

IOT BASED COVID PATIENT HEALTH MONITOR IN QUARANTINE

Mrs. Y.N. Dighe¹, Nishigandha Gosavi², Arti Andhale³, Sanika Avhad⁴, Manisha Mandlik⁵

¹Prof. Dept. of Electronics and Telecommunication Engineering, Amrutvahini Polytechnic, Sangamner, India

^{2,3,4,5}Students, Dept. of Electronics and Telecommunication Engineering, Amrutvahini Polytechnic, Sangamner, India

Abstract – Now a days on the platform of COVID we requires special Covid 19 Quarantine centers setup in order to treat covid patients. Because of covid is highly infectious it is very important to quarantine these patients but at the same time doctors need to monitor health of covid patients too. With the increasing number of cases it is becoming difficult to keep a track on the health conditions of many quarantined patients. Some problem are arises like 1] Doctors need to regularly monitor patient health. 2] There are increasing number of patients for the doctors to monitor. 3] the doctors are at risk of infection just for monitoring purpose. To solve this issue we here design a remote IOT based health monitor system that allows for remotely monitoring of multiple covid patients over the internet. The system monitors patient heartbeat, temperature and blood pressure using a heartbeat sensor, temperature sensor and BP Sensor respectively. The system then transmits this data over the internet using wifi transmission by connecting to wifi internet connection. The data is transmitted and received over IOT by IOT Gecko platform to display data of patient remotely. The entire system is run by a microcontroller based circuitry. If any anomaly is detected in patient health, if the patient presses the emergency help button on IOT device, an alert is sent over IOT remotely.

Key Words: IOT web server, Blood Pressure sensor, Temp Sensor, PIC Microcontroller, GSM.

1. INTRODUCTION

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. Internet of Things (IoT) development brings new opportunities in many applications, including smart cities and smart healthcare. Currently, the primary usage of the IoT in healthcare can be categorized as remote monitoring and real-time health systems. Controlling and managing dire situations, such as the one in 2020 when the coronavirus dis-ease (COVID-19) took over the world, can be achieved with the help of IoT systems, without imposing severe restrictions on people and industries. COVID-19 causes respiratory symptoms and appears to be more contagious in comparison to SARS in 2003. Health is always a major concern in every growth the human race is advancing in terms of technology. Like the recent corona virus attack that has ruined the economy of China to an extent is an example how health care has become of major importance.

Remote patient monitoring allows you to stay connected with the patient beyond an initial virtual visit or screening. It allows you to monitor changes in symptoms or underlying health conditions and risk factors with surveys and connected devices, and to provide educational content. It enables your care team to follow protocols to intervene timely and appropriately as the patient's condition changes. The system involves a mobile app or web browser. People who show symptoms of the viral infection can get enrolled with AIIMS-Rishikesh. The hospital will assess the complaints and, if found necessary, will provide the patient a health monitoring kit to monitor his or her parameters regularly.

Patient health parameters, along with patient location, are uploaded on a regular basis on to a centralized command and control center on cloud using either the patient's mobile phone or an integral GSM SIM card. The use of cloud will facilitate seamless scaling of the database of COVID-19 suspects/patients, BEL said.

When the health parameters exceed the threshold, an alert is sent to medical officers and healthcare workers. It will also show the severity of the patient's condition using color codes

1.1. LITERATURE REVIEW

In this work maker, Amna Abdullah and et al. demonstrate a LabVIEW based 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].

This paper exhibits the upgrade of a microcontroller based structure for remote heartbeat and temperature watching utilizing ZigBee. In India, different patients are passing on due to heart assaults and illumination for that they are not getting profitable and reasonable help. To give them worthwhile and bona fide enable first we to need to unending seeing of patient flourishing. The settled watching structure can be utilized precisely when the patient is on

intriguing little lodging framework are enormous and just open in the retouching workplaces in ICU. The framework I made for home use by patients that are not in a central condition but rather should be persistent or sporadically observed by clinician or family. In any major condition, the SMS is sent to the expert or any relative. With the target that we can without a considerable amount of a stretch additional different lives by giving them brisk association [2]

Imran et al.[4] have made an AI model to distinguish between coughs related to COVID-19 and coughs caused by other respiratory conditions. Their model has achieved promising results; however, their dataset is not large enough. Providing more data about the coughing of COVID-19 patients will make such AI models much more effective.

2. PROPOSED SYSTEM

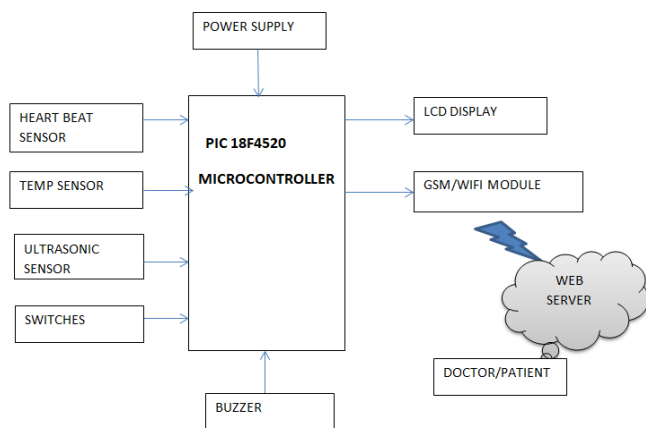


Fig 1: Block Diagram of System

The core objective of this project is the design and implementation of a smart patient health tracking system. Fig.1 shows block diagram of our system. All sensors interface with microcontroller. Blood pressure sensor sense pulse rate as well as BP of patient. Temp sense patient body temperature Ultrasonic sensor is place at home to sense the saline level of patient. Different sensors sense different parameter of patient health and send to controller, controller process on it and display on LCD display. As well as upload data over IOT. Here GSM module is use to access internet. If patient health parameter exceed its limit then GSM can send emergency SMS to doctor. Buzzer also provided here for alarm purpose. All system needs 5v power supply.

A. PIC 18f4520 microcontroller:

PIC18F4520 is a low-cost, low-power, high-speed 8-bit, fully-static Microcontroller unit with 40 pins, 36 of which can be used as I / O pins. It has power-on-reset (POR) and the WDT circuitry (Extended Watchdog Timer), which can be programmed for 4 ms to 131 s. It is an 8-bit enhanced flash PIC microcontroller that comes with Nano Watt technology

and is based on RISC architecture. Many electronic applications house this controller and cover wide areas ranging from home appliances, industrial automation, and security system and end-user products. It also incorporates 2 Comparators, 10-bit Analog to digital (A/D) converter with 13 channels, and houses decent memory endurance around 1,000,000 for EEPROM and 100,000 for program memory. The Enhanced Universal Asynchronous Receiver Transmitter (EUSART) feature is useful for developing the serial communication with other devices.



Fig -2: PIC18f4520

B. ULTRASONIC SENSOR (HC-SR04):

Ultrasonic sensors work by sending out a ultrasonic wave at a frequency above the range of human hearing. The transducer of the sensor acts as a microphone to receive and send the ultrasonic sound. Our ultrasonic sensors, like many others, use a single transducer to send a pulse and to receive the echo.

Typically, a microcontroller is used for communication with an ultrasonic sensor. To begin measuring the distance, the microcontroller sends a trigger signal to the ultrasonic sensor. The duty cycle of this trigger signal is 10µS for the HC-SR04 ultrasonic sensor. When triggered, the ultrasonic sensor generates eight acoustic (ultrasonic) wave bursts and initiates a time counter. As soon as the reflected (echo) signal is received, the timer stops. The output of the ultrasonic sensor is a high pulse with the same duration as the time difference between transmitted ultrasonic bursts and the received echo signal.



Fig -3: Ultrasonic sensor

C. Heart bit/Blood Pressure Sensor:

Blood Pressure & Pulse reading are shown on display with serial out for external projects of embedded circuit processing and display. This sensor gives Systolic, Diastolic

and Pulse Readings. It has Compact design fitted on your wrist like a watch. Blood pressure is the pressure of the blood in the arteries as it is pumped around the body by the heart. When your heart beats, it contracts and pushes blood through the arteries to the rest of your body. This force creates pressure on the arteries. Blood pressure is recorded as two numbers—the systolic pressure (as the heart beats) over the diastolic pressure (as the heart relaxes between beats). The unit which measures this is called Sphygmomanometer

Features

- Automatic compression and decompression
- Switching button to start measuring
- Easy operation.
- 60 groups measurements of memory.
- It can read single or all measures
- Automatic device debugging, automatic power to detect
- Local tests for : wrist circumference as 135-195mm
- Large-scale digital liquid crystal display screen, Easy to Read Display
- It is fully Automatic, Clinical Accuracy & High-accuracy



Fig -4: Blood Pressure sensor

D. GSM module:

This module has SIM800A chip and RS232 interface while enables too easy connection with the computer or laptop by using the USB to Serial connector it also connected to the microcontroller using the RS232 to TTL converter. The baud rate is configurable from 9600-115200 through AT command. Once you connect the SIM800 modem using the USB to RS232 connector, we need to find the respective COM port from the Device Manger of the USB to Serial Adapter. Then you can open Putty or any other terminal software and

open a connection to that COM port at 9600 baud rate, which is the default baud rate of this modem. The GSM/GPRS Modem is having internal TCP/IP stack to enable you to connect with internet via GPRS. It is suitable for SMS, Voice as well as DATA transfer application in M2M interface. The Modem is manufactured with Automatic Pick and place machine with high quality standard. The onboard Low dropout 3A Power supply allows you to connect wide range unregulated power supply (5V-12V). Using this modem, we can make audio calls, SMS, Read SMS, attend the incoming calls and internet etc. through simple AT commands.



Fig -5 GSM Module

E. LCD display:

A 16x2 means it can display 16 characters on each of 2lines. In this display each character is displayed in 5x7 pixel matrix. There are two registers, namely, Command and Data. The command register stores the command instructions of given LCD. A command is an instruction given to LCD to do initializing LCD, clearing LCDs screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD.

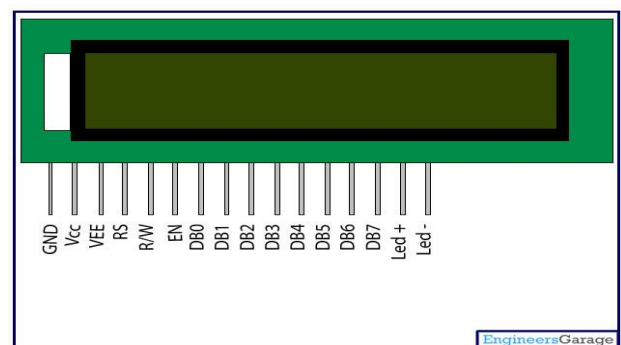


Fig -6 LCD display

3. CONCLUSIONS:

This System allows:

- Doctors to monitor patients remotely without risk of infection
- A single doctor over 500 patients at a time.
- Doctor gets instant alert in case of health fluctuations of emergency.

The system is mounted at patient bedside and constantly transmits patient health data over the internet so that doctors can monitor multiple patients remotely and attend the desired patient urgently when needed

This project fulfills the aims to significantly reduce the risk of exposure in healthcare workers. It is also expected to reduce the increasing demand of PPE (personnel protection equipment) and logistics. stays in quarantine period 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 temperature, pulse rate and saline level, which are also displayed on a LCD. 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.

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