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Various area based Routing Using Proactive and Reactive Routing Protocol in VANET

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ABSTRACT:- VANET is the technology of building a robust Ad-Hoc network between mobile vehicles and each other, between mobile vehicles and roadside units., there are two category of nodes in VANETs; mobile nodes as On Board Units (OBUs) and static nodes as Road Side Units (RSUs). In this paper rural and urban area scenario created for AODV and DSDV in VANET environment with varying speed i.e. 30m/sec, 60m.sec and 90m/sec, and the performance has been evaluated on the basis of throughput and residual energy.

Keywords: VANET, MANET, AODV, Routing

1. INTRODUCTION

The rise of the expanded number of vehicles are equipped with wireless transceivers to communicate with other vehicles to form a special class of wireless networks, known as vehicular ad hoc networks or VANETs.

Vehicular Ad Hoc Networks (VANET) upon implementation should collect and distribute safety information to massively reduce the number of accidents by warning drivers about the danger before they really face it. VANET can also be assisted by part of Roadside Units like Cellular Base Stations, to disburse the data to the substitute vehicles.

VANETs provide us the facility to develop new system to provide comfort and safety to the drivers and passengers. VANET also allow the nodes to move independently and established communication between them using wireless techniques. VANETs are distributed and self-organized network and provide the facility to move or communicate the vehicles or nodes with wireless communication devices. Vehicular ad-hoc network is a part of ITS (Intelligent Transportation Systems) to bring improvement of the traditional transport system performance and also improving the safety of the traditional transport system. There are number of vehicles, moving from one position to another on their lane and these vehicles can communicate from another vehicle called V2V communication. There are some Road side Unit (RSUs) which are connected through internet and having capabilities to communicate with Vehicles.

2. VANET Vs MANET

A mobile ad hoc network is a collection of two or more nodes equipped with wireless communications and networking capabilities without central network control, which may be assigned to as an infrastructure-less mobile network. Vehicular Ad-hoc Networks (VANETs) represent a speedily emerging, particularly challenging class of Mobile Ad Hoc Networks (MANETs). VANETs are allocate, self organizing communication networks built up by moving vehicles, and are thus individualize by very high node mobility and limited degrees of freedom in the mobility patterns. We have a count of ad hoc routing protocols [3, 10, 12] for MANETs but when we have to deal with a VANET then we require ad hoc routing protocols that must adapt continuously to the unreliable conditions.

Analysis of traditional routing protocols for mobile ad-hoc networks (MANETs) demonstrated that their performance is poor in VANETs [16]. The main issue with these protocols in VANETs environments is their route instability. The traditional node-centric view of the routes (i.e., an established route is a fixed succession of nodes between the source and destination) leads to frequent broken routes in the presence of VANETs' high mobility [20], as illustrated in figure below, therefore, many packets are dropped and the overhead due to route repairs or failure notifications increment intensely, dominant to low delivery ratios and high transmission delays.

3. ROUTING

Routing is mainly used to provide routes to the packet from source to destination. Routing protocols are required to send packets from source to destination. Main function of these protocols is to decide routes for packet to send it at proper destination. A source routing is used to provide proper path to the packet. In this routing the each packet must carry its path that packet should take through the network, means source decides the path. Flooding is also used to transfer information from origin node to neighbour node and so on, until the packet has reached to all nodes in network.

Routing protocols in an ad-hoc network is classified in to different categories as:

1. Centralized Vs Distributed.
2. Reactive Vs Proactive.
3. Static Vs Adaptive.

3.1 AD HOC ON-DEMAND DISTANCE VECTOR (AODV) :

Ad hoc On-Demand Distance Vector (AODV) Routing is a routing protocol for vehicular ad hoc networks (VANETs). It is a reactive routing protocol, fulfilled that it creat a route to a destination only on demand. In contrast, the most usual routing protocols of the Internet are proactive, meaning they find routing paths individually of the usage of the paths. AODV is, as the name, a distance-vector routing protocol. AODV avoids the counting-to-infinity issue of other distance-vector protocols by using sequence numbers on route updates, a technique establish by DSDV. AODV is beneficial of both unicast and multicast routing.

In AODV, the network is silent until a relation is needed. At that point the network node that needs a connection broadcasts a request for network. Other AODV nodes forward this message, and record the node that they caught it from, creating an explosion of alternate routes back to the needy node. When a node accept such a message and already has a route to the desired node, it sends a message backwards through a alternate route to the requesting node. The needy node then initiate using the route that has the least number of hops through other nodes. Unused access in the routing tables are recycled after a time.

Much of the complexity of the protocol is to lower the number of messages to conserve the capacity of the network. For example, each application for a route has a sequel number. Nodes use this sequence number so that they do not repeat route requests that they have already passed on. Another such quality is that the route requests have a "time to live" number that limits how many times they can be re-transmitted. Another such feature is that if a route demand fails, another route request may not be sent until twice as much time has passed as the timeout of the previous route.

3.2 DESTINATION-SEQUENCED DISTANCE VECTOR (DSDV):

DSDV routing protocol comes under the category of proactive routing protocol. This is distance vector routing protocol uses the bellmann-ford algorithm. DSDV has the quality of hop by hop distance vector routing protocol in that every node maintains routing table listing the “next hope” and “number of hopes” information for each possible destination. Periodical broadcasts of routing updates attempt to keep the routing table completely update at all times [8].in routing table each entry has sequence number. Whenever a new entry in a routing table has been obtained, then the protocol prefers to select the entry with the largest sequence number. If the entries with same sequence number has obtained then the protocol selects the metric with the lowest value.

Routing information is transmitted by broadcast. Updates have to be transmitted frequently or immediately when any significant topology change is available. Sequel numbers are assigned by destination, means the destination gives a sort of defect even order number, and the emitter has to send out the next update with this number. Packets are changed from the source to destination in the network by using routing table which are stored at the each station of the network. Routing information is displayed by broadcasting or multicasting the move within the network. Data is also stored about the length of time between arrival of the first and the arrival of best route for each destination. The entries in the routing table may change fairly dynamically over time [4].packets which are transmitted periodically and incrementally as topological changes are detected - for some time, when stations.

4. VEHECULAR NETWORKS CHALENGES

Mobility: The basic idea from Ad Hoc Networks is that each node in the network is mobile, and can move from one place to another within the coverage area, but still the mobility is circumscribe, in Vehicular Ad Hoc Networks nodes moving in high mobility, vehicles make relation throw their way with another vehicles that maybe never faced before, and this relation lasts for only few seconds as each vehicle goes in its order, and these two vehicles may never meet again. So securing mobility defiance is hard problem [8], [14].

Volatility: The connectivity among nodes can be highly temporary, and maybe will not happen again, Vehicles travelling throw analysis area and making connections with other vehicles, these relation will be lost as each car has a high mobility, and maybe will travel in opposite direction[2],[8]. Vehicular networks lacks the relatively long life situation, so personal contact of user’s device to a hot spot will require long life password, and this will be illogical for securing VC.

Network Scalability: The scale of this network in the world almost exceeding the 750 million nodes

[7], and this number is growing, another problem arise when we must know that there is no a global authority govern the standards for this network [2], [8], [9], for example: the standards for DSRC in North America is deferent from the DSRC standards in Europe, the standards for the GM Vehicles is deferent from the BMW one.

Bootstrap: At this occasion only few number of cars will be have the equipment required for the DSRC radios, so if we make a communication we have to assume that there is a limited number of cars that will receive the communication, in the future we must concentrate on getting the number higher, to get a financial benefit that will courage the commercial firms to invest in this technology [8].

5. SIMULATION & RESULTS

In this paper Creation of Rural area network and Urban area network with various speed i.e. 30m/sec, 60m/sec and 90m/sec in VANET Scenario for NS-2 and then to create Different routing protocols with the use of Various performance matrices Like Packet Delivery Ratio, End- to- End delay, Residual Energy, Normalized Routing overhead and Overall Throughput. In our case firstly we have created scenario file for IEEE 802.11p standard which has to be used onward with our TCL Script than we have created a TCL script consist of two routing protocols in our case these are AODV and DSDV than a particular VANET scenario consist of Rural and Urban area network with static and dynamic nodes with 100sec simulation time.

5.1 PERFORMANCE MATRICES

For our work to be done successfully we have used VANET scenario with varying speed and time of 30m/sec, 60m/sec and 90m/sec and 100 seconds respectively under dynamic scenario using two routing protocols. We have reached to the results with the help of various performance matrices for now we have used following performance matrices.

1. Energy
2. Throughput

5.2 ENERGY

Total amount of energy used by the Nodes during the Communication or simulation

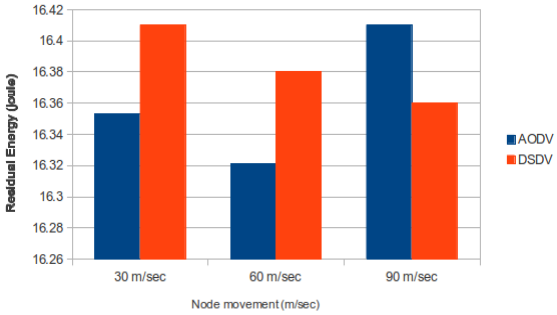

Fig1:- Residual Energy for rural area network

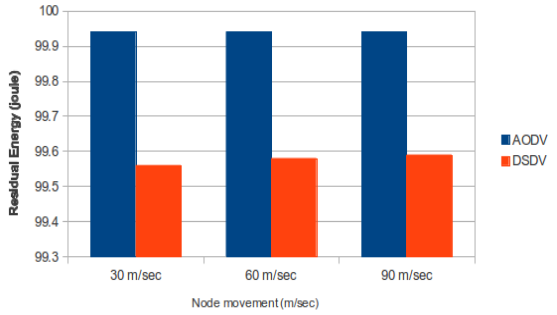

Fig2:-Residual Energy for urban area network

5.3 THROUGHPUT

The average rate at which the data packet is delivered successfully from one node to another over a communication network is known as throughput.

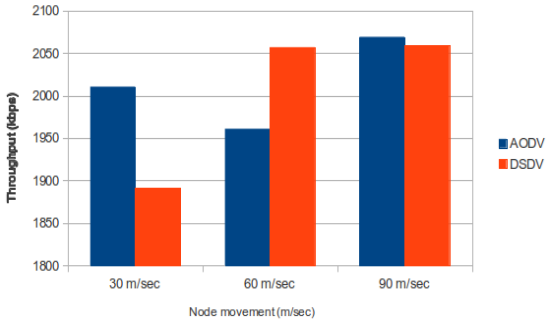

Fig3:- Throughput for rural area network

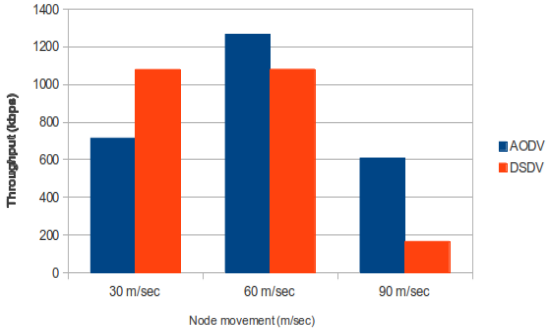

Fig4:-Throughput for urban area network

6. CONCLUSION

All the above result analyzed and it is concluded that for different performance matrices different cases has been observed DSDV routing protocol is having higher residual energy for rural area network whereas for urban area network AODV is having higher residual energy. If we conclude for throughput DSDV have higher average throughput as compare to the AODV routing protocol.

REFRENCES

[1] IEEE P802.11p, "Amendment 3: wireless access in vehicular environments (WAVE)," *Draft D0.26, January 2006.*

[2] N. Balon, and J. Guo, "Increasing Broadcast Reliability in Vehicular Ad Hoc Networks," In *Proc. of the 3rd ACM Int. Workshop on Vehicular Ad Hoc Networks VANET'06, NY, USA, pp. 104-105, 2006.*

[3] H. Alshaer and E. Horlait, "An optimized adaptive broadcast scheme for inter-vehicle communication," In *Proc. of the 61st Int. IEEE Vehicular Technology Conf. VTC'05, vol.5, pp. 2840–2844, 2005.*

[4] G. Korkmaz, E. Ekici, F. Özgüner, and U. Özgüner, "Urban multi-hop broadcast protocol for inter-vehicle communication systems," In *Proc. of the 1st ACM Int. Workshop on Vehicular Ad Hoc Networks VANET'04, NY, USA, pp. 76-85, 2004.*

[5] J. Harri, F. Filali, and C. Bonnet, "Mobility models for vehicular ad hoc networks: a survey and taxonomy," *The Institut Eurecom Department of Mobile Communications, FRANCE, 2007.*

[6] GM advanced technology, Vehicle-to-Vehicle technology, V2V_communications.htm

[7] "Assessment of the applicability of cooperative vehicle-highway automation systems to bus transit and intermodal freight: case study," *California Partners for Advanced Transit and Highways (PATH), 2004.*

[8] "London Congestion Charging Technology Trials," *Transport for London, Feb 2005.*

[9] G. Korkmaz, E. Ekici, F. Özgüner, and U. Özgüner, "Urban multi-hop broadcast protocol for inter-vehicle communication systems," In *Proc. of the 1st ACM Int. Workshop on Vehicular Ad Hoc Networks VANET'04, NY, USA, pp. 76-85, 2004.*

[10] B. Parno, and A. Perrig "Challenges in securing vehicular networks," *In Proc. of the Int. Workshop on Hot Topics in Networks (HotNets-IV), 2005.*

[11] A. Huhtonen, "Comparing AODV and OLSR Routing Protocols",*session on Internetworking, April 2004.*

[12] A. Aaron and J. Weng, "Performance Comparison of Ad-hoc Routing Protocols for Networks with Node Energy Constraints", *IEEE INFOCOM, Hong Kong, 2004.*

[13] Elizabeth M. Royer, Chai-Keong Toh, "A Review of Current Routing Protocols for Ad Hoc Mobile Wireless Networks", *IEEE Personal Communications, April 1999.*

[14] C. E. Perkins and P. Bhagwat, "Highly Dynamic Destination-Sequenced Distance Vector Routing (DSDV) for Mobile Computers", *Comp. Comm. Rev., Oct. 1994, pp. 234-44.*