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PREDICT THE SEVERITY OF HEALTH USING IOT

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ABSTRACT: In this paper for improving patient's wellness and treatment effectiveness for a wide range of health conditions. It can also reduce the costs of the public health system worldwide and its efficiency, which in the last decade has been challenged by the population aging and the rise of chronic diseases. Furthermore, the current COVID-19outbreak has exposed the importance of rapidly scaling the health system and keeping home patients who are at high-risk but not severe enough to stay hospitalized. Internet of Things (IoT) provides the scalability required for this purpose, supporting continuous and reliable health monitoring on a global scale. This paradigm is increasingly becoming a vital technology in healthcare. Furthermore, the recent progress in low-power consumption,miniaturization, and biosensors has revolutionized the process of monitoring and diagnosing health conditions, bringing comfort, personalization, and effectiveness through unobtrusive healthcare devices.

INTRODUCTION

There is a growing trend in the medical field to minimize the need for hospitalization, moving several health care procedures from hospitals (hospital-centric) to patient's homes (home-centric). Healthcare Applications (RAH) for healthcare applications for the context of the COVID-19 outbreak. We show how wearable and unobtrusive sensors can be integrated into the proposed platform and used to collect and process patient data to promote rapid clinical interventions while preventing contagion between clinical staff and infected patients. Finally, we report the results from a real experience, which used our approach to develop and deploy a system used by the intensive care unit (ICU) for COVID-19 patients in Brazil. Therefore, this paper aims to extend the platform proposed in, initially designed for patients' de-hospitalization, by including wearable and unobtrusive sensors to monitor patients with coronavirus disease. We developed software components guided by the Reference Architecture for IoT-based Healthcare Applications for interoperability with existing multiparametric monitors in a

real intensive care unit (ICU) for COVID-19 patients in Brazil. By describing the engineering process and the application deployment steps performed in this experience, we provided relevant guidelines to practitioners and researchers concerned with IoT-based.

LITERATURE SURVEY

Kevin Ashtor in 1998: In particular, for COVID-19 patients, high blood pressure patients, hypertension patients, diabetic patients, etc., in a country territory, in rural areas, the number of doctors is not exactly the same as in urban areas. Medical equipment is not readily available in rural areas, except for government medical centers. The percentage of patients in these clinics is greater than that in government medical facilities. Similarly, the equipment has, for the most part, ended. As a result, if an emergency situation arises, this hardware component will send a report to the physicians or medical professionals as soon as possible. The remaining work will be done by doctors based on their reports. The IoT health-monitoring platform has provided us with a significant benefit in the advancement of contemporary medicine. IoT devices are widely used in the medical sector. And the technology we are talking about is a patient health monitoring system that uses the IoT. A sensor in this health monitoring system will collect information about the patient's health condition. It is smaller in size, faster, and more affordable. This system can be used to measure the oxygen saturation level, heart rate, and temperature of the human body and display the results on a web-based platform. The physical, logical, and application layers are the three layers of the system. It is a multiparameter monitoring system that will monitor oxygen saturation level, heart rate, and temperature simultaneously. The term "IoT" was first referenced by Kevin Ashtor in 1998.

EXISTING SYSTEM

The system used for health monitoring is the fixed monitoring system, which can be detected only when the patient is in hospital or bed. In the existing system, patients need to get hospitalized for regular monitoring, where either the nurse or the doctor has to move physically for a health check, which may not be possible to monitor their conditions continuously. It is not possible once he/she is discharged from the hospital. Thus, any critical situation cannot be identified easily unless the nurse or doctor checks the person's health at that moment. This may be a strain for the doctors who have to take care of a lot of people in the hospital. Also, when medical emergencies happen to the patient, they are often unconscious and unable to press an Emergency Alert Button.

DISADVANTAGES OF EXISTING SYSTEM:

Although the Internet of Things can be of great benefit to healthcare, there are still major challenges to address before full-scale implementation. The threats and disadvantages of using connected devices in healthcare are as follows:

1. **Security and privacy**: Security and privacy remain a major concern deterring users from using IoT technology for medical purposes, as healthcare monitoring solutions have the potential to be breached or hacked. The leak of sensitive information about the patient's health and location and meddling with sensor data can have grave consequences, which would counter the benefits of IoT.
2. **Risk of failure**: Failure or bugs in the hardware or even power failure can impact the performance of sensors and connected equipment placing healthcare operations at risk. In addition, skipping a scheduled software update may be even more hazardous than skipping a doctor checkup.
3. **Integration**: There's no consensus regarding IoT protocols and standards, so devices produced by different manufacturers may not work well together. The lack of uniformity prevents full-scale integration of IoT, therefore limiting its potential effectiveness.
4. **Cost**: While IoT promises to reduce the cost of healthcare in the long-term, the cost of its implementation in hospitals and staff training is quite high.
5. **Emergencies**: The patient should visit the doctor or nurse when he/she is not feeling well, which may be difficult in every situation.

PROPOSED SYSTEM

Keeping track of the health status of your patient at home is a difficult task because of the busy schedules and our daily life work. Specially old age patients should be periodically monitored. So we propose an innovative system that automates this task with ease. Our device puts forward a smart patient health tracking system using an IoT server. The IoT server used here is ThingSpeak. So that the Patient health parameters like Heart Rate along with Body Temperature can be monitored

The system is implemented using the combination of hardware components. All the hardware components are assembled in the implementation phase. The circuit diagram of the developed system is demonstrated in Fig. 1.3. All the sensors are connected with ESP32 using physical pins. ESP32 is used as a processing device as it has a built-in Wi-Fi module. For all sensors, the *V*cc and GND are connected with the *V*cc and GND pin of ESP32. In the case of the heart beat sensor, the signal pin is connected with the D26 pin of ESP32. The

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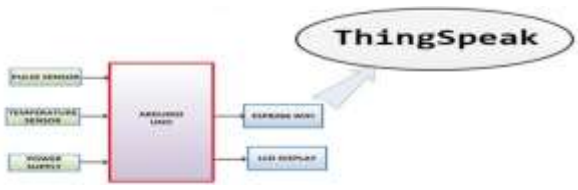
data pin of LM35 is mapped with the D35 pin of the microcontroller (ESP32). These are the case with a specific patient. For room condition monitoring, the data pin of DHT11 is linked with ESP32's D14 pin. In the implementation, DHT11 is only considered for room humidity measurement. The digital outpin of MQ-9 and MQ-135 are connected with D27 and D34 of ESP32, respectively, for the measurement of toxic gasses in room environment.

The user prototype is depicted in a figure where the system is tested with one user. Figure 1.3 is the block diagram that explains IoT based Health Monitoring System using Wi-fi module (ESP8266) & Arduino, Pulse Sensor and Temperature Sensors measures BPM & Environmental Temperature respectively. The Arduino processes the code and displays to 16*2 LCD Display. ESP8266 Wi-fi module connects to wifi and sends the data to the IoT device server. The server used here is Thingspeak. The data can be monitored fro any part of the world by logging into the ThingSpeak channel.



Architecture of the Proposed System

ADVANTAGES OF PROPOSED SYSTEM:

The following are the advantages of proposed system:

1. **Remote monitoring:** Real-time remote monitoring via connected IoT devices and smart alerts can diagnose illnesses, treat diseases and save lives in case of a medical emergency.
2. **Reduction of healthcare costs:** IOT reduces costly visits to doctors and hospital admissions and makes testing more affordable.
3. **Medical data accessibility:** Accessibility of electronic medical records allow patients to receive quality care and help healthcare providers make the right medical decisions and prevent complications.

IMPLEMENTATION

- **DATA COLLECTION:** The data will be collected from patients through various sensors like pulse sensor and temperature sensor. The collected data will be sent to the ThingSpeak platform to monitor health status.
- **TEMPERATURE SENSOR:** A temperature sensor is selected for the health monitoring system terminal and the hardware circuit is designed.

The digital conversion of the output analog signal is realized through the display.

- **PULSE SENSOR:**The photoelectric pulse sensor is divided into two types: transmitted wave monitoring and reflected wave monitoring according to how to detect light. Their key components are the same (i.e., stable light source and light-receiving sensor).
- **WORKING: The** connections between the sensors, wifi module and microcontroller are shown, as is the connection between the microcontroller and a device using a USB. Also, the data is received in the ThingSpeak IoT platform, and the respective output is shown in that platform. The circuit is mainly made with an Arduino Uno and two sensors that can measure two human body parameters. A 5 V power supply powers the sensors, LCD display, and microcontroller. The microcontroller is connected to a laptop using a USB that sends commands to the sensors. There is also a Wifi module that helps to read data from the system.
- **RESULT AND ANALYSIS:** The completed system consists of the pulse rate and and the body temperature sensor connected to an Arduino Uno. The Arduino is connected to a device with the help of a USB, which will help power up the system. When we upload data to the Arduino, the system starts working, and the measurement data will be shown in the ThingSpeak IoT platform and the Liquid Crystal Display (LCD) display, and the data will also be shown in a mobile application with the help of a Wifi module.
- **CONCLUSION:** This IoT-based device allows users to determine their health parameters, which could help regulate their health over time. Eventually, the patients could seek medical assistance if the need arises. They could easily share their health parameter data instantly within one application with the doctor. As we know, the IoT is now considered one of the most desirable solutions in health monitoring. It makes sure that the parameter data is secured inside the cloud, and the most important thing is that any doctor can monitor the health of any patient at any distance. The paper is about an IoT-based health monitoring system using Arduino that has been developed.

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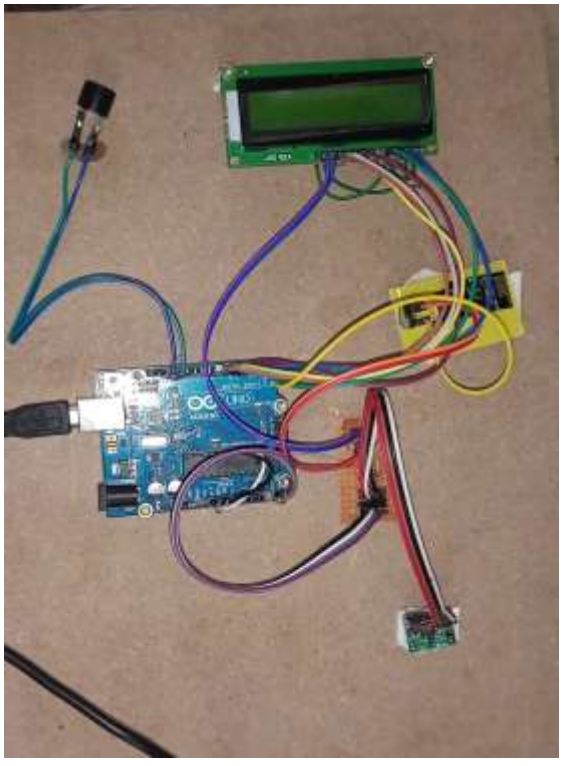
SAMPLE RESULTS



CONCLUSION

In this project extends the author's previous works by instantiating the Reference Architecture for IoT-based. Healthcare Applications (RAH) for healthcare applications for the context of the COVID-19 outbreak. We show how wearable and unobtrusive sensors can be integrated into the proposed platform and used to collect and process patient data to promote rapid clinical interventions while preventing contagion between clinical staff and infected patients. Finally, we report the results from a real experience, which used our approach to develop and deploy a system used by the intensive care unit (ICU) for COVID-19 patients in Brazil. Therefore, this paper aims to extend the platform proposed in, initially designed for patients' de-hospitalization, by including wearable and unobtrusive sensors to monitor patients with coronavirus disease. We developed software components guided by the Reference Architecture for IoT-based Healthcare Applications for interoperability with existing multiparametric monitors

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