

**A PROPOSED FRAMEWORK FOR ANALYZING
PERFORMANCE OF ROUTING PROTOCOLS IN WIRELESS
SENSOR NETWORKS USING A NETWORK SIMULATOR**

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**UNIVERSITI UTARA MALAYSIA
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**A PROPOSED FRAMEWORK FOR ANALYZING PERFORMANCE OF ROUTING
PROTOCOLS IN WIRELESS SENSOR NETWORKS USING A NETWORK
SIMULATOR**

**A thesis submitted to the Information Technology School in partial fulfillment of
the requirement for the degree of
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By

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ABSTRACT

Dramatic advancements in micro-electro-mechanical and wireless communication technology have heightened the usage of sensor networks. Much interest has been seen towards Sensor Network (SN) routing protocol research; however, lack of research tools preventing more people to endeavor into the routing protocol research. This thesis is an infinitesimal effort to fill this research gap by proposing a framework to analyze the performance of the SN routing protocols. Using content analysis approach to quantitative research and all-embracing study of power aware routing protocols especially LEACH, SPIN, and PEGASIS, several simulation requirement models from both hardware and software perspectives have been studied. These simplified models are further classified into several submodels and simulation classes which can be implemented on widely acclaimed discrete event-driven simulation environment, the ns-2. We believe that our proposed framework for sensor networks routing protocols' appraisal-oriented studies, by all means, provides a preordained research platform to novice researchers to start-off their research endeavor.

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Chapter 1

Introduction

Sensor Networks (SNs) are becoming smart choice of small and large organizations alike; Micro-electromechanical-systems (MEMS) based sensor technology has impudence to perform variety of functions. Cost effective, and easy to maintain sensor technology is being deployed largely in variety of milieus such as in the fields (e.g. vehicle, personals and wild life tracking), the workshop floors (e.g. motors, robotic devices, computer integrated manufacturing (CIM)), and other uncountable environments.

Since SNs are becoming popular from management and economic point of view, their use is subject to some certain constraints such as limited computing strength, less storage and battery capacity, scalability, connectivity, task dynamics and details, reachability, and device failure and other challenges.

One of the main challenges faced by the sprouting technology of SNs is power compactness and consumption. The energy efficiency of the SNs is further constrained by several other things e.g. node's distance from the base station, storage capacity of the base station, and the most importantly efficiency of routing protocols in transferring data packets from a sensor node the base station in question.

The main functionality of the routing protocols is to transfer data from one sensory node to another and to the BS in efficient and stout manners. Recently, there has

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