

Real Time Vital Health Parameters Monitoring

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ABSTRACT: The level of functional and metabolic efficiency of a living organism is health. Keeping track of health involves regular check-ups by visiting the doctor in a hospital/clinic. The objective of this project is to trace patient's health with the assistance of real time health monitoring system. The health monitoring system can keep track of patient's pulse rate, oxygen level, fall detection and body temperature. The doctor can login from any remote location and check these health parameters in real time. Waiting time of the patient in the reception can be reduced in case of any minor uneasiness in health conditions.

The Real Time Vital Health Monitoring Using IOT consists of several sensors which measure vital health parameters such as pulse rate, oxygen level, fall detection and body temperature sensor. The measured values from the sensors will be processed by the core controller. Vital health parameters are displayed on the LCD display and also the data from the sensors can be viewed on a computer or mobile using Internet of Things (IOT). Hence, vital health parameters can be monitored in real time using this system which reduces manual efforts and time.

KEYWORDS: Internet of Things (IOT), Health Monitoring, Sensors, Real Time.

I. INTRODUCTION

In day-to-day life, a person visits hospital/clinic in order to get a routine health check-up of various health parameters from the doctor. Routine health check-ups are suggested by the doctor for regular monitoring of a person's health parameters. A person has to visit the hospital/clinic, register with his details and wait for his turn. Some primary health parameters such as body temperature, weight etc. are sometimes measure while waiting before check-up by the doctor. In case of minor uneasiness or normal routine health check-up, a person must be able to check vital health parameters from his place and send the measure health parameters to the doctor at another location.

The Internet of things is the inter-connection of devices, apps, sensors and network connectivity that enhances these entities to gather and exchange data. The distinguishing characteristic of Internet of Things in the healthcare system is the constant monitoring a patient through checking various parameters and also infers a good result from the history of such constant monitoring. Many such devices equipped with medical sensors are present in the ICUs now-a-days. There could be such situations where the doctor couldn't be alerted in time when there is an emergency, despite of 24 hours of monitoring. Also there might be hurdles in sharing the data and information with the specialist doctors and the concerned family members and relatives. The technology that enhances these features is already available but is not accessible and affordable by most of the people in developing countries such as India. Hence these solutions to these problems can be just a simple extension to the current devices which don't have these facilities.

This system demonstrates a Real Time Vital Health Parameters Monitoring System Using IOT. This system is designed to continuously monitor the vital parameters such as pulse rate, oxygen level, body temperature and fall detection. The information is stored on a cloud server database and can be displayed through an online website or mobile application by authorized personnel only. The idea might not be very new, but this system proposes an absolute and low cost method for the process using a core controller. The main objective of this system is to update the data online and send an alert to the doctors for any abnormality and also predict if the patient needs any primary health advice. This system has much future scope as the data collected by monitoring is so valuable and can be used for any kind of research by the medical community.

II. SYSTEM DESCRIPTION

The major objectives of the system are: To obtain the real-time vital health parameters about a patient via IOT, Processing and displaying of health parameters collected about the patient, To interpret and predict any disorder in preliminary stage itself is advantageous for decision making, To provide monitoring of vital health parameters in real time.

The Internet of Things offers a rising technology to attain the next level of health services. It assures for the affordable, low-cost, reliable and handy devices to be carried or embedded with the patients, so that to enable seamless networking between the patients, medical devices and physicians. The sensors will collect the health parameter signals in a continuous manner, they are then correlated with the essential physiological parameters and communicated over the wireless network. The resulting data is stored, processed and analysed with the existing health records. Using the available data records and decision support systems, the physician can do a better prognosis so that to suggest early treatment. If the doctor is not available, this analysis will enable the today’s machines to predict the health issues. Along with prediction, machines can also be able to come out with the medicines from the systematic study of the medicinal databases. The progressive technology will have a transformative impact in every human’s life and health monitoring; it will remarkably cut down the healthcare expenses and a step ahead in the accuracy of disease predictions.

The system consists of several sensors, core controller, IOT and display methodology. The sensors in this system measure body temperature, oxygen level, pulse rate and if the person is fallen i.e., fall detection. These sensors are given as the input to the core controller. Measured values of the sensors are given to the core controller, then the core controller analyses the received health parameters sends measured data to the cloud computing through Wi-Fi module and simultaneously the measured values are displayed on the display as well. This system uses an IOT platform for cloud computing. The user gets the data on computer or mobile through IOT platform. The IOT analytics platform service allows to aggregate, visualize and analyse live data streams in the cloud. The user can send data to the IOT platform from user device, create instant visualizations of live data.

III. SYSTEM MODULES

The system consists of various sensors and a core controller. The choice of controller is made depending on the specifications that are required for processing health parameters received from the sensors. The core controller is capable of processing analog signals from sensors as well.

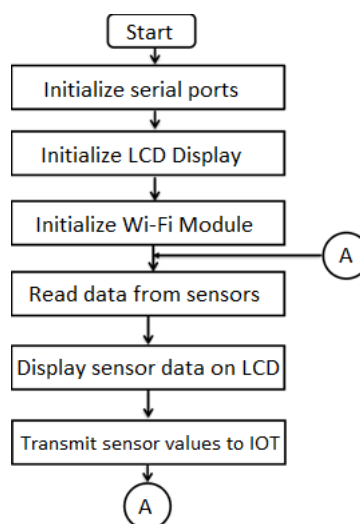


Fig. 1: Flowchart of the system

It converts the analog signal into digital signal for further processing. To measure pulse rate and oxygen level, the optical sensor derives its readings from emitting two wavelengths of light from two LEDs and then measuring the absorbance of pulsing blood through a photo detector. To measure body temperature, the temperature sensor uses IR rays to measure the temperature of the object without any physical contact and communicates to the microcontroller using the I2C protocol.

To transmit the data over the internet, a Wi-Fi module is used allowing it to either host the application or to offload all Wi-Fi networking functions from another application processor. It is used to send data to remote terminal via wireless link. The Wi-Fi module offers a complete and self-contained Wi-Fi networking solution, allowing it to either host the application or to offload all Wi-Fi networking functions from another application processor. The Internet of Things (IOT) platform lets the user collect and store sensor data in cloud and develop IOT applications.

IV. RESULTS AND DISCUSSION

In the fig 1, Body Temperature of a normal person is visible. The body temperature of the normal person is 99 degree Fahrenheit i.e., approximately, 37 degree Celsius. These results are visible to the person or a doctor on their mobile/computer at any location.



Fig. 1 Body Temperature of a normal person (In Fahrenheit)

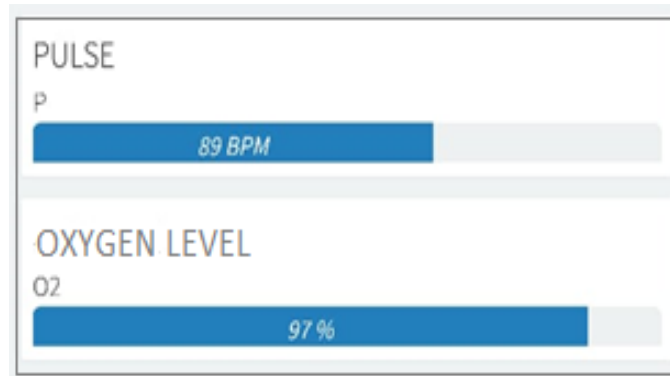


Fig. 2 Pulse rate and Oxygen Level of a normal person

In the fig 2, Pulse rate and Oxygen Level of a normal person is visible. The Pulse rate of the normal person is 89 BPM and Oxygen Level is 97% in the body. These results are visible to the person or a doctor on their mobile/computer at any location.



Fig. 3 Fall Detection check of a normal person (Not Fallen)

In Fig 3, Fall Detection check of a normal person is visible. The person is not fallen and is in a normal seating/standing position. These results are visible to the person or a doctor on their mobile/computer at any location.

V. CONCLUSION

The system is designed for the real time monitoring of the vital health parameters using IOT environment. It measures vital health parameters such as body temperature, oxygen level, pulse rate and fall detection using various sensors. The core controller processes these values and sends it to the IOT platform. A doctor at any remote location can login to the IOT platform and check the patient's health parameters. This minimizes normal routine check-ups of a person by visiting a doctor in case of no major uneasiness observed in his health condition. Also, as the health parameters are monitored in real time, a person can keep track of his health conditions.

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