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Stabilizing Route and Control Overhead by Using Ad-Hoc Routing Protocol in Vehicular Ad-Hoc Network (VANET)

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Abstract- AODV is well known and important routing protocols in Ad hoc networks. This protocol is a dynamic protocol that searches routes only when they are required to send data. It always transfers packets between neighbour nodes for routing. In this paper we proposed one system that system will reduces some overhead of AODV ad-hoc routing protocol and it make usable for VANET. We proposed one shortest path mechanism which will give us stable path and minimum overhead.

Keywords- Ad hoc network; Vehicular Ad-hoc Network; routing protocol; AODV; control overhead;

I. INTRODUCTION

A fundamental issue arising in mobile Ad hoc networks (MANETs) is the selection of the optimal path between any two nodes. A method that has been advices to improve routing efficiency in VANET is to select the most stable path so as to reduce the latency and the overhead due to route reconstruction [3]. In this work, we study both the route stability and the overhead of a routing path that is subject to link failures caused by node mobility. In particular, we focus on the area where the network nodes search the shortest path from source to destination, by using various scenarios.

II. RELATED WORK

Due to the dynamic, infrastructure less and scalable networks the MANET is very much popular. AODV is one of the most important routing protocols for MANET. The Improvement in VAENT is Possible by eliminating route discovery phase, restricting neighbour's distance and number of discovered routes, this leads to reduce most of control overheads [3]. The on-demand routing protocols with identical loads and evaluates their relative performance with respect to the two performance context: average End-to- End delay and packet delivery ratio [4].

In the network one author divide the whole network into sub-networks and perform the transmission over the sub goal and to achieve the efficient and reliable data transmission [5]. AODV and AOMDV are preferable for Packet Delivery Ratio while DSR has lower Avg. End-to-End delay. AOMDV has less value of dropped packets. AOMDV and DSDV have higher Normalized Routing load compare to other protocols. AODV has higher Avg. End-to-End delay and number of Dropped packets compare to other routing protocols in given scenarios. At the end they conclude that AODV is found most appropriate selection compare to other protocols at the network layer of given city models in VANET with varying traffic concentration [6].

In the evaluation the performance of routing protocols in urban traffic scenarios, author developed a realistic city mobility model, which was used to examine the performance of Ad-hoc routing protocols AODV, DSR, FSR and TORAon the basis of network simulations, they was found that routing protocols showed highly heterogeneous performance results. TORA is completely unsuitable for vehicular environments, whereas FSR and AODV showed promising results in the city scenarios. Although FSR's throughput at lower traffic densities is less than that of AODV (and DSR), both protocols cause the lowest routing overheads and deliver packets quite fast. DSR suffers especially from very high end-to-end delays [7]. Dijkstra algorithm is one of the static routing algorithms, which is widely used. Author presents a Hybrid Shortest Path Tree (HSPT) algorithm which reduces the total execution time of shortest path tree computation by using the advantages of both static and dynamic routing algorithms [8].

III. ROUTING PROTOCOL AODV

The Ad hoc On Demand Distance Vector (AODV) routing algorithm is a routing protocol designed for ad hoc mobile networks. AODV is capable for both uni-cast and multicast routing. We know that it is an on-demand algorithm, meaning that it builds routes between nodes only as desired by source nodes. AODV preserve these paths as long as they are needed by the sources. AODV protocol uses series numbers to ensure the freshness of routes. It is loop-free, self-starting, as well as scales to the huge numbers of mobile nodes.

AODV builds paths using a route requestor route reply query cycle. When a source node desires that this is a path to a destination for which it does not already have a path, it broadcasts a route request (RREQ) packetall over the network. Nodes receiving this packet update their data for the source node and set up backwards pointers to the source node in the route tables. In addition to the source node's IP address, current series number, as well as broadcast ID, the RREQ also contains the most recent series number for the destination of which the source node is aware. A node receiving the RREQ may send a route reply (RREP) if it is either the destination or if it has a route to the destination with corresponding series number greater than or equal to that contained in the RREQ.

If this is the case, it uni-cast a RREP back to the source. Otherwise, it rebroadcasts the RREQ. Nodes keep pathway of the RREQ's source IP address and broadcast ID. If they receive a RREQ which they have already processed, they discard the RREQ and do not forward it. As the RREP propagates back to the source, nodes set up forward pointers to the destination. Once the source node receives the RREP, it may begin to forward data packets to the destination. If the source later receives a RREP containing a greater series number or contains the same series number with a smaller hop-count, it may update its routing information for that destination and begin using the better route.

IV. Overview Of Vehicular Ad-Hoc Network (Vanet)

The up gradation of the network technologies has provided the use of them in several different fields. One of the most growing applications of them is the development of the Vehicular Ad-hoc Networks (VANETs), one unique kind of Mobile Ad-hoc Networks (MANETs) in which the communications are among the close vehicles. A VANET is vehicular network which turns every participating car into a wireless router or node, allowing cars approximately 100 to 300 metres of each other to connect and, in turn, create a network with a wide range. As cars fall out of the signal range and drop out of the network, other cars can join in, connecting vehicles to one another so that a mobile Internet is created. 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.

1. Need of VANET and Advantages

A Vehicular Ad-Hoc Network, or VANET, is a form of Mobile ad-hoc network, to provide communications among close vehicles and between vehicles and close to fixed equipment, usually described as roadside equipment. It is combination of vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communication.

The main goal or necessity of VANET is providing safety and comfort for passengers as shown in figure A. To this end a special electronic device will be placed inside each vehicle which will provide Ad-Hoc Network connectivity for the passengers.

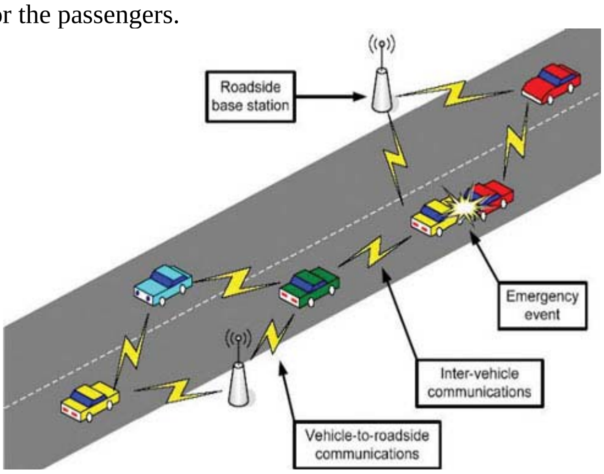

Fig-A. Need of VANET [5].

2. Characteristics of VANET

There are various characteristics of VANET which are point out as below:

High Dynamic Topology, Frequent disconnected Network, Mobility Modelling and Prediction, Communication Environment, Hard Delay Constraints, Interaction with on-board sensors.

3. Routing Type of VANET

There are various characteristics of VANET which are point out as below:

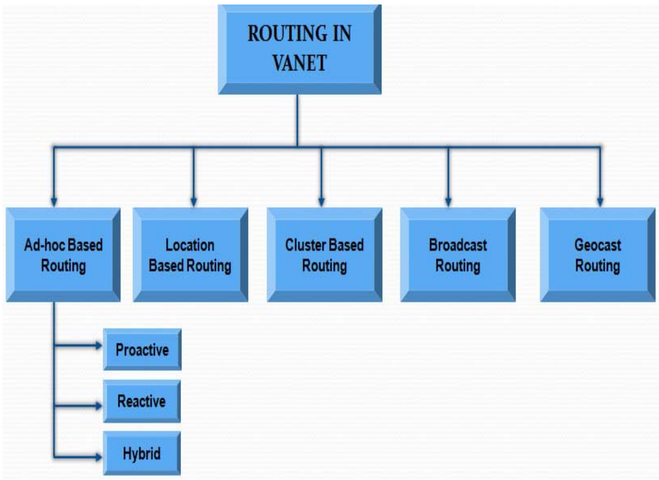

Fig- B. Types in VANET [2]

4. Types of Communication

There are three types of communication which are used for sending and receiving data in networking environment.

i. Vehicle to Vehicle, ii Vehicle to Roadside, iii Vehicle to Infrastructure

V. Working Of Vanet

Vehicular Ad Hoc Networks (VANETs) have grown to support the better number of wireless products that can now be used in vehicles.

1. VANET Overview

Intelligent transportation systems (ITSs) - In intelligent transportation systems, each vehicle takes on the role of source i.e sender , destination i.e receiver, and router to broadcast information to the vehicular network or transportation agency, which then uses the information to ensure safe, free-flow of traffic. For communication to occur between vehicles and Road Side Units (RSUs), vehicles must be equipped with some sort of radio interface or On Board Unit (OBU) that enables short-range wireless ad hoc networks to be formed. Vehicles must also be fitted with hardware that permits detailed position information such as Global Positioning System (GPS) or a Differential Global Positioning System (DGPS) receiver. Fixed RSUs, which are connected to the backbone network, must be in place to facilitate communication.

Inter-vehicle communication - The inter-vehicle communication configuration (Fig. C) uses multi-hop multicast/broadcast to transmit traffic related information over multiple hops to a group of receivers.

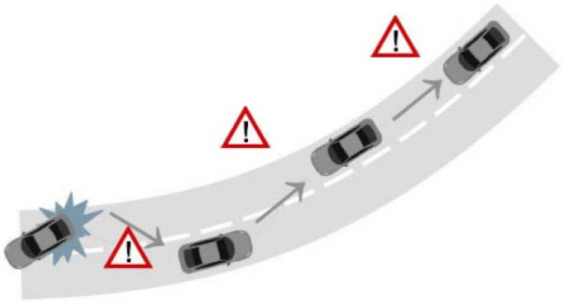

Fig- C. Inter-vehicle communication

There are two types of message forwarding in inter-vehicle communications: naïve broadcasting and intelligent broadcasting. In naïve broadcasting, vehicles send broadcast messages at regular intervals. Upon receipt of the message, the vehicle ignores the message if it has come from a vehicle behind it. If the message comes from a vehicle in front, the destination vehicle sends its own broadcast message to vehicles behind it [1].

2. Application of VANET

The application of VANET can come in three areas like i. Safety Application- e.g The early warning system, Collision avoidance ii. Traffic Management- e.g Information about the road congestions ahead, Roadside infrastructure iii User Application- e.g Peer-to-peer applications

3. Challenging Issues in VANET

There are many challenges which are faced by VANET. These challenges are technical challenges, Security challenges as well as business challenges. In next section we are trying to overcome the few challenges of VANET.

VI. EXISTING METHOD

AODV always exchanges control packets between neighbour nodes for routing. For reduction of control overheads and bandwidth consumption and make AODV usable for VANET [3].

By eliminating route discovery phase author restrict distance and number of discovered routes of neighbour's. This restriction leads to reduce most of control overheads. Author improves exisiting AODV protocol and proposes PAODV as routing protocol. This gives the enhancement on AODV control overheads and makes routes more stable.

VII. PROPOSED SYSTEM

In Ad-hoc routing protocol, we proposed the method to obtain shortest path for the problem of stable path in reactive protocol. By modification in existing systems in ad-hoc routing protocol, we proposed our work by showing shortest path algorithm we are going to examine some parameters regarding route stability and controlling overhead on ad-hoc routing protocol.

Shortest path mechanism always works for the communication between Vehicle to Vehicle (V2V), Vehicle to Infrastructure (V2I), and Vehicle to Roadside (V2R).

Steps for getting shortest path in vehicular ad-hoc network

Proposed Algorithm:

1. Insert the Source Node and Destination
2. Node Set new test and check the neighbouring routing table
3. If (vehicular Node = Destination Node)
   Go to step 10
   Else
   Find the Best Path
4. If (Number of Vehicular node> Threshold)
   Go to Step 10
   Else
   Initialize the node
5. If (Counter=Empty Condition)
   Go to Step 10
   Else
6. Select the Vehicular Node
7. Increment the Counter
8. Perform Same Operation Step 3 to Step till gate the best path
9. Print Shortest Path
10. End

VIII. SIMPLE SIMULATION RESULT

We implement a simple shortest path on Vehicular ad-hoc network using On-Demand Distance Vector Routing Protocol by using Open Source Network Simulator NS2 (Version-12.10).In fig D shows the transmission of data packets from source to destination by finding the best path in an ad-hoc network.

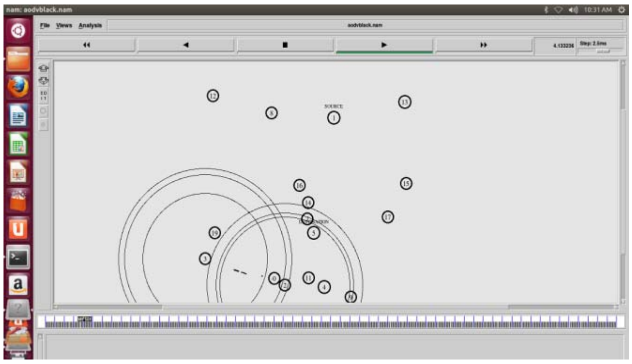

Fig-D- Propagation model of Simple 20 node

VIII. CONCLUSION

In this paper we proposed some system to calculate the shortest path of the vehicular ad-hoc network (VANET). From that we analysed that when there is the proper implementation of shortest path algorithm we can test the various parameter for VANET which will be conclude that this method may have some good points for getting stable routs as well as it will be possible to reduces some routing overheads in vehicular ad-hoc network.

In the future work challenges of the VANET, security got less attention. VANET packets contains life critical information hence it is necessary to make sure that these packets are not inserted or modified by the attacker; likewise the liability of drivers should also be established that they inform the traffic environment correctly and within time.

So security is the important concern in Vehicular ad-hoc network.

REFERENCES

[1]. Telecommun Syst DOI 10.1007/s11235-010-9400-5 “Vehicular ad hoc networks (VANETS): status, results, and challenges” Sherali Zeadally • Ray Hunt • Yuh-Shyan Chen • Angela Irwin • Aamir Hassan © Springer Science+Business Media, LLC 2010

[2]. Journal of Wireless Networking and Communications 2013, 3(3): 29-38 DOI: 0.5923/j.jwnc. 20130303.02 “Vehicular Ad-Hoc Networks (VANETs) - An Overview and Challenges” by Sabih ur Rehman*, M. Arif Khan, Tanveer A. Zia, Lihong Zheng School of Computing and Mathematics, Charles Sturt University, Australia.

[3]. Omid Abedi, Reza Barangi, M. Abdollahi Azgomi. “Improving Route Stability And Overhead of The Aodv Routing Protocol and Making it Usable For Vanet” 2009 29th IEEE International Conference on Distributed Computing Systems Workshops 1545-0678/09 $25.00 © 2009 IEEE DOI 10.1109/ICDCSW.2009.88 464.

[4]. International Journal of Wireless & Mobile Networks (IJWMN) by A. Shastri, R. Dadhich, Ramesh C. Poonia “PERFORMANCE ANALYSIS OF ON-DEMAND ROUTING PROTOCOLS FOR VEHICULAR AD-HOC NETWORKS.” Vol. 3, No. 4, August 2011 DOI : 10.5121/ijwmn.2011.3407 103 by

[5]. 2012 Second International Conference on Advanced Computing & Communication Technologies Alpana Dahiya ,Madhu ,Niyati Bansal “PATH DISCOVERY IN VEHICULAR AD HOC NETWORKS.”

[6]. Dharmendra Sutariya CSE Department, Institute of Technology Nirma University Ahmedabad, Gujarat, India Shrikant Pradhan CSE Department, Institute of Technology Nirma UniversityAhmedabad, Gujarat, India “Evaluation of Routing Protocols for Vanets in City Scenarios.” Published 978-1-4577-0240-2/11©2011 IEEE.

[7]. Sven Jaap, Marc Bechler and Lars Wolf , Technische Universität Braunschweig, Institute of Operating Systems and Computer Networks Mühlenpfordtstr. 23, D-38106 Braunschweig, Germany. “Evaluation of Routing Protocols for Vehicular Ad Hoc Networks in City Traffic Scenarios”

[8]. International Journal of Multimedia and Ubiquitous Engineering Vol. 8, No. 4, July, 2013 Taehwan Cho, Kyeongseob Kim, Wanoh Yoon and Sangbang Choi* Department of Electronics Engineering, Inha University, Incheon, Korea “A Hybrid Routing Algorithm for an Efficient Shortest Path Decision in Network Routing”