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Energy Efficient and Load Balanced Priority Queue Algorithm for Wireless Body Area Network

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Abstract

Wireless Body Area Network (WBAN) is a recent technology for improving the quality of life. Due to the unique requirements and specific characteristics of WBAN, monitoring the health conditions of remote patients is a critical and demanding task in recent days. During the data transmission process, MAC protocols are utilizing different standards such as IEEE 802.11 and IEEE 802.15.4, but they are fail to increase data rate, energy wastage, inefficient for bursty traffic, and delay. This paper introduces a new Energy Efficient and Load Balanced Priority Queue Algorithm (ELBPQA) using IEEE 802.15.6 standard to transmit critical data with minimum delay. At first, the packet received from the personalized device is classified based on the location. If it is generated from the local, it will be scheduled based on the data priority and if it is received from the remote area, the packet will be scheduled based on its deadline. In this work, the priority is provided in three different levels including high priority, medium priority, and low priority. Based on its priority, the data is scheduled and transmitted with the help of the hardware scheduler. The experimental results show the better performance compared with the existing mechanisms in terms of throughput, packet delivery ratio, delay, and power consumption.

Keywords: Wireless Body Area Network, IEEE 802.15.6, Energy Consumption, Delay, Priority Scheduling

1. Introduction

Nowadays, providing health care services to people is a challenging task due to the demanded medical services. It includes diet monitor, baby care, diseases, sport assists, people caring and monitoring etc. Moreover, new technologies and applications are also required to provide the auxiliary methods for elders and to reduce the medical cost. Most of the institutions and medical organizations offer a convenient and efficient service to the people, who required the medical services. But, it is not easy to provide all the service to the people because of insufficient devices, professional human resources, and limited financial support. Thus, the Wireless Body Area Network is used in recent days, which provides the benefits in both health and medical applications. It is a type of wireless network that contains a set of devices includes headsets, biosensors, and remote controllers. These devices are located in a human body, which monitors and detects the activities, statuses, and patterns. The fig.1 clearly shows that the overall structure of WBAN based data transmission process by improving the quality of service (QoS). The effective WBAN data transmission process have some advantages such as minimize failure, improves the throughput, reliability, and minimum delay. These advantages are further improved by making the transaction with the help of different process such as ZigBee, Wi-Fi and Bluetooth

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