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# A Hybrid Protocol for Vehicular Communication in VANET Using Location Aided Routing and Base Line Multicasting

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***Abstract:*** **The design a novel location aided routing protocol with the concept of baseline and distance minimization is presented in this paper. The protocol has been implemented successfully for a vehicular Adhoc network and Manhattan model is utilized. The vehicular movement used a new concept of communication using minimization of distance from base line. The base line was drawn from source to destination node. The discussed protocol seems to work quite well and seems to yield encouraging results. The packet delivery ratio was increased significantly and the average delay was reduced significantly.**

***Keywords:*** **VANET, Manhattan model, MANET**.

## I. INTRODUCTION

VANET (Vehicular Ad hoc networks) is a type of Mobile Ad hoc Network (MANET), where every node is a vehicle moving on the road. A node is used as router to send data from one node to another. In VANET mobility of vehicles; structure of the geographical areas since node movement depends on it, timely delivery of messages. In VANET, privacy is important characteristic. It uses two method of communication. One is vehicle to vehicle (V2V) and the other is vehicle to fixed road side equipment (V2R). In both the methods vehicles can communicate to other vehicles or road side unit either directly or through multiple hops. Vehicle to vehicle communication (V2V) has two types of communication: one hop communication and multi hop communication. One hop communication is the communication between the direct vehicle to vehicle. In multi hop communication, the vehicle relies on other vehicles to retransmit.

A mobile ad hoc network (MANET) is a dynamically reconfigurable wireless network that does not have a fixed infrastructure. In order to attain efficient routing several protocols has been presented for mobile Adhoc network. Vehicular ad hoc wireless networks (VANETs) are a specifically type of mobile ad hoc wireless networks (MANETs) that are popular among various researchers in the field of wireless networking as well as automotive industries. VANET is compared with MANET in terms high mobility. Infrastructure-free environments and higher dynamic network topology cause frequent network partition. Moreover, vehicular ad hoc wireless networks is developed by the constraint of roadways where trees, buildings and other assorted obstacles influence the practical transmission effects as compared to generic open fields. [1] [2]

### *1.1 Congestion In Vanet:*

Traffic on road is big problem today. Multiple hours and tons of fuel is wasted everyday by these vehicles jammed in traffic. This is a fact that, therefore million tons of fuel is going too wasted today due to the increase of traffic intensity. In Technology era all the vehicles themselves have an ability to compile and analyse the traffic data and communicate it to drivers in a layout which will let them to make smart decisions to the avoid congested areas. Communications between these vehicles can be obtained either through vehicle-to-vehicle communications or vehicle-to infrastructure. Vehicular ad-hoc networks are mobile ad-hoc networks that give the communications between adjoining vehicles or nearby fixed equipment [1]. Each vehicle records and flow the information such as place and speed or route that information is received from other vehicles in network. Congestion detection is one of the multiple applications of VANETs or it didn't design to be used as means for an automated driving rather as tool to deliver information to driver which will help her/him make decisions to avoid the heavy traffic.

Design traffic congestion detection system which will have good influence on budget, the surroundings or society in general letting us to spend less time stuck in the traffic or more time doing any creativity. The Vehicular Ad-hoc Network has been presented in various areas, such as detecting nearest collisions and giving warning signals to aware driver. Since VANET has ability to provides a variety of services. These services are provided by VANET often based on association or among vehicles which are furnished with a relatively motion sensors and GPS units. Awareness of the specific location is vibrant to the every vehicle in VANET so it can provide an accurate data to aristocrats.

## II. PROPOSED METHODOLOGY

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.

Let us suppose the leaf node moves and comes in the range of root node 2 and then leaf node 1 will join the root node 2. The leaf node will come under which root node it will be decided on the basis of distance formula. The threshold distance will be defined when distance will be greater the threshold value, then handoff takes place.

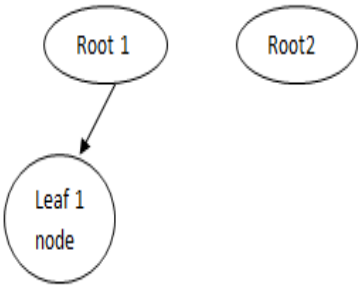


***Fig.1: Root1 Node Linked With Leaf Node***

Figure 1 shows a new node joins the network which comes under the root node 1 on the basis of distance and time formula using the predication based technique.

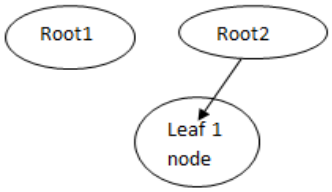


***Fig.2: Root2 Node Linked With Leaf Node***

The Root nodes are responsible to maintain the tree on the basis of distance between the nodes. The root nodes can maintain routing table and in this routing table information about their leaf nodes are stored. The root nodes can send the stored information to RSU's and before requesting for the path to destination. The source node communicates with the RSU and RSU give information about the leaf node for path establishment. The source node send route request packets to only those root nodes, which have access to desired leaf node.

## III. RESULTS

The proposed technique has been implemented in for a VANET environment with 10 horizontal and vertical roads. 300 vehicles were placed in the roads randomly and they moved according to the Manhattan model. All the simulations were carried out in MATLAB R2013b in a core i5 processor based computer with 8 GB RAM and 500 GB hard disk.

Figure 3 represents the plot of average delay versus each round. As observed the average delay of our proposed algorithm remains constant more or less around 3. This is a very low value and proves the efficacy of our algorithm. The communication between them is represented by green lines. The communication is done according to the proposed algorithm. The minimum distance line is found out and then the vehicles in the vicinity are found out. The vehicles which have the minimum perpendicular distance to the line are selected for next hopping.

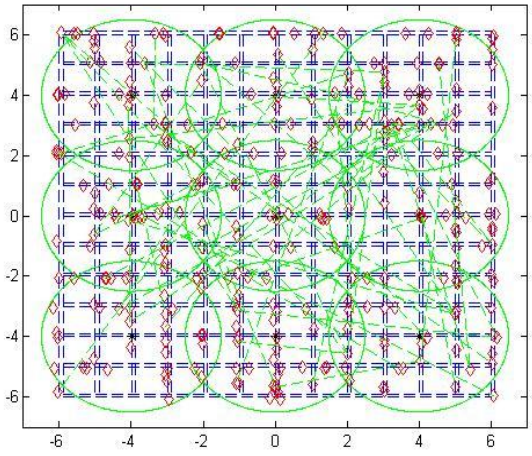


***Fig.3: Plot of Average Delay versus Each Round***

The packet delivery ratio of our algorithm is plotted against rounds and it is observed for our algorithm that it is very high nearly 87 % in each rounds. The high value of PDR represents that our algorithm performs quite well as compared to the traditional ones and the minor reduction in the average PDR is due to the decreasing energy of various batteries attached to the vehicles. Figure 4 show the plot of average packet delivery ratio versus number of nodes.

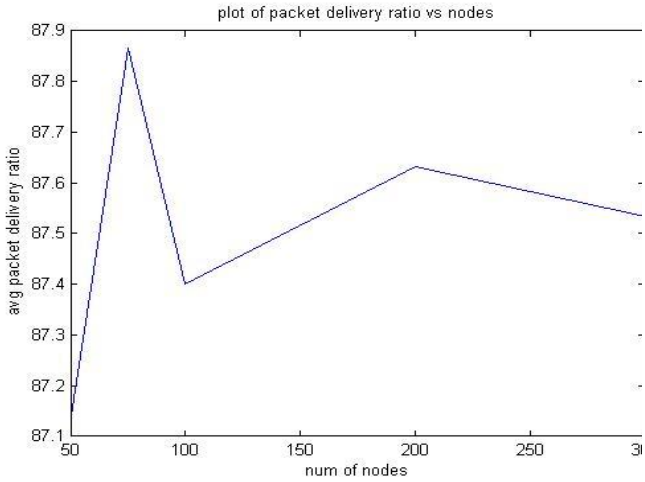


***Fig.4: Plot of Packet Delivery Ratio versus Nodes***

## IV. CONCLUSION AND FUTURE WORK :

The work tries to design a novel location aided routing protocol with the concept of baseline and distance minimization. The protocol has been implemented successfully for a vehicular adhoc network and Manhattan model is utilized. The vehicular movement used a new concept of communication using minimization of distance from base line. The base line was drawn from source to destination node. The discussed protocol seems to work quite well and seems to yield encouraging results. The packet delivery ratio was increased significantly and the average delay was reduced significantly. This shows the efficiency of our algorithm. In future other algorithms can be utilized for the same and our proposed model can be implemented for hybrid networks. Also Meta-heuristic algorithms can be utilized for the same and the performance can be compared with our method.

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