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IMPLEMENT MULTICASTING TECHNIQUE TO DECREASE DELAY IN VANET

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ABSTRACT

The vehicular Ad hoc network is the type of network in which vehicles can move from one location to another without help of any driver. To establish secure and shortest path from source to destination routing protocols are used which can be categorized into reactive, proactive and hybrid. To reduce chances of link failure, technique of root node selection is applied. When any node wants to establish path to destination, the path must be selected through root node. This reduce the chances of link failure in the network and path establishment process is made easy packet overhead is less in the proposed technique. It focuses at traffic and establishment of path by utilizing the R-optimal paths algorithm. The proposed technique is implemented in NS2 and it is been analyzed that proposed technique performs better in terms of throughput, delay and packetloss.

KEYWORDS:-*VANET, Multicasting technique, LAR*

1.INTRODUCTION

There are many research studies being proposed on the communication among the vehicles and the road-side units. Vehicular Ad hoc Networks (VANETs) are one of these prominent areas in today's technology era. Without the need of any underlying architecture, the vehicles as well as the elements are connected with each other [1]. They send and receive information along with providing important information such as warnings related to the traffic. For the deployment of VANETs, Wi-Fi IEEE 802.11 based technology is popularly used today. 802.11b or 802.11g are the two standards which are used by the vehicles with wireless network interface for accessing media. The requirements of high dynamic network such as VANETs are not well handled by these general purpose standards. VANETs have a large number of applications. The learning as well designing process of VANETs is a very difficult task. According to the various classes, the set of protocols are used for various applications [2]. VANETs are used for safety applications which involve practical applications such as monitoring the surrounding road, arriving vehicles, road surface and curves, etc. Commercial applications involve giving the driver entertainment and web accessing services, streaming audio and video services etc. The traffic management is dealt through the convenience applications. This is done by increasing the degree of convenience for the drivers [3]. Other productive applications which result in environmental benefits, time utilization and fuel saving are also provided by the VANETs.

To match up the complexity of VANETs, the researchers have developed suitable routing protocols accordingly [4]. The VANET routing protocols have been categorized into six broader classes which are Topology based, position based, geocast based, cluster based, broadcast based and Infrastructure based. In the topology based protocols, before the sender transmits the data the protocols need to discover the route and maintain the table accordingly. The topology based protocols have a further section of division of protocols into pro-active, reactive and hybrid routing protocols [5]. The table-driven protocols are known as the proactive protocols which periodically exchange the information regarding the topology of nodes throughout the network. Reactive protocols which are also known as the on-demand routing protocols, update the routing table periodically if only there is any data to be sent. Here, flooding process is utilized for route discovery. AODV and DSR are the two examples of this category [6]. The reduction of control overhead of proactive routing protocols and the decrement of initial route discovery delay in reactive routing protocols is done by evolving hybrid protocols. In position based routing protocols, the next forwarding hopes are selected by the geographic positioning information. This ensures that there is no further need to create or maintain the global route between source and destination. For transmitting a particular message to all the vehicles available in a pre-defined geographical region Geocast based protocols are used [7]. Another category, in which the vehicles which are closer to each other form a cluster, is known as cluster base routing protocol. Cluster heads are selected which play some important roles in management of the functions.

2.LITERATURE REVIEW

Zaki et.al (2012) [8] proposed that grey model of accuracy is used for defining the location of the nodes which is affected by the movement of nodes in VANET. The

information of the nodes such as the distance of the node to the intersection point and the speed in which the stable location servers are selected is used here. The prediction algorithm used here, filtered the noise of the data and produced accurate location of the destination. The delivery of packets to the destination is increased in this process and the end to end delay for routing packets is reduced.
Mustafa et.al (2010) [9] proposed in this paper the different ad hoc routing protocols in VANET. The objective of this paper is to recognize which ad hoc routing method performs better in highly mobile environment of VANETs. MATLAB is used in this paper for plotting graphs of comparing the results for selecting appropriate routing protocols. High throughput and low packet drop is seen in AODV and GPRS in city environment. In highway as well as the city environments, the GPRS shows better performance as compared to the AODV in VANET.

Ledy, et.al (2009) [10] represent on V-AODV a version of aodv (ad-hoc on demand distance vector) especially created for vehicular ad-hoc networks (VANETs). Communication ray tracer, a realistic environment tool is used here. The results show that the basic propagation model is not suitable for the ns2 because of its unsuitability in VANETs. Using the routing metric which is based on delay and BER, the first parameter is more relevant in terms of QoS.

Nzouonta, et.al (2009) [11] represent a paper which lists the classes of routing protocols which are used in VANET. A scenario is proposed here which is based on road paths which consist of successions of road intersections. 40% of improvement is shown in this technique by the simulation results. RBVT-P improves the performance up to 85% which is less in the other compared protocols.

Ohtaki, et.al (2006) [12] proposed a paper in which ant based routing algorithm is used. A scalable ant based routing algorithm is proposed which keeps the paths short. The probability of packet forwarding is updated by using multistep time to the live scheme. The results show that the proposed algorithm establishes shorter math as compared to the conventional ant based algorithm which has similar signalling overhead.

Ko, et.al (2000) [13] introduced a mobile ad hoc network which consists of wireless hosts that may move often. This paper suggests an approach to utilize location information to improve performance of routing protocols for ad hoc networks. By using location information, the proposed Location-Aided Routing (LAR) protocols limit the search for a new route to a smaller “request zone” of the ad hoc network. Two algorithms are presented to determine the request zone, and also suggest potential optimizations to the algorithms. This results in a significant reduction in the number of routing messages.

3.Location-Aided Routing (LAR) protocol

Similar to the protocols such as AODV and DSR, LAR is also an on demand routing protocol that minimizes the routing overhead within the network with the help of location information of the mobile nodes. The packets are forwarded within the request zone only within this method. A route request packet (RREQ) is sent to the destination with the help of position information to the destination within a particular request zone. For instance, there is a need to find a route between sender node (S) and destination node (D). The data is transmitted to the other node that belongs to the request zone only. The area should be the expected zone in case if the node wishes to send packets to the other nodes within the network. In other case, the packet is only transmitted within the request zone. There are two zones called the expected and request zones present within the LAR protocol. The flooding similar to DSR is utilized here for discovering the route. However, the flooding is limited within the request zone area. For the need of flooding route request packet for destination within the request zone the location information of the node is utilized and there is no need of acquiring other detailed information.

There is in some cases such as when the destination is very far from the sender node or when the route requests are not delivered well, no route request packet received by the destination. The route discovery process needs to be re-initiated by the sender in such scenarios. A timeout out is thus set by the sender during the route discovery process. If there is no route reply received within the timeout interval provided, a new route discovery is generated. The sequence number generated here is different from the previous one. There are multiple receptions detected for same route request with the help of sequence numbers. If there is no route request received by the destination or when the route reply message is lost the timeout may occur. In cases where whether an existing route is broken between the nodes or there is no route present, the route discovery process gets started.

4.PROPOSED METHODOLOGY

In the proposed work some root nodes are defined within the complete network under which further the leaf nodes are defined. On the basis of prediction based technique required for multicasting the root is decided for the leaf node. On the basis of distance amongst the nodes, the tree is maintained by the root nodes. The routing table is maintained by the root nodes. The information related to the leaf nodes is stored within the routing table. The stored information is delivered to RSUs by the root nodes. This is done before requesting the path for destination. There is a proper communication within RSU and source node. With the help of R-optimal path algorithm, the RSU provides information related to the lead node for establishing a path. Only the nodes that have an access to the required leaf

node can be sent the route request packets from the source node.

❖**R-optimal path algorithm**

Set M Mobile Node's
Set S sender and R receiver
Node Routing = AODV
Set Route
{ If (route found(from S to R))
{
Checking resistance of route;
If (route => 1)
{
Searching for nearest nodes
Trying to establish path through root node
root node is transmitting acknowledgement
}
}
Else
{
destination host unreachable
}
}
{
Creation of new node(root);
{
Data sending between source to destination by using root node
{
Q++;
Saving the receiving data;
}
destination picks data from I
node;
retrieve back to sender by ACK ; } }}

5.EXPERIMENTAL RESULTS

The simulation of the proposed technique is performed by considering the parameters given in table 1

Table 1: Parameter table

Parameter	**Values**
Anteena type	Omi directional
Channel	**Wireless channel**
Standard	**802.11**
Area	**800 *800**
No of nodes	**34**
Frequency	**2.4 Ghz**
Range	**18 meter**

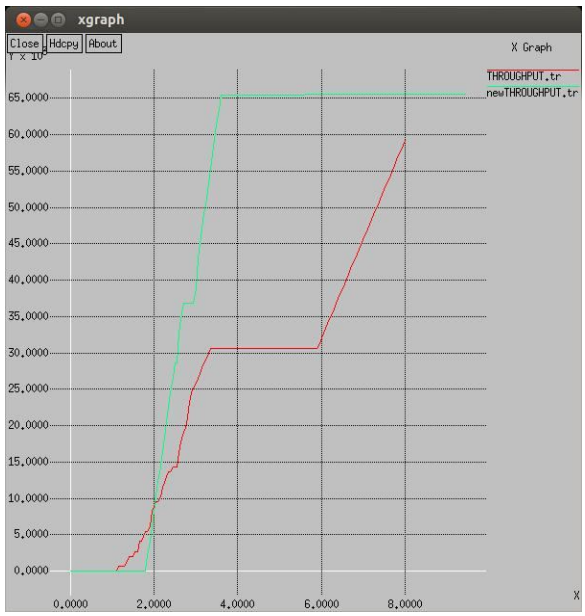

Fig 1: Throughput Comparison

As shown in figure 1, the technique of broadcasting is applied for the path establishment which is existing algorithm and technique of multicasting is applied which is the proposed algorithm for the path establishment in the network. This leads to increase the network throughput which is illustrated in the figure.

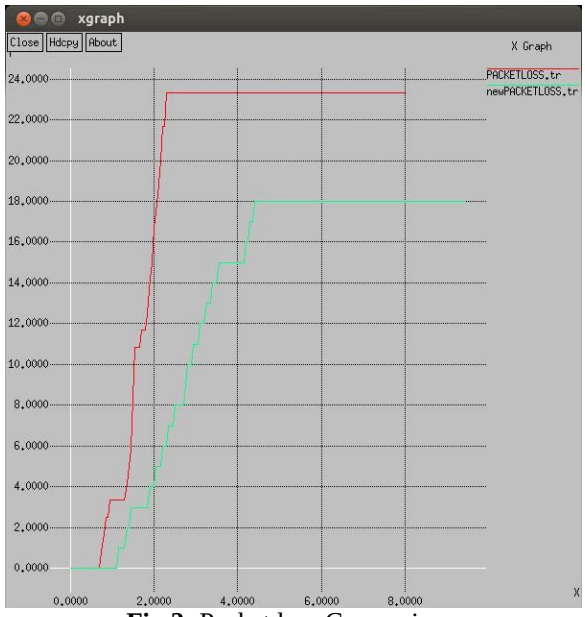

Fig 2: Packet loss Comparison

As shown in the figure 2, the proposed and existing techniques are compared in terms of packetloss. It is been analyzed that packetloss of the proposed is less and compared to proposed technique.

Fig 3: Delay comparison

As shown in figure 3, the proposed and existing techniques are compared in terms of delay. The delay in the proposed technique is less than the existing scheme due to multicasting approach is used for the path establishment.

6.CONCLUSION & FUTURE SCOPE

This research is based on routing issue in which two type of communication is possible; the first type of communication is V2V and second type of communication of V2I. In this work, multicasting technique will be proposed in which source node flood the route request packets to the node which has maximum possibility to establish path to destination. The propose improvement leads to reduction in packetloss, delay and increase in network throughput. The proposed algorithm is the multicasting algorithm which can be tested on the different scenarios to analyze network performance

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