

Post-Covid Patient Monitoring System

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Abstract: - With an improvement in technology and miniaturization of sensors, there have been attempts to utilize the new technology in various areas to improve the quality of human life. One main area of research that has seen an adoption of the technology is the healthcare sector. Post COVID infection patients are requested to be in home quarantine and monitoring becomes mandatory. The primary goal of the project is to develop a post-COVID patient Monitoring System, which records the patient heart beat rate, body temperature and blood oxygen level. Pulse rate, body temperature and blood oxygen level readings are monitored and transferred to cloud. Data are also recorded in Google spreadsheets with the help of IFTTT software so that patient health can be monitored from anywhere in the world over internet. IFTTT, React and Thing HTTP applications are used to generate and send the alert message through email. A panic button is also incorporated in the system so that patient can send messages in case of emergency.

Key Words: —*Thingspeak, IFTTT, pulse rate, temperature, blood oxygen level.*

I. INTRODUCTION

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 world to an extent is an example how health care has become of major importance. In such areas where the epidemic is spread, it is always a better idea to monitor these patients using remote patient monitoring technology.

So Internet of Things (IoT) based patient monitoring system is the current solution for it. Remote Patient Monitoring arrangement empowers observation of patients outside of customary clinical settings (e.g. at home), which expands access to human services offices at bring down expenses.

With an improvement in technology and miniaturization of sensors, there have been attempts to utilize the new technology in various areas to improve the quality of human life. One main area of research that has seen an adoption of the technology is the healthcare sector. The people in need of healthcare services find it very expensive this is particularly true in developing countries. Healthcare is given the extreme importance now a-days by each country with the advent of the novel corona virus.

Post an infection, most individuals do gain sufficient antibodies which prevent chances of reinfection.

However, it is still not conclusive as to how long can immunity last. Reinfection cases have been documented as well. More so, for people who belong to a high-risk category, or are old, taking preventive measures to further safe guard immunity can be quite helpful.

The core objective of this project is the design and implementation of a post covid patient monitoring system that uses Sensors to track patient health and uses internet to inform their loved ones in case of any issues. The objective of developing monitoring systems is to reduce health care costs by reducing physician office visits, hospitalizations, and diagnostic testing procedure.

II. PROPOSED METHODOLOGY

Post an infection; most individuals do gain sufficient antibodies which prevent chances of reinfection. However, it's still not conclusive as to how long can immunity last. Reinfection cases have been documented as well. More so, for people who belong to a high-risk category, or are old, taking preventive measures to further safeguard immunity can be quite helpful.

Hence, post-COVID infection, remote monitoring of patients are mandatory. In this project, sensor values are sent from microcontroller to Python using serial communication and then to thingspeak channel. Pulse rate, body temperature and blood oxygen level readings are recorded over ThingSpeak channel

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and continuously monitored over the internet. Data are also recorded in Google spread sheets with the help of IFTTT software so that patient health can be monitored from anywhere in the world over internet.

Mail alert will be sent to respective individuals using IFTTT, React and ThingHTTP app whenever the values go beyond critical values. A panic button is attached so that patient can press it to send email in case of emergency.

With this project, patient monitoring can be done in real-time, drastically cutting down the need for doctors going out, making visits, and thus making it very helpful in situations like COVID.

III. DESIGN

Post covid patient monitoring system includes hardware as well as software components. The hardware components include MLX90614 temperature sensor, MAX30100 pulse oximeter sensor, Arduino UNO board, push button etc., The software part includes thingspeak, IFTTT, python, react and thing HTTP app.

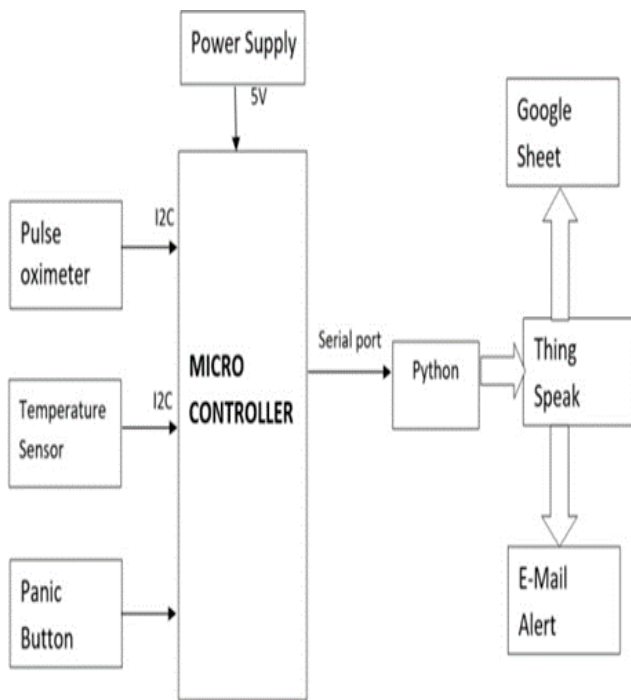


Fig.1. Block diagram of Post-COVID patient monitoring system

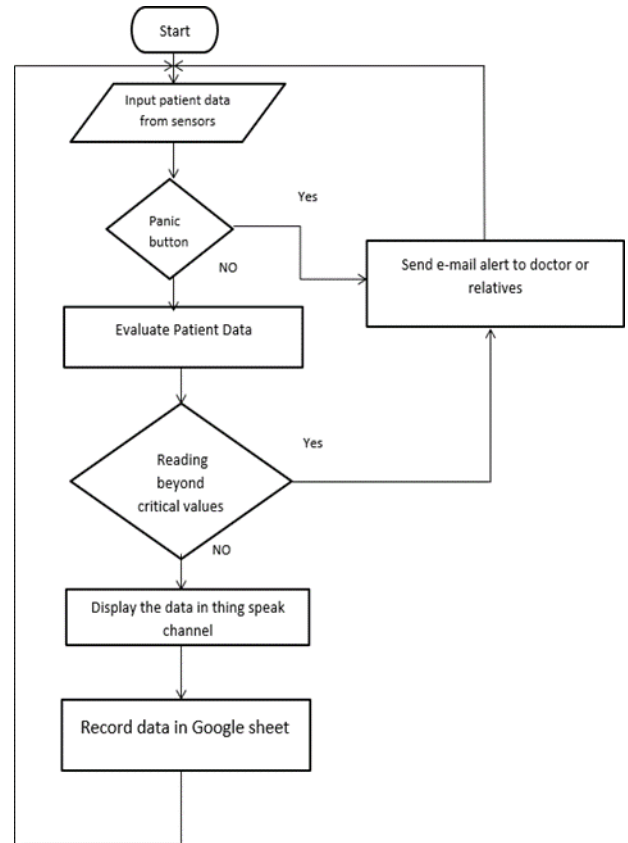


Fig .2. Flow chart of Post-COVID patient monitoring system

The data are obtained from the sensors. The panic button value is also obtained. If the panic button is pressed, then email alert is send to the doctor or relatives. After that, the sensor values are checked for normal range. The normal range of pulse rate is 60-120 bpm, the normal range of temperature is 36-38°C and the normal range of SPO2 is 90- 100%. If any of the sensor values are beyond or below the normal range, then email alert is send to the doctor or relatives. Then the data are recorded in the thingspeak channel as well as in the google spreadsheets.

IV. THINGSPEAK

ThingSpeak is an open-source Internet of Things (IoT) application and API to store and retrieve data from things using the HTTP and MQTT protocol over the Internet or via a Local Area Network. ThingSpeak enables the creation of sensor logging applications, location tracking applications, and a social network of things with status updates.

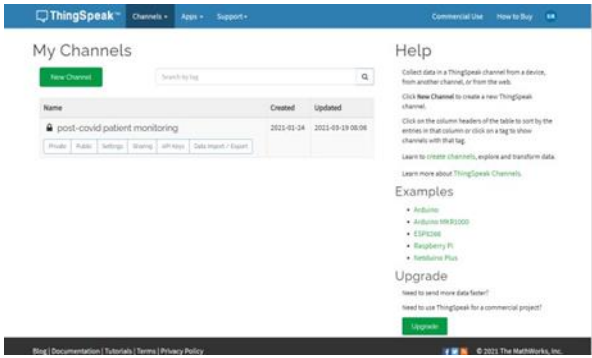


Fig.3. Post covid patient monitoring channel

ThingHTTP enables communication among devices, websites, and web services without having to implement the protocol on the device level. When someone specifies actions in ThingHTTP, which can be triggered using other ThingSpeak apps such as TweetControl, TimeControl, and React. In this project, React is used in order to trigger thingHTTP.

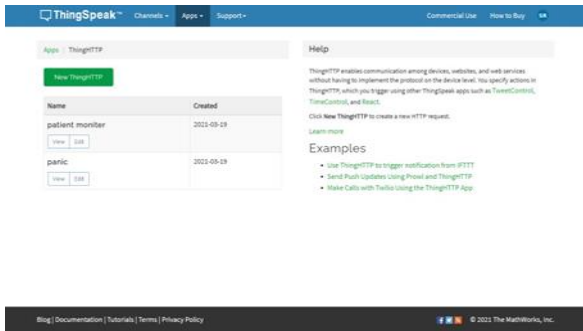


Fig.4. Summary of thingHTTP objects

React app allows the user to trigger a ThingHTTP request or send a tweet using ThingTweet when your ThingSpeak Channel meets a certain condition. The React app can evaluate ThingSpeak channel data and trigger other events. Create an instance of the React app that triggers the thingHTTP request.

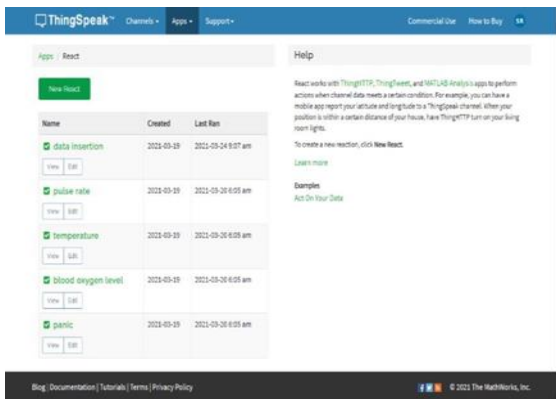


Fig.5. Summary of React objects

V. RESULTS AND DISCUSSION

The results of our proposed work is as follows. Fig.6. shows the thingspeak channel output. There are four fields in the thingspeak channel to store the four values pulse rate, temperature, blood oxygen level and panic button

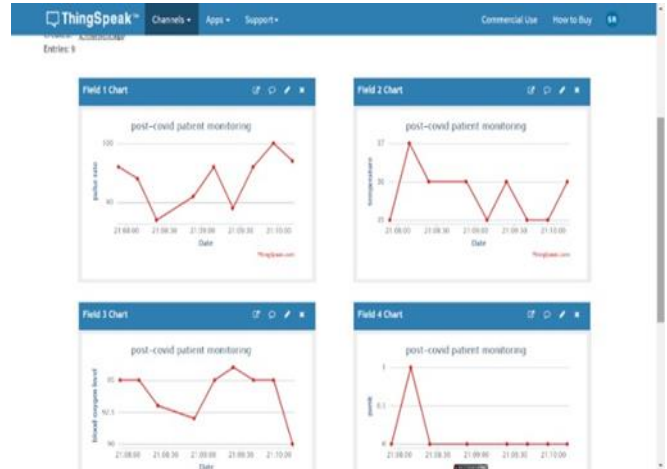


Fig. 6. Thingspeak channel output

Once the data are recorded in the thingspeak channel, all the data are recorded in google spreadsheets which is shown in Fig.7. The first column represents the data and time of the event, the second column shows the event name and the pulse rate, temperature and blood oxygen level are recorded in successive columns as row 3, column 4 and column 5 respectively. Whenever patient presses the panic button, an alert email is sent with the pulse rate, temperature, and blood oxygen level at that moment which is shown in Fig.8.

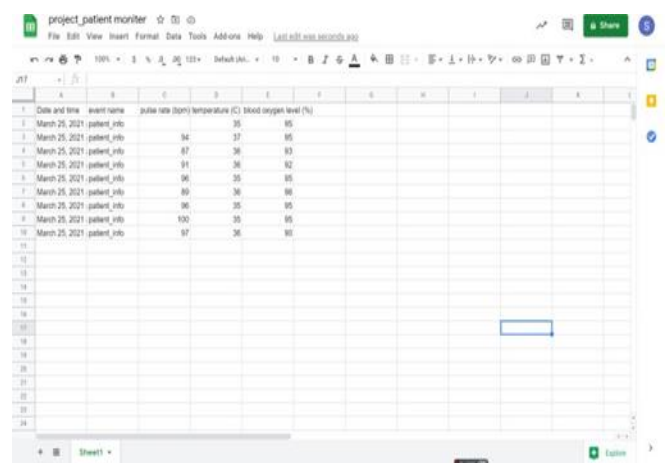


Fig.7. Google spreadsheet output

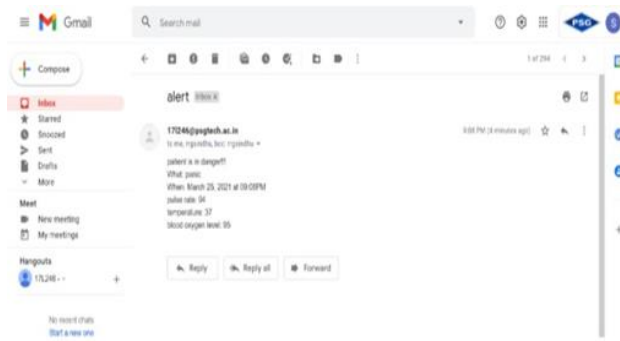


Fig.8. Mail alert for panic

VI. CONCLUSION AND FUTURE SCOPE

The main aim of the project is to develop a post covid patient monitoring system to continuously monitor the patient data and providing the patient information through google sheets and thingspeak channels. Another important objective of this project is to evaluate patient data and if the readings go beyond the critical values or if the patient presses the panic button, alert message will be sent to the respective individuals through mail. In this project, the development and integration of all software modules and sensors are carried out successfully. The main advantage of this project is that with this project, patient monitoring can be done in real-time, drastically cutting down the need for doctors making visits and thus making it very helpful in situations like COVID. The limitation of this project is that there is a delay of 60 seconds approximately in updating the sensor values in the thingspeak channels because everytime Python has to request the thingspeak channel and only when the permission is granted, the values are updated which results in delay. The future scope of this project includes adding more sensors like pressure sensor and ECG sensor and with the help of the parameters diagnosing diseases like cold, fever and cardiac related diseases.

REFERENCES

- [1]. D. S. R. Krishnan, S. C. Gupta and T. Choudhury, "An IoT based Patient Health Monitoring System," International Conference on Advances in Computing and Communication Engineering, June 2018.
- [2]. G. G. Warsi, K. Hans and S. K. Khatri, "IOT Based Remote Patient Health Monitoring System", International Conference on Machine Learning, Big Data, Cloud and Parallel Computing, Feb 2019.
- [3]. M. R. Ruman, A. Barua, W. Rahman, K. R. Jahan, "IoT Based Emergency Health Monitoring System", Feb 2020.
- [4]. A. Rahman, T. Rahman, N. H. Ghani, "IoT Based Patient Monitoring System Using ECG Sensor", Jan 2019.
- [5]. Aleksandar Kotevski and Natasa Koceska, "E-health monitoring system", June 2016.
- [6]. V. Yeri and D. C. Shubhangi, "IoT based Real Time Health Monitoring," July 2020.
- [7]. K Hari Kishore, K.V.Surendra Nath, "IOT Based Smart Health Monitoring Alert Device", April 2019.
- [8]. M. Sathya, S. Madhan, "IoT based health monitoring", 2018.
- [9]. Nor Shahanim Mohamad Hadis, Muhammad Nazri Amirnazarullah, "IoT Based Patient Monitoring System using Sensors to Detect, Analyse and Monitor Two Primary Vital Signs", April, 2019.
- [10]. T. Khan and M. K. Chattopadhyay, "Smart health monitoring system", International Conference on Information, Communication, Instrumentation and Control, Aug, 2017.
- [11]. MLX90614 temperature sensor datasheet (alldatasheet.com).