Survey on Performance Analysis of Location Based Routing protocol in VANET

Kavya Vidja[1], Krunal Panchal[2]

[1] *P.G Student, Department of Information Technology, L.J.I.E.T, Ahmedabad, Gujarat, India*
[2] *Assistant Professor, PG Department, L.J.I.E.T, Ahmedabad, Gujarat, India*

ABSTRACT

Vehicular ad-hoc networks (VANETs) technology has emerged as an important research area over the last few years. Being ad-hoc in nature, VANET is a type of networks that is created from the concept of establishing a network of cars for a specific need or situation. VANETs have now been established as reliable networks that vehicles use for communication purpose on highways or urban environments. Because of constraint roads and very high speed of vehicles routing is an issue in VANET. So we are analyzed the performance of topology based routing protocol. Routing Overhead Load and Lost Packet Ratio metrics are considered for analysis of Location based routing protocol using intelligent driver model (IDM) based VanetMobiSim and ns2.

Keywords: *VANET, Routing protocol, IDM, VanetMobiSim, ns2*

1. INTRODUCTION

The Vehicular Ad-Hoc Network, or VANET, is a technology that uses moves cars as nodes in a network to create a mobile network. VANET turns every participating car into a wireless router or node, allowing cars approximately 100 to 300 meters of each other to connect and, in turn, create a network with a wide range. Vehicular Ad- hoc network is a distributed and self-organized network, have emerged as a new powerful technology to improve driving safety and traffic management. There exist two main forms of communication in VANETs:-Vehicle-to-Infrastructure (V2I),Vehicle-to-Vehicle (V2V) While V2I refers to communication between vehicles and road-side equipment , V2V relates to direct connectivity between vehicles without involving the intermediate infrastructure. The VANET system model is illustrated in Fig.1, which consists of three major Components:

- Trusted Authority (TA),
- Fixed RSUs
- On Board Units (OBUs) mounted on the moving vehicles

The VANET manufacturing can be fixed the unique vehicle identification number for the wireless networking. And it can derive all cities covered by the road side unit (RSU).

The local information about the physical location of nodes can be provided by the global positioning system (GPS), if vehicular nodes are equipped with a GPS receiver. Research analysis show that geographic (or locationbased) routing reduces the scalability problem, because geographic routing protocols do not exchange any link-state information and do not required any routing tables to maintain information. Then it reduced routing overhead.

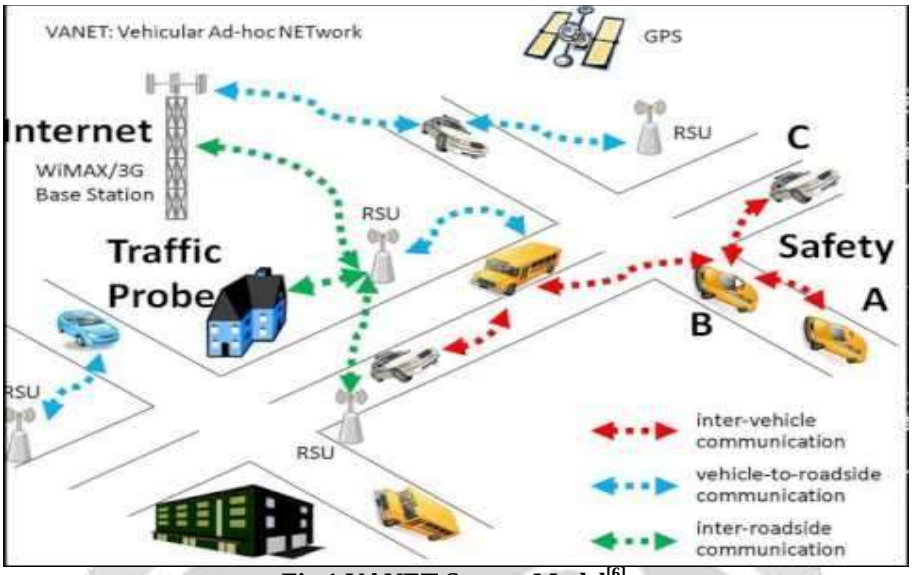

Fig.1 VANET System Model[6]

2. RELATED WORK

2.1 P. Dharani, S. Sibi Chakkaravarthy, M. Ganesan, Ethala Kamalanaban, P. Visu, Pravin R. Patil and C. Mahesh "An Unidentified Location-Based Efficient Routing Protocol in VANET"

In this paper, Main goal is to develop security architecture for VANETs that balances security requirements of all participants and also tries to identify to develop feasible mechanisms that fit in this architecture.
The way of transmitting and receiving the data with the help of that algorithm hides the node id, and the attacker cannot find out the data sources, destinations, and data routes. The data can transfer safely with the help of CMIX algorithm, and it can follow the mix zone routing protocols. The VANET can be used for hiding node identification, and data packets are used to save the public people and its vehicles from the bad people. The bad people can be the attacker, and he cannot see the vehicle id and the data routes; also, it can do nothing.
Here, we proposed a hybrid algorithm called "unidentified routing algorithm" for monitoring the active vehicles in the ad hoc mode with highness of security. Since routing is clearly done through the art of the characteristic "invisibleness" and integrity. Here, mixed zone-level security is provided with public key infrastructure, due to its standalone privacy policy, and it utilizes the node integrity in ad hoc mode.

2.2 Kavita Pandey, Saurabh Kumar Raina, Ram Shringar Rao "Hop Count Analysis Of Location Aided Multihop Routing Protocols For VANET"

In this paper, we have presented a Distance and Direction based Location aided routing (DD-LAR) protocol which is an extension of the existing D-LAR protocol. We have also presented a HopCount Algorithm that can be used to compute the hop count value of a routing protocol. HopCount algorithm has been used to compare the performances of all three protocols, DD-LAR, D-LAR and LAR. DD-LAR protocol reduces the hop count by selecting the next-hop node from an area nearer to border of the transmission range that is the node positioned at maximum distance from the source with minimum angular deviation from the connecting line of S and D. Simulation results show that DD-LAR has less average number of hops compared with D-LAR and LAR protocols. Moreover, D-LAR gives better hop count in comparison to LAR in a dense environment like the city traffic scenario. As the network is getting dense that is number of nodes increases, hop count value is further reduced.

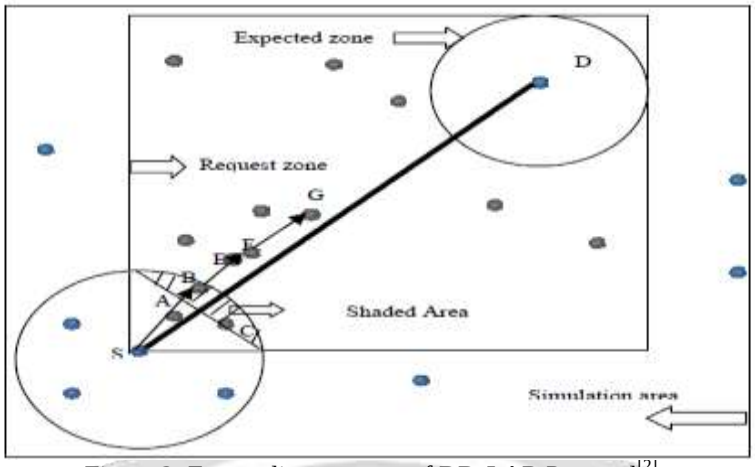

Figure 2: Forwarding strategy of DD-LAR Protocol[2]

Increase in transmission range or vehicular density using DD-LAR Forwarding Strategy and HOPCOUNT Algorithm.

2.3 K. Rajesh, R.Vimal Karthick, G.S.Raj "A New Scalable Reactive Location Based Ad Hoc Routing Protocol for VANETs"

The goal of this paper is to Improved the performance for scalable routing solution in the presence of location errors Using reactive location-based ad hoc routing protocol for VANETs.

*Optimality of RLAR in the presence of location Error:-*Vehicles have to continuously update location servers with their current location information. We use RLAR to route the location registration packets toward the location servers in the network and optimality process. We combine features of reactive routing with location based geographic routing. Using reactive location-based ad-hoc routing protocol for VANETs and we have improved the performance for scalable routing solution in the presence of location errors. By performing all these criteria's we increase our network throughput in the VANET Environment.

2.4 Mohamed Nabil, Abdelmajid Hajami, Abdlakrim Haqiq "Improvement of Location Aided Routing Protocol in Vehicular Ad Hoc Networks on Highway"

In this paper, we increased the stability of route between sources and destinations by sending route request messages to the vehicle travelling in the same direction of the source movement. Performance of LAR1 is improved for vehicular ad hoc networks in highway scenarios. We used VanetMobiSim to generate realistic mobility patterns. The original and modified protocols were tested against node density for various metrics. It is found that modified LAR outperforms than of the original protocol in highway environment.

In this work, if the number of vehicles traveling in the same direction of the source movement is insufficient to find the route to the destination, then a second route request message will broadcast in the entire network. But the path can be found from the first search if there is a route through the vehicles traveling in the opposite direction of source movement. To improve the stability of path between sources and destinations by removing from the paths the nodes that move in opposite direction of the source movement.

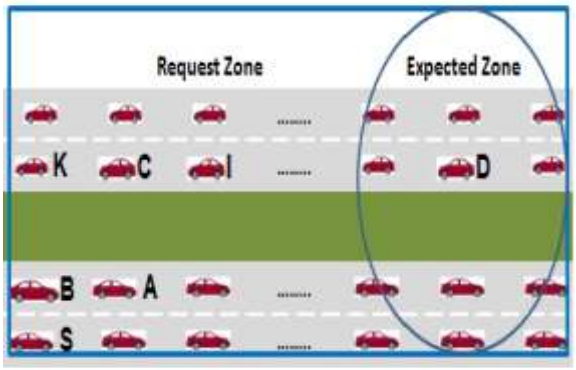

Fig 3: Bi-directional highway model[4]

2.5 Akhtar Husain and S.C. Sharma "Performance Analysis of Location and Distance Based Routing Protocols in VANET with IEEE802.11p"

This paper analyzed the performance of distance-effect routing algorithm for mobility (DREAM) and location aided routing (LAR) protocols for city and highway environment. Packet delivery ratio, throughput and delay metrics are considered for analysis of DREAM and LAR routing protocols using intelligent driver model (IDM).
Location Based Routing Protocols for VANET:-

- Distance-Effect Routing Algorithm for Mobility (DREAM)

DREAM [12] routed the data packets in the network by the use of distance and geographical location of the nodes. This geographical location is used to discover the route and bound the flooding in a small limited region. A proactive scheme is used in the routing process of DREAM. Each node of the network stores the location of all the nodes in a location table.

- Location Aided Routing (LAR)

The main objective of LAR [16] is to lower the overhead caused by routing process, for which this protocol uses information about location of the nodes with the help of GPS or some other location service.

3. COMPARATIVE ANALYSIS

Table 1: Literature Comparison

Sr. No.	Paper Title	Method Used	Advantages	Disadvantages
1.	"An Unidentified Location-Based Efficient Routing Protocol in VANET"	CMIX Algorithm	Data can transfer safely	Data packet loss
2.	"Hop Count Analysis Of Location Aided Multihop Routing Protocols For VANET"	HOPCOUNT Algorithm	Hop Count is compute when number of node is increases	End-to-End delay increases with number of node is increases
3.	"A New Scalable Reactive Location Based Ad Hoc	Reactive location based ad hoc	Scalability	Packet Loss increases with speed

	Routing Protocol for VANETs"	routing protocol	increases	increases
4.	"Improvement of Location Aided Routing Protocol in Vehicular Ad Hoc Networks on Highway"	Intelligent Driver Model with Lane Change	Route lifetime increases	Normalized Routing Load is decreases
5.	"Performance Analysis of Location and Distance Based Routing Protocols in VANET with IEEE802.11p"	Intelligent Driver Model	Packet Delivery Ratio increases with increases number of node	End-to-End delay increases with increases number of node

4. CONCLUSIONS

We analyzed packet delivery ratio, throughput and end2end delay metrics in city and highway scenarios using different type of location based routing protocol (i.e.) DREAM , LAR , DD-LAR.

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