International Journal of Engineering and Technology Innovation, vol. 6, no. 1, 2016, pp. 30 - 54

Performance Comparison of A New Non-RSSI Based Wireless Transmission Power Control Protocol with RSSI Based Methods: Experimentation with Real World Data

Debraj Basu*, Gourab Sen Gupta, Giovanni Moretti, Xiang Gui

School of Engineering and Advanced Technology, Massey University, New Zealand

Received 13 August 2015; received in revised form 03 November 2015; accepted 11 December 2015

Abstract

In this paper, simulations with MATLAB are used to compare the performance of a RSSI-based output power control with non-RSSI based adaptive power in terms of saving energy and extending the lifetime of battery powered wireless sensor nodes. This non-RSSI (received signal strength indicator) based adaptive power control algorithm does not use RSSI side information to estimate the link quality. The non-RSSI based approach has a unique methodology to choose the appropriate power level. It has drop-off algorithm that enables it to come back from a higher to a lower power level when deemed necessary. The performance parameters are compared with the RSSI-based adaptive power control algorithm and fixed power transmission. In order to evaluate the protocols in the real world scenarios, RSSI data from different indoor radio environments are collected. In simulation, these RSSI values are used as an input to the RSSI based power control algorithm to calculate the packet success rates and the energy expenditures. In this paper we present extensive analysis of the simulation results to find out the advantages and limitations of the non-RSSI based adaptive power control algorithm under different channel conditions.

Keywords: wireless sensor network, energy consumption optimization, adaptive power control

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* Corresponding author. E-mail address: d.basu@massey.ac.nz

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