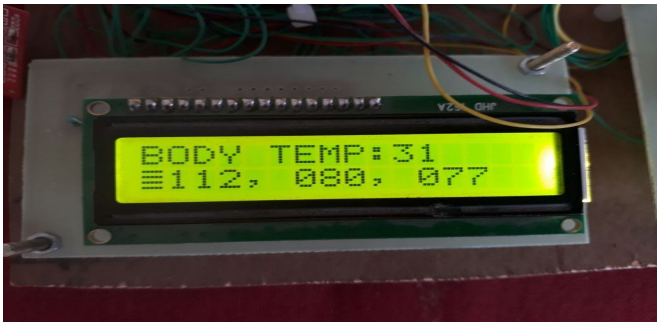


Fig 4. Readings on display.

The liquid crystal display is showing the values of body temperature, pulse rate and blood pressure of the patient the above result showing the normal values of the human body



Fig 5. Readings on blood pressure and pulse rate sensor.

The blood pressure and heart beat sensor is showing the appropriate values of blood pressure and pulse rate. We can also develop this system by using raspberry pi, but the arduino is more friendly and easy to use so in our project we are using this microcontroller.

IV. APPLICATIONS

1. It is used to patient monitoring in hospitals.
2. It is used for chronicle diseases, patients how has to go for daily checkups.
3. It is used in many fileds such as hospitals, home care units sports etc.

V. CONCLUSION

An efficient Patient Monitoring System is developed to monitor the up to date status of the patient irrespective of the presence of the doctor. The system collects information like temperature, blood pressure and pulse rate of the patient and updates the same to the doctor. Simultaneously this system monitors the environmental parameters like Humidity,

Temperature, CO₂ level, and control them. This is a real time system.

REFERENCES

- [1] Global Challenges for Humanity. [Online]. Available:<http://www.millenniumproject.org/millennium/challenges.html>
- [2] Jaiee Sitaram Adivarekar, Amisha Dilip Chordia, Harshada Hari Baviskar, Pooja Vijay Aher and Shraddha Gupta, “Patient Monitoring System Using GSM Technology”, *IJMCR* Volume-1, issue 2 March 2013.
- [3] Healthcare based on IoT using Raspberry Pi. [Online].
- [4] Amna Abdullah, Asma Ismael, Aisha Rashid, Ali Abou-EINour and Mohammed Tarique, “Real Time Wireless Health Monitoring Application using Mobile Devices”, *IJCNC* Vol.7, No.3,May 2015
- [5] Raspberry Pi as a Wireless Sensor node: Performances and constraints.[Online].
- [6] Cooking hacks. Homepage on Health Sensor Platform V2.0 for Arduino and Raspberry Pi [Biometric / Medical Applications][Online].
- [7] Praveen B Sarangama, Dr. Kiran A Gupta, “ A NovelImplementation For Automated Health Monitoring System”,*IJETAE*, Vol.5, Issue 6 June 2015
- [8] An embedded, GSM based, multi-parameter, real-time patientmonitoring system and control — An implementation for ICUpatients.[Online].
- [9] Sukanesh R,Rajan S.P,Vijayprasath S.S Prabhu,“GSMbased tele alert system”, IEEE 2010,pp1-5
- [10]Pooja Navden,Sumita Parte, Prachital Ashilkar, Jagruti Patil, Vaishnavi Khairnar “Patient parameter monitoring system using Raspberry PI” International Journal of Engineering and Computer Science(IJECS) Volume - 5, Issue -3, March 2016.