

Covid Patient Health Monitoring System

Janani.J¹, Aishwarya.M², Ms. A Sangeerani Devi M.E³ and Dr.A.Chinnasamy⁴

¹⁻³Dept of Computer Science and Engineering, Sri SaiRam Engineering college, Chennai, India

Email: e8cs093@sairamtap.edu.in, e8cs074@sairamtap.edu.in, sangeerani.cse@sairam.edu.in

⁴Associate professor, Dept of Computer Science and Engineering, Sri SaiRam Engineering college, Chennai, India
Email: chinnaamy.cse@sairam.edu.in

Abstract—Over the most recent couple of years, the gigantic innovation upset has been seen in the clinical business concerning continuous wellbeing checking applications using the Internet of Things (IoT). Low power sensor node design with reliable and low delay in communication has paramount importance for such applications. In this project, we have come up with a design of reliable, low power and cost-effective health monitoring system for Covid-19 Patients. The proposed system uses the IoT for monitoring the covid patient's health condition. All the on-body sensors with a microcontroller constitute a node. Patient health can be monitored using varied parameters. The node in the proposed system measures health parameters that include body temperature, Pulse Rate, and Respiration.

Index Terms— Microcontroller, LCD, Wireless body area network (WBAN), IoT, Health Monitoring System.

I. INTRODUCTION

Web of Things (IoT) improvement acquires new freedoms numerous applications, including keen urban areas and shrewd medical care. At present, the essential utilization of the IoT in medical care can be arranged as distant observing and constant wellbeing frameworks. Controlling and overseeing desperate circumstances, for example, the one of every 2020 when the Covid sickness (COVID-19) assumed control over the world, can be accomplished with the assistance of IoT frameworks, without forcing serious limitations on individuals and businesses. Coronavirus causes respiratory manifestations and seems, by all accounts, to be more infectious in contrast with SARS in 2003. By executing better frameworks for reconnaissance, medical services, and transportation, infectious illnesses will have less possibility of spreading. An IoT framework, joined with Artificial Intelligence (AI), may offer the accompanying commitments while thinking about a pandemic: 1) improving public security utilizing reconnaissance and picture acknowledgment frameworks, 2) using drones for supply, conveyance, or sterilization, 3) contact following and restricting individuals' admittance to public places through applications and stages engaged with AI. An IoT framework for medical care is ordinarily made out of numerous sensors associated with a worker; it gives realtime observing of a climate or clients. In a pandemic, AI-helped sensors can be utilized to help anticipate whether individuals are contaminated with the infection, in light of signs, for example, internal heat level, hacking examples, and blood oxygen levels. During the advancement of such stages, it is additionally vital to consider security and information the executives altogether to forestall maltreatment of individual data.

By utilizing wearables and other home checking hardware implanted with IoT, doctors can monitor patients well being all the more successfully. They can follow patients adherence to therapy plans or any requirement for sure

fire clinical consideration. IoT empowers medical services experts to be more attentive and interface with the patients proactively. Information gathered from IoT gadgets can help doctors distinguish the best treatment measure for patients and come to the normal results.

II. RELATED WORK

During the most recent days, diverse IoT applications have been proposed to improve medical care frameworks. The IoT can be utilized for distant patient observing, e.g., interfacing seniors who have ongoing infections to specialists and clinical assets. IoT applications have been carried out to help individuals with Parkinson's and Alzheimer's illness. It offers disaster management for seniors who are living alone and need special care and can also be applied to manage equipment and patients in hospitals. In a smart healthcare setting, the IoT can assist with giving a far off finding before clinics for more effective therapy. For diabetic patients, it is vital to monitor their blood glucose continuously; blood glucose data can be sent from wearable sensors to doctors or smartphones for continuous monitoring of patients' state of health. Castillejo et al. build up an IoT e-wellbeing framework dependent on Wireless Sensor Networks (WSN) for firemen.

In this article, the proposed COVID-SAFE framework offers: 1) a low-cost and lightweight IoT node to monitor continually a person's body temperature, heart rate, and blood oxygen saturation. 2) separate user id is given to each patient and the patient current status is updated.

III. SYSTEM ANALYSIS

Framework Analysis is a joined interaction taking apart the framework obligations that depend on the issue space attributes and client prerequisites.

A. Existing System

In medical clinics, where patient's status should be consistently checked, is normally done by a specialist or other paramedical staff by continually noticing some significant boundaries, for example, internal heat level, heartbeat, and circulatory strain hence, this assignment gets drawn-out after some time. Hence it can cause problems. However, many researchers have attempted before to solve it in many different ways, but the earlier methods in several cases either SMS will be sent using GSM. But in this pandemic situation, it takes a lot more time to monitor all the patients.

B. Major Hardware Components

Some kind of equipment parts is being utilized in the proposed framework. The parts which are utilized to build up the framework are laid out as follows.

i. *Body Temperature Sensor (LM35):*

The LM35 arrangement are precise improved temperature circuits with yield voltage, which is directly comparative with the temperature in centigrade. The LM35 has a vantage point over Kelvin's straight temperature sensors, as a reasonable centigrade scaling doesn't permit the customer to erase the tremendous steady voltage from the showcase. LM35 is appeared in Fig. 1A.

ii. *MAX30100 sensor(spo2 sensor):*

Pulse click conveys Maxim's MAX30100 incorporated heartbeat oximetry and a pulse sensor. It's an optical sensor that gets its readings from emanating two frequencies of light from two LEDs – a red and an infrared one – at that point estimating the absorbance of beating blood through a photodetector. This specific LED shading blend is advanced for perusing the information through the tip of one's finger.



Fig. 1A



Fig 1B

Fig.1A Body Temperature Sensor (LM35) Fig. 1B Sound Sensor Fig. 1C Node MCU Fig.1D MAX30100

iii. Node MCU

As Arduino.cc began becoming new MCU sheets reliant on non-AVR processors like the ARM/SAM MCU and used in the Arduino Due, they expected to change the Arduino IDE with the objective that it would be for the most part easy to change the IDE to help substitute toolchains to allow Arduino C/C++ to be gathered for these new processors. They did this with the presentation of the Board Manager and the SAM Core. A "center" is the assortment of programming segments needed by the Board Manager and the Arduino IDE to aggregate an Arduino C/C++ source record for the objective MCU's machine language. Some ESP8266 lovers built up an Arduino center for the ESP8266 WiFi SoC, famously called the "ESP8266 Core for the Arduino IDE". This has become a main programming improvement stage for the different ESP8266-based modules and advancement sheets, incorporating NodeMCUs appeared in Fig.1C.

iv. Sound sensor

The receiver sound sensor, as the name says, distinguishes sound. It gives an estimation of how noisy a sound is. There are a wide assortment of these sensors. In the figure underneath you can see the most well-known utilized with the Arduino. We utilize this to gauge the breath rate. Sound sensor is appeared in Fig 1B.



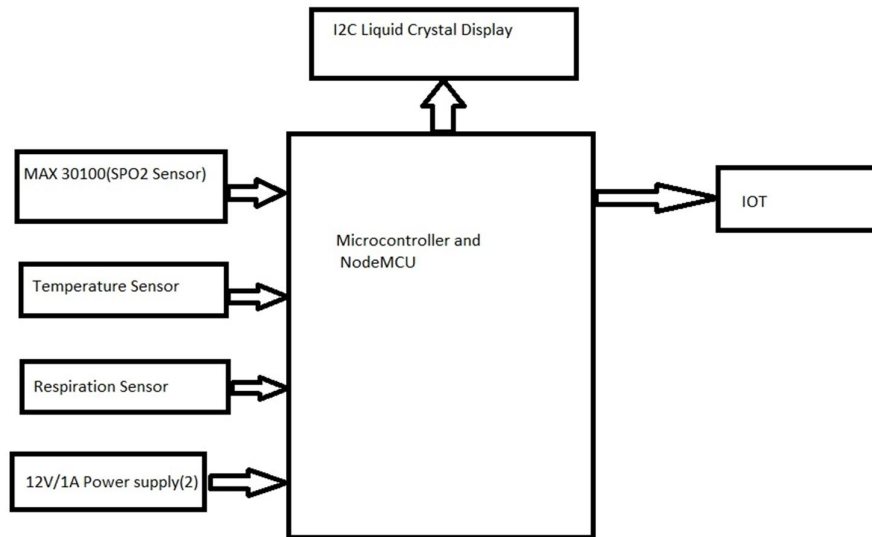
Fig. 1C



Fig. 1D

C. The Proposed Monitoring Mechanism

The proposed system in this paper thinks about the people who are isolated for 14 days, which is the COVID-19 brooding period. During this period, the isolated people, particularly the oldest, should be observed, and the Coronavirus manifestations ought to be thought of. The temperature is a typical manifestation, henceforth, it should be observed by the clinical supplier. The oldest have high danger of COVID-19, and it is hard for them to go to the emergency clinic or be checked straightforwardly at home by their family members. Hence, the proposed checking component can assist them with being checked during their isolate period by a specialist. The checking cycle in the proposed component is done distantly by applying the IoT innovation, where the LM35 temperature sensor is associated with an isolated individual and screens his/her temperature by utilizing Arduino Uno.



Arduino Uno gets simple signs from the sensor and changes them over to the relating advanced structure. From that point forward, the microcontroller measures the computerized information and sends the readings to the cloud which goes about as a worker. At that point the recipient side (specialist) can get the readings immediately. In the proposed framework, sensor's information is saved, dissected and pictured in the cloud by utilizing ThingSpeak, which is an IoT stage that gives moment perceptions of the information posted by the sensors represents the square chart of the proposed system. The Arduino Uno measures the signs and gives the comparing computerized perusing of the temperature in Celsius. From that point forward, ESP8266 Wi-Fi module associates with the accessible Wi-Fi and sends the information to the IoT worker, which is ThingSpeak in the proposed instrument. At last, the specialist can screen the information immediately from anyplace on the planet by signing into ThingSpeak channel identified with the proposed instrument. By making a record in ThingSpeak, you will actually want to make a particular channel for perusing and composing information, and imagining it as a graph for additional choices Fig. 2 shows the made channel for this application.

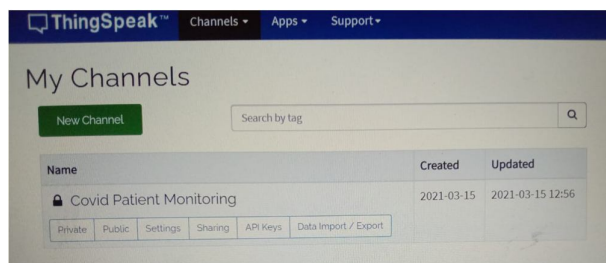


Fig 2 Quarantined Person Monitoring Channel

Fig. 2 shows the COVID-19 Quarantined Person Monitoring channel. Programming interface keys are produced naturally for composing the information to a channel or perusing the information from a channel by means of

Programming interface demands. The graphical yield at the predetermined channel at the cloud (ThingSpeak) can be handily observed immediately at anyplace on the planet by the specialist, and if the readings of the isolated individual are high, at that point the specialist will take the right activity to manage that individual and take him/her to the emergency clinic.

Figures shows some readings of a person's temperature, respiration, spo2 and heartrate which are output on the cloud.

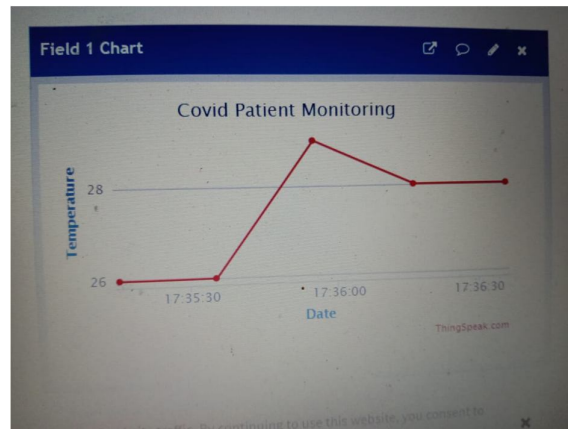


Fig 3A Output Temperature's Reading

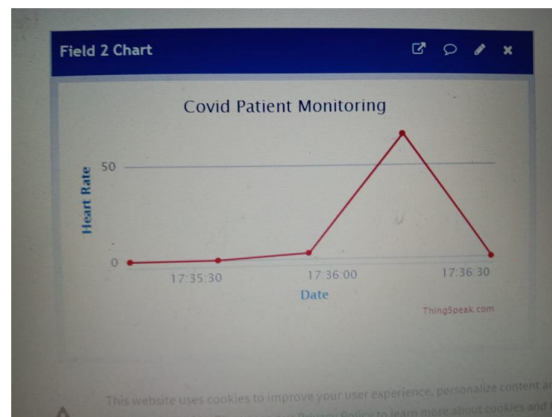


Fig 3B Output heartrate's Reading

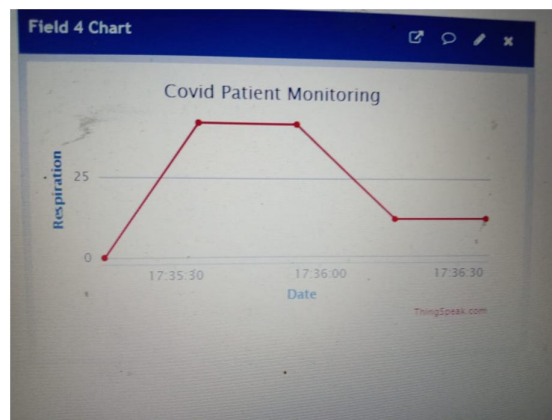


Fig 3C Output Resiration's Reading

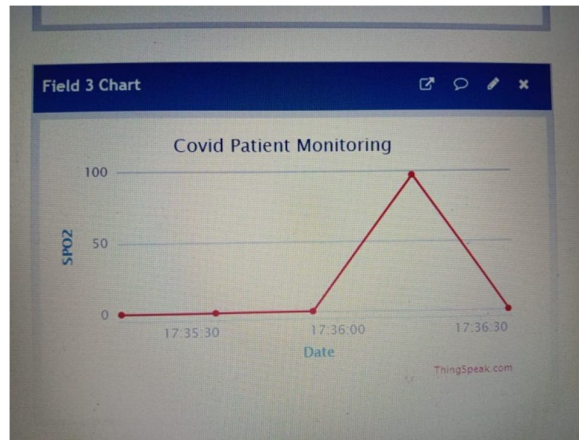


Fig 3D Output SPO₂'s Reading

Fig.3 shows a few readings of the isolated individual's temperature, SPO₂, Respiration and heartrate appeared at the ThingSpeak. The specialist can now sign into the cloud and see the graphical yield to check the status of the isolated individual during the isolate period, for example 14 days. This interaction can help the specialists in observing the enormous number of the isolated people straightforwardly in their houses, and it will likewise diminish the enormous number of emergency clinic's passages.

IV. CONCLUSION

The COVID-19 is an irresistible illness was started in China and spread quickly all throughout the planet. The fundamental significant issue in this new contamination is the fast spread, and as needs be the expanding number of the contaminated cases. The isolate measure is likewise a vital issue to manage the huge number of the people who contact the tainted people. The proposed system gives a live observing of the isolated people, particularly the oldest, during their isolate period. The proposed instrument helps the specialists to manage this huge number of isolated people distantly. The ThingSpeak IoT stage gives a graphical yield of the detected information which makes the examination as simple as conceivable.

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