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Neighbor Discovery in Vehicular Ad-hoc Network for Efficient Data Transmission

Hukum Singh Bisen[1], Prof. Jitendra Mishra[2]

[1]M. Tech Scholar, Department of EC, PCST, Bhopal (India)

[2]Head & Professor, Department of EC, PCST, Bhopal (India)

[1]hukumbisen@gmail.com, [2]jitendra.mishra260@gmail.com

ABSTRACT

VANET is a variation of MANET (Mobile Ad-hoc Network). MANET comprises of nodes which communicate without central network and where nodes are equipped with networking capabilities. VANET on the other side has emerged as a challenging and more liable class or variation of MANET. The communication between devices expands in such as way where nodes are free to join and leave the network i.e. it is an open network. The new vehicles being launched in the market are now coming with equipped on board sensors which make it easy for the vehicle to easily join and merge in the network and leverage the benefits of VANET. In this paper we proposed the route discovery mechanism for the best route for a communication in a minimum delay and maximum throughput, our experimental result shows that the proposed method gives better results than the previous method.

Keywords:- Mobile ad-hoc network, Vehicular Ad hoc networks, Intelligent transportation systems, Vehicle-to-vehicle, Vehicle-to-infrastructure.

INTRODUCTION

Vehicular Ad Hoc Networks (VANETs) is a subclass of Mobile Ad Hoc Networks (MANETs) and the general characteristics of VANETs are typically inherited from MANETs in terms of lack of infrastructure, self-management and shared transmission media. However, VANETs exhibit plenty of unique characteristics and operate in a challenging communications environment, which create diverse considerable challenges to develop efficient vehicular communication protocols. For instance, the high speed of the vehicles and the large scale of the network lead to dynamic topology.

Consequently, the rapid and continuous changing topology causes frequent disconnections of the communication links, which results in an increased overhead of the communication protocols. From another perspective, the future movements of the vehicles in VANETs are predictable due to the constraints of urban layout, road geometry, and traffic conditions. Hence, accurate prediction of the vehicles future movements could play a crucial role for both building efficient vehicular communication protocols and enhancing the vehicular transportation systems. Predicting the vehicles future movements is defined as the estimation of their future locations, trajectories and the time required reaching their destinations, which requires precise analysis of their mobility characteristics [5].

In recent years, wireless technology is widely adapted to many areas. In particular, vehicular network, also known as Vehicular Ad Hoc Network (VANET), is a core technology for next-generation intelligent transportation systems (ITS) and major part of smart city research. A VANET provided communication connections for vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) where each vehicle is assumed to equip with a vehicular communication system. However, maintaining communication links of an established communication path that extends between source

and destination nodes is a significant challenge in vehicular networks due to movement of the vehicles. In particular, such communication links are often broken under a high-mobility environment [9]. This network supports the communications among vehicles via inter-vehicle communication (V2V) mode and between vehicles and roadside units via vehicle to infrastructure (V2I) communication mode in order to simplify the exchanging of information in unicast, broadcast, geocast or multicast dissemination fashion.

In some cases like the accidents, it is better to send some of safety messages with a certain level of quality of service from a source vehicle that found in the accident location for a set of endangered vehicles in different locations. This transmission mode is known as multicast mode. As a result the endangered vehicles must perform some actions quickly before a certain critical time such as stopping or changing the moving direction to avoid a road accident or collision. So it is necessary the average end-to-end delay to be low and bandwidth to be highly significantly in order to deliver such QoS safety messages correctly [16].

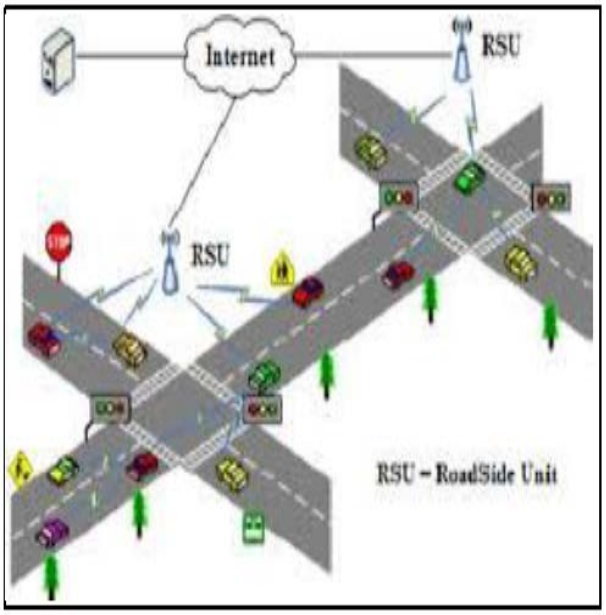

Figure 1: Vehicular Ad Hoc Network.

The rest of this paper is organized as follows in the first section we describe an introduction of about the mobile ad-hoc network and their application. In section II we discuss about the various routing mechanism specially trade off network, In section III we discuss about the proposed work and experimental solutions for the route discovery in vehicular ad-hoc network, finally in section IV we conclude the about our paper.

II TRADE-OFF ROUTING MECHANISM

In theoretical research, the nodes are massive such that they are deployed through the scatter manner, which results in a fact that there exist lots of redundant nodes and repeated information. Informally speaking, redundancy means that the same (or correlated) physical data is measured by several sensors [11]. In such a case, the QoS performance is unconcerned, while energy efficiency is one of the key objectives in data gathering in wireless sensor networks (WSNs). Whereas, the number of nodes are generally finite with a manual installation manner in the practical application, which also makes the energy restriction vanish and the redundancies are comparatively less. Uncertainties may come from the measurements, the noisy observations, the computation errors or the incomplete information.

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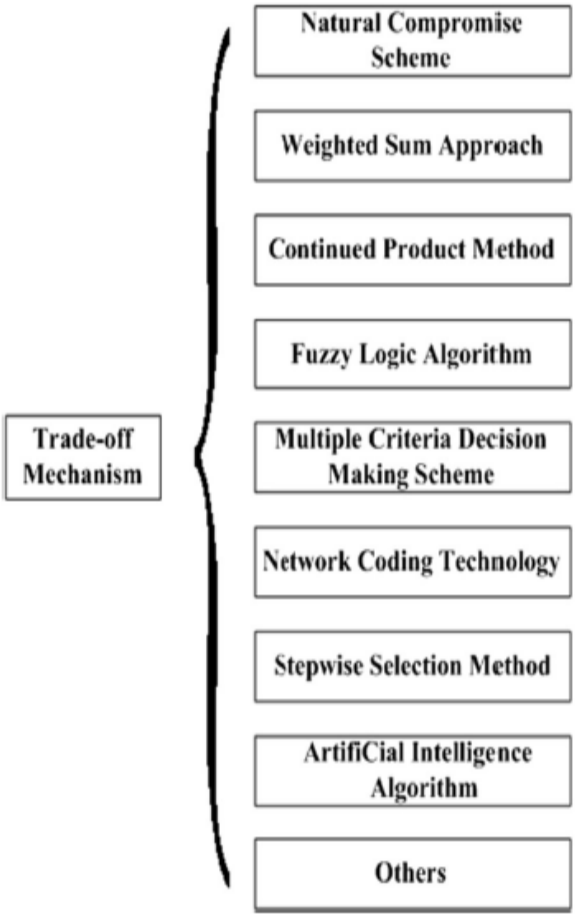

Figure 2: The trade-off mechanisms in routing.

As a result, the QoS performance becomes indispensable. Furthermore, each application has different performance requirements, thereby there is not a universal performance trade-off mechanism can make all performance achieve the best. This is also determined by the application related features of wireless sensor networks. Sometimes several performances are required simultaneously, which can be available if the performance trade-off mechanism is implemented within a certain layer. Routing is one of the key technologies in the network layer of the wireless sensor networks. Moreover, routing algorithms are important for the functionality of a network because they provide paths on which the packets are sent over the network. Therefore, the investigation on the performance trade-off mechanisms of the routing is prerequisite. Researchers are engaged in developing different solutions so as to fulfil various application performance requirements [11].

III PROPOSED WORK AND RESULT

Transportation is an indispensable part of modern civilization. It is inseparable from society and exerts a powerful influence on the lives of individuals and the development of nations. Time is considered as one of the important and recognized parameters for successful operation in existing technology-based communication systems, such as computer networks, cellular network and sensor network.

However, today's transportation systems do not depend on precise and accurate time in their operation. In order to alleviate the road fatalities including death, injuries and economic losses, transportation system researchers are evolving the concept of an Intelligent Transportation System. In this section we discuss about the proposed experimental environment and used performance evaluation parameter with their respective software and tools. Here we using the network simulator tool for the proposed methods simulation, which is basically support linux operating system. After the successful implementation of vehicle node we count or measure the performance of our proposed methods compare with the existing methods, here the performance of network measured with some parameters such as packet delivery ratio, error rate etc. Each vehicle maintains lists of its one-hop and two-hop neighbors, based on information exchanged among nodes within transmission range R. One-hop and two-hop nodes are those which can be reached at maximum one and two hops of transmission respectively from a reference node. Sets of these nodes are called one-hop set (OHS) and two-hop set (THS) respectively.

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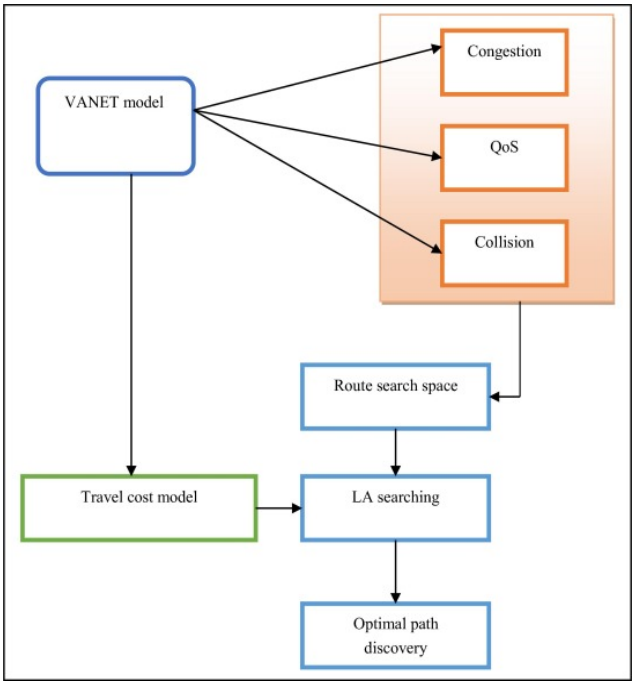

Figure 3: Proposed model diagram for performance parameters.

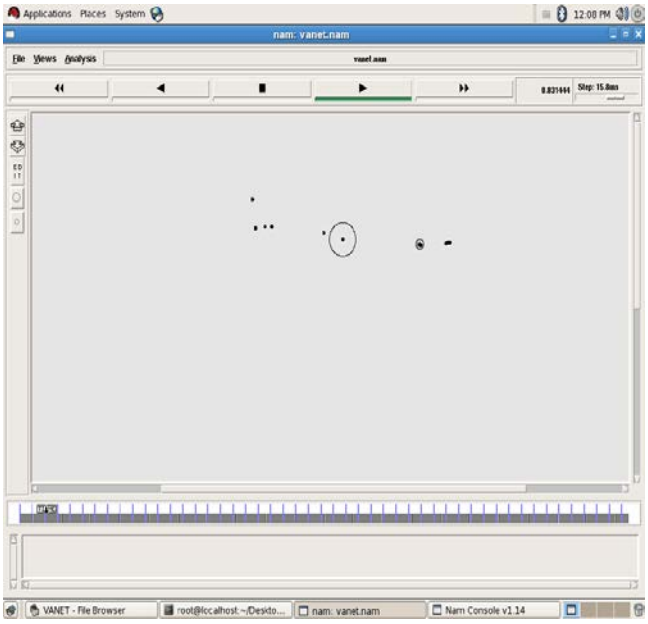

Figure 4: The above image shows the experimenatl results with using number of vehicle nodes.

IV CONCLUSIONS

VANET refers to a network created in an ad-hoc manner where different moving vehicles and other connecting devices come in contact over a wireless medium and exchange useful information to one another. A small network is created at the same moment with the vehicles and other devices behaving as nodes in the network. Whatever information the nodes possess is transferred to all other nodes. Similarly all the nodes after transferring their set of data receive the data being transmitted by other nodes. In this paper we proposed a mechanism for the best suitable route for the neighbour to discover easily and improved the performance then existing or previous techniques.

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Hukum Singh Bisen received his Bachelor`s degree in Electronics Comunication Engineering from RITS, Bhopal, M.P., in 2014. Currently he is pursuing Master of Technology Degree in Electronics & Comunication (Digital communication) from PCST, (RGPV), Bhopal, Madhya Pradesh India. His research area include Ad-hoc Network, Vehicular Ad-hoc Network.

Mr. **Jitendra Kumar Mishra** he is Associate Professor and Head of the Department of Electronics and communication in PCST, Bhopal (RGPV). His received Master of Technology and Bachelor's of engineering respectively in Digital communication from BUIT, Bhopal and from RGPV, Bhopal. He has more than 11 years of teaching experience and publish 35+ papers in International journals, conferences etc. His area of Interests is Antenna & Wave Propagation, Digital Signal Processing, Ad-hoc network, Wireless Communication, Vehicular Ad-hoc network, Image Processing etc.