UNIVERSITI TEKNOLOGI MARA

HYBRID ENHANCED DISTRIBUTED ENERGY-EFFICIENT CLUSTERING (HYBRID-EDEEC) PROTOCOL BASED ON STABILITY AND NETWORK LIFETIME IN HETEROGENEOUS WIRELESS SENSOR NETWORK

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Disertation submitted in fulfillment
of the requirements for the degree of
Master of Science in Computer Networking

Faculty of Computer and Mathematical Science

January 2019

ABSTRACT

Clustering is one of the effective technique used to stabilize and extend the network lifetime in wireless sensor network (WSN). Recently, many routing protocols on clustering structure have been designed and proposed for heterogeneous based on network stability and lifetime performance. In fact, early death nodes are one of the key challenges that reflect to the network performance. The aim of this research study is to improve network stability and lifetime period for EDEEC protocol by modify the EDEEC protocol using probability technique in heterogeneous wireless sensor network which is call Hybrid-EDEEC. Hybrid-EDEEC protocol formed from a hybrid method which is by a combination of EDDEEC and IEDDEEC protocols. Dynamically the selection of cluster-heads is based on probability of three-level heterogeneity and probability threshold. The results are analysed and compared with relevant protocols DEEC, DDEEC and EDEEC. As a simulation results shows that the Hybrid-EDEEC protocol has better performance in term of network stability and lifetime performance compared to other protocols.

ACKNOWLEDGEMENT

TABLE OF CONTENT

CHAPTER ONE
INTRODUCTION

This chapter describes the introduction of the research study. This introduction will cover the problem statements in section 1.2, research questions in section 1.3, objectives of this project in section 1.4, research scopes in section 1.5, research significances in section 1.6 and summary in last section 1.7.

1.1   Background of Study

Wireless Sensor Network (WSN) consists of a large number of group sensor nodes device which are used to monitor physical or environmental condition and to collect the data with organize at some certain central. Physically, the size of the nodes are very small and it is portable where can be easily located anywhere without using wired power. In-term of working process, these sensor nodes will communicate with others nodes using sensor transmission units or directly to the based station to transmit the data packets. For example, refer to the basic architecture of wireless sensor network shown in Figure 1.1 by Bilal Malik (2015). The effectiveness of the group sensor nodes in wireless sensor network is depending on the sensor nodes functionality. Hence, if sensor nodes improper functioning, it will create failures in wireless sensor network function. The limitation of deploying wireless sensor network lies on the management based on battery lifetime. As mention by Zarei B. & Zeynali M. (2010), the lifetime of wireless sensor network is limited because the sensor nodes work on the battery life. It is very hard to recharge the battery in regular basis due to limitation on capacity node storage with the small size by deploy in remote wireless. From the impact, until today many experiments of the sensor nodes have been investigated to enhance the wireless sensor technologies which is important to environmental purpose nowadays. Most of the experiment researches are focused more on the protocol design of the sensor to extend the lifetime battery. Therefore, some protocols from other researchers have been taken to begin this research on wireless sensor network.