DHAKA UNIVERSITY OF ENGINEERING & TECHNOLOGY, GAZIPUR

Department of Computer Science and Engineering

Software & Hardware Project (CSE-3114)

Report

Project Name: Covid-19 patient health monitoring in quarantine.

Submitted by

Group No: 33
Group Member:

1. Imran Hossain (174075)
2. Md. Parimul Haque (174077)
3. Md. Naeem-Al-Imran (174078)

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Project Title: Covid-19 patient health monitoring in quarantine

Objectives: In times of Covid-19 we have special Covid-19 Quarantine centers setup in order to treat Covid-19 patients. Since Covid-19 is highly infectious it is very important to quarantine Covid-19 patients but at the same time doctors need to monitor health of Covid-19 patients. The doctor are at risk of infection just for monitoring purpose. To solve this issue. we want to design a remote IOT based health monitoring system that allows for remotely monitoring of multiple Covid-19 patient over the internet. And attend the desired patient urgently when needed.

Hardware Requirement:

1. Arduino UNO
2. ESP8266 WIFI module
3. Heart rate pulse sensor
4. 16*2 LCD display
5. LM35 Temperature sensor
6. Resistor 220ohm
7. LED
8. Breadboard
9. Jumper wires (male to male)

Software Requirement:

1. Arduino
2. Google Firebase
3. Website
4.

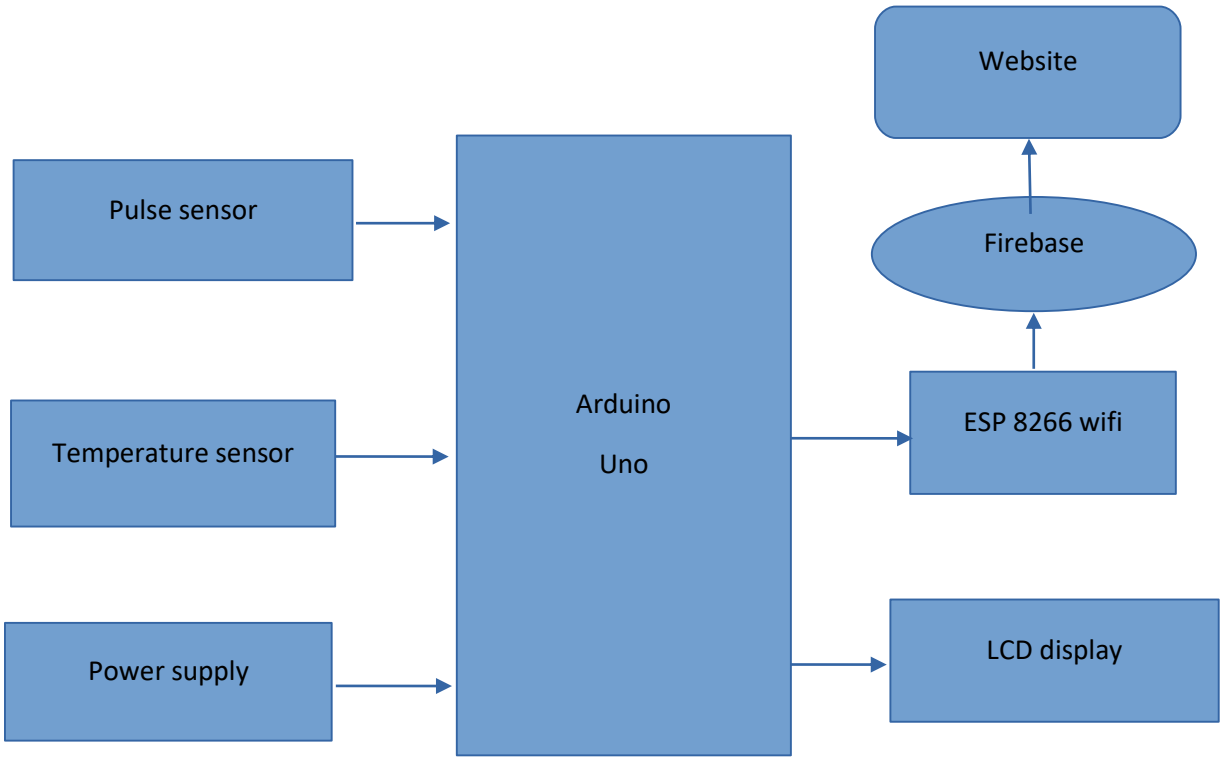
Budgetary:

Name	Price	Name	Price
Arduino UNO	590 tk	Breadboard	94 tk
ESP8266	200 tk	Jumper Wire	50 tk
Pulse Sensor	310 tk	Resistor 220ohm	2 tk

16*2 LCD display	159 tk	LED	5 tk
LM35	71 tk		

Total Cost = 1481 tk

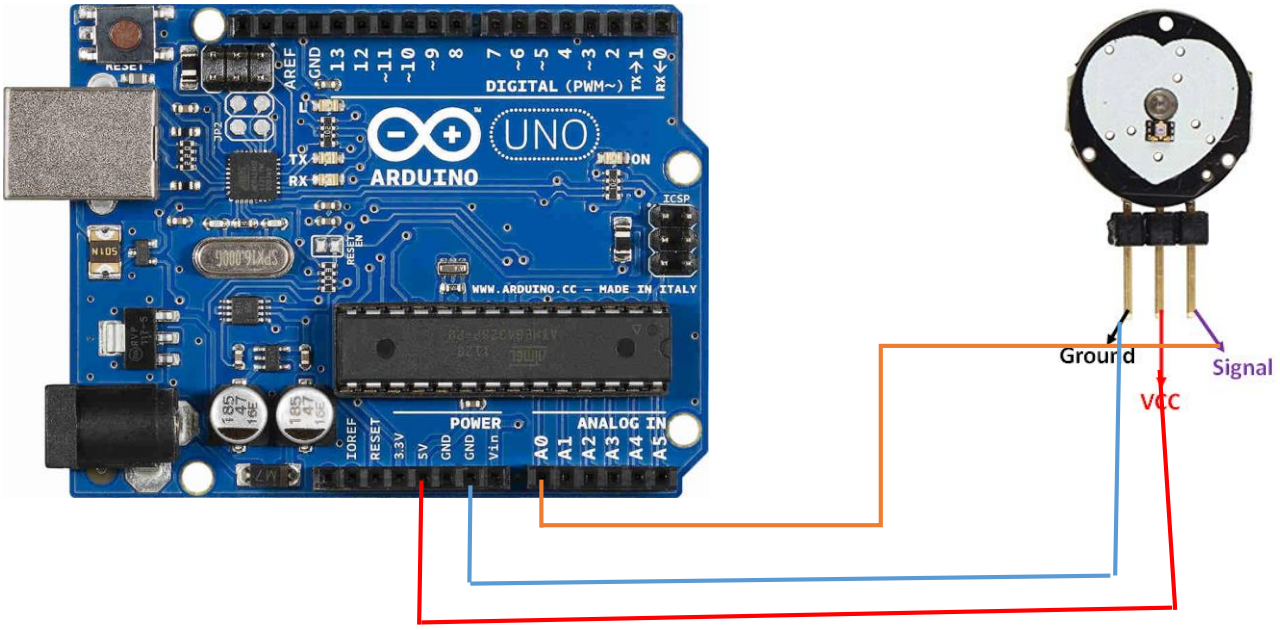
Prototype model (pen and paper base) :



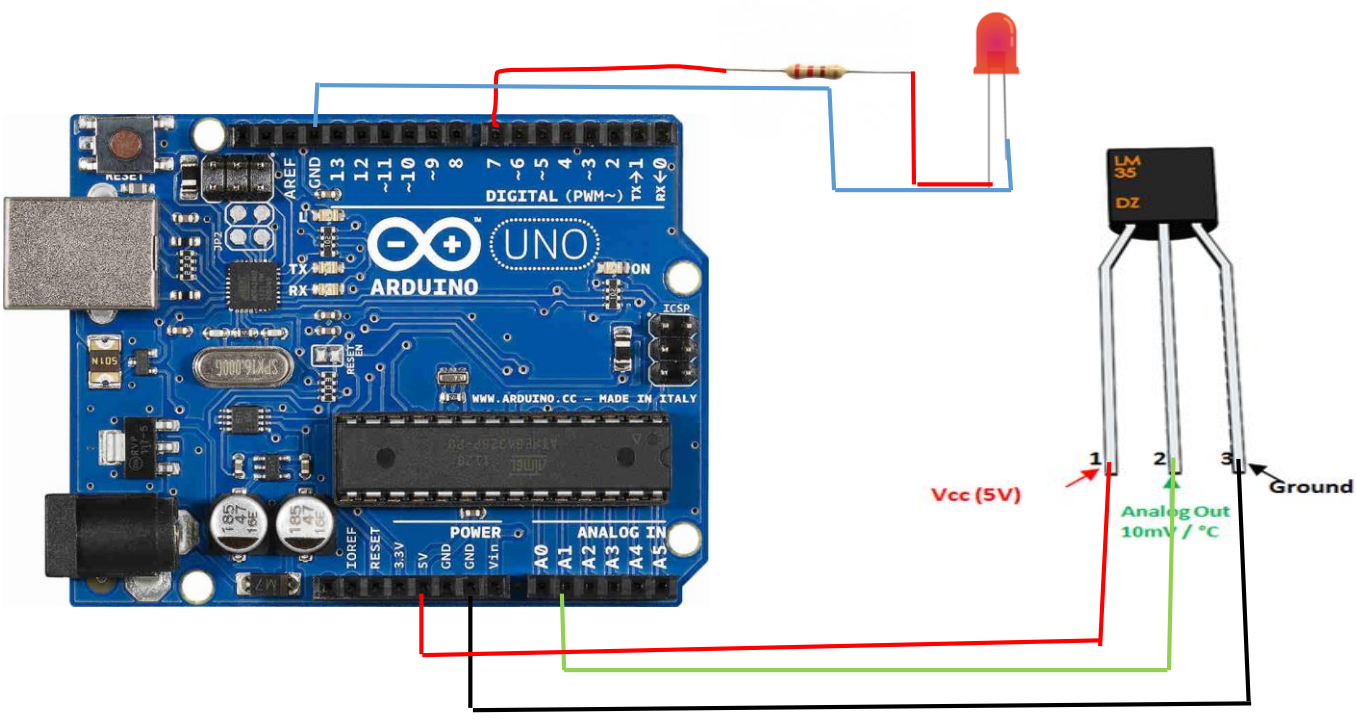
Block diagram

In this block diagram Pulse sensor and LM35 temperature sensor measure heartbeat/pulse rate and temperature respectively. The Arduino processes the code and displays it to 16*2 LCD display. ESP8266 WIFI module connects to WIFI and send the data to google firebase. We query the data from firebase to our website. Finally, the data can be monitoring from any part of the world by visiting our website. The data will be updated every 15 second. By this website the doctor can be seen more patient at a time. And take necessary steps when critical condition will be occur.

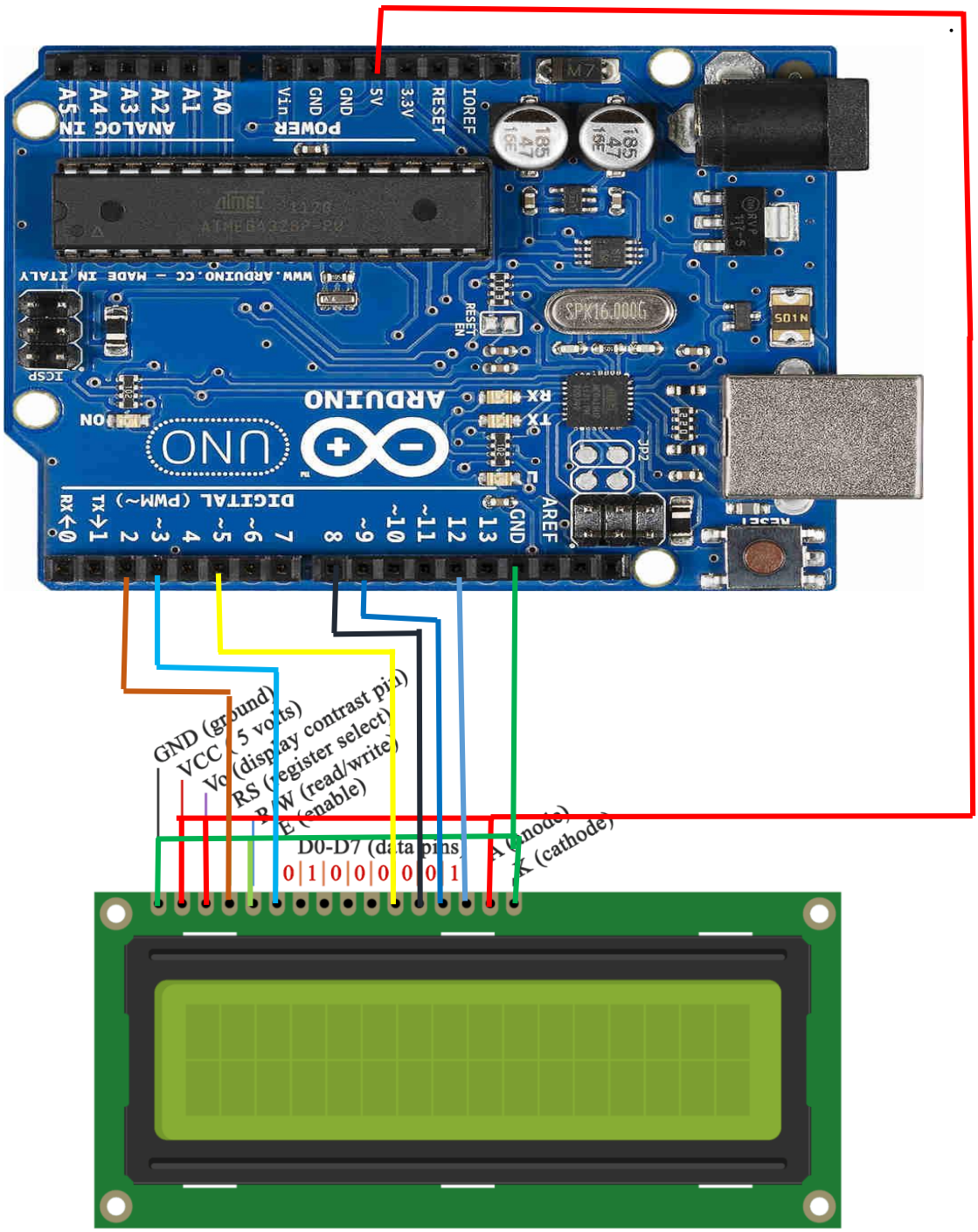
Prototype or Model (Implementation base)



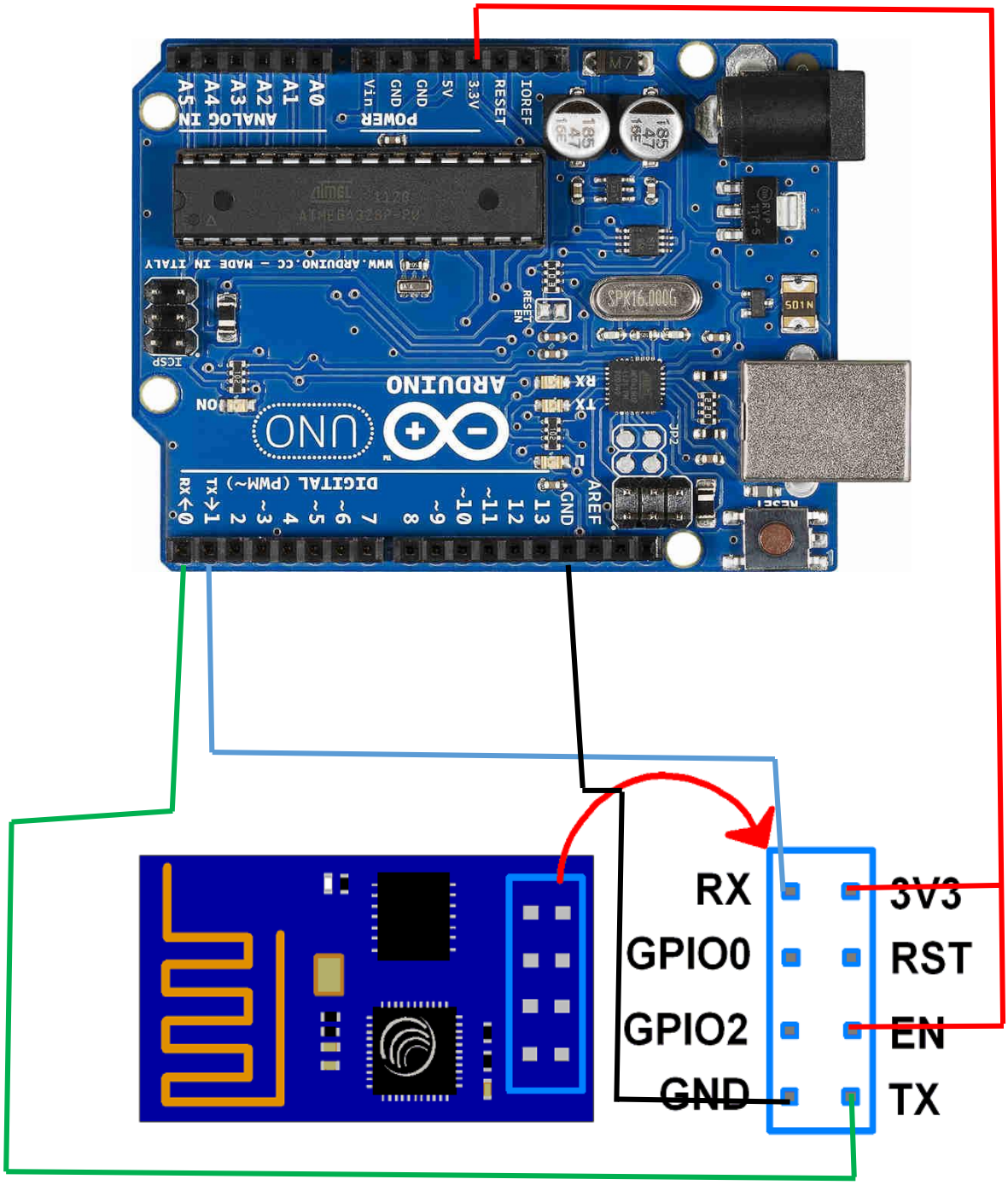
1. Connect Pulse Sensor output pin to A0 of Arduino, VCC pin connect to 5v and Ground pin connect to GND of Arduino.



2. Connect Temperature Sensor output pin to A1 of Arduino, VCC pin connect to 5v and Ground pin connect to GND of Arduino.
3. Connect the LED (+ve) pin to Digital Pin 7 of Arduino via a 220-ohm resistor. And Ground pin to connect GND.



4. Connect Pin 1,5,16 of LCD to GND of Arduino.
5. Connect Pin 2,3,15 of LCD to VCC.
6. Connect Pin 4,6,11,12,13,14 of LCD to Digital Pin 2, 3, 5, 8, 9, 12 of Arduino.



7. Connect pin EN & VCC of ESP8266 to 3.3V of Arduino, TX, RX and GND pin of ESP8266 to connect respectively RX, TX and GND pin of Arduino.

Programming and Software Development:

Step 1: WIFI Connection

Step 2: Firebase Connection

Step 3: Read signal from sensor

Step 4: Convert signal to Temperature and Pulse

Temp = (signal * 5.0/1024) * 100

Temp = (Temp * 9/5) + 32

If Pulse_signal > Threshold 550

Pulse = signal / 8

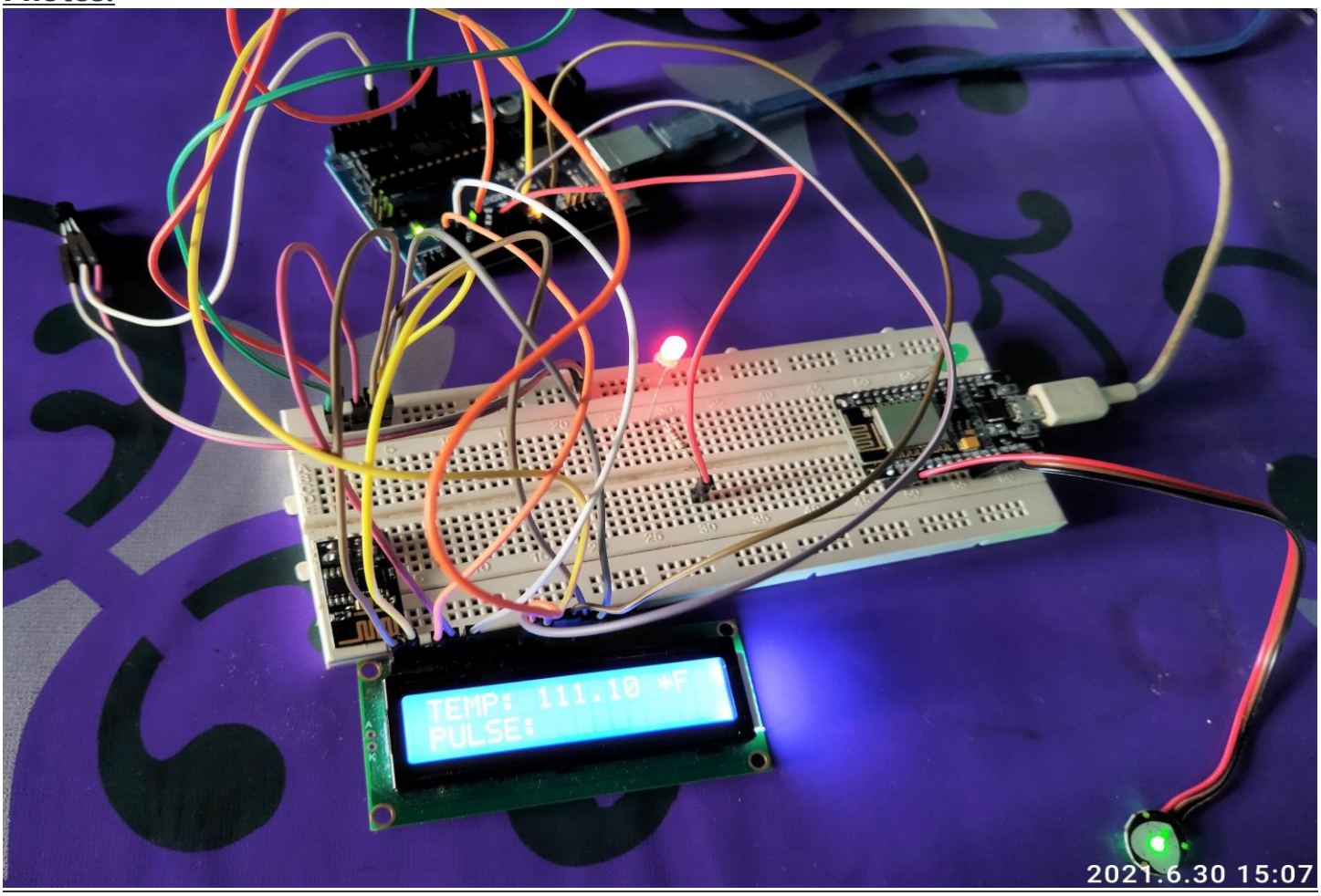
Step 5: Temp and Pulse show the Display

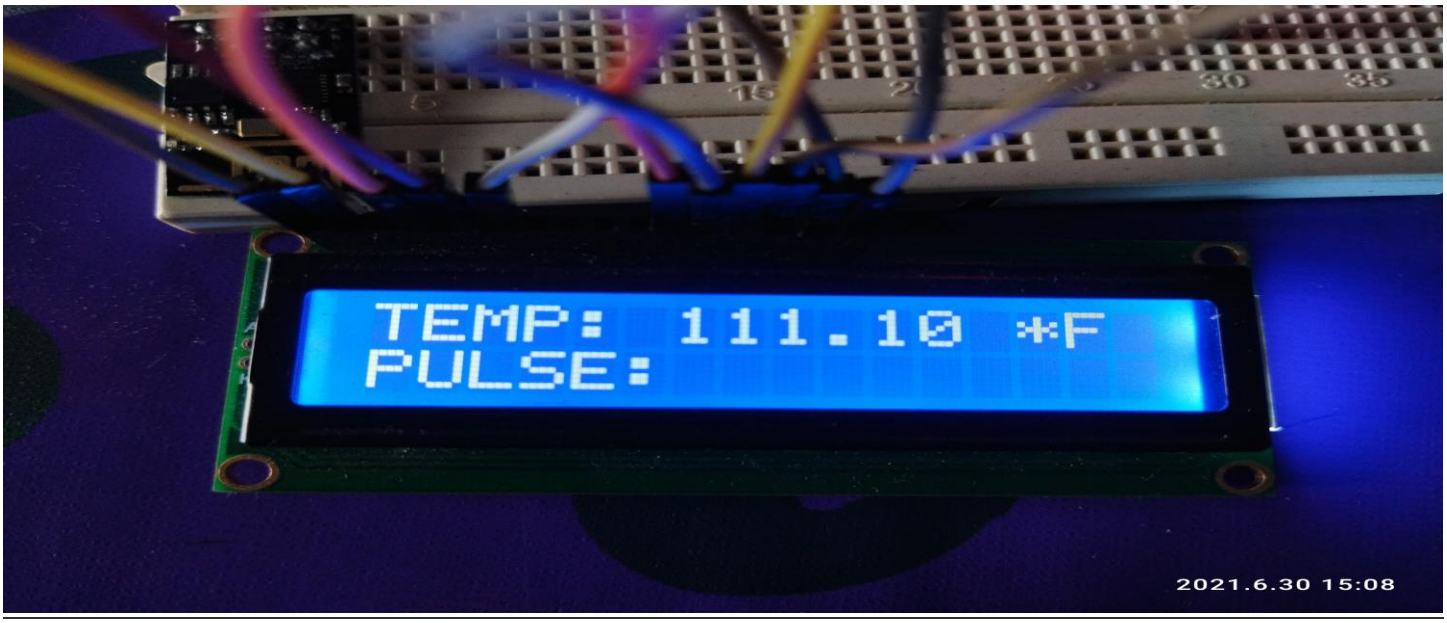
Step 6: Temp and Pulse Upload to Firebase database

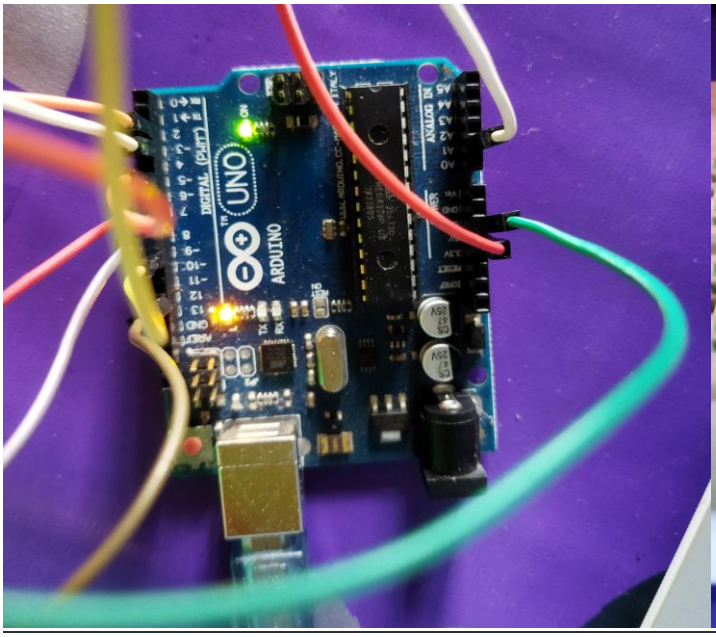
Step 7: Show the Data from firebase to website

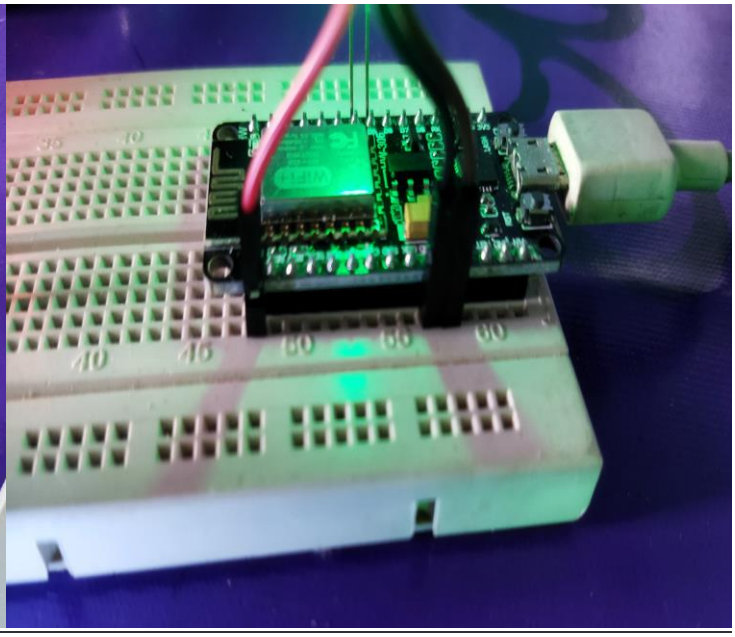
Project Demonstration:

Photos:









Covid-19 patient health monitoring in quarantine

Room No: 1

Bed: 01
BPM:
70

Discussion:

We have developed remote IOT based health monitoring system **Covid-19 patient health monitoring in quarantine**. Our goal is design a remote IOT based health monitoring system that allows for remotely monitoring of multiple Covid-19 patient over the internet. For design this system we needed to design a hardware system where we will take patient temperature and pulse rate. And After calculating this data show it in the monitor. And data will be store in database by firebase via internet. Doctor will see the result from the website.

We faced some problem. For the technical challenge we did not implement properly. At the last time our ESP8266 WIFI module damaged, that why we can't show temperature and pulse rate at a time. Also temperature sensor can't measure accurate data.

We implemented almost 90 percent of our challenge and completed major things. Doctor will be risk free from the infection of Covid-19 patient for implement this system. And where patient also be monitoring. Hopefully Doctor and patient will be benefited from this system.

Our future plan:

1.We will try to convert this website base to android base.

2. We will try to monitoring blood pressure and oxygen saturation.

3. We want to implement it for public place where there are huge number of people movement. Where it will take temperature, pulse rate, oxygen saturation and if it's match with covid-19's symptoms then an alert message will show and an message will given to authority.

Appendices:

Arduino:

```
#include <LiquidCrystal.h>

const int RS = 2, E = 3, D4 = 5, D5 = 8, D6 = 9, D7 = 12;// 2, 3, 5, 8, 9, 12
LiquidCrystal lcd(RS, E, D4, D5, D6, D7);

const int LED = 7;

void setup() {
  Serial.begin(9600);
  lcd.begin(16, 2);
  pinMode(LED, OUTPUT);
}
```

```
void loop() {
  digitalWrite(LED, HIGH);
  float Temp = analogRead(1);

  Temp=(Temp*5.0/1024)*100;
  Temp = (Temp * 9/5) + 32;

  lcd.setCursor(0,0);
  lcd.print("TEMP: ");
  lcd.print(Temp);
  lcd.print(" *F");

  lcd.setCursor(0,1);
  lcd.print("PULSE: ");

  delay(350);
  lcd.clear();
}
```

NodeMCU:

```
#include <ESP8266WiFi.h>
#include <FirebaseArduino.h>

#define FIREBASE_HOST "covid-19-78b8e-default-rtdb.firebaseio.com"
#define FIREBASE_AUTH "g1OHyuq2FmqWpkg6gzyUuERuNbrHZP9VhH5rc8x3"
#define WIFI_SSID "POCO M3"
#define WIFI_PASSWORD "1234567ii"

const int Pulsepin = A0;
int Threshold = 550;
int Signal;
int c=0;
int LED = D5;
```

```
void setup() {
  Serial.begin(9600);
  pinMode(LED, OUTPUT);
  WiFi.begin(WIFI_SSID, WIFI_PASSWORD);
  Serial.print("connecting");
  while (WiFi.status() != WL_CONNECTED) {
    Serial.print(".");
    delay(500);
  }
  Serial.println();
  Serial.print("connected: ");
  digitalWrite(LED, HIGH);
  Serial.println(WiFi.localIP());
  delay(500);
  Firebase.begin(FIREBASE_HOST, FIREBASE_AUTH);
}

int n = 0;

void loop() {
  Signal = analogRead(Pulsepin);

  Serial.print("Signal: ");
  Serial.println(Signal);

  Firebase.setFloat("test", c++);
  if(Signal > Threshold && Signal < 900){
    int BPM = Signal / 8;
    Firebase.setFloat("Pulse/1/BPM", BPM);
    Serial.print("BPM: ");
    Serial.println(BPM);
  }
  delay(500);
}
```