Improve Performance of LAR Routing for Path Establishment in VANETs

Priyanka Chopra[1], Mr. Parveen Sharma[2]
[1]Research Scholar, [2]Assistant Professor
Chandigarh Engineering Collage, Landran, Mohali – Punjab (India)

Abstract - The vehicles are present in the networks which form the nodes of the network in the vehicular ad hoc networks. The nodes in the VANETs consider themselves as servers or clients which exchange the data across the network. In the vehicular ad hoc network vehicle to vehicle and vehicle to road side unit communication is possible. The LAR routing is proposed in the previous times, which use the broadcasting technique for the path establishment from the source to destination. The improvement in the LAR routing is proposed to implement multicasting in the network. The multicasting technique will be based on the location prediction technique. The simulation of the proposed and existing technique is done in NS2 and it is been analyzed that network throughput is increased, delay and packetloss are reduced in the network.

I. INTRODUCTION

Technology development of engineers during the twentieth century has gotten a vast change the human way of life. The communication between the networking elements along with sensing and figuring is known as the sensor network. There are large numbers of low-cost small sized devices known as nodes deployed in the sensor networks [1]. The base station is sent the information from all the nodes in the network. In a sensor network, there are large numbers of small, inexpensive, self powered devices deployed. These devices have the properties of sensing, figuring and communicating with various devices and aim to collect information from the network. The vehicles are present in the networks which form the nodes of the network in the vehicular ad hoc networks. This type of network is known as the vehicular ad hoc network. The communication which is done in between the vehicles is carried on for the purpose of safety of the driver as well as his comfort [2]. The sub-class of the mobile ad hoc networks is the vehicular ad hoc networks which differentiate the approach which hold the transport system. Each vehicle has to have this important facility. This type of network provides vehicle to roadside wireless communications across the network. This type of network is an autonomous network which also includes self-organizing the wireless communication of the network. The nodes in the VANETs consider themselves as servers or clients which exchange the data across the network [3]. The information is shared to and from the nodes which is substantially important. There are three broader categories of the VANETs. For the purpose of ensuring the delivery of packets from the sender to destination, the routing protocol is made to run through the network. Within the memory of the network a routing table is maintained. There are three broader categories of the routing table which are the proactive, reactive and the hybrid. In the reactive protocol additionally called an on demand routing protocol. In the reactive protocol, topology data is given only when required. A route request message is flood to the network when the node has to acknowledge the route to destination node in the network [4]. There is a periodic exchange of the topology control messages of the network in the proactive protocol usage. The routing tables are designed again and the traffic control needs more routes accessing due to all such reasons. Hybrid protocol has the both properties of reactive and proactive in nature. Network divide into various regions like inside it's near neighborhood regions and outside this region [5]. The list of various routing protocols is given below:

a. DSR (Dynamic source routing): On the basic idea of source routing, the on-demand routing protocol known as DSR is formed. The route caches of the network are maintained by the mobile nodes.

b. AODV (Ad hoc on-demand distance vector routing): It is distance vector protocol. In this process source nodes send message to a few destinations it initiates a path discovery process to locate the other node. A route request (RREQ) packet is sent to the neighbours by it [6]. This process continues of forwarding the RREQ until the destination node arrives which holds a new destination with fresh nodes.

c. OLSR (optimized Link State Routing): Optimized link state routing protocol is proactive link state routing protocol used in networking. For the purpose of distributing the link state routing this protocol uses the flooding mechanism. The nodes are selected here which are also known as the multipoint transfers.

d. STAR (Source tree adaptive routing): In this routing protocol utilize the source tree and computed by each node

keeping in mind the end goal to route packets [7]. Each node then shares its whole tree with the assistance of its neighbors.

e. ZRP (zone based routing protocol): All the nodes in this protocol define in the radius it is inside which packets are routed utilizing proactive routing protocol. Every one of the repetitions those are outside the radius it is discovered by the reactive protocol.

There are different behaviors and characteristic properties of VANETs which help them be different from the other networks. The main aspect in the ad hoc devices is the power issue [8]. In the VANETs however, continuous power is supplied to the computing and communication devices.

II. LITERATURE REVIEW

Rakesh Kumar et.al (2012) represent a paper [9], based on the VANET vehicular ad-hoc networks are upcoming wireless network environment for intelligent transportation system. In the VANET applications build upon the data push communication model where information is disseminated to set of vehicles. In this paper mainly define the VANET applications based on the various broadcasting data dissemination protocols are surveyed separately and their fundamental characteristics are revealed. At the end of this paper comparison of all the protocols.

Aswathy M et.al (2012) represent a paper [10], in on vehicular ad-hoc network are special kind of mobile ad-hoc network (MANET). This paper defines the vehicles on road as nodes of network. With the help of VANET give us many applications as an intelligent transportation system. In the dynamic network architectures and node movement characteristics differentiates VANETs from other kind of ad-hoc networks. The dynamic change in topology shortens the effective time of routing. This paper main aim to improving the performance of AODV by enhancing the existing protocol by creating stable clusters and performing routing by cluster head and gateway nodes.

Patil V.P (2012) represent a paper [11], on vehicular ad-hoc network is a type of mobile ad-hoc network where nodes are constrained to move along the road. Vehicular networks aims to make the driving experience safe, efficient and enjoyable. Vehicle traffic congestion is reflected as delays while travelling, it also have a number of negative effects and create a major problem in the society. In this paper suggest more innovative approach to deal with this traffic congestion problem using the characteristics of vehicular ad-hoc networks (VANET). This system is developed and tested using the AODV protocol of ad-hoc mobile network to deal with the problem of vehicle traffic congestion in vehicular network. In the main simulation shows the domain of vehicle traffic congestion in VANET is demonstrated.

Salim M.Zaki (2012) represent a paper [12], on location based service is used in vehicular ad-hoc network to locate node position before the start of any communication. In the paper use the grey model of accuracy to define nodes locations is affected by the nodes acceleration in the VANET. Prediction algorithm also filtered the noise data and produced accurate location of destination and overcome the problem of outdated location with other protocols in reducing overhead of control packets and high delivery of packets to destination and it reduce the end to end delay for routing packets.

Jamal Toutouh, Jose Garcia-Nieto (2012) represents a paper [13], on advance technologies gave rise to the emergence of vehicular ad hoc networks (VANETs)**.** In this type of scenarios there is limited coverage of Wi-Fi and high mobility of nodes generated frequent topology with the changes and fragmentations. For this reason there is no central manager entity, routing packets through the network is challenging task. Therefore, efficient routing strategy is crucial to deploy VANETs. This work deals with optimal parameter setting the OLSR a well known mobile ad-hoc network routing protocol, by defining an optimization problem. In the experiment defined OLSR configurations result in better QoS than the standard then several human experts making it amenable for utilization in VANETs configurations.

Marwane Ayaida, et.al (2013) proposed in this paper [14], Location-based services give (and maintain) location data utilized by geographic routing protocols. In this paper, a hybrid approach, denoted mobility-Prediction-based Hybrid Routing and Hierarchical Location Service (PHRHLS), coupling a VANET routing protocol, the Greedy Perimeter Stateless Routing (GPSR), and the Hierarchical Location Service (HLS) extended with a mobility prediction algorithm is proposed. It is seen that our approach, PHRHLS, reduces the confinement overhead and enhances the routing performances.

III. RESEARCH METHODOLOGY

In the vehicular ad hoc network, vehicle to vehicle and vehicle to infrastructure communication is available for communication. The vehicle to vehicle communication is available to exchange important information between vehicles. To establish path between various vehicles various routing protocols had been proposed which are of reactive and proactive type. The reactive routing protocols had remarkable performance in VANETS which use the broadcasting technique for path establishment. The broadcasting technique will increase delay in the network and network resource consumption increase at steady rate. To reduce delay in the

network, the technique of multicasting had been proposed. The following are various assumptions of the proposed technique

1. The network will be deployed with the fixed number of nodes and roads structure already defined
2. Every node are responsible to maintain the table of its adjacent nodes
3. Some nodes in the network are predefined as root nodes for multicasting nodes

In the proposed technique, in the whole network we define some nodes which are root nodes, under these root nodes we will defines the leaf nodes. The leaf node comes under which root that will be decided by prediction based technique for multicasting.

Algorithm

- **R-optimal path algorithm**

Set M Mobile Node's
Set S sender and R receiver
Node Routing = AODV
Set Route
{ If (route from S to R found)
{ Check number of route;
If (route => 1) //means alternative route exist in network
{
Search nearest neighbouring nodes
Establish path through root nodes
Send route acknowledge of route establishment through root node
}
}
Else {root unreachable
}
}
{
New root node formation;
{
Source node start sending data to destination through root node
{
Increment-Q;
Store incoming data;
} Receiver receives data from I
node;
Send ACK to sender S;
}
}
}

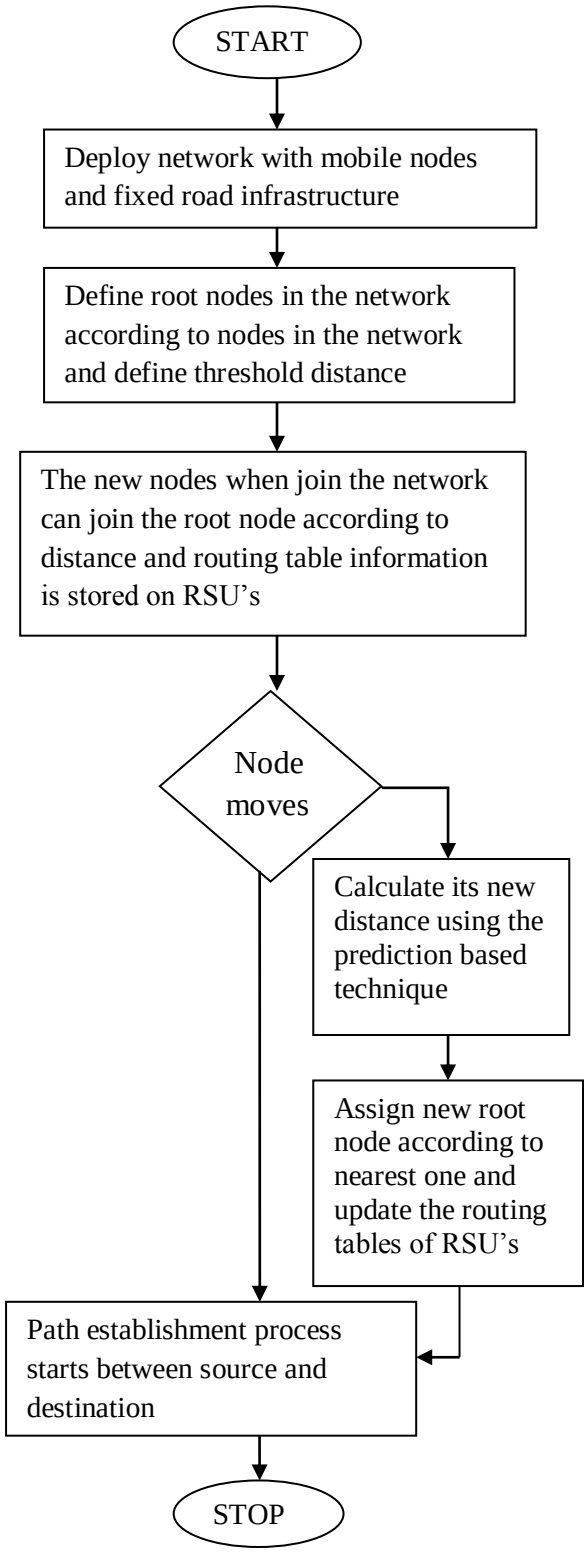

Fig. 1 Flowchart of Proposed Work

IV. EXPERIMENTAL RESULTS

The proposed algorithm has been implemented in NS-2 and the results are analyzed in terms of packetloss, delay and throughput.

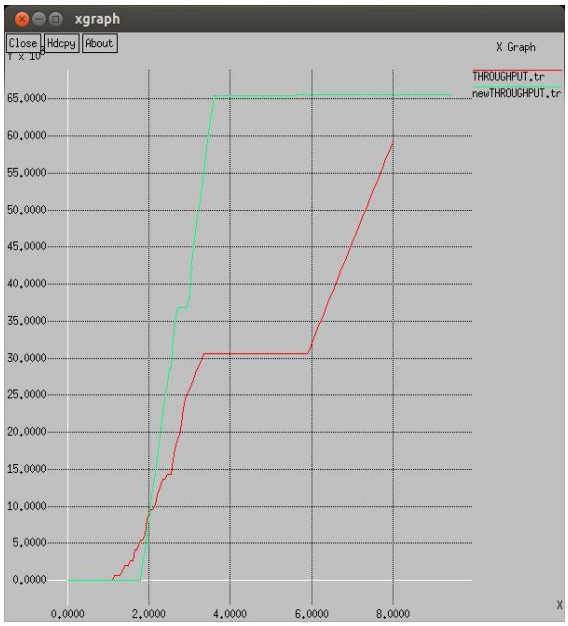

Fig 2: Throughput

As shown in figure 2, for the purpose of establishing a path the broadcasting technique is used. Also the multicasting technique is applied by the proposed algorithm in the network. Due to this reason, the throughput of the network is increased as illustrated in the figure 15.1.

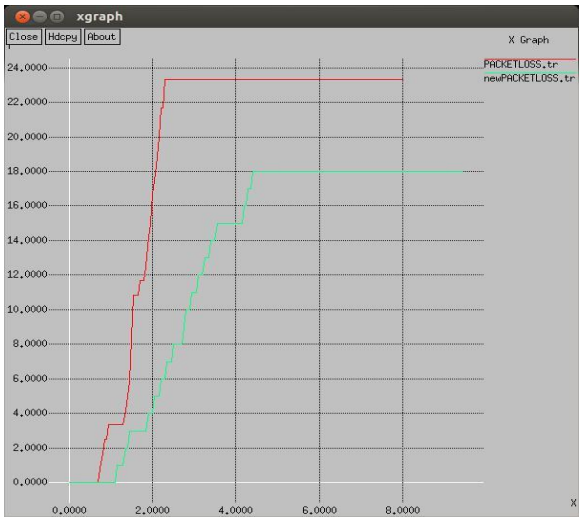

Fig 3: Packet loss

As shown in the figure 3, packetloss criteria are used to compare the old as well as the new proposed technique. The packetloss is found to be less in the new proposed technique than the already existing technique.

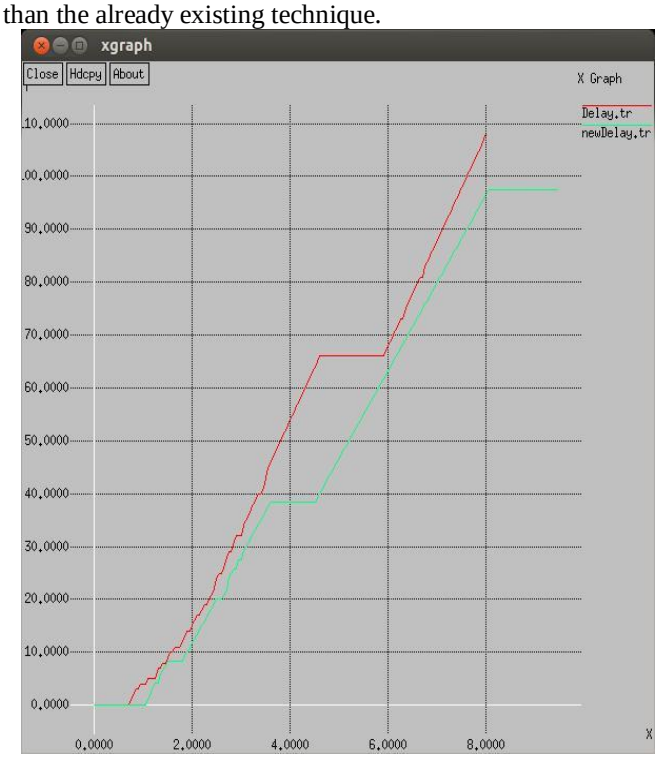

Fig 4: Delay

As shown in figure 4, the delay criteria are used for comparing the proposed and the already existing techniques. There is a reduction in the delay in the new proposed technique when compared to already existing technique. This is due to the use of multicasting approach which is used for path establishment.

V. CONCLUSION

The vehicular ad hoc network is the decentralized type of network in which vehicle to vehicle and vehicle to infrastructure type of communication is possible in the network. Due to high mobility in the network, vehicle nodes can change its location at very steady rate. The various routing protocols have been proposed in the recent times which establish efficient path from source to destination. The LAR routing is the efficient type of routing which uses the broadcasting approach for the path establishment from source to destination. The muticasting technique is been required for the path establishment from source to destination. The multicasting technique is based on location prediction technique. The proposed technique is implemented in NS2 and it is been analyzed that network throughput is increased and path from source to destination is established in minimum time.

VI. REFERENCES

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