Study of the main determinants of the VANET network using the simulation program VANETSIM

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Abstract

Many research institutions in the field of transport is seeking to try to find safe ways, through the vehicles are equipped with the information gathered from inside and outside the vehicle in order to be delivered to the central processing unit analyzes the information and give the appropriate commands to the executive.

This information is collected using communication networks for vehicles VANET, which includes many of the features and benefits of improving traffic safety on the road and effectiveness, comfort and quality of daily travel trips and lose time.

In order to show these benefits be closer to the truth and to the difficulty of the practical application of network VANET on the highway, it has the use of simulation program (VANET-Simulator), where the simulation results showed the importance of having and using VANET network in addressing realistic problem of securing safe access and shortest time possible for the important procession consists of several cars that runs from Damascus International Airport to reach the People's Palace, after processing all the possibilities that can be exposed to that procession and without the use of any other means of communication, and to prove to us that this procession needs 22 minutes at best until it reaches to the exact location, a figure that resembles the real figure to reach within a specific parameter realistic conditions.

About scientific research.

Wireless communication has become the most common means of transmission of information, and the transfer of such information in mobile wireless networks in general and in vehicular networks (VANETs) is especially important because of its economic and security benefits, in addition to being the backbone of the evolution of intelligent transport system.

In this study, we implemented VANET modeling and simulation through a design analysis study to identify the main determinants of the VANET network, specifically our Case Study. This is an important procession that takes off from Damascus International Airport - the green dot in Figure 1 to the People's Palace in Damascus - The red point in Fig. 1 is through the airport road, the southern junction, the Mezze motorway and the People's Palace road.

The micro-maps of the simulator were adopted by openstreetmap.org using a precise map of the chosen route shown in Figure 1:

The ad hoc network of vehicles (VANET) is a special type of ad-hoc mobile networks in short-range wireless communication (MANET), where all nodes are generally moving vehicles at high speed, making them a decentralized network with self-regulation and structure As opposed to Wi-Fi, WiMAX, and GSM.

Modern vehicles are often designed to be local networks, with the ability to connect to multiple computers that can communicate with each other and with other vehicles through multiple wireless connections as shown in Figure 2.

VANET is used in many commercial applications such as providing effective routing information for vehicles and informing drivers of traffic conditions, accidents, road conditions, etc. For this purpose, VANET uses sensitive devices to monitor network conditions such as vibration, pressure, movement and pollution, Temperature, and sound. These sensors provide information relevant to their specific function to transmit data later to other networks. These sensitive devices are very small and inexpensive and can be deployed in large numbers in the network.

Wireless communication between vehicles can be seen as a complex system, for three main reasons as a two-dimensional model:

1 - There are many reflective wireless surfaces in the environment in which the vehicles are moving.

2. The vehicles run on a wide range of speeds, resulting in a breakdown in wireless communication.

3. RF interference is common from all sources within the vehicle and from other nearby transmissions.

In general, vehicle communication within a VANET environment is classified as follows:

1- Communication between vehicles.
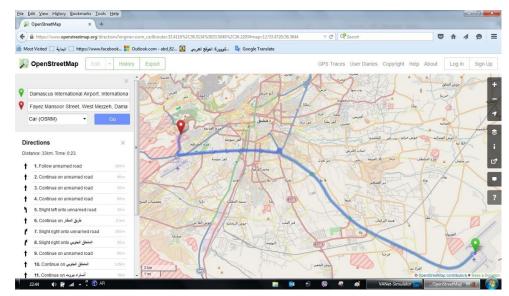
2- Communication between vehicles and side units.

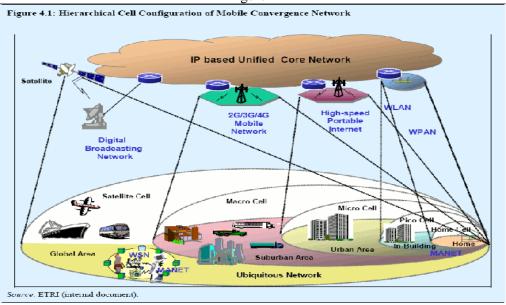3. Communication within the vehicles.

Figure 1

Figure 2

Figure 3