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Iot Based Health Monitoring System

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Abstract

This paper describes the development of a wireless heartbeat and temperature monitoring system based on a microcontroller at a reasonable cost with great effect. Most monitoring systems that are in use in today's world works in offline mode but it is of great need that a system must be designed so that patient can be monitored remotely in real time. The paper consists of sensors which measures heartbeat and body temperature of a patient which is controlled by the microcontroller. Both the readings are displayed in LCD monitor. Wireless system is used to transmit the measured data to a remote location. The heartbeat sensor counts the heartbeat for specific interval of time and estimates Beats per Minute while the temperature sensor measures the temperature and both the data are sent to the microcontroller for transmission to receiving end. Finally, the data are displayed in the LCD at the receiving end.

***Keyword*:** IOT, Heart rate, Body temperature

Introduction –

Internet of Things (IOT) can be defined as the wireless network of devices which are connected to each other to share information and data in order to communicate and produce new information so as to record and analyze it for future Use. The Internet of things in the field of healthcare also plays a major role in providing ease to patients and doctors. It consists of a system that communicates between network connected systems, apps and devices that can help patients and doctors to monitor, track and record patients' vital data and medical information. The power of IOT for health and medical services are harnessed by smart sensors (sensor and a microcontroller) which accurately measures, monitors and analyze a variety of health status indicators. These can include basic vital health signs such as pulse rate and blood pressure, oxygen and glucose level in blood and heart rate. Smart sensors can be incorporated into medicines and pill bottles that are connected to a network and can generate alerts about whether the patient has taken ascheduled dose of medication. To take the full advantage of revolutionizing IOT in healthcare, the consumers, patients and other health experts need to think of some innovative and more reliable methods

LITERATURE REVIEW

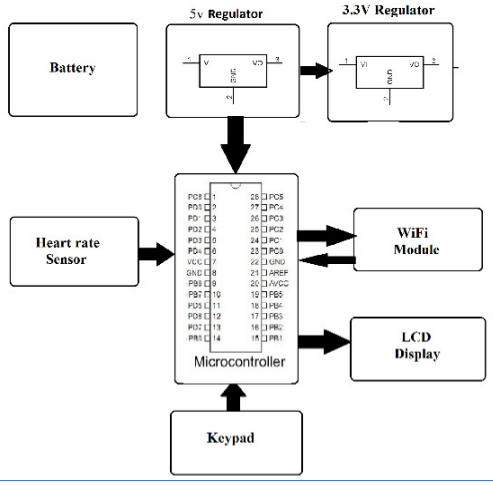
A new integrated device for monitoring the heart rate using a finger- tip sensor is designed and implemented. There are many methods to measure heart rates like Phonocardiogram (PCG), ECG, pulse meters, stethoscope etc. but are clinical and expensive. The proposed Heart Rate Measuring (HRM) device is economical and user friendly and has used optical technology to detect the flow of blood through index finger. Three phases are used to detect pulses on the fingertip that include pulse detection, signal extraction, and pulse amplification. A microcontroller is used for counting the pulse rate and controlling a LED display. The microcontroller is programmed by developing an algorithm to count the pulse rate. Once a signal is detected, the algorithm will be executed according to the defined flow chart.

The performance of the HRM device is tested with the output of ECG for some patients for its accuracy [7].

SYSTEM HARDWARE

The device consists of two PIC16F72 microcontroller- one for the measuring and transmitting end while other for the receiving end. For measuring heartbeat, the device makes the use of photo diode and bright LED along with amplifier and filter while for measuring temperature, the device uses LM35 IC. The device measures heartbeat and temperature of the body and transmits it wirelessly with the help of RF transmitter and the data is received at the other end with the help of RF receiver, and finally the data is displayed on the LCD. Figure 1 and figure 2 shows the block diagram of the device of transmitting end and receiving end respectively.

Block diagram -



Working

We have proposed a robust health monitoring system that is intelligent enough to monitor the patient automatically using IOT that collects the status information through these systems which would include patient's heart rate, blood pressure and ECG and sends an emergency alert to patient's doctor with his current status and full medical information. This would help the doctor to monitor his patient from anywhere and also to the. Patient to send his health status directly without visiting to the hospital. Our model can be deployed at various hospitals and medical institutes. The system uses smart sensors that generates raw data information collected from each sensor and send it to a database server where the data can be further analyzed and statistically maintained to be used by the medical experts. Maintaining a database server is a must so that there is even track of previous medical record of the patient providing a better and improved examining.

Conclusion-

Optical sensor was used in this project which provides electrical isolation to the user. Simple operational amplifier with inverting and non-inverting configurations was used to amplify and filter the signal from sensor which narrowed the detecting range of heartbeat. Better configuration of instrumentation amplifier and other filters like Butterworth and Chebyshev filters with higher order can be used for better signal conditioning compromising to the complexity of the amplifier and filter circuit. PIC16F72 microcontroller contains in-built Analog to Digital Converter (ADC). So, extra Analog to Digital Converter device is not necessary. RF transmitter and receiver were preferred over IR transmitter and receiver as RF transmitter and receiver is superior over infrared device in many ways. The heartbeat was measured with the help of photodiode and bright LED while the temperature was measured by using precision integrated temperature sensor LM35. Both the data were processed in the microcontroller and sent to the remote end wirelessly by using RF transmitter and received at the remote end by using RF receiver. The received data was processed in the microcontroller and the data measured was displayed successfully with the help of LCD at the remote end. The wireless communication

was preferred because it gives greater mobility to the sensor equipment and reduces the cost wherein there are multi-transmitting sections.

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