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Enhancement of Quality of Service in VANET'S By Using Reliable Routing Scheme

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***Abstract*— A Vehicular Ad hoc Network (VANET) uses cars as mobile nodes in a MANET . A VANET creates all participating car into a wireless node, allowing cars approximately 100 to 300 meters of each other to connect and in turn create a network with a wide range. As cars go out of the signal range and drop out of the network other car which enters comes on communication range.It is estimated that the first systems that will integrate this technology are police and fire vehicles to communicate with each other for safety purposes. In VANET, the vehicles are moving in a highly dynamic fashion. So routing protocols designed for MANET is not suitable for VANET due to high mobility. The MANET routing protocols cannot provide reliable data transmission in VANET. To provide reliable data transmission in Bi-directional traffic with variable velocity and to reduce the delay due to frequent link failure, we are going to use opportunistic routing scheme to provide the reliability in VANET.**

***Index Terms*—Opportunistic Routing Scheme, Vehicular ad hoc network (VANET), Quality of Service (QoS), vehicular networks.**

I. INTRODUCTION

A Vehicular Ad hoc Network (VANET) uses vehicles as nodes in a MANET to create a network. A VANET makes wide range of network which covers 100 to 300m long vehicles to travel. Vehicles which enters into an network creates an link those vehicles which falls out of link drops the network. First system which combines this technology is police and fire vehicles for providing safety. Automotive companies like BMW,Toyota and many companies use this terms.

Safety-related applications may be grouped in three main classes: assistance (navigation, cooperative collision avoidance, and lane-changing), information (speed limit or work zone info) and warning (post-crash, obstacle or road condition warnings). They provide direct communication because of critical delay in nature. One such application would be emergency notifications, e.g. emergency braking alarms. In case of an accident (the airbag trigger event) or sudden break notification is sent to an vehicles for safety purpose. Information can also be sent by vehicle driving which is coming in opposite direction and conveyed to the vehicles that may run into the accident. Another, more advanced example is cooperative driver system, which exchange of sensor data or other status information among cars. The basic idea is to broaden the range of perception of the driver beyond his field of vision and further on to assist the driver with autonomous assistance applications.. Some applications of this kind are only applicable if the penetration of VANET enabled cars is high enough.

Vehicular ad hoc networks can be viewed as component of the intelligent transportation systems (ITS).As promoted in ITS, vehicles communicate with each other via inter-vehicle communication (IVC) as well as with roadside base stations via roadside-to-vehicle communication (RVC). Automatic payment for parking lots and toll collection are other examples of possibilities inside VANET. VANET which operates without an infrastructure can send, receive and relay messages.

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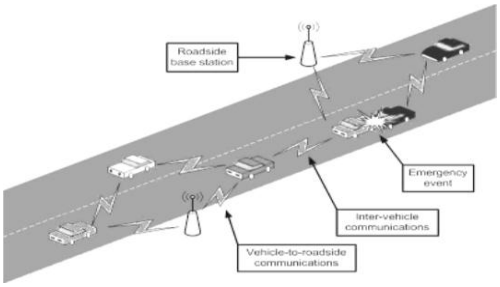

Figure 1.1: A VANET consists of vehicles and roadside base stations that exchange primarily safety Messages to give the drivers the time to react to life-endangering events.

This way vehicle can exchange real-time information and drivers can be informed about road traffic conditions and other travel-related information. The special behaviour and characteristics of VANETs raise important technical challenges that should be considered to deploy these networks effectively. The most challenging issue is potentially the high mobility and the frequent changes of the network topology

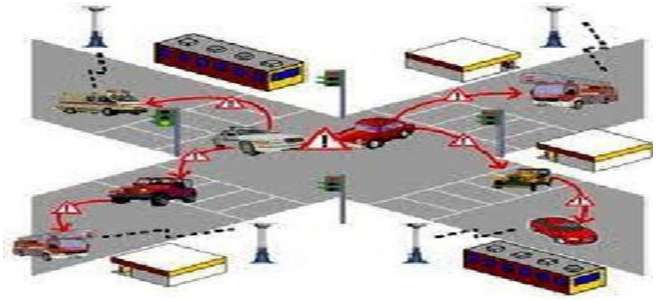

Fig: 1.2 Messages Disseminate To End Nodes.

In this paper, we assume that vehicles move at a variable velocity along the Bi-direction traffic on the highway and that the source and destination vehicle has full knowledge of a VANET communication graph at any given time. In VANET, the alert message is propagated through a relay node that is selected among nodes within the transmission range of source. To reduce the contention and to take another path.

II. Opportunistic Routing

Opportunistic routing (OR) takes advantages of the spatial diversity and broadcast nature of wireless networks to combat the time-varying links by involving multiple neighboring nodes (forwarding candidates) for each packet relay. Firstly, geographic opportunistic routing (GOR), a variant of OR which makes use of nodes' location information. To identify and prove three properties of GOR. The first one is prioritizing forwarding candidates according to geographic advancements to the destination. The second one is choosing the forwarding candidates based on their advancements and link qualities in order to maximize the expected packet advancement (EPA) with different number of forwarding candidates.

In conventional opportunistic routing, to have a packet received by multiple candidates, either IP broadcast or integration of routing and MAC protocol is adopted. The former is MAC collision because of the lack of collision avoidance support for broadcast packet .In POR, use similar scheme as the MAC multicast mode described in. The packet is transmitted as unicast (the best forwarder which makes the largest positive progress toward the destination is set as the next hop) in IP layer and multiple receptions is achieved in interception.

As the data packets are transmitted in a multicast form, each one is identified with a unique tuple (src_ip, seq_no) where src_ip is the IP address of the source node and seq_no is the corresponding sequence number. Each node maintains a monotonically increasing sequence number and an ID_Cache to record the ID (src_ip, seq_no) of the packets. If a packet with the same ID is received again, it will be discarded. In case node A fails to deliver the packet (e.g., node A has moved out and cannot receive the packet)node B the forwarding candidate with higher priority, will relay the packet and suppress the lower priority candidate's forwarding (e.g., node C) as well as node S. The forwarding candidates are selected and prioritize based on the parameter residual distance to come out of transmission range.

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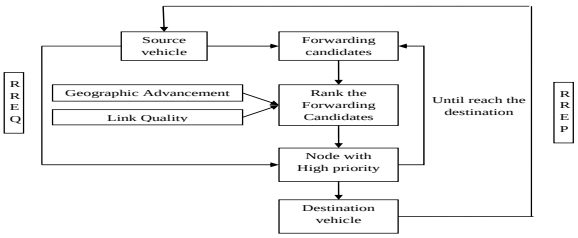
III. ARCHITECTURE

Reliable data Transmission between source and destination end when vehicles travel at high speed.



IV. RELIABLE ROUTING SCHEME

Reliable routing scheme is used obtain a VANET communication graph even when vehicles move with variable velocities along bidirectional traffic. In VANET, the vehicles are moving in a highly dynamic fashion. So routing protocols designed for MANET is not suitable for VANET due to high mobility.

A.Graph Based Reliable Routing

The topology refers to the structure of the network. It clearly says that, the way in which all the nodes are located and connect with each other. In the simulation, the vehicles are located in the road units. Each vehicle move horizontally and vertically in the simulation area. Every vehicle has the connection with the vehicles which are in the communication range of that vehicle. If any one of the vehicle is move out of the communication range of that vehicle means the link between those two vehicles are broken. In our simulation, the city section mobility model is used for the vehicle movement. The Omni antenna is used for transmission and reception of signals. Two Ray ground is used as the radio propagation model which accepts the reflected and refracted.

B. Determination of link residual Life

Link residual life is defined as the time during which a link will be active once it becomes a part of a path. A link between two mobile nodes will be active as long as they are in the transmission range of each other. Link residual life (t) can be expressed as the ratio

$$t = d/vr$$

Where d is the distance that the neighbor (relay) node needs to travel to get out of the transmission range of its neighbor and vr is the relative velocity between the two neighbors. In the following subsections, the PDF for the path duration Tpath and its expected value are derived using fundamental principles. In order to find the distribution of link residual life, the distributions of D and Vr need to be known. In this analysis, the neighbors that do not fall in the path towards the destination are ignored and only those nodes which are on the path to destination are considered.

C Detection of next best forwarder node.

The forwarding area is identified by the source and the immediate node. A node located in the forwarding area satisfies the following two conditions: 1) it makes positive progress toward the destination; and 2) its distance to the next hop node should not exceed half of the transmission range of a wireless node so that ideally all the forwarding candidates can hear one another

D Reliable Communication

The proposed scheme predicts route lifetimes and preemptively creates new routes before the existing routes fail. The link lifetime is predicted based on the how much time the vehicle stay in communication range. Since a route is composed of one or more links. PBR allows the processing of multiple routing requests to check all the available routes to the destination. If the source node gets multiple response, then it uses the route that has the maximum predicted route lifetime. The vehicle transmits their data only through the route with maximum lifetime. As the link failure is reduced, each vehicle enables reliable communication.

E. Performance Evaluation

The performance of the proposed scheme is evaluated by plotting the graph. The parameter used to evaluate the performance is as follows: Packet delivery ratio, Packet loss ratio, End to end delay and Throughput. These parameters are recorded during the simulation by using record procedure. The recorded details are stored in the trace file. The trace file is executed by using the Xgraph to get graph.

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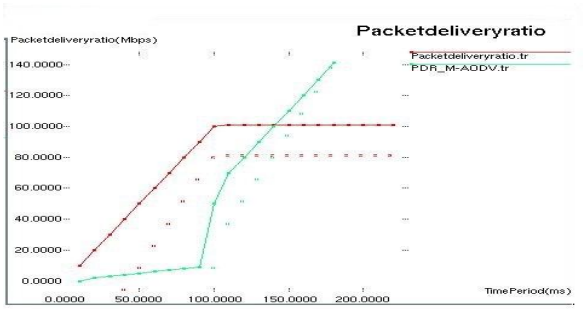
V. SIMULATION RESULT

Constructing a simulation scenario which uses a city environment with two lanes for vehicles to move in opposite direction. The number of vehicles is 30 When vehicles reach the end of the city environment they will exit the simulation area

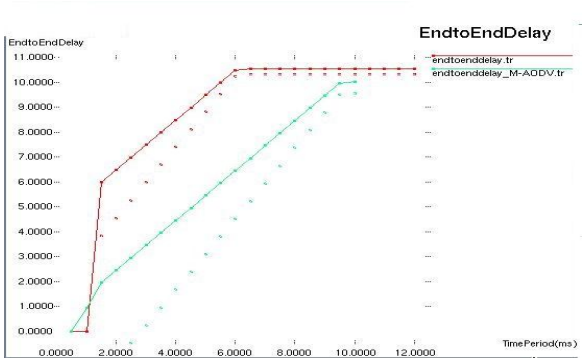
A Performance Metrics.

Performance metrics are considered for simulation result as

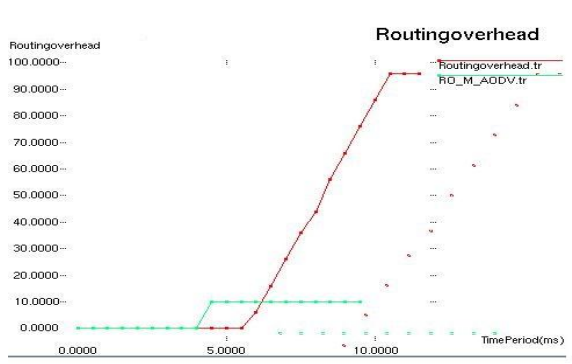
1) Packet delivery ratio: it represent total number of packets has been received in destination end from source.
2) End-to-End delay: It represent how much time has taken during packet transfer from source to destination.
3) Route lifetime: It represents how long the route is enabled in communication range



a) Packet Delivery Ratio



b) End to End Delay



c) Routing Overhead

VI. CONCLUSION

PBR allows the processing of multiple routing requests to check all the available routes to the destination. If the source node receives multiple response, then it uses the route that has the maximum predicted route lifetime. The vehicle transmits their data only through the route with maximum lifetime. As the link failure is reduced, each vehicle enables reliable communication.

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REFERENCES

[1] H. Moustafa and Y. Zhang, Vehicular Networks Techniques, Standards and Applications. New York, NY, USA: Taylor & Francis, 2009, pp. 7–11.

[2] G. M. T. Abdalla, M. A. Abu-Rgheff, and S. M. Senouci, "Current trends in vehicular ad hoc networks," in Proc. IEEE Global Inf. Infrastruct.Symp., Marrakech, Morocco, 2007, pp. 1–9.

[3] J. J. Blum, A. Eskandarian, and L. J. Hoffman, "Challenges of inter vehicle ad hoc networks," IEEE Trans. Intell. Transp. Syst., vol.5, no. 4, pp. 347–351, Dec. 2004

[4] G. Mao and B. D. O. Anderson, "Graph theoretic models and tools for the analysis of dynamic wireless multihop networks," in Proc. IEEE WirelessCommun. Netw.Conf.,

[5] J. Monteiro, A. Goldman, and A. Ferreira, "Performance evaluation of dynamic networks using an evolving graph combinatorial model," in Proc.IEEE Int. Conf. WiMobComput., Netw. Commun., 2006, pp. 173–180

[6]] A. Ferreira, "Building a reference combinatorial model for MANETs," IEEE Netw.Mag., vol. 18, no. 5, pp. 24–29, Sep./Oct. 2004..

[7]] S. C. Ng, W. Zhang, Y. Zhang, Y. Yang, and G. Mao, "Analysis of access and connectivity probabilities in vehicular relay networks," IEEE J. Sel.Areas Commun.vol. 29, no. 1, pp. 140–150, Jan. 2011.

[8] L. C. Andrews, Special Functions of Mathematics for Engineers, 2nd ed. New York NY, USA: McGraw-Hill, 1992, pp. 110–112.

[9] V. A. Davis, "Evaluating mobility models within an ad hoc network," M.S. thesis, Colorado Sch. Mines, Golden, CO, USA, 2000.

[10] T. H. Cormen, C. E. Leiserson, and L. R. Ronald, Introduction toAlgorithms Cambridge, MA, USA: MIT Press, 1990.

[11]] V. A. Davis, "Evaluating mobility models within an ad hoc network," M.S. thesis, Colorado Sch. Mines, Golden, CO, USA, 2000.

[12] M. Rudack, M. Meincke, K. Jobmann, and M. Lott, "On traffic dynamical aspects of inter vehicle communications (IVC)," in Proc. IEEE Veh.Technol. Conf., 2003, pp. 3368–3372.