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The effects of transmission power control in mobile ad-hoc sensor networks

Mohamad Nazim Jambli^a, Halikul Lenando^a, Kartinah Zen^a, Sinarwati Mohamad Suhaili^b, Alan Tully^c,

^aFaculty of Computer Science & Information Technology, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia

^bPre-University Studies, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia

^cSchool of Computing Science, Newcastle University, Newcastle upon Tyne, NE1 7RU, UK

Abstract

Preserving energy is a very critical issue in mobile ad-hoc sensor networks (MASNETs) because sensor nodes have a severe resource constraints due to their lack of processing power and limited in power supply. Since the communication is the most energy consuming activities in MASNETS, the power use for transmission or reception of packet should be managed as much as possible. One way to reduce energy consumption is by applying transmission power control (TPC) technique to adjust the transmission power in communication between nodes. This technique has been widely studied in MASNETS. However, as MASNET applications emerge, the unique characteristics of this network such as severe resource constraints and frequent topology change suggest that TPC might be useful to reduce energy consumption in MASNETS. Therefore, we investigate different effects of TPC on Ad hoc On-Demand Distance Vector (AODV) routing protocols for MASNETS. AODV is used as a medium of communication to assist the investigation of the effects of TPC in multihop communication in this networks with Random Way Point (RWP) mobility model. Our simulation results show a noticeable effects of TPC implementation technique on MASNETS in respect to transmission energy consumption and packet received ratio at low node mobility. These results support the use of TPC technique to enhance the performance of multihop AODV routing protocol in MASNETS.

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1. Introduction

Recent rapid development of wireless communication technologies and portable mobile devices such as laptops, PDAs, smart phone and wireless sensors bring the best out of mobile computing particularly Mobile Ad-hoc Sensor Networks (MASNETs). MASNETS are particular types of Mobile Ad-hoc Networks (MANETs) that are designed to consider energy in mind because they have severe resource constraints due to their lack of processing power, limited memory, and bandwidth as in Wireless Sensor Networks (WSNs) [1, 2]. Hence, they have the characteristics, requirements, and limitations of both MANETs and WSNs. There are many potential applications of MASNETs,

* Corresponding author. Tel.: +6082 583650 ; fax: +6082 583764 .

E-mail address: jmnazim@fit.unimas.my