



IoT Based Health Tracking System

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ABSTRACT-

The advent of the Internet of Things (IoT) has revolutionized various sectors, including healthcare, by enabling the development of innovative solutions for real-time health monitoring and management. The sensors collect the real-time data from the patient and transfer it to the processors. This data is transmitted securely to a cloud-based platform for processing and analysis. Health monitoring system implementation may include initial expenses, but these are frequently outweighed by the long-term advantages, which can include better health outcomes, lower medical expenses and healthy life. In this paper, we proposed a basic Internet of Things (IoT)-based health monitoring system designed to give people proactive, personalised healthcare.

Keywords: Internet of Things (IoT), ESP 8266 WiFi Module, Health Monitoring System, Arduino Uno.

Introduction:

There have been several studies on tracking and maintaining health in recent years. In the field of health monitoring systems, there have been significant advancements and significant developments that have made health monitoring simple. It is possible to identify conditions in their early stages and prevent them with appropriate medical care by keeping a tab on heart rate, temperature, oxygen supply, and many other health-related factors. Health monitoring systems are made up of various sensors, gadgets, and software that track and analyse various health-related parameters to provide accurate insights into an individual's condition. These wearable, multi-use gadgets may be utilised in homes and hospitals and continuously monitor and save the data that the sensors collect. It is possible to create the health monitoring system using multiple processors. Health monitoring systems encompass a broad range of elements, functions, and applications designed to monitor, evaluate, and manage many facets of an individual's health. The Arduino Uno is the one we utilise in our system. A practical and affordable option for real-time health tracking in areas with limited resources is the Basic Health Monitoring System Using Arduino Uno. The system uses the adaptability and simplicity of Arduino Uno microcontroller board to gather and analyse critical health related data which leads to wellness of an individual.

Related Work:

There have been and there are going to be many changes and advancement in Healthcare sector. These changes are beneficial for human beings and are to keep them healthy and happy. In [8] the authors have created a advance system which relies on WIFI based connection because of which there is fast communication between patients and doctors. They have created a system that sends data to the cloud and also notifies us in an emergency through email. In [3] the authors have discussed about how to implement a system with combination of IoT and Cloud Computing which collects the real-time data from patients and using Machine Learning it analyzes it and updates the respective patients and their doctors. Our work is similar to these previous work rather it is a simple health tracking system that used Arduino uno along with temperature sensor and heart beat sensor and displays it on Thingspeak an open IoT platform.

Proposed System:

The suggested system is being executed with a structure with three layers made up of multiple tools that interact to achieve the system's objective. These layers are sensing layer, processing layer and communication layer.

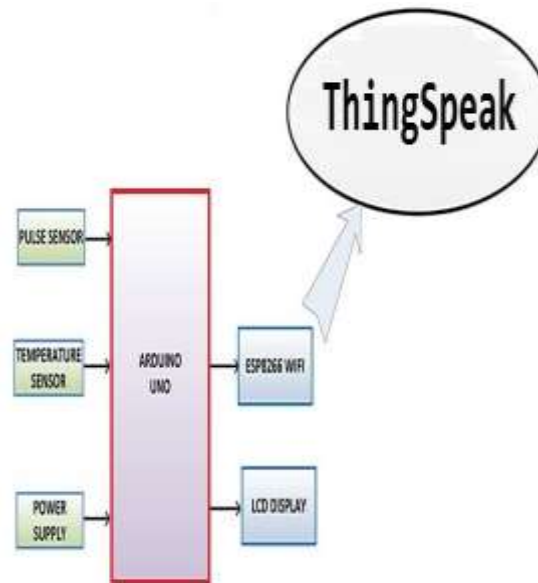


Fig 1. Block Diagram of System.

Sensing Layer: Health data is gathered at this layer from a variety of sensors that are connected to the Arduino device. These sensors collect the real-time data from patient and transfers it to the next layer. There are many sensors like temperature sensor, pulse rate sensor, ECG and other biometric sensor. The sensors used in this work are temperature sensors and pulse rate sensors.

Temperature sensor (LM35): The linear temperature sensing idea is the basis of the LM35 sensor's functioning. The LM35 sensor produces an analog voltage as its output, which is easily interfaced with controllers such as the Raspberry Pi or Arduino for further processing. The output voltage it generates is precisely proportional to the temperature in Celsius.



Fig 2. Temperature sensor.

Pulse rate sensor: Pulse rate sensors monitor blood flow in the arteries, often utilising optical sensors. These sensors send light onto the skin and detect how much light is reflected back. When blood travels through the veins, it absorbs light differently, allowing the sensor to detect the pulse variations in blood volume that occur with single pulse. Pulse rate sensors are intended to offer reliable heart rate readings in real time. Pulse rate sensors generally give beats per minute (BPM) or heart rate readings.



Fig 3. Pulse sensor.

ESP8266 WiFi module: A microprocessor with built-in Wi-Fi is found in the ESP8266 module. It establishes a Wi-Fi network connection and uses the internet to communicate with other gadgets or servers. The module is appropriate for Internet of Things (IoT) applications since it has the ability to send and receive data packets. Because of its tiny size and light weight, the module is appropriate for small and portable electronics.



Fig 4. WiFi module

Along with these main components the system also includes Arduino Uno which is the heart of system, LCD which displays the data to the user, and connecting wires which connects the system.

Processing Layer: The temperature and pulse rate sensors in this system are used to gather real-time data, which is then sent to the processing layer, which processes the data using an Arduino Uno. Customising and integrating the Arduino Uno with other platforms and devices is a simple process. The health data is ready for additional interpretation and visualisation because of the processing layer.

Communication Layer: The real-time data which is collected using different sensors in sensing layer and then is processed in processing layer finally arrives at communication layer where the data processed is displayed using different interfaces to respective patients and doctors. In order to receive instructions or updates from the external platform, bidirectional communication may be used at the communication layer. In our system we have used the open source Thingspeak which displays the data received in repetitive format of 15 seconds, because of this it is easy to analyze a data and work on it.

Result:

The result of the defined system is:

In this system the real-time data is collected from the sensors and are processed using Arduino Uno and this data is displayed on thingspeak as shown below. We can monitor data by analysing the data displayed on the graph. As this is basic Health Tracking System there are many things that can be improved like creating an application for this system and adding different technologies which will improve its ability of analysis data accurately.



Fig 5:Result of Hardware.

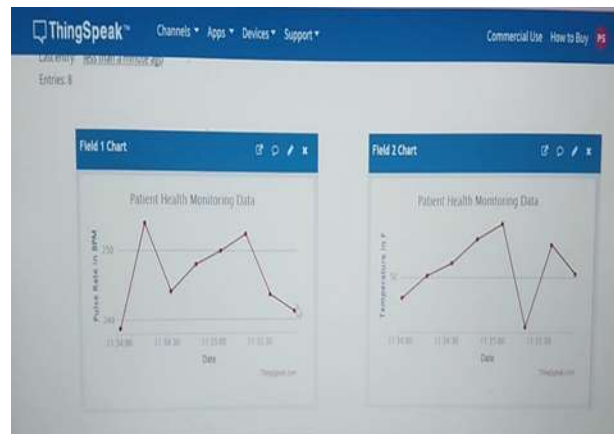


Fig 6:Thingspeak Result.

Merits and Demerits of Health Tracking System:

As the system is a Health Tracking System there are many advantages than disadvantages. Early detection of diseases and continuous analysis of health which leads in improving patients health that leads to happy life is a main advantage of this system. As there are pros there are some cons too. Failure of sensors can lead to false results and can affect analysis. User Adoption, cost of products and Technical Challenges are some of the cons of the System. But these are the things that can be improved with the growing technologies.

Conclusion:

In the area of healthcare technology, the Health Monitoring System's development and deployment are advantageous. This project addresses the issue of constantly controlling and monitoring health through the usage of numerous hardware and software components. An essential and beneficial instrument in the endeavour of healthcare management is the health monitoring system. We are able to consistently manage, track, and evaluate indicators of health with its help. The system has enormous potential to enhance overall health, enhance healthcare outcomes, and improve patient care. As technology advances, more system integration and enhancement will surely increase the system's effectiveness and wider application in healthcare settings.

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