A Project Report on

IOT Based Smart Healthcare Monitoring System

Submitted in partial fulfillment of the requirements
of the degree of

Bachelor of Engineering

in

Information Technology

by

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CERTIFICATE

This is to certify that the project Synopsis entitled *"IOT Based Smart Healthcare Monitoring System* Submitted by *"Divya S. Shepal"* for the partial fulfillment of the requirement for award of a degree *Bachelor of Engineering* in *Information Technology* to the University of Mumbai,is a bonafide work carried out during academic year 2022-2023

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Date:

Abstract

Technology plays the foremost role in healthcare not only for sensory devices but also in communication and recording. It is vital to observe varied medical parameters and post operational days. So the most recent development in healthcare communication methodology, IoT is customized. IoT is a catalyst for the healthcare and plays distinguished role in many applications. In this project, microcontroller is used as a gateway for communication. This system puts forward a wise patient health monitoring system that uses sensors to trace patient health and uses internet to intimate their loved ones or concerned doctors in case of any emergency. The controller is additionally connected with a buzzer to alert the caretaker regarding variation in detector output. The sensors are connected to a microcontroller to trace the status of the patient which in turn is interfaced with LCD display furthermore as wireless local area network association so as to transmit alerts. If the system detects any changes in patient pulse rate or BP, the system automatically sends an alert to the doctor regarding the patient status over IoT and additionally shows the details of heartbeat, BP and temperature of patient, live over the cloud. So IoT based patient health monitoring system effectively uses internet to watch patient health status and save lives on time. For this reason fast conditional medication may be simply done by this technique. This system is easy to setup and is capable of high performance and time to time response.

Introduction

In low- and middle-income countries, an increasing number of people have chronic illnesses due to a different risk factors like eating habits, inactivity, and alcohol consumption among others. According to World Health organization, 4.9 million people die from lung cancer through snuff use, 2.6 million obese people, 4.4 million high cholesterol and 7.1 million high blood pressure. Chronic diseases vary greatly in their symptoms evolution and their therapies. Some, if not observed and treated early, can end a patient's life.[1]

For many years the standard method for measuring blood sugar, blood pressure, and heart rate was traditional tests in specialized health facilities. With the advent of technology today, there is a huge diversity of sensors that learn important signals such as a blood pressure monitor, a glucometer, a heart rate regulator, including electrocardiograms, which allows patients to take essentials daily. Daily readings are sent to doctors and they will recommend medication and exercise procedures allow them to improve the quality of life and overcome such diseases. The internet of materials used in the care of patients is becoming increasingly common in the field of health, which improve the quality of life of the people. Internet of Things is defined as the integration of all devices connected to a network, which can be controlled from the web and provide information in real time, allowing communication with the users.

On the other hand, the Internet of Things can be seen from three paradigms, namely the middleware centred on the Internet, objects information-oriented and informative senses.[2]

Arduino is a tool that can be programmed to understand and interact with its environment. It is a good open source a microcontroller platform that allows electronics enthusiasts to build quickly, easily and at low cost with minimal use and monitoring projects. The combination of IoT and Arduino is a new way to introduce the Internet of Things to Health Care Monitor the patient system. The Arduino Uno Board collects data from sensors and transmits wirelessly to the IoT website.[3]

Communication of medical information, correct decision- making of knowledge collected and knowledge patient could be a difficult task in IoT. For this project, the IoT primarily based Patient Health Monitoring System (PHMS) is being employed Arduino is projected to gather the specified parameters and examine the information obtained from sensory devices. PHMS with Arduino conjointly provides patient notifications of preventative measures. This program advises the patient with medical facilitate and also the next step to follow within the event of Associate in Nursing emergency. IoT combination with Arduino could be a new thing to introduce net of Things to the Patient Health Care System. Arduino Uno Board collects information from sensors and transmits wirelessly to the IoT web site. The projected PHMS system is certainly being tested parameters like pulse rate, vital sign, pressure level etc.

Objectives

1.The main objective of the project is monitoring the health parameters using different sensors as mentioned – pulse sensor, Temperature sensor, heart rate sensor.
2.To Make a budget health monitoring system.
3.To make a system in which Uploading patient's sensor data to ThingSpeak cloud so that it is available for doctors.
4.To program the project in a such way that it can be send with data serially to the controller.
5.To design and implement a reliable , cheap, low powered and accurate system that can be work on a regular basis and monitors the vital signs.

Literature Review

The purpose of literature review is to gain an understanding of the existing research on IOT Based health monitoring system. The literature review helped in selecting appropriate information and suitable feature extraction process for getting efficient results.

In [1], author has presented "An IOT Based Smart Health care system using Raspberry Pi". They have used an exclusive sensor to monitor a patient's health parameters. Hence author has used platform Raspberry Pi for IoT. The Raspberry Pi is a platform which offers compact platform for a Linux server with a low cost. The combination of Raspberry Pi and IoT is a new changing technology in the healthcare system. Raspberry Pi collects various data from sensors and transfers to database. Cloud computing possess numerous advantages such as flexibility, highly automated, low cost etc. The Cloud's features enable customers to build and deploy their applications on virtual servers. Here the author has concentrated over the idea of separating wireless sensor network and cloud computing. Once sensors are connected to patients' bodies, they start to receive and transmit data to the database sensors like temperature (DS18B20), heartbeat, blood pressure, ECG (AD8232) services available in the cloud are responsible for receiving, storing, and distributing patient's data.

In [2], author has presented "An Overview on Heart rate Monitoring and Pulse Oximeter System". In this paper a low-cost device is described that measures the heart rate of the patient by placing sensors on the fingers, later the result will be displayed on LCD. The designed system can be used by unprofessional people. The change in heart rate can be displayed by graph using graphical LCD. Over a period of time, maximum and minimum heart rate can be displayed using the designed system. Abnormalities are displayed on LCD indicated by buzzer. In order to send heart rate to PC output should be attached.

In [3], author has presented "Survey of IOT Based Patient Health Monitoring System". Here author proposes a smart health care system that includes smart identification tag, server and internet. Physiological conditions are provided by smart identification tag on the basis of medical report of the patient which is diagnosed by doctor via WLAN. The objective of this paper is to monitor the patient often. New technology proposed here is capable of providing a large range of benefits to patients. The author has proposed a mobile physiological monitoring system, which is capable of monitoring the patient's body parameters in the hospital. Sensing, and controlling are the functions of smart system and decision made is based on available data.

Problem Definition

- In hospitals, where patient's status needs to be regularly monitored, is usually done by a doctor or other paramedical staff by constantly observing some important parameters, such as body temperature, heartbeat, and blood pressure thus, this task becomes tedious after sometime. Hence it can cause problems. However, there are many researchers have attempted before to solve it in many different ways, but the earlier methods in several cases either SMS will be sent using GSM or RF module will be used to send patient's data from sender device to receiver device. Moreover, in the earlier cases the history of the patient cannot be displayed, only current data is displayed
- Iot enabled devices have made remote monitoring in the healthcare sector possible unleashing the potential to keep patient safe and healthy. And Reducing healthcare costs significantly and improving treatment outcomes. Also, IOT has application in healthcare that benefits patients, families, physicians, hospitals and insurance companies

Proposed System Architecture/Design Prototype

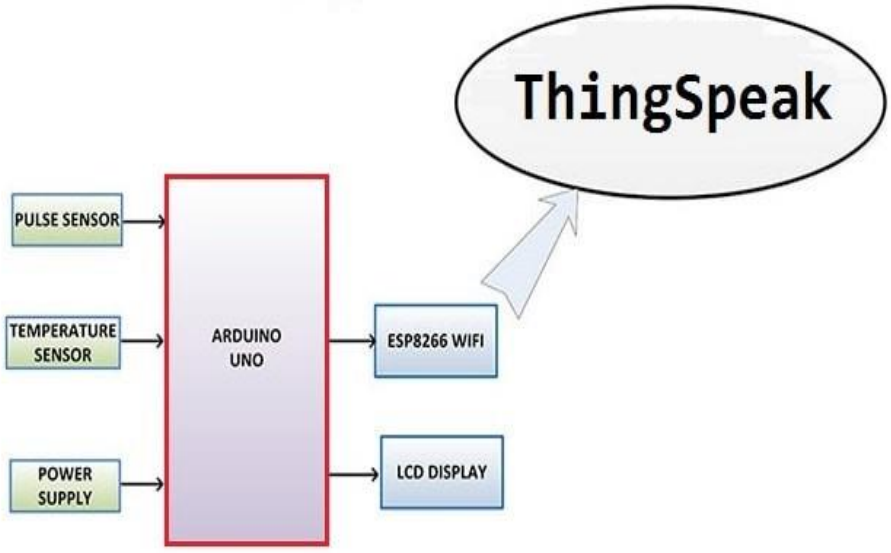

Figure 1: Wokflow

This is a simple block diagram that explains the IoT Based Patient Health Monitoring System using ESP8266 Arduino. Pulse Sensor and LM35 Temperature Sensors measure BPM Environmental Temperature respectively. The Arduino processes the code and displays it to 16*2 LCD Display. ESP8266 Wi-Fi module connects to Wi-Fi and sends the data to IoT device server. The IoT server used here is Thingspeak. Finally, the data can be monitored from any part of the world by logging into the Thingspeak channel.

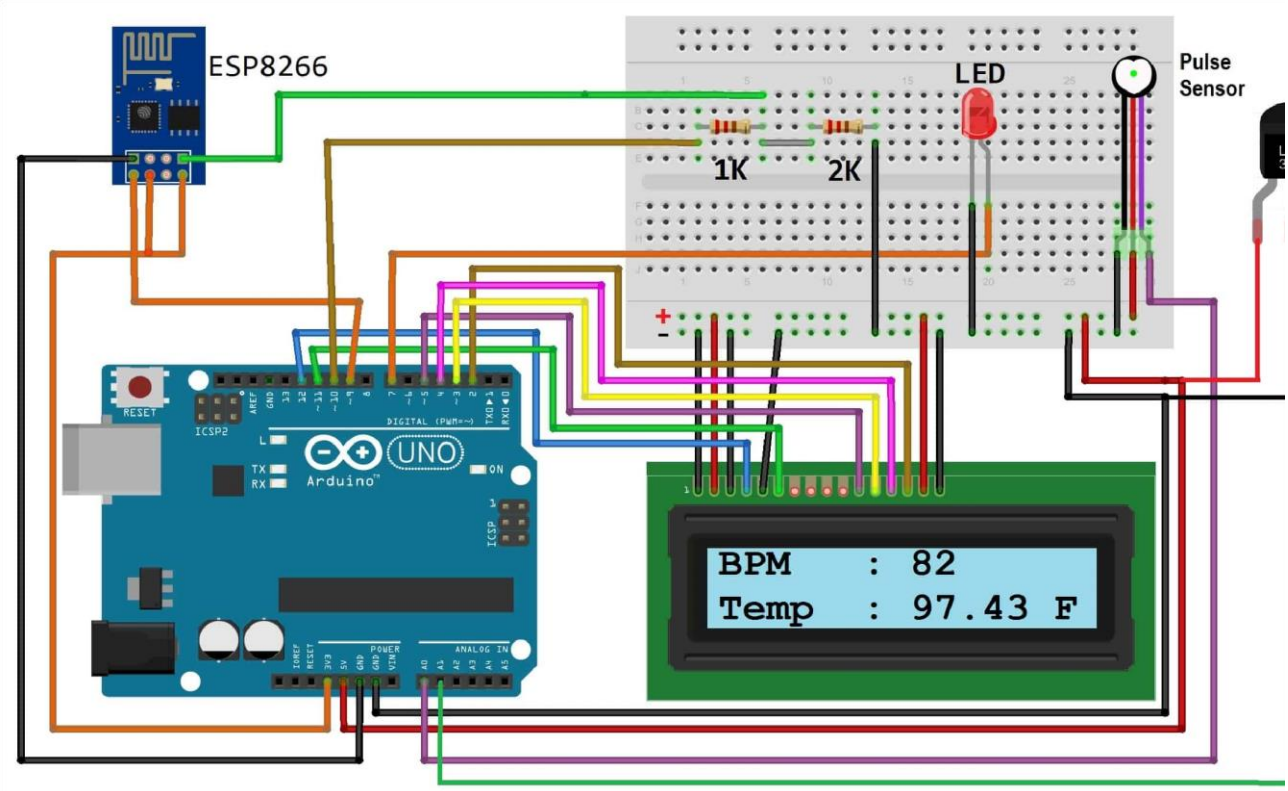

Figure 2: Circuit Diagram

Result

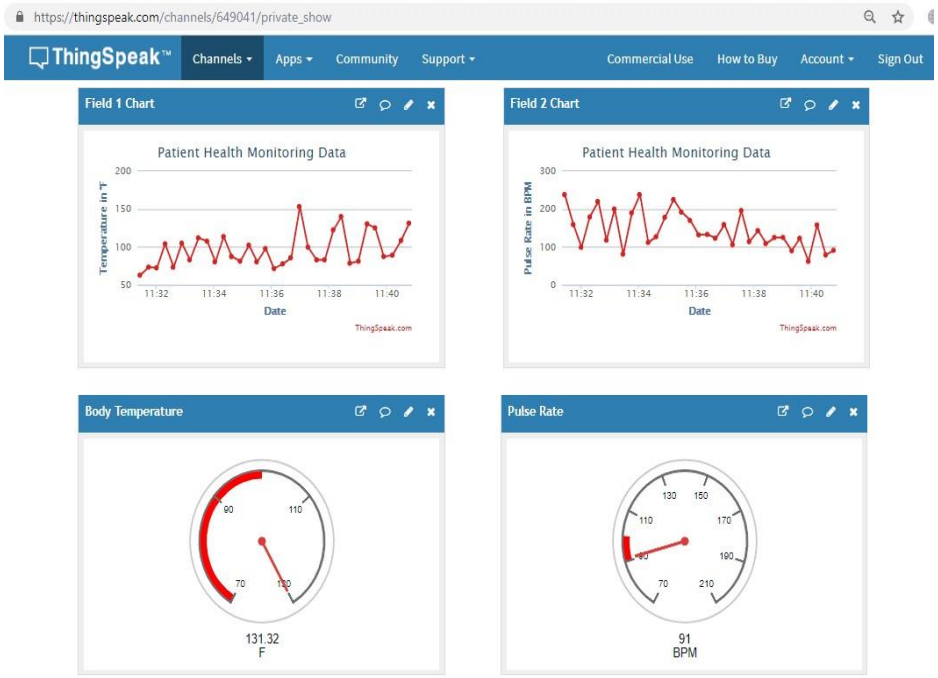

Figure 3: Thingspeak Garaph

References

[1] Raghavendra K K, Sharanya P S, Shaila Patil."An IoT Based Smart Healthcare System Using Raspberry Pi", Int. J. of Research and Scientific Innovation (IJRSI), 5(6), June 2018, pp.103-106.

[2] Esrat Jahan, Tilottoma Barua, Umme Salma, "An Overview on Heart rate Monitoring and Pulse Oximeter System", Int. J. of Latest Research in Science and Technology , 3(5), SeptemberOctober 2014, pp. 148-152.

[3] Rakshith Babu H and Prof. Latha. S, " Survey of IOT based Patient Health Monitoring System", Int. e-Journal For Technology and Research, 1(6), June 2017, pp.1-5.

[4] S. B. Akshaya1 , Gowri Anil2 , Raimy Paulson3 , Reya Jijy Abraham4 , P. Vandana5 , "An IoT based Patient Health Monitoring System using Arduino Uno", International Journal of Research in Information Technology, Volume 2, Issue 6, November 2019, pp 1-9

[5] Vishal Dineshkumar Soni , "An IoT Based Patient Health Monitoring System ", International Journal on Integrated.

[6] 1 C.Senthamilarasi, 2 J.Jansi Rani, 3 B.Vidhya , 4 H.Aritha "A Smart Patient heath Monitoring System using IOT" International Journal of Pure and Applied Mathematics Volume
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1.Publication

Paper entitled **"Paper Title"** is presented at **"International Conference/Journal Name"** by **"Author Name".**