Abstract

The Last decade has seen many advances in wireless networks. Among these networks are the so called mobile ad hoc networks (MANETs) that do not rely on any existing infrastructure. MANETs have no special fixed routers. Instead, the mobile nodes themselves function as routers which discover and maintain communication connections. Thus, a MANET is a self-organizing multi-hop wireless network where all nodes participate in the routing and data forwarding process.

Vehicular Ad Hoc Network (VANET) is special case of MANET where the network is focused on providing vehicle to vehicle (V2V) and vehicle to infrastructure (V2I) communications. VANET has been one of the hottest research topics in the last few years and is considered one of the most promising types of networks in the future. The main goals of VANET are to increase traffic safety, to increase transportation efficiency, and to reduce the negative impacts of the transportation on environment. VANET has received a wide attention from many car manufacturers, governmental organizations and the academic communities. Due to the mobility of vehicles in VANETs, topology of these networks change unpredictably. Moreover, routing in VANETs work mainly in a distributed manner. These factors make routing one of the main challenging issues to be considered in VANETs.

Simulation is a necessary tool for conducting research in this field for cost and safety reasons. So, simulation tools have a significant role in studying VANETs. The main goal of this thesis is to find the best routing protocol suitable in VANETs city scenario. Our assumed VANET scenario in this thesis consists of vehicles (nodes) approaching a road intersection in urban environment. The scenario focuses on sending information about the intersection from a node existing at the intersection (source node) to other nodes (destination nodes) that are at distance of approximately 1km from the road intersection moving towards it. The information sent to the destination nodes contains the conditions about the intersection. The information may take several types of data such as voice, image, or video. This application assists the driver in dealing with the conditions of

intersection, such as traffic congestion and traffic light phase, before his arrival to it. In this thesis, we carried out a comparative simulation study using SUMO and ns-2 simulators to investigate the performance of (V2V) communications based on MANETs routing protocols AODV, AOMDV, DYMO, and DSDV for different parameters such as number of vehicles, maximum speed of vehicles, and number of sent data packets. The simulation results showed that DYMO routing protocol has better performance than other routing protocols in terms of routing overhead and end-to-end delay.