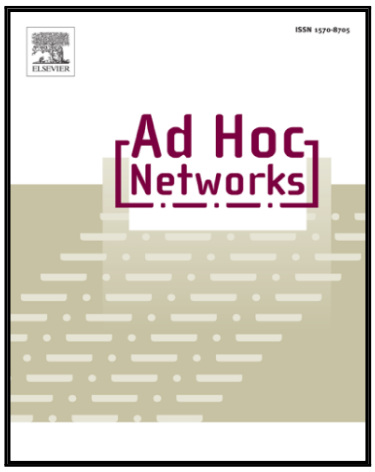

Optimized Cost Effective and Energy Efficient Routing Protocol for Wireless Body Area Networks

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Optimized Cost Effective and Energy Efficient Routing Protocol for Wireless Body Area Networks

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Abstract

The increase in average lifespan and huge costs for health treatments have resulted in cost effective solutions for healthcare management. Wireless Body Area Network (WBAN) is a promising technology for delivering quality healthcare to its users. Low power devices attached to the body have limited battery life. It is desirable to have energy efficient routing protocols that maintain the required reliability value for sending the data from a given node to the sink. The current work proposes two protocols: Optimized Cost Effective and Energy Efficient Routing protocol (OCER) and Extended-OCER (E-OCER). In OCER, optimization using Genetic Algorithm (GA) is applied to the multi-objective cost function with residual energy, link reliability and path loss as its parameters for selecting the most optimal route from a given body coordinator to the sink. Distance between any two sensor nodes is reduced by applying multi-hop approach. E-OCER extends the work of OCER by considering inter-BAN communication. Performance of OCER is compared with other existing energy aware routing protocols by considering different parameters. A comparison of the performance of E-OCER with OCER is made to study the effect of on-body sensors communication on the energy consumption and throughput of the network. This paper also provides a comprehensive energy model to calculate the total energy consumption of the network. In addition to the radio transmission and receiving energy, other basic energy consumption sources viz. processing energy, sensor sensing, transient energy and transmission/reception on/off energy have also been taken into account. The results show an improved performance of the proposed protocols in terms of energy efficiency.

Keywords: Energy Aware, WBAN, Routing Protocol

1. Introduction

The development of wireless sensors has revolutionized the health management and offered step-changing improvements. These sensors communicate with

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