Review

Node-Power-Based MAC Protocol with Adaptive Listening Period for Wireless Sensor Networks

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PII: S1434-8411(17)30885-3
DOI: https://doi.org/10.1016/j.aeue.2017.10.034
Reference: AEUE 52112

To appear in: *International Journal of Electronics and Communications*

Received Date: 14 April 2017
Accepted Date: 29 October 2017

Please cite this article as: K.F. Ramadan, M.I. Dessouky, M. Abd-Elnaby, F.E. Abd El-Samie, Node-Power-Based MAC Protocol with Adaptive Listening Period for Wireless Sensor Networks, *International Journal of Electronics and Communications* (2017), doi: https://doi.org/10.1016/j.aeue.2017.10.034

Node-Power-Based MAC Protocol with Adaptive Listening Period for Wireless Sensor Networks

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ABSTRACT

One of the major challenges during initiation of Wireless Sensor Networks (WSNs) is the energy conservation. Knowing that the transceiver is the main source of energy dissipation, we have to design a suitable protocol at the Medium Access Control (MAC) layer to maximize the network lifetime. We are interested in reducing the energy consumption in such networks with very little degradation in the delay profile. In this paper, a Node-power-based MAC protocol with adaptive listening period for WSNs is presented. The proposed protocol alleviates the problems of unfair distribution of power among nodes in the original Sensor-MAC (S-MAC) and Multi-Layer MAC (ML-MAC) protocols. Simulation results show that the proposed MAC protocol provides an enhanced performance compared to both the S-MAC and ML-MAC protocols. The simulation results show also that the proposed MAC protocol consumes less energy than those consumed by both the S-MAC and ML-MAC protocols. The proposed protocol saves about 61.1% of the energy consumed by the S-MAC protocol. It also achieves 17% energy saving as compared to the ML-MAC protocol in the non-coherent mode. Moreover, in the coherent mode, the proposed protocol saves 73% and 23.1 % of the energy consumed by the S-MAC and ML-MAC protocols, respectively.

Index terms

Wireless Sensor Networks (WSNs), S-MAC, ML-MAC.

1. Introduction

Wireless Sensor Networks (WSNs) have received much attention in recent years, because they caused a revolution in sensing in a wide range of applications [1, 2] . They consist of an enormous number of sensor