Data Analytics In Health Monitoring System

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Abstract— **In recent days fast contactless spreading of the covid-19 virus, the covid-19 patient not getting beds in hospital and so many are staying in home quarantine. We are monitoring the health of covid-19 home quarantine patient from hospital. We are using Heartbeat sensor, SpO2 sensor and temperature sensor to monitor the patient health. The data of each patient is sent and store in cloud. Using data analytics the patient data will monitor by doctor. The doctor can monitor all the co-vid patients health from hospital. The medical device is applied to determine the patient's critical status of the effects of the coronavirus or its symptoms using heartbeat, temperature and Oxygen concentration (SpO2) that are evaluated using our custom algorithm. Until now, it has been found that many coronavirus patients remain asymptomatic, but in case of known symptoms, a person can be quickly identified with our device. It also allows doctors to examine their patients without the need for physical direct contact with them to reduce the possibility of infection. It analysing the patient's data and shows the patient's health condition. When the patient get serious the doctor gets alerts immediately the doctor take care the serious patient's health.**

I. INTRODUCTION

Coronaviruses are a broad range of contagions that can cause disease in both animals and humans. The coronavirus is caused by a novel coronavirus that was just discovered. first complaint in year 2019 is upon us (COVID-19). According to the centre for Disease Control and Prevention (CDC), there are at least seven different fatal coronaviruses that have been identified so far, with the number likely to grow in the future. As of March 2021, the virus has led to 117 million cases and 2.7 million deaths. When a sick person coughs, sneezes, or talks, COVID-19 is transmitted through respiratory droplets emitted from the nose or mouth.

These drops are relatively heavy and don't cover large distances. Covid-19 can be contracted if the drops are inhaled. For this, it's so important to stay at least one meter away from the peoples. Around a sick individual, these droplets can be discovered on items or surfaces (tables, door handles, ramps, etc.). If someone comes into contact with certain objects or surfaces and subsequently contacts their eyes, nose, or mouth, COVID-19 can be contracted. COVID-19 coronavirus incubation time, or the time between contamination and the development of the first symptoms, is typically three to five days. During the days, if a person carries the virus before the first symptoms appear, they are contagious. Scientists and researchers have uncovered several signs that may identify a person afflicted with the coronavirus, similar to other known viruses and diseases. Fever, tiredness, and a dry cough are the most typical symptoms of covid-19. Pain and wheezing, headache, sore throat, loss of taste or smell, nasal congestion, and rash are some of the less common symptoms. These signs and symptoms are usually minor. Some people have had to deal with extremely severe symptoms in the past. As can be seen, doctors are still unable to pinpoint specific symptoms for virus detection. Taking into account all of these factors, including the difficulty in diagnosing the virus and the difficulty in treating it due to its contactless spread in the patient's environment, the presence of coronavirus in a patient can be detected using remote methods with minimal medical staff involvement

II. RELATED WORK

In this paper [1],the author says that the fact how and why the understanding of the health monitoring system by using the IOT tools, which are recommended to acquire the specifications and use the data that is acquired from the IOT tools is important, In this paper [2],the author saysthatBig data analytics on IoT based Health care system is proposed. IoT based health care monitoring system comprises of "Internet of health sensor things". These things produce huge volumes of data that could not be handled by the physician, In this paper [3],the author saysthat it includes many devices communication between them by intelligent decisions. building modern IOT system based smart devices and sensors is the best solution to detect the patient of COVID-19 at real time, In this paper [4],the author saysthat with the help of

IoT's such features, will help to keep the necessary details and reports of a patient organized and available to all actors in the system. IoT devices like low power sensors will be used to collect data from patients and it will be displayed using LCD and stored on any personal computer and also on the cloud so that any actor in the system can refer to it, In this paper [5],the author saysthat to provide a cost-effective IoT-based framework that will assist organizations in adhering to COVID-19 protection rules and recommendations in order to prevent disease transmission. It concentrates on the most common indoor precautions: people with elevated body temperatures should remain at home, masks must be worn, and people should be separated by at least 1.5-2 meters.

III. SYSTEM ANALYSIS AND DESIGN

A. Existing System

In Existing system, there is no centralized health monitoring system for particular hospital. For home quarantine people, doctor doesn't know patient health report. We do not have monitoring system in home. The monitoring system is fixed in hospital. 24/7 a person can monitor the health. The patient's data cannot be stores in cloud.

B. Proposed System

In proposed system, we consists of microcontroller prototype it contains various sensors used to measure the patient health such as heart rate, temperature and SpO2. Once collected data is sent to microcontroller (Arduino-UNO) it is responsible for forwarding the data to connected Wi-Fi module(esp8266). The Wi-Fi module takes the data from Arduino and send it cloud. The doctor can monitor data of different patient periodically. When the patient gets serious the doctor gets alert.

C. Methodology

This project does health monitoring. In this, the health of a patient is monitored with some sensors Temperature, MAX30100. This will monitor the health of the patient. In this we are using Arduino uno microcontroller that will send data of the sensors is sent to cloud through Wi-Fi module.

In this we are using esp8266 Wi-Fi module to microcontroller and sends data to cloud. We are using Thing speak to store the data of sensors. In Thing speak we have to create API keys. This key is required for programming modifications and setting your data. Data will store in excel in Thing speak.

Using get data we using the analytics we will divide the data into Non-symptomatic, Mild symptoms, Moderate clinical symptoms, Serious clinical symptoms.

When the patient gets serious clinical symptoms the doctor gets alert.

	Non-symptomatic	Mild symptoms	Moderate clinical symptoms	Serious clinical symptoms
Temperature	≤ 37.2 °C	36 °C ≤ 38 °C	≥ 38 °C	> 38 °C

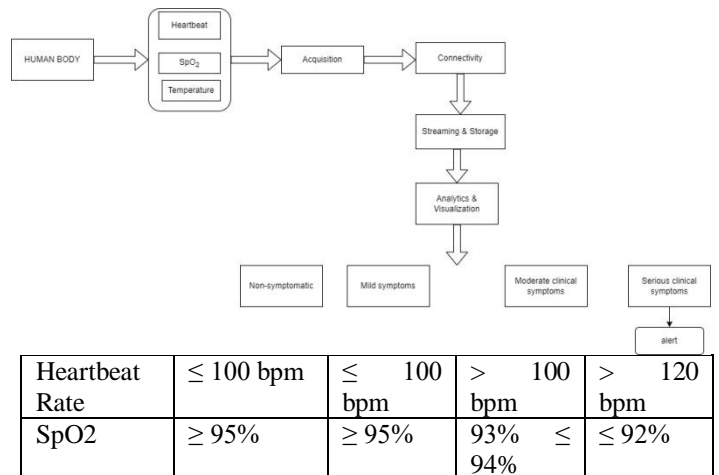| Heartbeat Rate	≤ 100 bpm	≤ 100 bpm	> 100 bpm	> 120 bpm
SpO2	≥ 95%	≥ 95%	93% ≤ 94%	≤ 92%

Figure 1 Flow Diagram of System

IV. MODULES

A. Arduino-Uno

The Uno is one of the most popular Arduino boards. It consists of 14-digital I/O pins, where 6-pinscan PWM (pulse width modulation) outputs, 6-analog inputs, a reset button, a power jack, a USB connection, and more can all be found on this device. It comes with everything you'll need to mount the microcontroller; all you have to do now is plug it into a computer using a USB cable and give the supply to get started with a battery or an AC-to-DC adapter.

Figure 2 Arduino-Uno

B. ESP8266 WI-FI module

The Module is a self-contained SOC with an integrated TCP/IP protocol mound that can grant access to your Wi-Fi network to any microcontroller. The ESP8266 can either host

an operation or decompress all Wi-Fi networking functions from another processor.

This module has sufficient on-board processing and storage capability to allow it to be integrated with detectors and other operation-specific bias via its GPI0s with minimal development and loading during runtime.

Figure 3 ESP8266 Wi-Fi Module

C. Temperature Sensor

Temperature can be measured more directly with the LM35 than with a thermistor.It also has a lower tone heating than a thermistor.It also has a low tone-heating effect,causing a temperature rise of less than 0.1°Cin still air.The operating temperature range is -55 to 150 °C
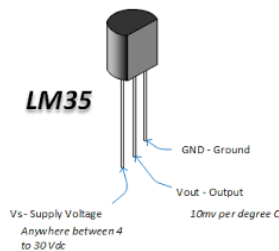

Figure 4 LM35

D. MAX30100 Sensor

It's a integrated pulse oximetry and a heart-rate sensor. It's an optical sensor that derives threading from emitting two wavelengths of light from two LEDs. This particular LED combination is optimized for reading the data through the tip of one's finger. The signal is processed through a low-noise analog signal processing unit and communicated to the MCU.

Figure 5 MAX30100

V. RESULTS AND DISCUSSION

This project does health monitoring. In this , the health of a patient is monitored with some sensors Temperature,MAX30100.This will monitor the health of the patient. In this we are using Arduino uno microcontroller that will send data of the sensors is sent to cloud through Wi-Fi module.

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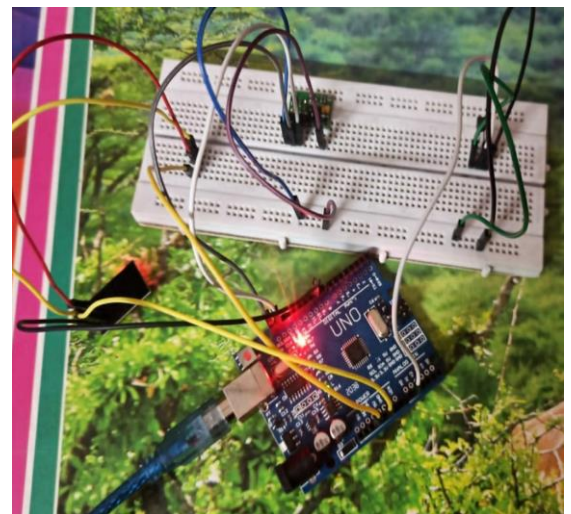

Figure 6 Cricut

From doing above project the health monitoring process made in smart way. The doctor can easily monitor the patient situation always by sitting in hospital. It is very ease for the doctor and patient to interaction. It will get alert to doctor when patient is serious.

When a person reported with covid-19 positive the hospital have no bed. The patient gets the device. The device will monitor the health of the patient. The data of the patient will send to cloud using wi-fi. The data of the patient will store in the excel in Thing speak. Using the data when the patient get serious the doctor gets alert.
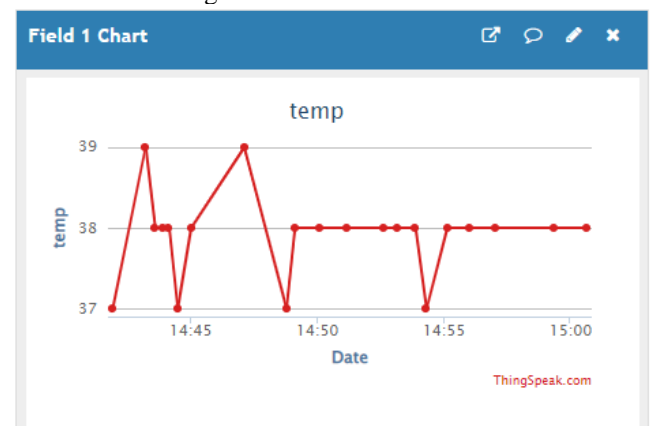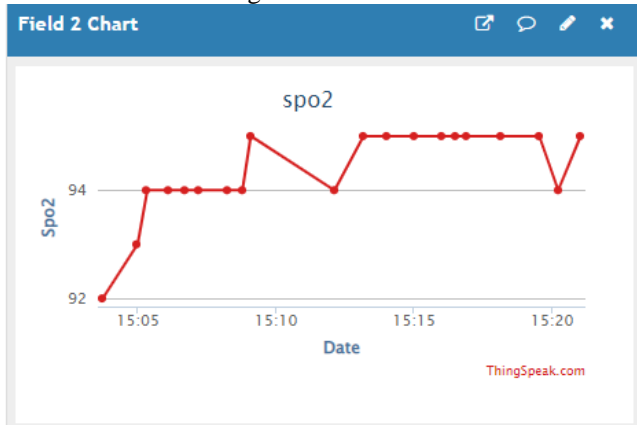
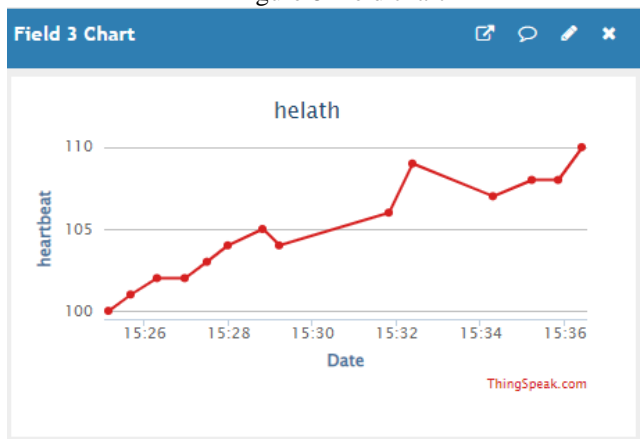Figure 7 Field chart

Figure 8 Field chart

Figure 9 Field chart

VI. CONCLUSION

We design a IOT based health monitoring system which can monitor the health of a covid-19 positive patients with Mild symptoms. Since patient's all the health information are maintained in the cloud, they don't need to maintain their records in home.so, the health records can seethe doctor's When the patient gets serious clinical symptoms the doctor gets alert. Finally, the health monitoring will help all the covid-19 patients

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