AN ASSESSMENT ON VANETS ROUTING PROTOCOLS

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Abstract*—VANETs are considered as autonomous self-configuring networks and created by applying the principles of MANETs. MANETs are composed of self-organizable infrastructure of mobile devices connected without wires. VANETs form a spontaneous creation of wireless networks for data exchange in the domain of vehicles. VANETs thus provide services for improving the road safety. One of the main services is routing mechanisms. Due to the high mobility of nodes routing becomes more difficult. The routing protocols depend on routing information, network structures and techniques and so on. VANETs protocols reduce time consumption, overhead between the nodes, performance efficiency. In this paper describes VANET architectures, routing protocols, features and classification. Also a comparative study of VANETs routing protocols.

Index Terms*—Vehicular Ad-hoc Networks (VANETs), Vehicle-To-Vehicle (V2V), Vehicle-To-Roadside (V2R), Vehicle-To-Infrastructure (V2I), Vehicle-To-System (V2S), Mobile Ad-hoc Networks (MANETs)

I. INTRODUCTION

VANETS are under the class of ad-hoc networks from the root considered as wireless networks. Wireless communication is a type of data communication i.e., performed and delivered wirelessly [1]. These are the networks created by applying the principle if MANETs. The spontaneous creation of wireless network in the domain of vehicles, thus VANETS formed. Here vehicles are considered as the mobile nodes. VANETS provide communication to nearby vehicles and between vehicles and roadside equipment. This is mainly used in road safety applications [2]. This technology aims to provide drivers and others who travel on the vehicle with the updated information based on the accidents, traffic jams, weather, etc. By using these information drivers may find it easy to decide routes and avoid accidents.

II. VANETS COMMUNICATION ARCHITECTURES

Several architectures are supported to the VANET communication. They are:

- Vehicle-to-System (V2S) communication:

This system can easily identify the vehicle's performance and analyze the driver's weakness like tiredness and drowsiness, which is considered as very crucial element for drivers and public safety.

- Vehicle-to-vehicle (V2V) communication:

This architecture that provides sharing and exchange of warning information for drivers, i.e., this specifies the driver assistance.

- Vehicle-to-road side (V2R) communication:

It includes real-time traffic/weather updates for drivers and enables environmental sensing and monitoring.

- Vehicle-to-Infrastructure (V2I) communication:

This specifies that vehicles may communicate via wireless broadband mechanisms such as 3G/4G. This includes more traffic information and monitoring data, this type of communication will be useful for active driver assistance and vehicle tracking.

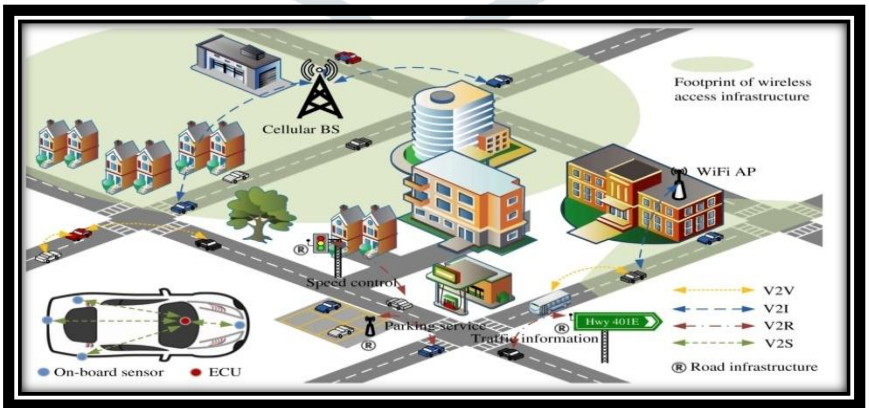

Fig: 1: VANETS communication architectures

III. VANETS ROUTING PROTOCOLS

VANETS Routing Protocols are classified into two:

- Vehicle-to-vehicle (V2V) routing protocols
- Vehicle-to-infrastructure (V2I) routing protocols

This paper mainly focus on the detailed information about the routing protocols related to vehicle-to-vehicle routing protocols.

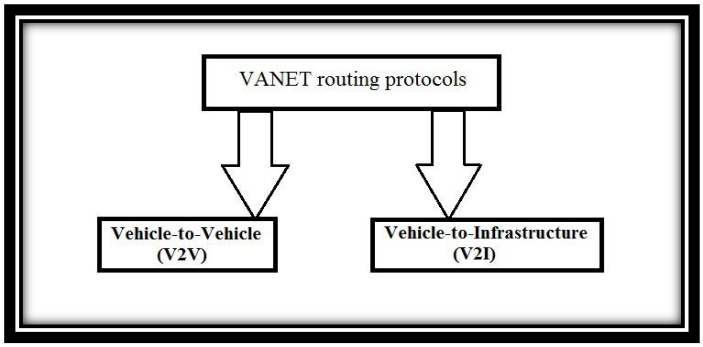

Fig: 2: VANET routing protocols

Due to the high mobility of nodes (vehicles), routing becomes the most challenging task in VANETS. Many protocols are developed with respect to the VANET environment, can be classified on the basis of different aspects such as routing information, QoS, network structures, techniques used and so on.

IV. LITERATURE SURVEY

The survey can be done based on the Vehicular Ad-hoc networks, related to the different routing algorithms in various aspects are:

Miao Wang, Hangguan Shan, et.al [3] based on the recent technology VANET provides wide range of broadband services to the vehicles. Vehicles transmits message to the road side units (RSUs) and also communication in between the vehicles can be easily done with the involvement of VANETs. Sometimes several challenges can be arises due to the inter-vehicle connectivity. In order to solve this issue, an efficient message routing scheme can be proposed. The main aim of this routing scheme is to rise up the message flow and also analyze the asymptotic throughput during the message delivery. This scheme can be explained with the help of a mathematical framework. By using these concepts a novel packet forwarding scheme can be developed to overcome the difficulties occur in the mobility diversity of vehicles. Thus improves the network throughput and reduces the collisions.

Stefano Rosati, et.al [4] here by applying the wireless network concept to the FANET (Flying Ad-hoc Network), which is composed of small flying robots. The flying robot is considered as small unmanned aerial vehicle (UAV). This type of technology is mainly used in civilian and military applications. FANET is a special case of mobile ad-hoc networks. Dynamic routing in ad-hoc networks facing several challenges. In order to reduce these challenges several algorithms are used such as OLSR (Optimized Link-State Routing). This aims at meeting the need for highly dynamic routing in MANETs composed of fast-moving and slow-moving nodes. The extension of OLSR can also be used called as predictive-OLSR (P-OLSR). The main idea of P-OLSR is, to use GPS information available on board and to weigh the expected transmission count (ETX) metric by a factor that shows the particular direction and calculates the relative speed between the UAVs. In future, the function of P-OLSR can be improves the routing in SMAVNET II (Swarming Micro Air Vehicle Network) project. This paper also compares the OLSR and P-OLSR algorithms.

Jack Fernando, et.al [5] the virtual nodes are emulates by the collaboration of physical nodes. The Virtual Node Layer (VNLayer) consists of a set of procedures to solve the problems that occurred in mobile ad-hoc networks. Every physical node can send/receive messages to/from other neighboring nodes. The VNLayer is lies in between the link layer and the internet layer. Several routing algorithms are used to improve the performance of existing ones. Here a new reactive routing algorithm can be used are called as Ad-hoc On Demand Distance Vector Routing (AODV). This algorithm is also called as VNAODV, because it is used in VNLayer. New mechanisms and updates the multi-hop features are also occurred in VNLayer, hence the version of VNLayer is called as VaNetLayer. Thus the algorithm VNAODV can be modified and adds several other features then the algorithm called as VNAODV+. Here compares the characteristics of the each extension of algorithms.

Konstantinos Katsaros, et.al [6] in the hybrid vehicular networks the vehicles are equipped with two network interfaces i.e., IEEE 802.11p based on short range communication and 3GPP LTE is used to access cellular networks. Here proposes a new challenging routing algorithm for hybrid vehicular network can be implemented. The improved location based routing algorithm can be used, which based on different architectures i.e., short range ad-hoc only, cellular only and hybrid ad-hoc/cellular network. These architectures can be specified by an analytical approach called as Stochastic Network Calculus. With the help of this algorithm the performance, traffic signaling can be improved. The simulation can be done by using NS3, analyzing end-to-end delay.

Mahmoud Hashem Eiza, et.al [7] VANETs have safety and traffic management applications. These applications are offered by QoS guarantees. Sometimes this QoS metrics which causes inefficient and infeasible routes can be find out. This can be avoided by using a particular routing algorithm called as Situation Aware Multi-constrained QoS routing algorithm (SAMQ). This algorithm that combines two concepts, they are Situational Awareness (SA) and Anti Colony System (ACS). The SAMQ selects best route in between source and destination with respect to the QoS constraints.

V. CONCLUSION

Different types of vehicle-to-vehicle protocols, classifications and examples are described here. The literature survey can be done with respect to the V2V routing protocols. Each of them specifies different problems and their solutions, which are related to the routing algorithms. Different types of routing algorithms are supported for the VANETS to resolve the problems or difficulties such as to find the best route in between the source and destination, improve performance, and avoid traffic, so on. Here brief comparative study based on different papers related to the vehicle-to-vehicle routing protocols.

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REFERENCES

[1] Sommer, Christopher; Dressler, Falko (December 2014). *Vehicular Networking*. Cambridge University Press. ISBN 9781107046719.
[2] "A Comparative study of MANET and VANET Environment". *Journal of Computing* 2 (7). July 2010. Retrieved 28 October 2013.
[3] Miao Wang, Hangguan Shan, Tom H. Luan, Ning Lu, Ran Zhang, Xuemin (Sherman) Shen, and Fan Bai, "Asymptotic Throughput Capacity Analysis of VANETs Exploiting Mobility Diversity", IEEE transactions on vehicular technology, vol. 64, no. 9, September 2015.
[4] Stefano Rosati, Karol Kruzelecki, Gregoire Heitz, Dario Floreano, and Bixio Rimoldi, "Dynamic Routing for Flying Ad Hoc Networks", IEEE Transactions on Vehicular Technology, 2015.
[5] Jack Fernando, Bravo-Torres, "Optimizing Reactive Routing over Virtual Nodes in VANETs", IEEE Transactions on Vehicular Technology, 2015.
[6] Konstantinos Katsaros, Mehrdad Dianati, Rahim Tafazolli, Xiaolong Guo, " End-to-End Delay Bound Analysis for Location-based Routing in Hybrid Vehicular Networks", IEEE Transactions on Vehicular Technology, 2015.
[7] Mahmoud Hashem Eiza, Thomas Owens, Qiang Ni, Qi Shi, "Situation-Aware QoS Routing Algorithm for Vehicular Ad hoc Networks", IEEE Transactions on Vehicular Technology VTCV-2015-00687.R2.