

IOT COVID-19 PATIENT HEALTH MONITORING

G Mohan Krishna¹, Machha Likhitha², Murali Niyal³, Kalidindi Poojitha⁴

(Assistant Professor¹, EEE students^{2,3,4})

Electrical and Electronics Engineering,

St. Peters Engineering College, Opp. Forest Academy, Kompally Road, Dulapally,

Maisammaguda, Medchal, Hyderabad.

500100, Telangana, India.

Abstract:

Internet of Things (IoT)- based remote health monitoring systems have an enormous potential of becoming an integral part of the future medical system. In particular, these systems can play life-saving roles for treating or monitoring patients with critical health issues. The main aim of the project is to build covid-19 patients health monitoring system using IOT and blynk app. The system makes a use of LM35 temperature sensor which detects the body temperature and Digital BP sensor which is used to measure the patients BP, systolic, diastolic and also heartrate. The main controlling device of the project is NodeMCU module and it has inbuilt Wi-Fi which is used to send the blynk notification and active the buzzer if the sensor data exceed threshold value and also monitor the patient health parameters on LCD module.

Keywords:

NodeMCU, Digital BP sensor, LM35 Temperature sensor. LCD display, Buzzer, Blynkapp

1. Introduction:

Internet of Things (IoT) is rapidly increasing technology. IoT is the network of physical objects or things embedded with electronics, software, sensors, and network connectivity, which enables these objects to collect and exchange data. In this paper, we are developing a system which will monitoring health parameters of covid-19 patient' s remotely. It is very use full device to monitor the patient data using sensors and send the notification into the blynk app.

To reduce these costs and the anxiety of people with known their health problems we propose a portable monitoring system that measure the body temperature, BP, heart beat and notifies the person into the blynk app over IOT. Our

monitoring system is meant for patients that have a known the covid-19 disease and need to be monitored around the clock.

The system using LM 35 Temperature sensor to detects the body temperature. **LM35** is a precession Integrated circuit **Temperature sensor**, whose output voltage varies, based on the **temperature** around it. It is a small and cheap IC which can be used to measure **temperature** anywhere between -55°C to 150°C . A Blood Pressure machine or Blood Pressure Machine or digital BP monitor is a diagnostic tool to check the blood pressure levels in the body. High blood pressure is associated with a multitude of problems which makes it necessary for doctors and patients themselves, to check their BP levels on a regular basis to monitor and maintain regular levels under the limit. **NodeMCU** is an open source development board and firmware based in the widely used **ESP8266 - 12E Wi-Fi** module is used to send the health notification into the blynk app and monitor this sensor data on LCD module and also the system gives the buzzer alert in abnormal conditions

2. LITERATURE SURVEY:

1. C. Premalatha developa human health monitoring system. In this concept, Internet of Things (IoT) and Cloud Computing present great advantages by providing remote and efficient services for home use by patients that are not in critical condition but need to be constant or periodically monitored by clinician or family. In any critical condition the SMS is send to doctor or any family member.

2. The Epi-medics project defines an intelligent ECG monitor which can record, analyses ECG signals and other sensor information and can generate alarms. It can also be personalized but it is

not a device meant to monitor the patient 24/7. The patient connects to the 12 lead monitor periodically as directed by the heart specialist or when he/she doesn't feel well.

3. In this work maker, Amna Abdullah and et al. demonstrate a LabVIEWbased patient checking framework. The framework undertaking is done in five key advances. We think about two frameworks to execute the structure. In the rule system, we interface the sensors joined with the patient's body to a transmitter unit related with a ZigBee or GSM orchestrate. The transmitter transmits the information remotely to a recipient that is additionally connected with a ZigBee or GSM engineer. The beneficiary is connected directly to the USB port of a near to watching unit (which is a Laptop with LabVIEW programming in it). The region watching unit shows the last information [1].

3. Implementation:

IOT COVID-19 PATIENT HEALTH MONITORING



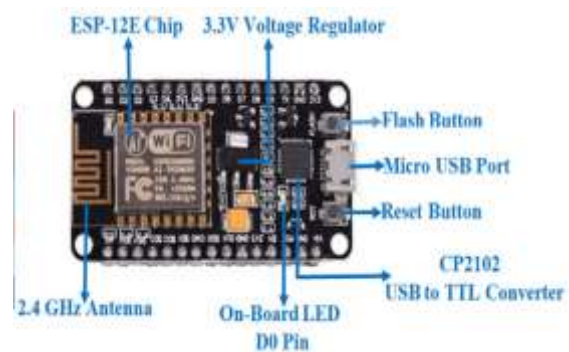
3.1 Block Diagram of IOT COVID-19 Patient Health Monitoring

The design can be implemented with NodeMCU microcontroller. The interfaced devices to the NodeMU microcontroller are digital Blood Pressure sensor, LM35 temperature sensor, LCD display, Buzzer. The main controlling device of the project is NodeMCU module which is interfaced with input and output modules and it has inbuilt Wi-Fi which is used to upload the sensor data into the blynk app and display on LCD module also active the buzzer if the sensor data exceed threshold value.

4. Related Work:

The brief introduction of different modules used in this project is discussed below:

4.1. NodeMCU:



4.1.1 NodeMCU Module

NodeMCU ESP8266 Specifications & Features

- NodeMCUESP8266 Specifications & Features
- Microcontroller: Tensilica 32-bit RISC CPU Xtensa LX106
- Operating Voltage: 3.3V
- Input Voltage: 7-12V
- Digital I/O Pins (DIO): 16
- Analog Input Pins (ADC): 1
- UARTs: 1
- SPIs: 1
- I2Cs: 1
- Flash Memory: 4 MB
- SRAM: 64 KB
- Clock Speed: 80 MHz
- USB-TTL based on CP2102 is included onboard, Enabling Plug n Play
- PCB Antenna
- Small Sized module to fit smartly inside your IoT projects

4.2. LM35 temperature sensor:



LM35 sensor is used for measurement of body temperature. Sensor is put in contact with body and it senses body temperature. It is calibrated linearly in Celsius. It has low self-heating capability. Also it doesn't require external calibration. Rated for full -55° to $+150^{\circ}\text{C}$ range.

4.3. Digital BP sensor:



Fig : Digital BP sensor

A digital blood pressure monitor uses an air pump to inflate a cuff surrounding an upper arm or a wrist with sufficient pressure to prevent blood flow in the local main artery. This pressure is then gradually released using a digitally-controlled solenoid valve until the moment that the blood begins to flow through the artery.

The blood pressure measured by a pressure sensor at this point determines the systolic pressure. Pulse rate is also sensed at this time. The measurement taken when the blood flow is no longer restricted determines the diastolic pressure. This complete measurement cycle is controlled automatically by the micro-controller.

4.4 LCD display:



Fig: LCD display

Liquid crystal display is very important device in embedded system. It offers high flexibility to user as he can display the required data on it. 16*2 means 16 characters per line by 2 lines respectively. The LCD display is interfaced to the NodeMCU module to display the health parameters on LCD.

4.5 Buzzer:



Basically, the sound source of a piezoelectric sound component is a piezoelectric diaphragm. A piezoelectric diaphragm consists of a piezoelectric ceramic plate which has electrodes on both sides and a metal plate (brass or stainless steel, etc.). A piezoelectric ceramic plate is attached to a metal plate with adhesives. Applying D.C. voltage between electrodes of a piezoelectric diaphragm causes mechanical distortion due to the piezoelectric effect.

5. CONCLUSION:

The wearable sensors device is an advanced information and communications technology have opened the window to a new era of cost-effective remote healthcare services. Hence the latest trend in Healthcare communication method using IOT. The systems can display sensor parameter on LCD and the system able to monitor the health parameters into the blynk app using IOT technology and also send the notifications in abnormal conditions. The system able to give the buzzer alerts if the sensor data exceed threshold value.

6. ACKNOWLEDGEMENT

We would like to thank all the authors of different research papers referred during writing this paper. It was very knowledge gaining and helpful for the further research to be done in future.

7. RESULTS:

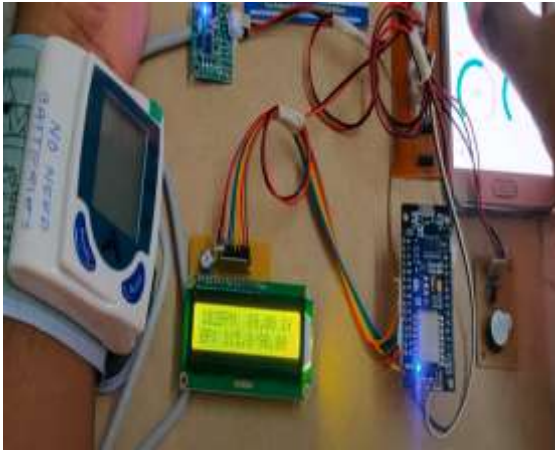


Fig: 7.2 Project Output LCD and blynk app

REFERENCES:

- [1] Abdullah A, Ismael A, Rashid A, Abou-ElNour A, Tarique M (2015) Real time wireless health monitoring application using mobile devices. *Int J Comput Net w Commun (IJCNC)* 7(3):13, May 2015.
- [2] Shelar M, Singh J, Tiwari M (2013) Wireless patient health monitoring system. *Int J Comput Appl (0975– 8887)* 62(6):1, Jan 2013
- [3] Hossain SM. Patient status monitoring for smart home healthcare. In: *IEEE international conference on multimedia and expo workshop*. Seattle: ICMEN); 2016
- [4] A. Imran, I. Posokhova, H. N. Qureshi, U. Masood, M. S. Riaz, K. Ali, C. N. John, M. I. Hussain, and M. Nabeel, ‘ ‘ AI4COVID-19: AI enabled preliminary diagnosis for COVID19 from cough samples via an app,’ ’ *Informat. Med. Unlocked*, vol. 20, 2020, Art. no. 100378, doi: 10.1016/j.imu.2020.100378.
- [5] D. S. W. Ting, L. Carin, V. Dzau, and T. Y. Wong, ‘ ‘ Digital technology and COVID-19,’ ’ *Nature Med.*, vol. 26, no. 4, pp. 459– 461, Apr. 2020, doi: 10.1038/s41591-020-0824-5.
- [6] J. A. Lewnard and N. C. Lo, ‘ ‘ Scientific and ethical basis for social-distancing interventions against COVID-19,’ ’ *Lancet Infect. Dis.*, vol. 20, no. 6, pp. 631– 633, 2020, doi: 10.1016/S1473-3099(20)30190-0.
- [7] S. Woolhandler and D. U. Himmelstein, ‘ ‘ Intersecting U.S. epidemics: COVID-19 and lack of health insurance,’ ’ *Ann. Internal Med.*, vol. 173, no. 1, pp. 63– 64, Jul. 2020, doi: 10.7326/M20-1491