MSEE Thesis

Performance evaluation of 802.11g using OPNET

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Declaration

I **Hassan Tariq** certify that this is my own work and the work has not, in whole or part, been presented elsewhere for assessment.

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Abstract

Wireless networks in comparison with wired networks have main constraint of very limited bandwidth, but in spite of bandwidth constraint, due to mobility, flexibility and very cheap physical medium, i.e. air, wireless networks are becoming popular day by day. Wireless networks based on IEEE802.11 standard are becoming very important and popular in current business era and are in high demand by the business companies.

This work provides the performance evaluation of a number of technologies i.e. Direct Sequence Spread Spectrum, Frequency Hopping, Infra-Red, IEEE 802.11a and IEEE 802.11g based on delay and media access delay employing OPNET. The literature review has revealed that most of the work on this area has been done using other simulators like OMNET, Network Simulator 2, and Network Simulator 3 etc. However, not much work exists which has employed OPNET to carry out comparative evaluation employing delay and media access delay.

For performance modeling and evaluation of telecommunication and computer networks, computer simulation is becoming admirable among computer network researchers. This huge popularity of computer simulation is due to the availability of various powerful and sophisticated simulators, and is also due to the built-in flexibility in validation offered by simulation and model construction. Various open and commercial network simulators are available for performance evaluation and modeling of telecommunication/computer networks. OPNET is a popular and famous network simulator that is available for this purpose, especially its subset, OPNET IT Guru.

This thesis aims at utilizing of OPNET towards performance modeling and simulation of IEEE802.11wireless local area networks. The performance of IEEE802.11g is modelled and evaluated in comparison with other technologies such as Direct Sequence Spread Spectrum, Frequency Hopping, Infra-Red and IEEE802.11a. The techniques useful in reducing end-to-end delay and media-access delay at all available data rates are discussed for future work.

Chapter 1
Introduction

Background

As advancements in technology are occurring in society, the graph of the need of wired and wireless networking has been increasing. Wired networks are those networks in which devices in the networks are connected using wires. On the other hand, wireless networks are those in which devices are connected using wireless media like air etc.

Each of these types of networking has its advantages and disadvantages according to security. Wired networking has different hardware requirements and range due to which benefits of each hardware is different. Wireless networking considers several types of hardware components, mobility and range.

If we make a comparison between wired networks and wireless networks, it can be observed that wireless networks have main constraint of very limited bandwidth. But on the other hand wireless networks are offering their user mobility, flexibility and a very cheap physical medium that is air.