An IoT Based Remote HRV Monitoring System for Hypertensive Patients

ABSTRACT

Heart Rate Variability (HRV) is a measure of variation in the time interval between consecutive heart beats. HRV analysis is highly sensitive for risks linked with cardiovascular disease, Diabetic Mellitus, disease states associated with Autonomic Dysrhythmia such as Hypertension and a large array of chronic degenerative medical condition. Sensitivity of HRV towards various medical condition accounts for its increased usage by doctors as a diagnostic, prognostic tool and to evaluate the effectiveness of the treatment offered. Often borderline hypertensive patients with and without history of a cardiac event are subjected to stroke as well as cardiac mortality at high risk. Monitoring of HRV parameters for such cases of high risk will prove useful in providing adequate medical care at needed times. In this paper, the authors propose a low-cost and easy to use Remote HRV Monitoring System based on the Internet of Things (IoT) technology for borderline Hypertensive patients. In the proposed system, HRV parameters are derived using Wireless Zigbee based pulse sensor. Arduino transmits patient data to server using MQTT protocol. The application server collects HRV data and plots graphs. In case of an emergency situation, the care taker and doctor are intimated through Short Message Service (SMS) for providing adequate medical help. While there are currently no HRV analysis systems that alerts at times of high risk for hypertensive patients along with the aid of a remote doctor, the proposed system aims at achieving the same. The proposed system combines the dual benefits of Zigbee and Wi-Fi technology. By doing so, it successfully fulfils all the ideal traits of a remote health monitoring system in terms of low-cost, long range, security, promptness and easy-to-use that serves in saving lives.

EXISTING SYSTEM

Now a days Heart attacks are more . We cannot estimate the occurrence of stroke . It is easy to estimate the occurrence of stroke if the doctor receives continuous records of the heart beat variations. There are many reasons for the heart attack .One of the factor is Hypertension.

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Hypertension has become common yet a serious disease that remains as the root cause for major Cardiac mortality and Stroke mortality. Hypertension is a condition where the blood pressure in the arteries of the body is higher than 120/80 mm Hg (more than 120 systolic and more than 80 diastolic). Though it is often a condition occurring in the elderly, children are also susceptible to fall prey to it. Patient has to move to the hospital at the time of heart attack which may sometimes not possible.

DRAWBACKS

- It is hard to estimate the occurrence of stroke.
- It causes severe problem for patients.

PROPOSED SYSTEM

In the proposed system, HRV parameters are derived using Wireless Zigbee based pulse sensor. Arduino transmits patient data to server using MQTT protocol. The application server collects HRV data and plots graphs. In case of an emergency situation, the care taker and doctor are intimated through Short Message Service (SMS) for providing adequate medical help. While there are currently no HRV analysis systems that alerts at times of high risk for hypertensive patients along with the aid of a remote doctor, the proposed system aims at achieving the same. The proposed system combines the dual benefits of Zigbee and Wi-Fi technology. By doing so, it successfully fulfils all the ideal traits of a remote health monitoring system in terms of low-cost, long range, security, promptness and easy-to-use that serves in saving lives.

ADVANTAGES

- It is low cost.
- It is easy to use for patients.
- It consumes low power and used for a long range.

SYSTEM EQUIREMENTS

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H/W System Configuration:-

- Processor - Pentium –IV
- RAM - 4 GB (min)
- Hard Disk - 20 GB
- Key Board - Standard Windows Keyboard
- Mouse - Two or Three Button Mouse
- Monitor - SVGA

S/W System Configuration:-

- Operating System : Windows 7 or 8 32 bit
- Application Server : Tomcat5.0/6.X
- Programming Language : Java
- Java Version : JDK 1.6 and above

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