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Performance comparison between 802.11 and 802.11p for high speed vehicle in VANET

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ABSTRACT

Vehicular ad-hoc networks (VANETs) technology has been emerged as a critical research area. Being ad-hoc in nature, VANET is a type of networks that is created from the concept of establishing a network of cars for a specific need or situation. Communication via routing packets over the high-speed vehicles is a challenging task. Vehicles mobility, speed can vary depending on the road specification. However, on highway, the speed can be increase up to 120–200 Km/H. Moving at high speed can affect the efficiency of data delivery. In particular V2I traffic where moving car trying to deliver data to fixed space units which are designed to collect and process data from vehicles. Different protocols have been proposed to be implemented for VANET infrastructure, including 802.11 and 802.11p. The performance of these proposed protocols has not been compared and investigated to find out the robust mechanism for handling high speed VANETs. In this paper, the performance of the most widely deployed MAC protocols for handling wireless communication which is 802.11 and the 802.11p have been compared, which is a customized version for high speed modes. Performance is investigated in term of data delivery evaluation metrics including network throughput, delay and packet delivery ration. Results show that 802.11p has efficiently enhanced the network performance where network throughput is increased, delay is decreased, and packet delivery ratio is increased as well.

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1. INTRODUCTION

Recently, Vehicular Ad-hoc Networks (VANET) becomes more popular and widely deployed over all the roads across the world. Most of modern cars are equipped with Wireless modules which provides vehicles to communicate with each other's and with communication control points [1]. Enhancing Inter-Vehicle communication and roadside communication are considered as the most popular wireless communication research topic. VANET allows road vehicles to notify other vehicles about traffic jams, sudden stops and other hazardous road conditions [2]. The huge number of expected benefits of VANET and a number of supporting vehicles are likely become the most realized implementation of mobile Ad hoc networks. Short range IEEE 802.11 can be used for vehicle communications using suitable radio interface technology [3]. However, a new standard for both physical and MAC layer has been developed to meet the requirement of communication between vehicles, IEEE 802.11p is an approved amendment to the IEEE