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Health Monitoring System Using IoT

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Abstract: ***Health on of the key aspects of any human's life and one needs to keep up good health to make progress in life. We see most of the people facing health issues during different times during their life and it is their first job as an individual to keep up their health. As weare already seeing the novel coronavirus has devastated the world for the past few months and continues to do so. We see many cases like people living in distant villages and towns where there are no proper medical facilities to have a health check-up once in a while, they need to travel long distances to get a basic health checkup done. Especially the old people who cannot travel much due to their age.*** *A human's health can be carefully monitored and a reasonable outcome can be predicted to avoid unfortunate deaths or misfortunate occurrences by measuring temperature, sp02, or pulse and Strain upon the muscles. These factors are being collected by various devices, but have never been classified and carefully monitored for anomalies. So this system is the best option to counter the situation as it collects data and stores it in the webserver and also gives alerts.*

Keywords: Health, Sensors, Internet of things

I. INTRODUCTION

Health has always been the major concern in anyone's life and if one is healthy, he can achieve any goal in life with hard work. As we are seeing the pandemic that hit us a few months ago, the coronavirus or Covid 19 virus has hit us badly. It is a growing concern at present and also due to the pandemic the countries are shut down to stop the contamination of the virus which has, in turn, lead to global and individual countries facing an economic crisis and the proposed system helps us in monitoring our health at home. This system allows the doctors and nurses to monitor the patient's details from a distance which reduces the risk of transmission. It has sensors that take the data and process it and stores the info in the cloud server. The data includes sp02, pulse, and sp02 levels which fluctuate when a person is infected with the virus. So, the health monitoring device using Iot is the way forward during this pandemic. It is handy not only during the pandemic but only when there are bedridden patients the System can be used for them also to keep a check on the patients. And even when the family or doctors are away the patient details are being stored on the server, so the doctor can come back later and check the information. The sensors are connected to a microcontroller which is also connected to an LCD screen, when the data is being read the info not only is updated on the server but also generates alerts on the screen and also with a buzzer which alerts the doctor and the patient's dear ones that there anomalies in the readings[1]. The system generates alertswhen the sp02 or pulse or temperature goes beyond a limit so that the patient can be given the utmost attention. We have seen that the situation during the second wave has been worse, people are having a tough time finding a bed in hospitals, so the people who have a mild infection can stay in home quarantine, and with the help of this kit the doctor and their dear ones can monitor them at home which will pave the path for patients who are highly infected to get beds in the hospital

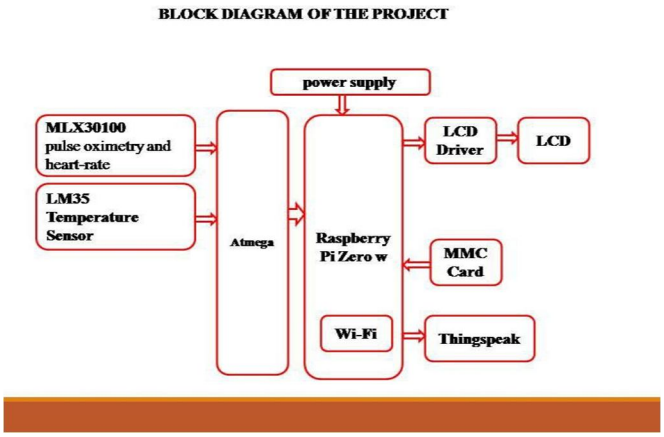

Fig 1: Block diagram

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II. LITERATURE REVIEW

Remote patient monitoring (RPM) uses digitaltechnologies to collect medical and other forms of health data from individuals in one location and electronically transmit that information securely to health care providers in a different location for assessment. Health monitoring is very important in terms of prevention, particularly if the early detection of diseases can reduce suffering and medical costs. It can radically improve alternatives for the medical treatmentof the patient. This project aims at developing a system that is capable of monitoring the patient's medical parameters likepulse oximetry and heart-rate signals, Temperature wirelesslythrough a WI-FI module using thing speak. Also, IoT and cloud-based computing are the basis of telemedicine, as not everyone can go to the clinic to get their health check-up. Body wireless sensor Network (BWSN) is used in IoT as a basis of such projects where the parameters are collected andsent to the webserver using the Raspberry Pi Zero W microcontroller. The Sensors are interfaced to the RaspberryPi Zero W and also the raspberry pi has an interface with an LCD screen where the data is displayed and also can be interfaced to a buzzer to give sound alerts for fluctuations. The system generates alerts when the sp02 or pulse or temperature goes beyond a limit so that the patient can be given the utmost attention.

1) *Thingspeak:* It is a platform providing various services mainly for IoT projects. It collects datafrom the prototypes and stores it. The data is also represented graphically.
2) *MAX30100:* MAX30100 Pulse Oximeter/Heart-Rate ModuleMAX30100 is an integrated pulse oximeter and heart-rate monitorsensor solution
3) *LM35:* LM35 sensor is used for the measurement of body temperature. The sensor is put in contact with the body and it senses body temperature. It is calibrated linearly in Celsius. It has low self-heating capability. Also, id doesn't require external calibration.

Fig.2: Display when it is powered up initially

Fig.3: When the temp is displayed

III. PROPOSED SYSTEM

The project aims at developing a system that is capable of monitoring the patient's medical parameters like pulse oximetry and heart-rate signals, Temperature wirelessly through a WI-FI module using thing speak. The sensors are in contact with the body of the patient and keep collecting the data, when the temperature sensor is in contact with the body it gives the temperature of the body and the other sensor measures the Pulse and spo2 levels of the individual. We have used an LM35 sensor for the temperature sensing and used a MAX30100 as a pulse oximeter for the pulse and sp02 calculation. Visible alerts using the LCD[2]. This SD card is a key part of the Raspberry Pi Zero W; it provides the initial storage for the Operating System and files In this monitor the sensor data on thing speak cloud along with date and time, so this system able to check the data from anywhere in the world. To achieve this task using Raspberry pi zero w processor, the main use of it is that we can store the Operating system files and also host a web server to send the data over to the thing speak server. Additionally, we have used an atmega328 microprocessor to interface the sensors to the raspberry pi Zero W.

IV. WORKING

The IoT technology is used to monitor the health parameters such as body temperature, blood oxygen, and heart rate. The signals received by the atmega328 microcontroller from the sensors are converted from analog signals to serial signals with the help of ADC located in the Arduino board and further is processed and sent to the Raspberry Pi then updates them into the thing speak cloud and also display on the LCD module as shown in fig.2 and fig.3. The main controlling device of the project is the Raspberry pi zero w processor which is loaded with an intelligent program in python language. The data is also depicted graphically to show if the data or the health parameters are increasing or decreasing as the data is updated in the server every 12 sec in fig.4 and fig.5.

Fig.4 & Fig.5: Graphical representation of the datacollected

V. RESULTS AND ANALYSIS

The project Health monitoring system using IoT was designed such that to monitors the health parameters such asbody temperature, blood oxygen, and heart rate. The signalsreceived by the atmega328 microcontroller from the sensorsare converted from analog signals to serial signals with the help of ADC located in the Arduino board and further is processed and sent to the Raspberry Pi then updates them into the thing speak cloud and also display on the LCD module. The main controlling device of the project is the raspberry pi zero w processor which is loaded with a pythonprogram for operation.

VI. CONCLUSION

This paper focuses on real-time iot application of health monitoring using Iot and cloud computing to make health care easy for people. It provides how iot can be used to self-treat at home at the time of a pandemic and how to keep a check on one's health, also shows how the data is being relayed from the sensors to the Raspberry pi and then to the think speak server where it is stored and also depicted graphically. Our future work will concentrate on including other parameters such as Blood Pressure, Sugar which has seen a rise recently.

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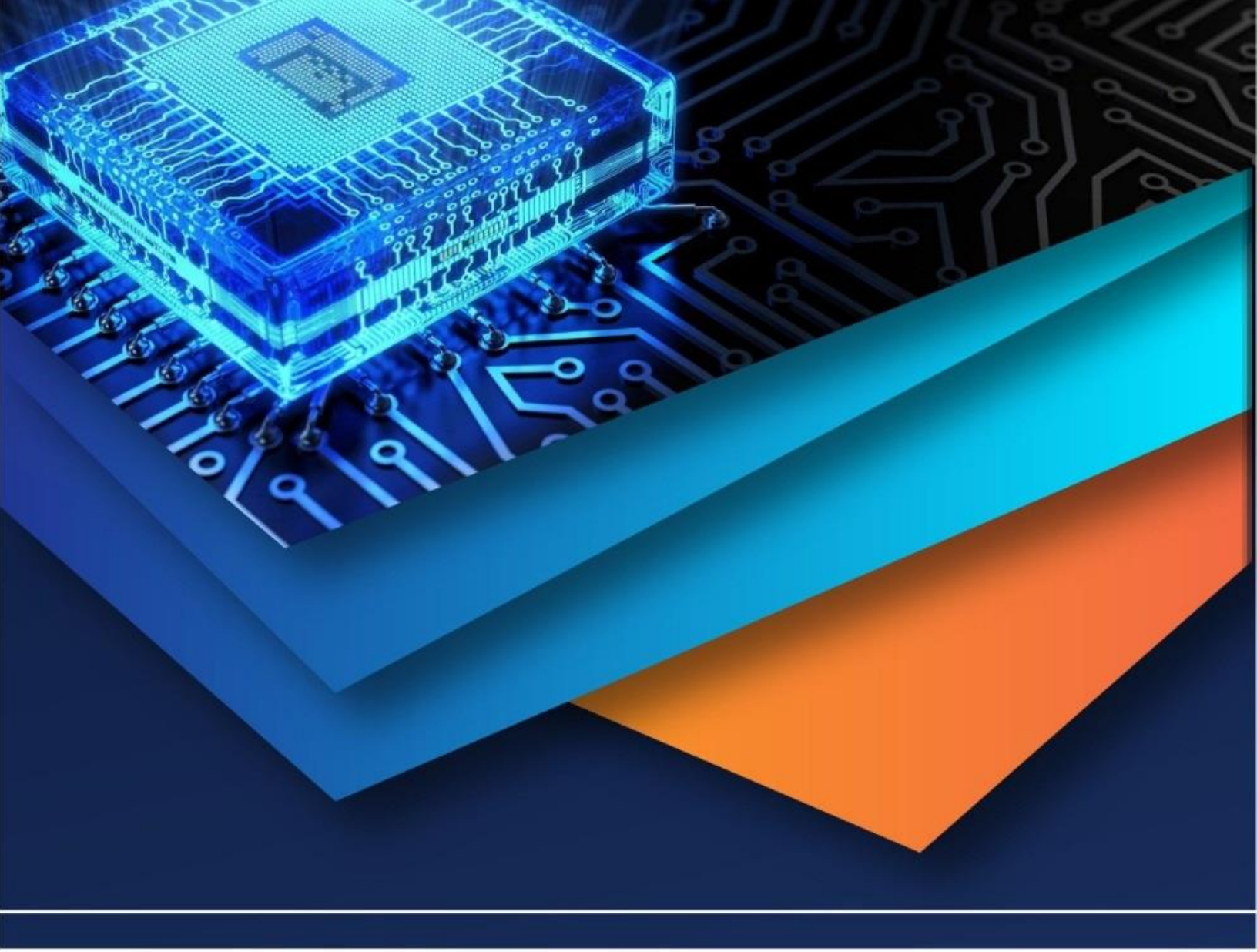

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