THE IMPACT OF TRANSMISSION RANGE OVER NODE DENSITY IN VEHICULAR AD HOC NETWORK (VANET) WITH OBSTRUCTION OF ROAD INFRASTRUCTURE

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ABSTRACT

Vehicular ad hoc networks have the characteristic to of experiencing rapid change of network topology and mobility. Importantly, vehicular networks are required to deal with different network densities in order to provide efficient routing and data dissemination. These are some of the main characteristic that can affect the performance of the network immensely. The main issue that became the driving factor in implementing this project is the need to fill these gaps of understanding the behavioral of vehicular network performance when they are restrained by certain network condition which in this case, dealing with an obstruction of road infrastructure with varying transmission range and node density.

In order to understand this problem, we identify the objectives of this project to integrate SUMO/MOVE (a vehicular traffic generator) into NS-2 to simulate a realistic vehicular ad hoc network environment and to study the performance of the network when the being conditioned into varying settings of transmission range and node density.

In this project, we evaluate the network performance of VANETs in a highway environment using SUMO traffic simulator and network simulator, NS-2 which specifically focusing at the toll booths by studying the effect of varying transmission range over node density.

From the simulation results, we found out that the smaller transmission range will produce less throughput, higher end to end delay and also higher normalized routing load. Particularly in vehicular ad hoc network, a constant or a fixed transmission range is not efficient enough in maintaining the connectivity in the network. This is due to the unpredictable of traffic conditions in the network. In addition to this, by dynamically

changing the transmission range according to its need, will offer the advantage of power saving and increase capacity.

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CHAPTER ONE

INTRODUCTION

Vehicular networks are type of network that can be spontaneously formed between moving nodes or vehicles that are geared with wireless interfaces, where its implementation will benefit in terms of providing the intelligent transport system (ITS) with assistant services. These services are also beneficial for drivers and passengers (Moustafa et al., 2009). There are numerous studies carried out in this area which focuses on the design and enhancement of routing protocols, medium access control protocols, data dissemination protocols, security and much more. This project on the other hand, studies the impact of different transmission range over node density in vehicular ad hoc networks. VANETs are subjected with diverse situation, ranging from very low vehicle densities to very high densities (Schmidt et al., 2009). This chapter will present the introduction for this project that also includes problem statements, research questions, research scope, research objectives, research significance, and organization of the project report.

1.1. INTRODUCTION

There are various applications of VANETs among them is to tackle network congestion and provide drivers with the best route as well as updated road conditions. Another interesting application is eToll plaza, where vehicles do not need to stop or slow down their vehicles at toll booths to pay toll fee. Vehicles can communicate with roadside

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