RESEARCH ARTICLE   OPEN ACCESS

An IOT Based Project on Health Monitoring System using Thing Speak server

Naimur Rahman, Robin Pal, Adarsh Minz, Salman Shah, Ashiq Tomal, Parampreet Kaur

School of Computer Science and Engineering, Lovely Professional University, Phagwara, Punjab - India.

ABSTRACT

Now a-days healthcare has been given such extreme importance by most of the countries with the beginning of the corona virus. So in this phase of time, an IoT based health monitoring system will be the best solution for such an outbreak. The aim of the Health Monitoring System is to make the work of health workers and individual users easier, to save time and money. The project will entail the development of an IoT-based health monitoring system using Arduino and Thing Speak. Thing Speak is a non-proprietary application programming interface (API) that can store, retrieve, and access data over the Internet using the Hyper Text Transfer Protocol (HTTP). The heart rate (pulse) and body temperature of users can be read on the LCD monitor and on Thing Speak by logging in. It keeps track of the data in real time and changes it according to the Thing Speak tenet. In today's world and age of advanced technology, it is preferable for us to use a system that is more reliable, accurate, affordable, and time efficient.

Keywords: Health Monitoring System, Arduino, Thing Speak, IoT, Pulse sensor and LM35 sensor.

I.   INTRODUCTION

Health has always been a major distress in the human race. Like the recent corona virus attack that has tumbledown the economy of China. This is an example how health care has become a prime importance in the world. In such areas where the epidemic is circulated, it is always a better idea to supervise these patients using remote health monitoring technology. The cost, a faster network, demand, and other factors are aligned with the growth of IoT. So, having a capable system with such parameter will reduce power consumption, cost and increase efficiency.

In health care system the patient plays a crucial role. However, the process is sometimes lengthy for the patients to do checkup. Where people wait in long queue to register and finally gets an appointment after long and tiresome wait. Because of this process many people do not visit or postpone their visit to hospital. Thus, our system will reduce expenditure and time consumption .Our project will be detecting unusual habits of user's body such as high or low body temperature and normal or abnormal pulse rate beats per minute before people falls sick and then it will also keep track of the user's health via LCD display and the result will be shown in the server..

BLOCK DIAGRAM

Figure 1 : Block Diagram of Proposed Project

II.   COMPONENTS OF THE HEALTH MONITORING SYSTEM PROJECT

- **Health Monitoring** is one way where each user, colleague, family members and health workers can check the health condition of person using this system which is based on IoT[2]. There is a need to design a system which automatically monitors the health of individual users in anyplace effectively and efficiently [3].

- **Pulse Sensor** is device which can be connected to Arduino. It has two sides for amplifying the circuit and to eliminate the noise. Users have to hold the pulse sensor using fingertip and connect it to the Arduino. Then user can see the heart rate. It has a LED in the center which will detect heartbeat beats per minute [4]. Right below the LED, a circuit is located which will be used to eliminate noise which may affect the readings while pulse sensor reads the rate of a user.

Figure 2 : Pulse Sensor

- **LM35 sensor** is a measuring device which have a voltage (output) which is proportionate (linearly) to the temperature and can measure any temperature from -55°C to 150°C. It consists of 3 pins.

Figure 3 : LM35 SENSOR

- **Arduino Uno** is an open-source board. This microcontroller board is equipped with both input- output pins (digital and analog) which can be configured with other boards or system. Arduino IDE software is tenet in which simulation is done. It consists of 14 digital input- output pins. The board has peripheral such as USB and it provide SDL to its processor.

Figure 4 : Arduino Uno

- **Thing Speak** is used to transfer data to the Thing Speak server from electronic devices such as laptops, computers, pad, and mobile phones [4]. It can be configured, and it can also display the data collected instantaneously (real-time). The data collected from any sensors can be converted to useful information using this Thing Speak platform. It is an open source that can collect the data from two sensors, and then can be stored, accessed, visualized, and analyzed.
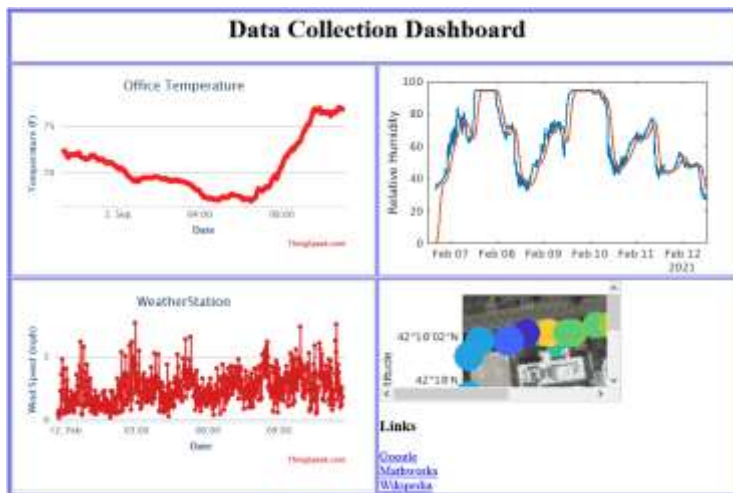

Figure 5 : Thing Speak Dashboard

- **16x2 LCD Display** is LCD modules are used in the embedded projects and circuits because it is cheap, easily available and programmer friendly. It is called 16x2 LCD since it consists of 2 rows and 16 columns.

Figure 6 : 16x2 LCD Display

- **ESP8266 WIFI Module** is a very user-friendly and low-cost device to provide internet connectivity to your projects. The module can work both as an Access point (can create hotspot) and as a station (can connect to Wi-Fi), hence it can easily fetch data and upload it to the internet making the Internet of Things as easy as possible [5][2]. It can also fetch data from the internet using API's hence your project could access any information that is available on the internet, thus making it smarter. Another exciting feature of this module is that it can be programmed using the Arduino IDE which makes it a lot more user-friendly.
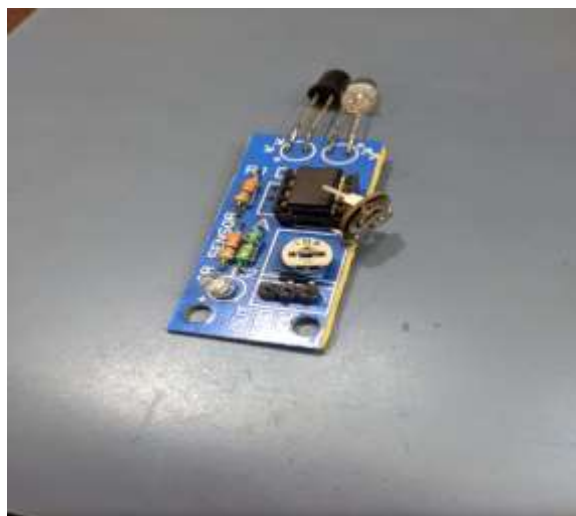

Figure 7 : ESP8266 WIFI MODULE

- **A breadboard** is a device used for a device which is used for electronics and test circuit designs. The components can be interconnected by inserting its terminals or head into the holes and finally the making connections through different wires. It has strips of metal underneath it which connects the gap of bread board. The center between the tip and base rows of board are split and are horizontally connected while the other remaining holes are connected vertically.

Figure 8 : Breadboard

III . PROJECT IMPLEMENTATION STEPS

1. Place the fingertip on the pulse sensor and hold the LM35 sensor.

2. Initiate the monitoring system using the power supply connected to it.

3. The LM35 sensor will detect the heat in your body and pulse sensor will detect the blood flows in your body, which will ultimately be detecting the pulse rate.

4. After detecting both the pulse rate and body temperature, the data will be displayed on the connected LCD.

5. Further, the detected readings will be transferred to the Thing Speak Server with the help ofesp8266 Wi-Fi module which acts as an interface for communication to take place.

6. Once the data is transferred to the server, the data will be stored in the interface. From the interface, we can access and analyze the data using the Thing Speak authentication mechanism.

Setting the Thing Speak Server

Thing Speak is a very good platform for IoT based projects. By using Thing Speak website, we can fetch our data and monitor our system from the Internet, using the Channels and also web pages provided by Thing Speak. we have to sign up for Thing Speak [6]. Then after creating a new channel and setting up what we need, an API Key is required for the system to work [1][5]. This key is needed for programming modifications and setting the data. Then after creating the API, The result will be displayed in 16x2 LCD display and will be stored on Thing Speak server[3][7]. From there, users can access, analyze the result, and can maintain one's health.

IV. CONCLUSION

Health Monitoring System, a IoT-based application, has been designed and developed to reduce the time taken in manual health checkup and to generate report easily on LCD display and Thing Speak server at the end of the session. It is indeed a needed application to make the process more efficient and time saving [2][6].

Hence, we have designed system that collects readings (data) of body parameters from LM35 sensors and Temperature sensor and this data is transferred to Thing Speak server through the wi-fi module which acts as an interface. Finally, data can be stored, retrieved and accessed by the users.

REFERENCES

1. Rahaman A, Islam M, Islam M, Sadi M, Nooruddin S. fkveloping IoT based seiari hearth monitoring systems: a review. Rev Intcll Anif. 20 l9;33:435—40, https //doi.orgy 10.18280/ria.330605.
2. Riazul Islam 8M, Kwak Daehan, Humaun Kabir M, Hossain M, Kwak Kyung-Sup. The Internet of Things for health care: a comprehensive survey. IEEE Access. 2015:3:678—708. hnps://doi. org/ 10.1109/ACCESS.2015.2437951.
3. Lin T, Rixano H, Le Mouel F. A survey of smart parking solutions. IEEE Tmns 1o1el1 Transp Syst. 20l7;l 8:322T-53. bnps:// doi.org/l0.1 l09/TITS.20 17.2685143.
4. Al-Ali AR, Zualkernan lA, Rasbid M, Gupta R• Alikarar M. A suman home energy management system using IoT and big data analytics approach. IEEE Trans Consume Electron. 2017. htips:// doi.org/l0.1109/TCE.2017.015014
5. Zanella A. But N, Castellani A, Vangelista L, Zorzi M. Internet of Things for smart cities. IEEE Internet Things J. 2014.
6. Mois G, Folea S, Sanislav T. Analysis of three IoT-based wireless sensors for environmental monitoring. IEEE Trans Instrum Meas.
7. Chen B, Wan J, Shu R, Li P, Mukherjee M, Yin B. Smart factory of Industry 4.0: key technologies, application ease, and challenges. IEEE Access. 201