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Covid-19 Patient Health Monitoring System Using Cloud Server

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ABSTRACT

Analyzing and taking care of health is a very important task in everyone's life. Because of busy schedules of all individual visiting hospitals for frequent health checkups are not possible which leads to a lot of health issues suddenly. Especially during this Covid times continuous monitoring of health tracking is impossible as this is a transmitting disease. So, a wireless technology is required to monitor the patients. In this paper we are proposing an IOT based health care monitoring which is helpful for covid-19 patients. The data is transferred wirelessly to cloud server using ESP8266 WIFI Module. The main microcontroller used here is Arduino. The sensors used are Heartbeat, Temperature, MEMS and Gas Sensor.

Keywords : Arduino, ESP8266, MEMS Sensor, Gas Sensor, Temperature Sensor, IOT.

I. INTRODUCTION

This project is important in several ways because in today's world, everyday many lives are affected because the patients are not timely and properly operated. Also, for real time parameter values are not efficiently measured in clinic as well as in hospitals. Sometimes it becomes difficult for hospitals to frequently check patient's conditions. Also, continuous monitoring of ICU patients is very difficult. To deal with these types of situations, our system is beneficial. Our system is designed to be used in hospitals and homes also for measuring and monitoring various parameters like temperature, respiratory and heart rate. The results can be recorded using Arduino. Also, the doctors can see those results on website/android app. This project will be more helpful to all the people those who want to check Temperature, Respiratory levels, movement of the body and Heart rate parameters during this Covid-19 Pandemic situation.

II. Existing System

In existing we don't have any proper equipment to monitor the patient's health parameters wirelessly. So that a care taker is required continuously in order to measure the health parameters which may affect the care taker also.If the care taker is not aware of or shows any negligence then there is a chance of causing death of the patient. So, there is a need of wireless and long-distance communication.

Drawbacks:

- Patient Data is not exchanged Continuously.
- Patient needs to attend for every checkup.
- Critical condition is unknown.

III. Proposed System

Main purpose of IoT based system to help healthcare system in case of emergencies. The system self-monitor and able to inform critical situations of patients to the doctors. Sensors signals are sent to Arduino via ESP8266. Here patients body temperature, respiration, movements and heartbeat values are measured using respective sensors and it can be monitored in the cloud database system as well as monitored anywhere in the world using internet source.

Block Diagram:

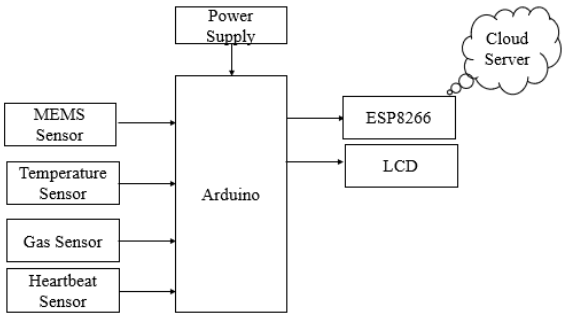

Fig1: Block Diagram

Hardware Requirements

Power Supply:

Transformer:

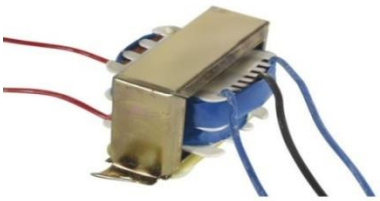

Fig2: Transformer

Transformer is a device which reduces A.C current into required D.C current.

Bridge Rectifier:

Fig3: Bridge rectifier

A diode bridge is a technique of four diodes in a bridge circuit arrangement that provides equal polarity of output for mutually polarity of input.While used in its maximum shared application, for transformation of an alternating-current input into a direct-current output, it is called as a bridge rectifier.

Capacitor:

Fig4:Capacitor

A capacitor could be a passive two terminal eletrical component that stores current in a electric field. The result of this can be termed as capacitance.

Regulator:

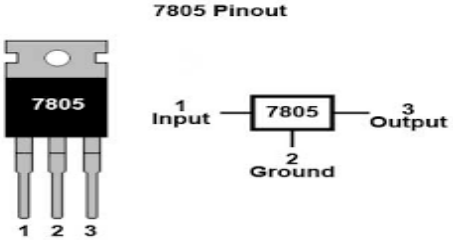

Fig5: Regulator

A voltage regulator IC keeps the output voltage at a continuous value. 7805 IC is one of the IC of 78xx family. It maintains fixed linear regulators which is used to maintain fluctuations.

Arduino:

Arduino uno is a microcontroller board which inbuilt has an IC that is ATMega328P which is Main Microcontroller. In this we have 14 digital pins, 6 Analog Pins, 16MHz Crystal Oscillator and a Reset Button.

Fig6: Arduino

ESP8266 WIFI Module:

The ESP8266 WiFi module is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your WiFi network. The ESP8266 is capable of either hosting an application or offloading all WiFi networking functions from another application processor.

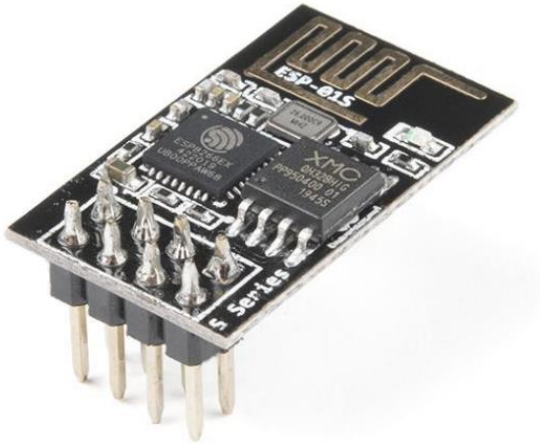

Fig7: ESP8266 WIFI Module

Relay:

Relay is electromagnetic switch that open or close the switches electrically or electromechanically.Relay is mostly used to switch smaller circuits.

Fig8: Relay

Gas Sensor:

MQ2 gas sensor can be used to detect the presence of LPG, Propane and Hydrogen, also could be used to detect Methane and other combustible steam, it is with low cost and suitable for different application. Sensor is sensitive to flammable gas and smoke.

Fig9: Gas Sensor

MEMS Sensor:

MEMS are slight expense, and high exactness inertial sensors and these are utilized to serve a broad scope of modern applications. This sensor utilizes a chip-based innovation specifically micro-electro-mechanical-system. These sensors are utilized to distinguish as well as measure the outside enhancement like tension and strain.

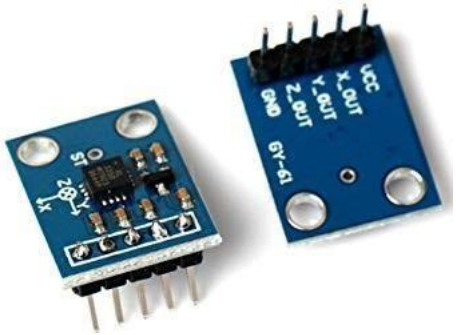

Fig10: MEMS Sensor

LM35 Temperature Sensor:

The LM35 series are accuracy incorporated circuit temperature sensors, whose resultvoltage is straightly corresponding to the Celsius (Centigrade) temperatureIts output is 10 MilliVolts per degree centigrade. So if the output is 310 mV then temperature is 31 degree C. It has a range of –55 to +150°C temperature range. LM35 is a popular and low-cost temperature sensor. To use the sensor simply connect the Vcc to 5V, GND to Gnd and the Out to one of the ADC (analog to digital converter channel). The output linearly varies with temperature.

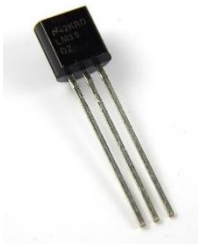

Fig11: Temperature Sensor

Heartbeat Sensor:

Heartbeat Sensor is an electronic device that is utilized to scale thepulse for example speed of the heartbeat. Observing internal heat level, pulse and bloodpressure are the fundamental things that we really do to keep us solid.

Fig12: Heartbeat Sensor

LCD:

In LCD 16×2, the term LCD represents Liquid Crystal Display that utilizes a plane board show innovation, utilized in screens of PC screens and TVs, cell phones, tablets, cell phones, and so forth. Both the showcases like LCD and CRTs appear to be identical yet their activity is unique. Rather than electrons diffraction at a glass display, a liquid crystal display show has a backdrop illumination that gives light to every pixel that is organized in a rectangular organization.

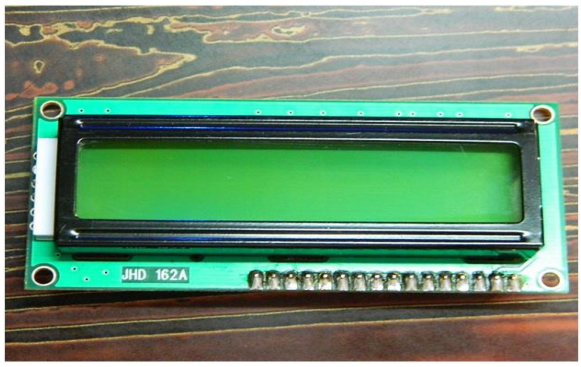

Fig13: LCD

Software Requirements

Arduino IDE:

The Arduino IDE software is an open-source software, where we can have the example codes for the beginners. In the Present world there are lot of versions in the Arduino IDE in which present usage is Version1.0.5. It is very easy to connect the PC with Arduino Board.

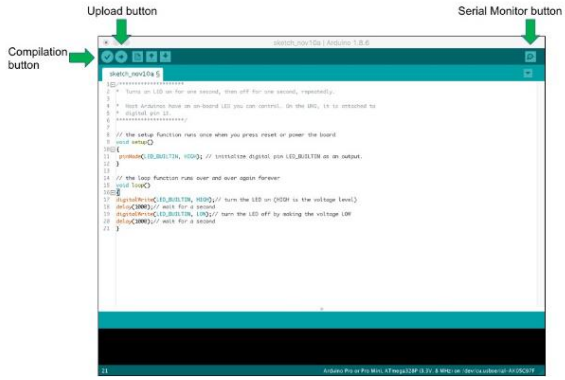

Fig14 : Arduino IDE Window

VI. Advantages

1. Monitoring the Patient Continuously.
2. They can easily communicate with us.

VII. Applications

1. Used in the hospitals
2. Patients at home

IV. CONCLUSION

IoT based design is helpful for an infected patient of COVID-19 and provides better treatment rapidly. It is useful for patient, physician, surgeon and hospital management system. For future enhancement we can add ECG measurement as well as voice support system with IoT. Role of Internet of Things technology is very important in the field of healthcare sector. IoT based Proposed design can able to provide better accuracy and status in real time. System is portable so that it can be tie up with patient and parameter can be monitor on mobile application through internet connectivity.

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