

Review on Data Dissemination Techniques in VANET

Harjivan Preet Kaur

M.Tech Research Scholar

Department of Computer Science and Engineering

Amritsar College of Engineering & Technology

Amarpreet Singh

Associate Professor

Department of Computer Science and Engineering

Amritsar College of Engineering & Technology

Abstract - Data dissemination in VANET is a puzzling task. Various protocols and techniques are used for data dissemination. For this, it is essential to route information efficiently from source to destination in order to avoid accidents or collisions. This paper highlights different data dissemination techniques in a clustered and unclustered environment in VANET.

Keywords - Vehicular adhoc network, routing protocols, data dissemination techniques

I. INTRODUCTION

VANET is the Vehicular Adhoc Network which is the category of Mobile Adhoc Network (MANET). In VANET the nodes between which the communication takes place are the vehicles. VANET deliver wireless communication between road side equipment and vehicles. . This technology helps in changing all nodes into wireless node within the range of 100 to 300 meters. There are mainly three chief workings of VANETs such as:

1. On Board Units (OBU).
2. Road side Units (RSUs).
3. Authentication Server (AS).

II. CHARACTERISTICS OF VANET

VANET carry unique network distinctive that differentiate it from other ad hoc networks. Some characteristics of VANET are as follows [14]:

- Different Communication Environment
- Mobility Modeling and Prediction
- Frequent Network Disconnection
- Intersection with On-Board Sensors
- Adequate Storage and Energy
- Highly Dynamic Topology

III. APPLICATIONS OF VANET

Applications of VANET are arranged in three major classes [14]:

1. Traffic Monitoring and Management Applications:-

It is answerable for arranging update local information, maps and applicable messages bounded in space and/or time. Further classification of this application are:

- Speed Management Application
- Co-operative Navigation Application

2. Safety Applications:-

Active road safety is provided to avoid collision by providing the information which is shared between vehicles and road side units. Sub classification of this application are:

- Collision Risk Warning
- Emergency Electronic Brake Lights
- Curve Speed Warning

- Control Loss Warning

3. Infotainment Applications

Infotainment Application proposed the information to the drivers like finding the nearest coffee shop, mall, cinemas, fuel station in that area. This application gives convenience and comfort to drivers and passengers. Further classifications are as follows:

- Global Internet Application
- Co-operative Local Application

IV. VANET CHALLENGES

Data Pass through Different Structures is Difficult: The existing structures such as clustering, grid and tree in this data dissemination is extremely tough for developing in case of diversity in network.

Data Distribute Over the Mesh Nodes: In order to have more and more proper data dissemination, the multiple roadside unit can be connected with the help of wires in order to form the mesh network infrastructure and the cooperatively transmitting of data to the nodes.

High Mobility and Frequent Disconnect Topology: The main challenge which is prevalent in VANET is the high mobility and the frequent disconnection of topologies at different parts of the metropolitan area.

Unbounded Network Size: The VANET would help in involving the nodes in one city or in several cities or even in the country. So, the VANETs network is not to be dependent on the number of nodes.

Delay-sensitive Data Exchange: In case of VANETs network the message which is to be transmitted without any delay.

V. ARCHITECTURE

VANET is basically combination of an On-Board Unit (OBU) and more Application Units (AU). A device with communication capabilities placed inside the vehicle is known as OBU. An AU is a device executing applications by using OBU's communication capabilities. Both units of VANET are attached with a wired connection or wireless.

RSU can be attached to an infrastructure network, which in turn can be connected to the Internet. Road Side Stationary can also communicate to each other via multi-hop or directly.

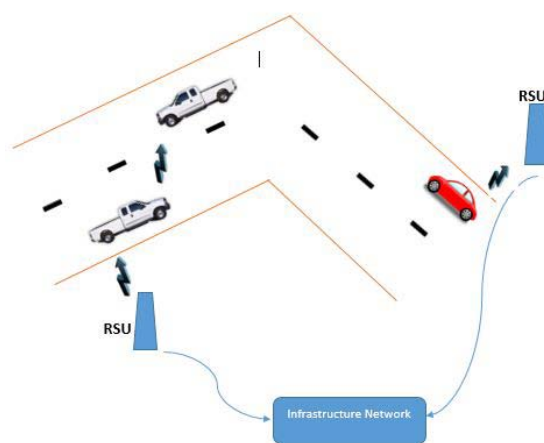


Fig 1: VANET Architecture

VI. ROUTING TECHNIQUES IN VANET

Routing is the performance of dynamic information over the network from source to destination. Main purpose of routing is to select the path over which the packets are sent. Routing have different mathematical standard measurements to calculate shortest and best path for sending and receiving the packets. In VANET, routing is done in different ways: unicast, broadcast and multicast based and for these ways different protocols are used.

VII. ROUTING PROTOCOLS

Routing protocols are classified as [17]:

Re-active Routing Protocols: It is also called demand driven routing protocol. It starts the discovery of routes only when communication is needed between two or more nodes. This helps in reducing the network traffic.

- Adhoc On Demand Distance Vector (AODV): As in VANET, nodes (vehicles) have high movement and moves with great speed. Proactive based routing is not suitable for it. AODV is a reactive routing protocol,

which operates on node-by-node pattern. AODV allows mobile nodes to achieve routes quickly for new destinations, and does not require nodes to keep routes to destinations that are not in active communication.

- Dynamic Source Routing (DSR): It is co-relate with AODV. The Dynamic Source Routing protocol has no need to used control messages and it uses route discovery and repairs process.
- Pro-active Routing Protocols:* It is also called table driven routing protocol. Information of nodes are stored in the form of tables. Neighbour's node collect the table for communication.
- Optimized Link State Routing (OLSR): It is established on the traditional link-state algorithm. Multipoint relaying technique is used by OSR. This technique optimized message and flooding process for route maintenance and setup. This algorithm reduces the number of active relays. This protocol find and maintain all routes and destination before any operation. These results give fast moving nodes.
 - Destination Sequence Distance Vector Routing (DSDV): It uses algorithm to find shortest path called distance vector shortest path algorithm. This protocol send two types of packets. 1) Full Dump: It contains routing information. It reduces the bandwidth. 2) Incremental: It contains information's updates and it raises the overhead in the network.

VIII. DATA DISSEMINATION

Data Dissemination is a technique which helps in transferring the data from sender to receiver using different types of data dissemination techniques. Data Dissemination helps in delivering the data at receiver end and helps in end to end connection of sender and receiver.

Types of Data Dissemination

There are different types of data dissemination techniques which are classified below[1].

- V2I/I2V Dissemination (vehicle to infrastructural, RSU)
- V2V Dissemination
- Opportunistic dissemination
- Geographical dissemination
- Peer-to-peer dissemination
- Cluster based dissemination

Data Dissemination Techniques:

Beam Efficient Acknowledgement based Multicasting (BEAM) technique: Aim of this protocol is to utilize bandwidth efficiently during an emergency situation by minimizing total number of in network message transactions. BEAM is created instead of existing broadcasting protocol such as Acknowledgment broadcast from static to highly mobile (ABSM) an adaptive broadcast protocol. BEAM protocol does multicasting instead of broadcasting[5].

Enhanced Beam Efficient Cluster based Multicasting (EBECM) technique: Main aim of EBECM is to overcome the trouble arises in BEAM i.e. multicar chain problem. V2V communication is provided in it and clusters are used for ordinary nodes. EBECM provide emergency situation messages for non-multicast group members which avoid the problem of multicar chain collision[2].

Urban Multihop Broadcast Protocol: This is multihop broadcasting based protocol that uses RTB/CTB handshake approach for sending packets and receiving acknowledgments. Message dissemination is very hard in urban areas. So, it becomes mandatory to have techniques or protocols for sending data packets in urban areas. And Urban Multihop broadcast (UMB) protocol is one of them that does directional broadcasting as well as broadcasting at intersections in urban areas[1].

Ad-Hoc Multihop Broadcast Protocol: In the AMB protocol, directional broadcast is same as that of UMB protocol but in case of Intersection broadcast- vehicles attempt to choose the closest vehicle to the intersection using a fully adhoc algorithm and the chosen vehicle forwards the packet to all road segments except the road segment the packet is received from[1].

Acknowledgment-Based Broadcast from Static to highly Mobile Protocol: In this protocol, a vehicle that receives a data packet will not forward that packet immediately rather vehicle will check if retransmissions from other neighbours already cover its whole neighbourhood in order to avoid redundancy. And this is done by computing Connecting Dominating Set (CDS) of each vehicle. Nodes in the CDS will select a shorter waiting time-out than regular nodes. This allows them to retransmit first if their neighbourhood has not been covered before [1].

IX. CONCLUSION

In this paper, a survey is done on various data dissemination techniques. The literature study shows that there are three types of data dissemination techniques named broadcasting based, multicasting and geocasting based. These techniques reveal that different disseminating protocols are used in different scenarios. Each protocol has

its own way to deal with these problems. The survey reveals that to disseminate maximum data over vehicular networks by using minimum bandwidth and to disseminate data in urban areas is a challenging task which needs and has the scope for further research.

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