

# Health Monitoring System Using IoT

**S Shivakumar<sup>1</sup>, SK Shabeena Anjum<sup>2</sup>, K Vamshi Krishna<sup>3</sup>, Nuli Namassivaya<sup>4</sup>**  
*Maturi Venkata Subba Rao Engineering (MVSR) College, Nadergul (Po), Balapur (M), RR Dist, Telangana, India.*

**Abstract:** Healthcare is given the extreme importance now a- days by each country with the advent of the novel corona virus. So in this aspect, an IoT based health monitoring system is the best solution for such an epidemic. Internet of Things (IoT) is the new revolution of internet which is the growing research area especially in the health care. The use of the IoT protocol on medical equipment is expected to provide protection for medical personnel in dealing with Covid-19 patients, especially when medical personnel are monitoring and setting up an equipment. This study aims to produce a monitoring and control system for a breathing apparatus (Ventilator) and also check the patient health parameters like heart rate , SpO2 level and body temperature based on the Internet of Thing (IoT) this whole system is to test the data transmission function with the IoT protocol. The method used is Define, Design, Develop, and Disseminate (4D). Data collection is done through (1) Testing and Observation (2) Limited field test. This project produces a control and monitoring system for Vacuumed Air Pump based Ventilator one for the the inlet and one for the Outlet. The Air Pump based ventilator consists of two Air pump mechanism driven by a dc motor. The air pump creates pressure and releases pressure on the valves and pressure of the air delivered to the lungs for heart rate , SpO2 level we use MAX30100 sensor and for body temperature we use DS18B temperature sensor. This whole system is controlled by 2 micro controllers ESP32 and NodeMCU ESP8266 which are connected to the Blynk IOT Server. A remote health monitoring system using IoT is proposed where the authorized personal can access these data stored using any IoT platform and based on these values received, the diseases are diagnosed by the doctors from a distance. The method considers pressure measurements from the inspiratory limb and alerts clinicians in real-time whether the patient is under a healthy or unhealthy situation. Experiments carried out in the laboratory that had emulated healthy and unhealthy patients illustrate the potential benefits of the derived mechanical ventilator. A remote health monitoring system using IoT is proposed where the authorized personal can access these data stored using any IoT platform and based on these values received, the diseases are diagnosed by the doctors from a distance.

**Keywords:** *Oxygen levels, medication timing , Heartbeat*

## I. INTRODUCTION

Previously it is impossible to monitor the patient by doctor in remote areas during critical conditions. So we introduced a method which continuously monitors the patient condition and automatically sends the data to server, so the doctor can access the data continuously and we can intimate caretaker when patient is in critical condition. In previous methods, monitoring of patient can be done only by using instruments for different parameters. So, we decided to monitor required conditions of patient by assembling different instruments in a single module. Now a days IoT is the widely used technology. The growth of internet is tremendous and has been further extended to connecting things through internet. All devices are connected to one another with various smart technologies to create worldwide ubiquitous network called Internet of Things (IoT)[1]. We recorded the data of each sensor and uploaded the data into the server. We observed the data on many devices using internet with secured login and password.

A Remote health monitoring system is an extension of a hospital medical system where a patient's vital body state can be monitored remotely. Traditionally the detection systems were only found in hospitals and were characterized by huge and complex circuitry which required high power consumption. Continuous advances in the semiconductor technology industry have led to sensors and micro controllers that are smaller in size, faster in operation, low in power consumption and affordable in cost[2]. This has further seen development in the remote monitoring of vital life signs of patients especially the elderly. The remote health monitoring system can be applied in the following scenarios:

1. A patient is known to have a medical condition with unstable regulatory body system. This is in

cases where a new drug is being introduced to a patient.

2. A patient is prone to heart attacks or may have suffered one before. The vitals may be monitored to predict and alert in advance any indication of the body status.

3. Critical body organ situation

4. The situation leading to the development of a risky life-threatening condition. This is for people at an advanced age and maybe having failing health conditions.

5. Athletes during training.

## II. PROBLEM STATEMENT

- In rural hospitals, the facilities for health caring are limited. The poor quality of health management enables issues in health care system.

- In developing countries there is lack of resources and management to reach out the problems of individuals.

- A common man cannot afford the expensive and daily check up for his health[3].

## III. PROPOSED METHOD

In our proposed system, we are using the Arduino Uno, Pulse Sensor wifi Module, Air Pump, Relay Module, Power supply.

- An Smart patient health Monitoring System will not only help in maintaining health but also reducing the work of doctors and saving the time of patients.

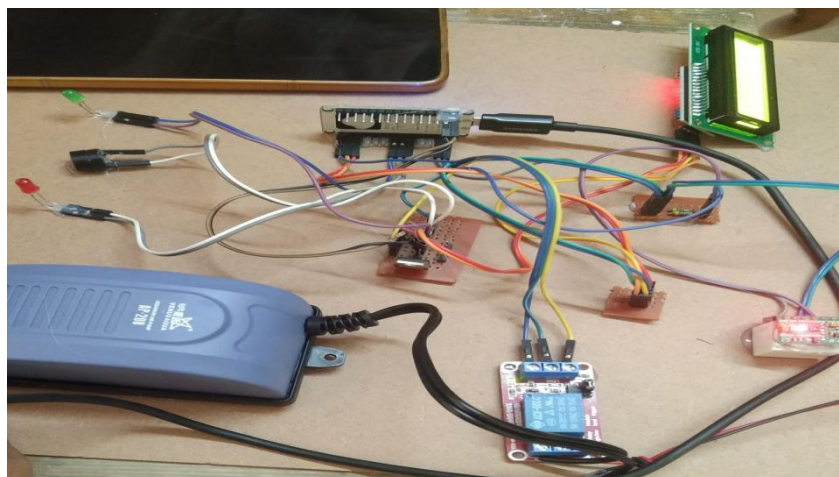
- The proposed method of patient monitoring system monitors patient's health parameters using Arduino Uno. After connecting internet to the Arduino uno, it is connected to cloud database system which acts as a server. Then the server automatically sends data to the receiver system. Hence, it enables continuous monitoring of the patient's health parameters by the doctor. Any abrupt increase or decrease in these parameter values can be detected at the earliest and hence necessary medications can be implemented by the doctor immediately[3].

- Various varieties of sensors are interfaced with the microcontroller Arduino Uno to create the system smart. The info will display on both LCD and in their webpage.

- The most ideal of the system is to transmit the knowledge through the webpage to continuous monitoring of the patient over the internet. Such a system would constantly detect the important body parameters like temperature, vital signs and would compare it against a predetermined range set and if these values cross the particular limit, it will immediately alert the doctor, during this system, a microcontroller is employed to transmit the info[4].

- The doctor will simply access the patients health anytime from anyplace. An LCD is additionally connected to the microcontroller for the patients to look at their health status live[5].

## IV. COMPONENTS USED FOR IMPLEMENTATION OF SYSTEM



**Fig 1: Practical Representation of Experiment**

**A. Arduino Uno**



**Fig 2: Arduino Uno**

Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (which 6 can be used as PWM outputs), 6 analog pins, 16MHz ceramic resonator. USB connections, power jack, ICSP plug, and a reset button. It contains everything needed to support the microcontroller, simply use the USB cable or power it with a AC-to-DC adapter or battery is connected to a computer begins.

**B. NodeMCU ESP8266**

NodeMCU is an open-source development board specially targeted for IoT based Applications. It includes firmware that runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which is based on the ESP-12 module.



**Fig 3: NodeMCU**

**C. MAX30100 Pulse Oximeter**

In MAX30100 one LED emits monochromatic light and the other LED emits infrared light. The MAX30100 pulse oximeter can measure both the heart pulse rate and the oxygen level in the blood. The Redlight that the red LED emits is used to measure the pulse rate. And for measuring the oxygen level, both the LEDs are used.



**Fig 4: Pulse Oximeter**

**D. Air pumps(oxygen)**

Air pumps include a motor type, voice coil motor (electromagnetic) type, and piezoelectric type, etc. All the types use a valve to divide the suction and discharge, and generally repeat the suction and discharge of air

through the reciprocating motion of a diaphragm by a drive source (motor / piezoelectric, etc.)



Fig 5: Air Pumps

### E. Relay Module

Relay is also a switch that connects or disconnects two circuits. But instead of manual operation a relay is applied with electrical signal, which in turn connects or disconnects another circuit. Relays can be of different types like electromechanical, solid state. Electromechanical relays are frequently used.



Fig 6: Relay Module

### F. Liquid Crystal Display

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs.

The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on.

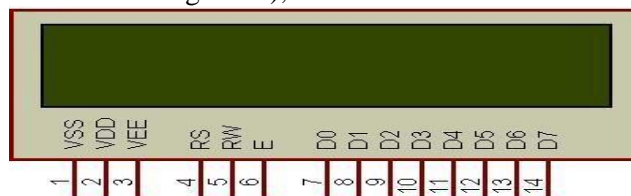


Fig 7: LCD

### G. Blynk IOT

Blynk is a Server and APP Service providing Platform. It provides High Security Service and Server for IOT applications. This is easy to use and supports all advance Micro controllers .

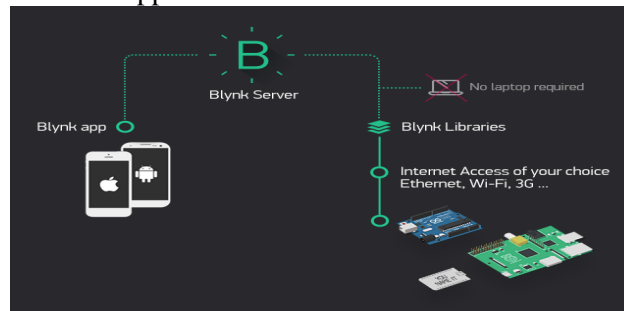


Fig 8: Blynk App

## V. RESULTS AND DISCUSSION

This project is well prepared and acting accordingly (including all the hardware and software) as per the

initial specifications and requirements of our project. Because of the creative nature and design the idea of applying this project is very new, the opportunities for this project are immense.

## VI .CONCLUSION

The Internet of Things is considered now as one of the feasible solutions for any remote value tracking especially in the field of health monitoring. It facilitates that the individual prosperity parameter data is secured inside the cloud, stays in the hospital are reduced for conventional routine examinations and most important that the health can be monitored and disease diagnosed by any doctor at any distance. In this paper, an IoT based health monitoring system was developed. The system monitored body pulse rate and room humidity and temperature using sensors,. These sensor values are then sent to a medical server using wireless communication. These data are then received in an authorized personals smart phone with IoT platform. With the values received the doctor then diagnose the disease and the state of health of the patient

## VII. References

- [1] Ananda Mohon Ghosh; Debashish Halder; S K Alamgir Hossain, Remote health monitoring system through IoT, 5th International Conference on Informatics, Electronics and Vision (ICIEV)
- [2] R. Kumar; M. Pallikonda Rajasekaran, An IoT patient-based monitoring system using Raspberry Pi, 2016 International Conference on Computing Technologies and Intelligent Data Engineering (ICCTIDE'16)
- [3] Sarfraz Fayaz Khan, Health care monitoring system in the Internet of Things (IoT) by using RFID, 2017 6th International Conference on Industrial Technology and Management (ICITM).
- [4] Freddy Jimenez, Romina Torres; Building an IoT – aware healthcare monitoring system, 2015 34th International Conference of the Chilean Computer Science Society (SCCC).
- [5] S. Sival, P. Suresh, S. Seeba Merlin and R. Punidha; A Smart heart rate sensing system in IoT, IJCTA, 9(9),2016, pp. 3659- 3663.

## AUTHOR'S PROFILE



**Saikonda shiva kumar** pursuing his B.Tech from MVSR Engineering College Nadergul Hyderabad. He is interested in learning telecommunication engineering.



**Shaik Shabeena Anjum** pursuing her B.Tech from MVSR Engineering College Nadergul Hyderabad. She is interested in learning VSLI .



**Kalal Vamshi Krishna** pursuing his B.Tech from MVSR Engineering College Nadergul Hyderabad. He is interested in learning VLSI.



**Nuli Namassivaya** was born in August 1967 at Eluru, Andhra Pradesh. He obtained B.E. from Gulbarga University in 1988 and MTech. from Jawaharlal Nehru Technological University in 1994 with Automation and Control Systems with University Topper. Presently he is working as Associate Professor in MVSR Engineering College, Hyderabad. He published 45 papers at International & National Journals & Conferences to his credit and out of 6 papers won Best Paper awards. He has more than 2 decades of teaching experience. He is a Fellow member of IETE and a Life Member of CSI, IE(I), ISOI, BES and ISTE. He served in various capacities in the above-mentioned Professional organizations. He obtained Rastriya Gaurav Award by India International Friendship Society, New Delhi on 11 March, 2005 & Best Citizens of India award in recognition of exceptional caliber and outstanding performance in chosen area of activity by Best Citizen of India, New Delhi during Jan.,