IMPROVING NETWORK PERFORMANCE IN VANET USING SADV ROUTING PROTOCOL

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Abstract— *Vehicular ad hoc networks (VANETs) are a special form of wireless networks made by vehicles communicating among themselves on roads. The conventional routing protocols proposed for mobile ad hoc networks (MANETs) work poorly in VANETs. As communication links break more frequently in VANETs than in MANETs, the routing reliability of such highly dynamic networks needs to be paid special attention.. In existing methods the vehicular mobility pattern and the vehicular traffic distribution are examples of factors that affect the reliable routing process. EG-AODV causes large delays in a route discovery, also route failure may require a new route discovery which produces additional delays that decrease the data transmission rate and increase the network overhead. We propose an Infrastructure Based Routing scheme consists of an Assisted Adaptive Data Dissemination protocol for vehicular networks. It uses static nodes at junctions to forward a packet and the data is forwarded through the best delivery path, which reduces the overall data delivery delay.*

Keywords— VANET; AODV Protocol; SADV Architecture

1. INTRODUCTION

Vehicular ad hoc network (VANET) uses cars as mobile nodes in a MANET to create a mobile network. A VANET turns every participating car into a wireless router or 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 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. Most of the concerns of interest to mobile ad hoc networks (MANETs) are of interest in VANETs, but the details differ. Rather than moving at random, vehicles tend to move in an organized fashion. The interactions with roadside equipment can likewise be characterized fairly accurately. And finally, most vehicles are restricted in their range of motion, for example by being constrained to follow a paved highway.

Wireless operations permit services, such as long-range communications, that are impossible or impractical to implement with the use of wires. The term is commonly used in the telecommunications industry to refer to telecommunications systems (e.g. radio transmitters and receivers, remote controls etc.) which use some form of energy (e.g. radio waves, acoustic energy, etc.) to transfer information without the use of wires. Information is transferred in this manner over both short and long distances.

The paper is organized as follows: Section 2 outline the literature survey, Section 3 presents the proposed system and discusses the experimental results and Section 4 concludes the paper.

2. LITERATURE SURVEY

Conventional routing protocols proposed for mobile ad hoc networks (MANETs) work poorly in VANETs. As communication links break more frequently in VANETs than in MANETs, the routing reliability of such highly dynamic networks needs to be paid special attention. To date, very little research has focused on the routing reliability of VANETs on highways. In this paper [3], uses the evolving graph theory to model the VANET communication graph on a highway. The extended evolving graph helps capture the evolving characteristics of the vehicular network topology and determines the reliable routes preemptively. This paper is the first to propose an evolving graph-based reliable routing scheme for VANETs to facilitate quality-of- service (QoS) support in the routing process. A new algorithm is developed to find the most reliable route in the VANET evolving graph from the source to the destination.

The paper [4] focuses focus on how the VMeshes can be used to capture and retain certain transient information on the road within a given region of interest for a certain period of time, without any infrastructure support. Through theoretical analysis and detailed simulation validated by the realistic mobility trace observed in San Francisco Yellow Cabs, researchers observed that the same system parameters (e.g., transmission range and the size of the region of interest) had impact on VANET storage properties under different mobility patterns.

The authors proposed an efficient and multi-level conditional privacy preservation authentication protocol [5] in vehicular ad hoc networks (VANETs) based on ring signature. The protocol has three characteristics:

1. It offers conditional privacy preservation authentication: while every receiver can verify that a message issuer is an authorized participant in the system only a trusted authority can reveal the true identity of a message sender.
2. It is equipped with multi-level countermeasure: each vehicle can select the degree of privacy according to its own requirements.

3. It is efficient: our system outperforms previous proposals in message authentication and verification, cost-effective identity tracking in case of a dispute, and low storage requirements.

Performance of vehicle mobility can be determined by average inter-vehicle link available time and the average number of inter-vehicle link changes for maintaining an active link in VANET. This paper[6] focuses on vehicle mobility analysis in VANET. The numerical results indicate that the analytical random moving model is able to appropriately present the behavior of vehicle moving under different conditions, especially when mobile vehicle is moving relatively fast. On the other hand, the effect of traffic conditions on the accuracy of theoretical analysis is also investigated.
In existing system, the vehicular mobility pattern and the vehicular traffic distribution are examples of factors that affect the reliable routing process. EG-AODV causes large delays in a route discovery, also route failure may require a new route discovery which produces additional delays that decrease the data transmission rate and increase the network overhead. Moreover, the redundant broadcasts without control will consume extra bandwidth (broadcast storm problem), this problem grows as the number of network nodes increases, that besides collisions which lead to packet lost problem. There are several protocols have been proposed to enhance AODV protocol; by decreasing its problems.

The routing process is an important issue that needs to be addressed before these networks can be deployed effectively. Data packets are forwarded from the source node to the destination node using the available vehicles as relays. However, the expected large number of vehicles and the high dynamics and frequent changing of vehicles' densities raise real challenges for the routing process. Crossing, traffic lights and similar traffic network conditions cause frequent partitions in VANETs that make the routing process even harder. Position based protocols uses geographic positioning information to select next hop so no global routing between source and destination. The probability theory is used to describe the likelihood of certain events like the probability of link breakage with a certain transmission power or a certain mobility parameter.

3. PROPOSED METHOD

3.1. INFRASTRUCTURE BASED ROUTING SCHEME USING STATIC NODE

We propose an Infrastructure Based Routing scheme consists of an Assisted Adaptive Data Dissemination protocol for vehicular networks. It uses static nodes at junctions to forward a packet and the data is forwarded through the best delivery path, which reduces the overall data delivery delay. The QoS will be enhanced in our proposed routing scheme since a static assistance will

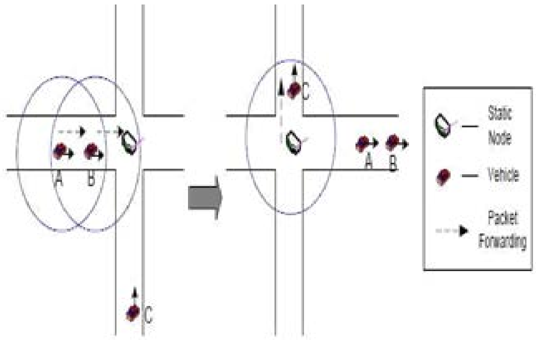

Fig 1: Static Routing assistance in VANET

Since the best path is not always available at the moment a packet reaches an intersection, we can deploy a static node at each intersection to assist packet delivery. The static node can store the packet for some time until the best path becomes available to deliver the packet. As illustrated in Fig.4.2, a packet is forwarded by wireless communication through vehicles A, B to the static node S. When the packet reaches S, the best path to deliver it is northward. However, there are no vehicles within communication range along this road at that time. Thus, S will store the packet for a while, and forward it to the vehicle C when C passes the intersection and enters the northward road. From the figure, we can see that without the help of the static node, the packet will be carried by B to the eastward road if B does not meet C at the intersection, which may lead to a much longer packet delivery path.

For the in-road mode, two strategies can be used for geographic forwarding with regard to whether it should resort to the vehicles running in the opposite direction on the same road for packet forwarding. As shown in Fig.4.3, if these vehicles are used, the packet may be delivered to the next intersection faster through the chance that the vehicle running in the opposite direction may have wireless connection to a further vehicle in the same direction. Otherwise, however, the packet may be delivered back to the original vehicle when it turns out to be closer to the intersection than the vehicle in the opposite direction, which incurs greater packet delivery overhead.

4. RESULTS AND DISCUSSION

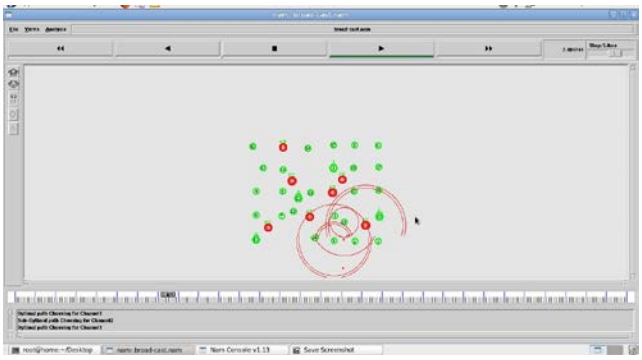

Fig 2: VANET transmission using SADV in city Environment

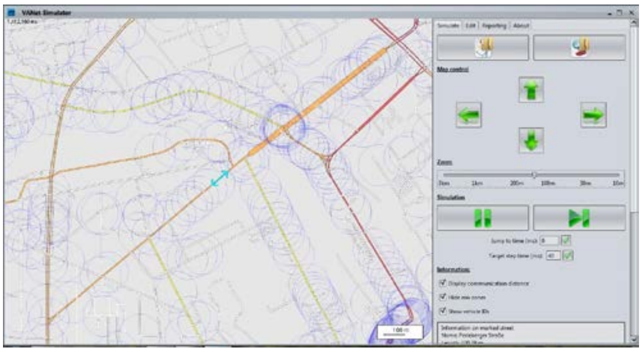

Fig 3: Highway Scenario Using VANET Simulator-1

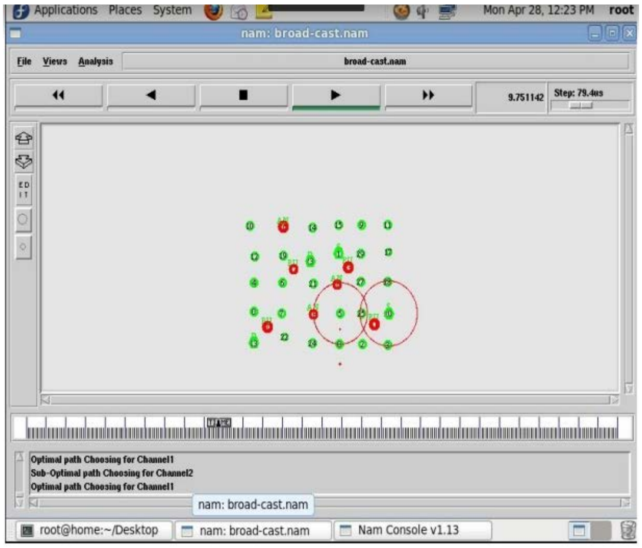

Fig 4: Message drop and transmit property

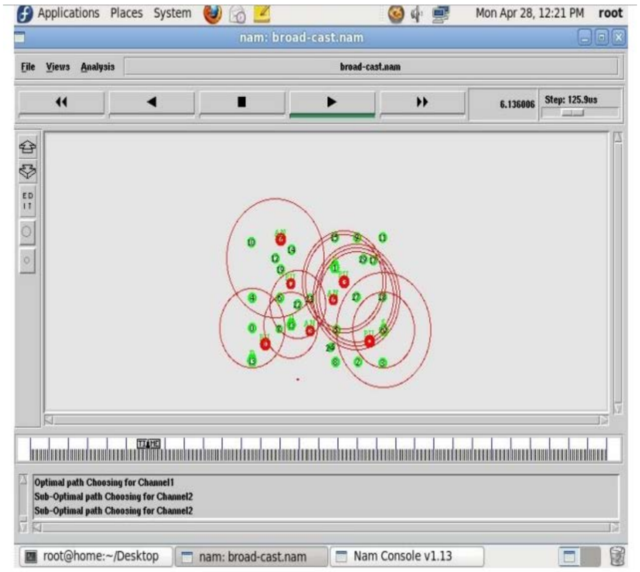

Fig 5: Priorotized Epidemic Routing in VANET

5. CONCLUSION AND FUTURE WORK

We have extended the static node theory and proposed our infrastructure robust routing protocol for VANET. We designed and formalized our SADV routing protocol to provide a reliability-based routing scheme for VANET. The performance of the proposed protocol has been compared with AODV using extensive simulations with data packets of different sizes. SADV uses Priority function which prioritizes the messages for transmission and deletion. Inter-node costs are computed with a metric called average availability. The QoS will be enhanced in our proposed routing scheme by improving data delivery Performance by mechanisms LDU & MPDD. The results showed that the SADV achieves the highest performance in

Qos among those routing protocols by dropping the packets which reach the maximum threshold.

The future work is to minimize the delay and increase the packet delivery ratio and Link-Reliability in Vehicular Ad-Hoc Network. The main aim of the future work is to improve the performance of the VANET in which a vehicle has a very short time residing in a particular node; the link between the vehicles is always making hand off from one node to another node. Hence with the help of other various routing technologies we can provide an efficient way to collect and disseminate real time information. By this we will be able to increase the overall performance when compared with the existing system and can be graphically proved.

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