

Arduino Based Online Patient Health Monitoring System

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Abstract - In the COVID-19 pandemic, it's visible that the number of HCWs is less, which makes it impossible to monitor so many patients at the same time. The physical presence of doctors and nurses is required for monitoring, they need to work for long hours which is exhausting. For them maintaining records is a difficult task as patient numbers are increasing so rapidly. So, making a product which could satisfy all these conditions is need of an hour. So, making a product/device which could monitor patients regardless of location and time of doctors. Using Arduino for taking inputs, temperature and pulse rate of patients and displaying it on LCD as well as on web page could help in maintaining records. This product is handy and can be used easily for maintaining records.

Key Words: Records, Arduino, Temperature, Pulse rate, Monitoring.

1. INTRODUCTION

In this pandemic the number of patients is increasing day by day. The COVID-19 has resulted in significant burdens globally. Its effects include high rates of infection and death, financial hardships faced by individuals, stress related to known and particularly unknown information, and fear of the uncertainty regarding continued impact. Healthcare workers (HCWs), at the heart of the unparalleled crisis of COVID-19, face challenges treating patients with COVID-19: reducing the spread of infection; developing suitable short-term strategies; and formulating long-term plans. HCWs experience emotional exhaustion, which may lead to medical errors, lower productivity, and higher turnover rates. Maintaining records of numerous patients is just so impossible to do manually. Which result, need for front-line health-care workers inpatient-facing roles. We can clearly see the need of health workers for testing, keeping records of patients etc. Apart from this, health workers have close personal exposure to patients with SARS-CoV2, front-line health-care workers are at high risk of infection, contributing to further spread. So an increasing number of patients require more health care workers, making device which could be monitoring patients regardless of location of doctors and health workers, where no physical presence is required to monitor patients which will not only reduce the risk of workers getting affected but it will also make monitoring easy.

2. OBJECTIVES

1. System that monitors patients regardless of physical presence
2. Location and time should not now be the criteria for monitoring
3. Easy to use.
4. Keeps record of different patients
5. Accessibility of record should be easy and quick

Arduino based Online patient health monitoring has mainly 2 parts in it, one wherein we are using Arduino for taking input such as temperature and pulse rate which would be displaying on LCD and other displaying records on webpage. These records can be easily accessed by doctors and nurses whenever that's required. This system is easy to use, cost effective, and most importantly solves the problem of monitors patients and reduces the work of HCWs.

3. METHODOLOGY

The following block diagram gives a small glimpse of the entire project and its working:

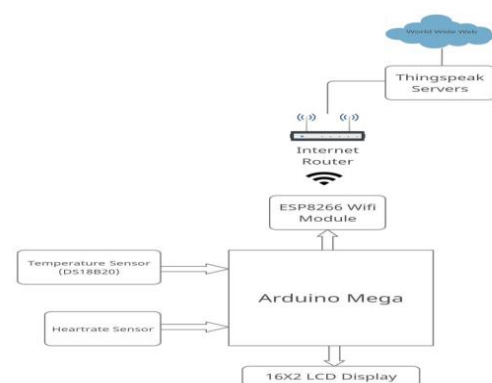


Fig -1: Block diagram of system

Here are two sensors one is temperature and other is a heart-rate sensor which is used to collect the data from the patients and collected data put in the cloud through Thing Speak. The collected data are also displayed through the LCD

3. IMPLEMENTATION

3.1 Software implementation

Before implementing the circuit design in real life, a simulated version of the circuit was developed. The software used for the same is Proteus 8.9. To simulate the contrast feature of the LCD in the software, the voltage is varied by using the potentiometer as the trigger. After the software simulation and testing, the circuit was finalized and designed to make the final schematic. The schematic which was developed for the simulation is shown below:

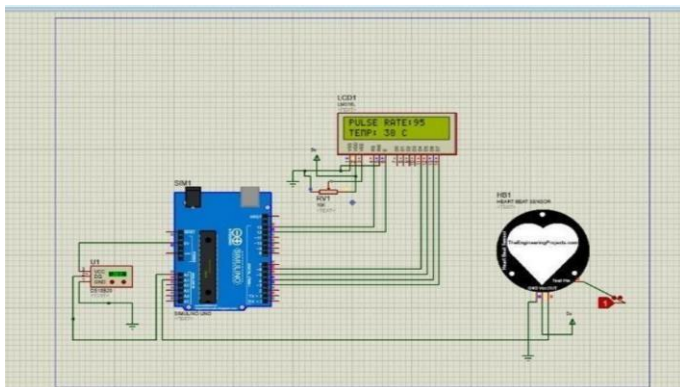


Fig -1: Diagram of Arduino in Proteus

3.2 Hardware implementation

So Arduino board's analog pin 0 is connected to the Pulse Sensor output and the other two pins of the sensor to VCC & GND. The DS18B20 Temperature Sensor output pin to Analog 1 of Arduino and the other two pins to VCC & GND. Pins 1,3,5,16 of LCD are connected to GND, Pins 2,15 of LCD are connected to VCC. 11 Pins 4,6,11,12,13,14 of LCD are connected to Digital Pins 12,11,5,4,3,2 of the Arduino board. The RX pin of ESP8266 works on 3.3V and thus it will not communicate with the Arduino when we connect it directly to the Arduino. So, there is a need to make a voltage divider for it that will convert the 5V into 3.3V. This can be done by connecting the 2.2K & 1K resistors. Thus the RX pin of the ESP8266 is connected to pin 10 of Arduino using resistors. The TX pin of the ESP8266 is connected to pin 9 of the Arduino. So in this way communication between Arduino and Thingspeak occurs via ESP8266. As soon as one login to the webpage through appropriate credentials then one can check and monitor patients. Records could be easily checked via logging in and thus as expected there is no physical presence required to check records.

3.3 Results

So below are the snippets of the system implemented on Arduino board, LCD displays the temperature and the heart rate of the patient and on Thingspeak one could get such output wherein graphs are displayed of patients.

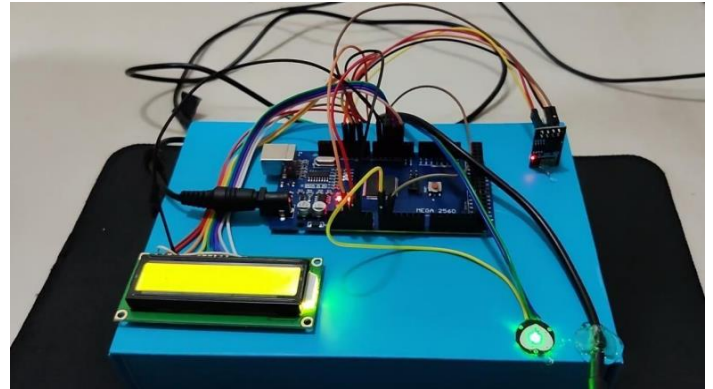


Fig -2: Monitoring System



Fig -2: LCD display

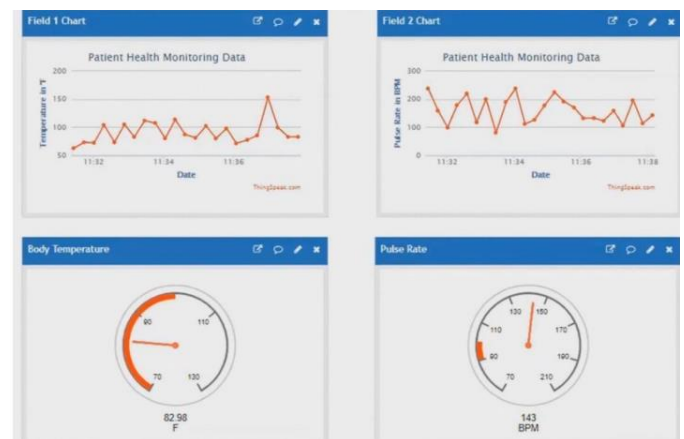


Fig -1: Thingspeak output

4. CONCLUSIONS

The conclusions drawn from this project is that it helps to monitor patients without physical monitoring. In this pandemic situation such kind of system is essential at least for basic checkups, as one could easily monitor and check

records of patient which would not only help health care workers but also it would help the entire humanity.

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