

Survey on Routing Protocols and Its Methodology in VANET

Kiran. L¹, Suganya. R², Mani. J²

¹UG Scholar, RAAK College of Engineering & Technology, Puducherry, Tamil Nadu, India

²Assistant Professor, RAAK College of Engineering & Technology, Puducherry, Tamil Nadu, India

ABSTRACT

Vehicular Ad hoc Network(VANET) is an emerging technology used for inter-vehicle communications, for the development of road safety, sharing and accessing the information, alert messages and entertainments. An subclass of mobile ad hoc networks (MANETs) is Vehicular Ad hoc Network (VANET) which is an approach for (ITS) intelligent transportation system. For the support of an smart (ITS) it is necessary to design the routing protocols in VANETs. Although the motivate researchers of the vehicle equipments, realistic traffic data availability, the scale and the ad hoc networks literature exists for the unique characterstics of VANET. The goal to survey the compare literature and paper on the existing routing protocol and the characterization of vehicular Ad hoc network(VANET).

Keywords : VANET, ITS, MANET, NS2, RSU, GeoSVR, DTN, V2V, V2I

I. INTRODUCTION

Vehicular Ad hoc Network(VANET) is a technology used for traffic collision, altering the drivers depend on the status of the roads, and the instructions for the safety and control the flow of vehicles. For implementing this technology, we should know all the accurate information about vehicles. For addressing the above problem the fig 1 shows a vehicular ad hoc network

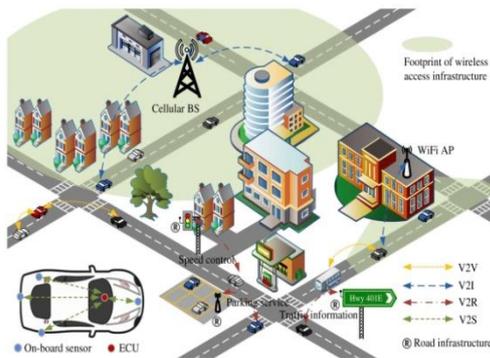


Figure 1. VANET Architecture

To avoid the traffic collision during the accident time the VANET technology should provide the information to other vehicles. VANET technology

need to know all the traffic usability information on the road side which are collision, traffic density, speed of vehicles, directions of road and also about different weather conditions. By using inter vehicle ad hoc network the informations are gathered to the roadside communication technologies.

Vehicular ad hoc network (VANET) is an emerging technique which integrates the wireless network in the new generation of vehicles for the communication. The main purpose of VANET is 1. Providing the continuous connections in between the vehicles. 2. Provides the link for transferring the informations like conference meeting, videochatting for other vehicles. 3. Vehicles between the efficient wireless communication doesn't depends on any kind of fixed infrastructure. In VANET the informations are transferred as packets and the codes are send receive through the wireless network. The informations about the accidents, traffic jams, flooding, are provided by these wireless network devices, to the drivers and the passangers by using VANET technology. By receving the information on

time, drivers will make the correct decisions and they avoid mishaps. As in the technology of MANET, the VANET technology also described the similar features as MANET. This technology integrates the self management, self organization, and it will reduce the bandwidth which can able to distribute the radio transmission.

For the purpose of fast mobility in VANET node, this type of designed protocol is used efficiently. This paper aims the major issues for VANET about the routing protocol. The main goal of this paper is for achieving the less communication time when using minimum simulation which provides the performance of the vehicular ad hoc network (VANET).

II. LITERATURE SURVEY

Maram Bani Younes at[1], introduced Intelligent path recommendation protocol(ICOD), goal of this protocol is to find the best path towards each and every destination in the layout area based on grid. Centralized behavior problem can also handle by it, there are three different variants which are focused in ICOD such as congestion avoidance, context aware, and economical. The variant that recommends the least of congestion path across the destination is the congestion avoidance. The variant that recommends the best fuel consumption, economical path, and the gas emission in each path of parameters. The variant that consider the condition of the road and road segments and analyzing the desire path is the context aware variant. Different variants and the ICOD protocol are using in the similar distributed way and minimizing the centralized behavior problem, providing the fast communications between vehicles. This paper implemented by using NS2, it shows the ability to recommend the best path and exhibit a good performance with the decreases the delay of each vehicles. In order to find the best path the path recommendation protocol introduced on distributed manner which is consider as road side unit(RSU), which can be solving the congestion problem.

Yi-Shiun Lin, Sheng-Shih at[2] in this paper the passive clustering mechanism can used for constructing the reliable and stable structure of cluster during the route discovery phase. With the comparison of traditional clustering mechanism, the validated and more efficient one is the pc mechanism than others. Each candidate self determines its own priority and the multi metric election based strategy on metric such as expected link lifetime, node degree. To create the cluster structure it not only will increases the probability selected suitable nodes and route discovery. To improve the packet delivery ratio cluster structure is used and achieves the higher throughput in network due to the performance for reliable, stable, and the durable routing path. To construct a stable and reliable cluster structure for enhancing routing performance in VANETs, the passive clustering aided mechanism is used. The mechanism based on the contention wins the first declaration, when cluster the node, the other node is dominated by the head of the node within its communication range. Node degree, route metrics, link lifetime, expected transmission count, these to construct an efficient structure for the durable and reliable routing.

D.Manivannan, James Bernsen, at[3] (RIVER) Reliable Inter-Vehicular Routing protocol an efficient routing protocol for VANETs. The surrounding street layout where an vertices of graph are pointed in the street curve are represented by this protocol. RIVER performs active traffic observance, period of time and these informations and alternative informations are gathered using the passive mechanisms in every street edge to assign the reliability rating. Control messages to identify neighbours node's, determine the street edges dependability, and to share the alternative nodes with the street edge dependability data. The geolocations and communicates responsibility data about the every edge is identified by the known-edge list. Weighted routers- Each RIVER routing packet contains anchor points listing for route, which is known by geolocation. The list representation of an

edge has any two consecutive route anchor points within the list in graph has an edge weight related to it.

Jung-Shian Li at[4] in Vehicular ad hoc network the link quality changing constantly. Different routing algorithm for discovering of available transmission paths that are proposed, in VANET environment it is impossible to find end-to-end reliable path. Intelligent adjustment forwarding(IAF) is designated by the forwarding protocol called an application layer, in which a transmission paradigm as segment-segment is used for data delivery enhance performance. In networks the transmitting data , connections like end-to-end are not easily established, they are broken easily. In transmission path by implementing a forward-and-store capability in each hop then the BP protocol ensures an reliability between the source and destination of each connection. Network simulation 2 (Ns2) performed to compare the BP control with that of the routing performance of (IAF) and an forwarding scheme called existing VANET,namely approach of an existing VANET. DTN(Delay tolerant network) networks, beats the inherent issues of an DTN networks, such as variable or long delays, intermittent property, by some kind of informations the communications are handled usually using some types of bundling of informations protocols. Several web services causes the BP protocol to fail since some of the services typically communications transmission protocol where an end-to-end communication paradigm is utilizes. To establish an transmission path for the destination the Intelligent Adjustment Forwarding(IAF) algorithms are used which performs an intelligent routing process to establish an transmission path.

Teresa Vazao, Antonio Fonseca at[5] The vehicles positions based on the protocols were they found more adequate for VANETs due to their handling to resilience the position variation nodes. The position based protocols are compared to the topology based protocols and identified latter the different strategies

that are used and their performances are evaluated qualitatively relatively to the different metrics. The different perspectives are based on the pseudo code specifications that includes the different proposals which are described by the position based routing protocols. The GSR(geographic source routing) selects a path to reach the destination using the algorithm called dijkstra shortest path algorithm with the map information.

The digital map and node location is combined with an geographic stateless routing. To solve the sparse connectivity problem and local maximum, the GeoSVR enhanced an forwarding path and the forwarding algorithm which is restricted are overcomes the wireless channel unreliable issues. The issues of the sparse connectivity and the local maximum are solved by using GeoSVR by estimating the density of the vehicle given by the road type. To reduce the packet loss which is caused by the unreliable wireless channel in an restricted range the restricted forwarding algorithm is used. The ratio of high packet delivery with the low latency can be provided by the GeoSVR that indicates the results and the synthetic scenario in an proposed routing algorithm. The proposed routing is implemented in the real world test and deployed in an urban road for the evaluation of performance. An novel stateless VANET routing which is combined with the node location and the digital map is an GeoSVR. The GeoSVR is comprise In two core algorithms: restricted forwarding algorithm and the optimal forwarding path algorithm.

Overview of VANET routing protocols:

In VANET there are wide range of routing protocols. When packet loss is occur (Ahmed,2006) these protocols are aimed mainly to increase throughput range. The main objective is to provide the routing protocol as energy efficient in VANET (Hen, 2006). For the purpose of communication the VANET require an new type of an routing protocol. Here, the VANET routing protocols are consider two different types of the communication architecture of VANET.

They are:

- I. Vehicle to vehicle (V2V)
- II. Vehicle to infrastructure (V2I)

(I) Vehicle to vehicle (V2V):

To perform the communication between the vehicle to vehicle this protocol is used, this protocol doesn't focus on the roadsides fixed base stations. It consists of six main categories of the routing protocols. They are as:

- I. Position based
- II. Topology based
- III. Cluster based
- IV. Multicast based
- V. Geo-cast based
- VI. Broadcast based

(i) Position based

In the position based routing protocols, every nodes will recognize their own locations and geographic locations of their neighbor node through the device called position pointing such as GPS. It does not exchange any informations and does not manage the kind of routing tables which are related to the link state with the several neighbor nodes.

(ii) Topology based

In this class of the routing protocols the link information employs that exists to execute the packet forwarding in the network.

(iii) Cluster based

For the network cluster topology the cluster based routing protocols are more suitable, there is one cluster head in every cluster which is then responsible for inter-and intra-cluster management purposes.

(iv) Multicast based

The multicast based mostly transmission within the VANET is associate transmission generally from one supply to the multiple destinations that is typically

conducted through the geo forged routing among associate specific geographic area.

(v) Geo-cast based

The geo-cast routing protocol is also called as position based multicast routing which is employed to transfer a message to the vehicles located at the fixed geographical area. To distribute the packets in the particular geographical area from the source node to the all other nodes is the main objective of this approach.

(vi) Broadcast based

The normally used routing protocol in VANET is the broadcast based routing protocols which is used to share the various informations about the conditions of roads, the urgent situation in vehicles, and climate, and also for the announcements and adversting

(II) Vehicle to infrastructure (V2I)

V2I protocol is used to perform the communication between vehicle to infrastructure, it aims at the fixed base station, on the road sides. There are two different infrastructure categories such as:

- I. static infrastructure routing protocols
- II. mobile infrastructure routing protocols

(i) static infrastructure routing protocols:

The fixed RSUs are placing which are linked with the network called backbone in the precise position, which is necessary for communication. Depend upon the communication protocol the distributions and RSUs numbers are employed.

(ii) mobile infrastructure routing protocols:

The end-to-end delay is significantly minimized by RSUs, the number that is needed to cover an area is the inherited problem of RSUs and the cost that associated with the each RSU. The cost includes the hardware, operational, installation, and the maintenance cost.

III. DISCOVERY OF ROUTE IN VANET:

ADOV:

In the ad hoc on Demand Vector, to initiate the source of the node of an routing protocol hello becomes are used which are helpful for the neighbor node detection.

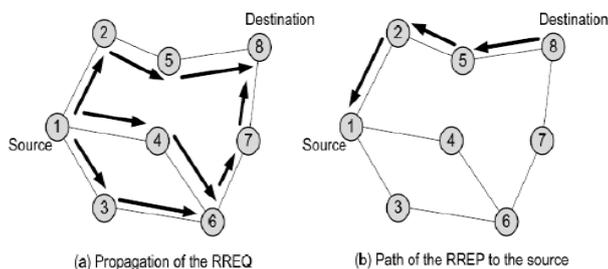


Figure 2. AODV Request Message

To find the path for destination the request message will be send the source node, which will broadcast (RREQ) route request packet, the packet will be then broadcast RREQ by neighbouring node until reaching the sink node. The source node IP address should carried by RREQ packets. It also carries IP adrees, current sequence number of the destination node.

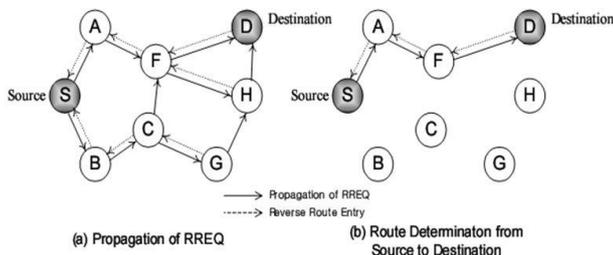


Figure 3. AODV Reply Message

After receiving the PREQ packets then the nodes are then registered in routing table. A route reply packet (RREP) is sent after reaching the sink node which is sent backward learning process through the path to the source node.

IV. CONCLUSION

Vehicle communicaton technology has become crucial in designing vehicles for the future. VANET offers the communication services among the vehicles or with the road side infrastructure. In this study, we discussed the prospective applications and

the problems involved in designing routing protocol in VANETs as well as surveyed and analyzed a large number of routing protocols. We also proposed taxonomy of protocol based on the VANET features and classified these protocols into two main categories: (1) vehicle-to-vehicle based routing protocols and (2) vehicle-to-infrastructure-based routing protocols. This study discussed the characteristics, routing metrics and routing philosophies of each of these protocols selected from a class of similar approaches, which can reflect state of the art research at VANET routing protocols. The classification of the primary routing selection principles can simplify the task of a network designer in deciding the VANET routing strategies to be adopted in a given condition. VANET doesn't have any stable path, the receiver based multicast routing protocol is used in VANET. So link stability should maintain stable path and multicast the packets to their neighbor nodes.

V. REFERENCES

- [1]. Ahmed, S., SS.SK.V. Kanere, 2006. "scalable knowledge-based routing architecture for public transport networks." In:Proceedings of the 3rd international workshop on vehicularad hoc networks, pp: 92-3.
- [2]. Hen, I., 2006. "MIMO architecture for wireless communication," Intel Technol. J., 10(2): 157-165.
- [3]. Herhold, P., E. Zimmermann and G. Fettweis, 2005. "Cooperative multi-hop transmission in wireless networks," Comput. Netw, 49(3): 299-324.
- [4]. Hui Cheng, Jiannong Cao, Xingwei Wang, 2007. "A fast and efficient multicast algorithm for QoS group communications in heterogeneous network", Computer Communications, 30: 2225-2235.
- [5]. Khandani, A., J. Abounadi, E. Modiano and L. Zheng, 2007. "Cooperative routing in static wireless networks," IEEE Trans. Commun, 55(11): 2185-2192.

- [6]. Rajashekhar Biradar, Sunilkumar Manvi, Mylara Reddy, 2010. "Link stability based multicast routing scheme in MANET", Computer Networks, pp: 54.
- [7]. Shen, H. and S. Kalyanaraman, 2007. "Asynchronous cooperative MIMO communication," in Proc. IEEE WiOpt, Limassol, Cyprus, pp: 1-9.
- [8]. Stefanov, A. and E. Erkip, 2002. "Cooperative information transmission in wireless networks," in Proc. Asian-Eur. Workshop Inf. Theory, Breisach, Germany, pp: 90-93.
- [9]. Yuan, Y., M. Chen and T. Kwon, 2006. "A novel cluster-based cooperative MIMO scheme for multi-hop wireless sensor networks," EURASIP J. Wireless Commun. Netw, 2: 38-38.