Generic Benchmarking for Application Specific Wireless Sensor Networks Multi Criteria Performance

A thesis submitted for the degree of
Master by Research

By

Dong YU

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CERTIFICATE OF AUTHORSHIP/ORIGINALITY

I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

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ABSTRACT

Due to stringent energy constraint and demand for performance requirement, a generic architecture like TCP/IP or Internet is not feasible with sensors used across various applications. Instead, application specific design methodology is the de facto consensus accepted among Wireless Sensor Network (WSN) community. While it wins WSN performance gains for individual applications, the methodology sacrifices all plausible attributes a generic architecture can contribute. Without a unified reference model as comparing foundation, the profound problem in true protocols contribution evaluation and comparison remains challenging. Moreover, the stochastic and statistical nature of WSNs makes realistic performance analysis fairly complex. In multi criteria QoS context, this problem is further magnified by big design space with not yet fully understood parameters and the competing relationship between multi objective performance metrics. This work introduces a generic wireless-benchmarking methodology not only qualitatively evaluation from high level abstraction, concerning only profound pros and cons from a general viewpoint of tradeoffs between generality, performance and cost, but also a set of practical workflows that are designed to support quantitative evaluation and analysis of WSN protocols for application-specific objectives. This methodology and the accompanying new benchmark concepts, such as performance efficiency, development efficiency and performance stability, are designed to gain new insight of the dynamic behavior of WSN protocols in a systematical way

compared to the current ad-hoc evaluation approaches applied by most of the community.

LIST OF FIGURES

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