Enhancement in Location Aided Routing Protocol for VANET using Multicasting Tree Maintenance Technique

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ABSTRACT
VANET is most popular network which stands for vehicular ad-hoc network. The researchers make a lot of work in this network. Vehicular Ad hoc Networking is a special case of mobile ad hoc networking which provides communication among the vehicles and between the vehicles and nearby fixed equipments called road side units. In ad-hoc networks, to ensure the delivery of packets from sender to destination, each node must run a routing protocol.In this paper link failure problem has been discussed in AODV protocol. A novel technique based upon multicasting has been proposed to solve link failure problem.

Keywords
VANET, AODV, Multicasting, Ant Colony Optimization.

1. INTRODUCTION
The advent of ad hoc wireless networking is possibly one of the most significant developments in wireless networking and telecommunications in the last decade . Ad hoc wireless networking has becomeincreasingly popular in the computing industry. It is a combination of wireless mobile nodes or devices forming a temporary network dynamically without any use of central administration.VANET stands for Vehicular Adhoc Network which is a kind of wireless adhoc networking in which all vehicles act like the nodes of a network. There is an option for driver comfort and road safety, the inter-vehicle communication provide them. Vehicular ad hoc network is special type of mobile ad hoc network (MANET) which providesa distinguished approach for Intelligent Transport System (ITS). There are many challenges in VANET. Therefore there is a need to be solved in order to provide reliable services. Stable & reliable routing in VANET is one of the major issues. So we need to conduct more research to utilize VANET. Because vehicles behave dynamically and have high speed and mobility which makes routing more difficult in ad-hoc networks, so to ensure delivery of packets from sender to receiver, each node must have a routing protocol.

There are basically two types of communication in VANET:

1. Vehicle- Vehicle communication
2. Vehicle - Road-side communication

1.Vehicle-Vehicle communication:In this configuration multi-hop multicasting/broadcasting techniquesare used to share traffic related information with multiple hops to a group of receivers. Its main duty is to look after the activity of the vehicle which is ahead not behind.

We can broadcast message by two techniques
in inter vehicle communications: naïve broadcasting and intelligent broadcasting.

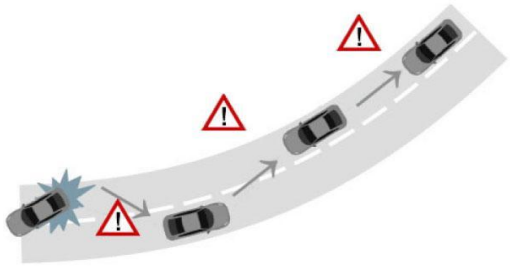

Figure 1.1. Inter-vehicle Communication

2. Vehicle to Roadside Communication: In vehicle-to-roadside communication configuration the road-side unit sends a broadcast message to all vehicles in the network representing single hop broadcast. It provides a high bandwidth link between the vehicles and the roadside units.

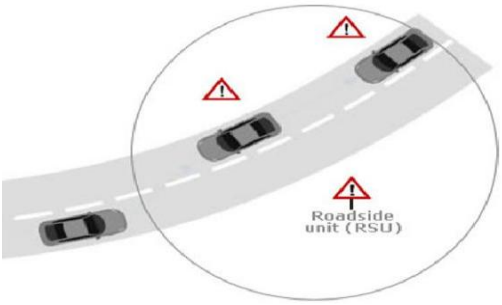

Figure 1.2. Vehicle to roadside communication

2. LITERATURE REVIEW
In this paper [1],they have discussed the various characteristics and challenges of VANET. Most VANET applications are built upon the data movement communication model, where information is propagated to a set of vehicles. There is a survey of application based various broadcasting data dissemination protocols separately and their fundamental characteristics are revealed. And at the end, tabular comparison of all the protocols is also done.

In this paper [2], the pros/cons and the uses of various routing protocols for vehicular ad hoc networks are discussed. Vehicular Ad Hoc Networks (VANET) is a subclass of Mobile ad hoc networks which provides a dignified approach for Intelligent Transport System (ITS). The survey of routing protocols in VANET is very significant as well asmandatory for smart ITS. This paper [2], discusses the main five types of protocols for VANET that are Topology Based, Positioned Based, Geo Cast, Broad Cast, Cluster Based Protocols. We can conclude from the inspection that position based, geocast and cluster based protocols are more reliable for most of the applications in VANET.

In this paper [3], the authors have investigated the pros and cons of different routing protocols for inter-vehicle

communication in VANET. Design of an efficient routing protocol is required as existing routing protocols for VANET are not efficient to meet various traffic conditions. So, identification of pros and cons of routing protocols is required for further improvement or development of any new routing protocol.

In this paper [3] , they presented a FairAD, a dissemination protocol that utilizes the available bandwidth in a better way by maximizing the vehicle's data utility gain in the neighbourhood and controlling the network load inserted into the network.It has shown that connectivity time between vehicles moving at high speeds in opposite directions can be limited to a few seconds and compromise the amount of data exchanged.

In this paper [4] they have shown that how VANETs can be used to aid in traffic signal control including a new Job-Scheduling based online algorithm i.e. OAF algorithm and how it reduces the delays experienced by the vehicles as they passed through the intersection under light and medium vehicular traffic loads.

In this paper [5], they represented upcoming wireless network environment for intelligent transportation system. They mainly define the VANET applications based on the various broadcasting data propagation protocols their fundamental characteristics are revealed.

3. ANT COLONY OPTIMIZATION

In the ant colony optimization meta-heuristic for mobile ad-hoc networks and describes the ant colony algorithm (ARA). It can be constructed into three phases.

1. Route discovery phase: In this phase route is discovered. It creating the new routes requires the use of forward ant (FANT) and backward (BANT). In the process FANT is work as agent which establishes the pheromone track to source node. As compared to BANT construct a track to the destination node. In the FANT process have small packets with unique sequence number. All the nodes are able to distinguish duplicate packets on the basis of the sequence number and the source address of the FANT. In case of forward ant is broadcasted by sender and will be relayed by the neighbour of the sender. A node receiving a FANT for first time creates a record in the routing table. The routing table contains destination address, pheromone value and next hop. The node represents the source address of the FANT as destination address, next hop represents the address of the previous node and calculates the pheromone value depending on the number of hops the FANT needed to reach the node. Nodes relays the FANT to its neighbour so due to FANTS are indentified through the unique [9].

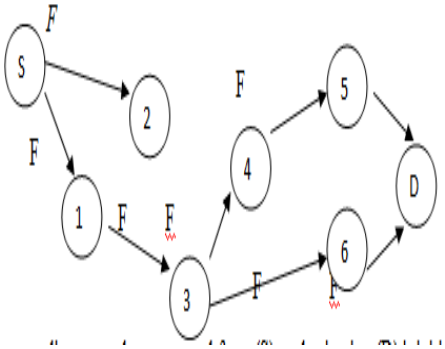

Figure 1.3. Route Discovery Phase

Sequence number and destroyed by the nodes. In case when the FANT react to destination it processed in special way. The destination extracts the information of FANT and destroys it. It also creates BANT and sends it to the source node. The BANT has same task as FANT establish a track to this node.

2. Route maintenance phase: In the second phase is called a route maintenance phase is responsible for improvement in the route communication. ABA does not need any special packets for route maintenance. Once the FANT and BANT establish the pheromone paths from the sender and receiver nodes, subsequent data packets are used to maintain the path.
3. Route failure handling: In the third step ARA handles routing failure which is caused through node mobility. ARA perceives a route failure through a missing acknowledgement. Some times when node gets a route_error message for certain link, first deactivates link by setting the pheromone value to 0. After that node search the alternative node from the routing table. If any path exist sends the packet via this path.

2. PROPOSED METHODOLOGY

In the vehicular adhoc network, vehicle to vehicle and vehicle to infrastructure communication is available for communication. To vehicle to vehicle communication is available to exchange important information between vehicles. To establish path between various vehicles various routing protocols had been proposed which are of reactive and proactive type . The reactive routing protocols had remarkable performance in VANETS which use the broadcasting technique for path establishment. The broadcasting technique will increase delay in the network and network resource consumption increase at steady rate. To reduce delay in the network, the technique of multicasting had been proposed. 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.

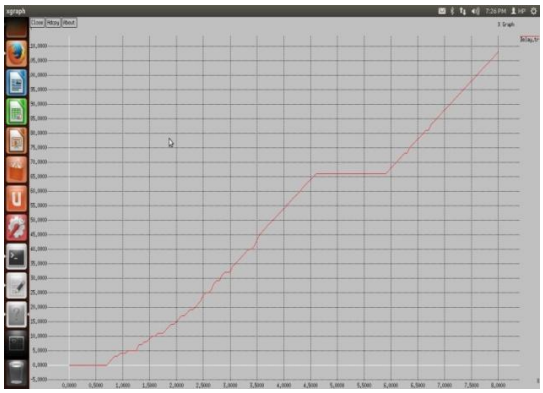

Figure 1. Delay Graph

As illustrated in the graph delay of the existing technique is shown, it is been analyzed that delay in the network is increased at steady rate

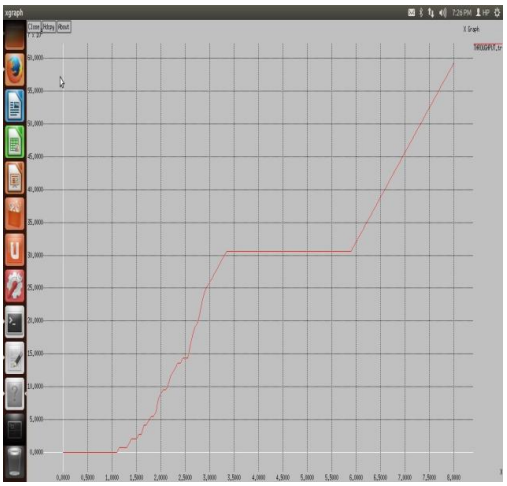

Figure 2. Throughput Graph

As shown in figure 2, throughput of the network is increased at constant rate. The throughput of the network is after the path establishment from source to destination

3. CONCLUSION

In VANET network topology change at fast range due to higher node mobility. In the previous time technique of broadcasting is used to establish path from source to destination and leads to high bandwidth consumption and delay. In future work, technique of muticasting will be proposed of VANETs for easy path establishment from source to destination. The proposed technique leads to reduction in bandwidth consumption and network delay In future performance of proposed technique will be analyzed on audio and video type of data

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