Abstract

Vehicular ad-hoc network is a type of Mobile ad-hoc network. VANET is a temporary network which creates communication between the vehicles with the help of base station. Vehicular network is used to make the driving safer, comfort and enjoyable. While travelling, vehicle traffic congestion is expressed as delays. Traffic congestion is the major problem in today's life. Different techniques have been implemented to improve this problem. In this paper, we will create a network to provide the communication between the vehicles with the help of the various characteristics of the VANET. The performance is measured in terms of the packet delivery ratio, number of packets, number of packet drop and overhead to handle the traffic congestion problem in the network.

Keywords: VANET, NS2 Simulator, traffic congestion, traffic management, Java.

1. INTRODUCTION

The one of the most challenging problem in modern cities by the large number of vehicles travels daily on the roads. The vehicular traffic increasingly day by day and it creates the traffic jams. Traffic congestion is the major problem in modern cities. One of the limitations of the existing tools is the lack of interaction between the vehicles. The vehicular transportation network defines the Vanet (Vehicular ad-hoc network). Vanet is an ad-hoc network which is used to create the communication between the vehicles. Vehicles acting as nodes in VANET and all nodes are able to make queries and respond to queries from other nodes in the ad-hoc network. Vanet can provide the efficient way to share the information between the vehicles. VANET provides vehicle to vehicle and vehicle to roadside vehicle communication and improve the traffic congestion. The main goal of the Vanet is to provide safety and comfort for the drivers. With the help of the communication between the vehicles, the driver can know the various services like: Collision warning, Traffic congestion and weather information. In VANET, Vehicles provide timely information to drivers.

2. APPLICATIONS OF VANET

The three main classes of the VANET applications are: safety oriented convenience oriented and commercial oriented. Safety Oriented applications will check the surrounding roads, vehicles and surface of the road. Convenience oriented applications will be handle the traffic management type. Commercial Oriented applications provide the entertainment services like audio and video to the driver.

3. ROUTING PROTOCOLS IN VANET

VANET routing protocols can be classified as topology based routing protocols and Geographic based routing protocols as shown in Figure 1.

3.1 Topology Based Routing Protocols

These protocols use the links information to send the data packets from source to destination. These protocols can further be divided into proactive (table driven) and reactive protocols (on demand).

3.1.1 Proactive based protocols: It is related to the shortest path algorithm. They provide information of all connecting nodes in the form of tables because these protocols are also known as table driven protocols. If any change occurs in the network, each node updates its routing table.

- Fisheye state routing: FSR is a table driven protocol where the routing table is calculated when the information of every node collects from its neighboring nodes.
3.1.2 Reactive Protocols: Reactive protocols are known as on-demand protocols because it starts when a node needs to communicate with the other nodes to share the information and it reduces the traffic.

- **AODV**: Ad-hoc on demand distance vector protocol is known as reactive protocol which creates a route when a node requires sending the data packets. In AODV protocol, the route built when a node needs to send the data packet and does not updated until the route breaks or times out.

3.2 Geographic Based Routing Protocols
This technique is used to aware the vehicle about the position of the other vehicle by sending the messages that indicates the current position of the destination vehicle. It does not exchange any information with the neighbor vehicle.

- **DTN**: DTN stands for delay tolerant network uses carry and forward technique to overcome the data lost in the network. In this technique if node does not connect with the other node, it stores the packet and forward when node connects with the other node.
- **BEACON**: BEACON means transmit a message to the neighbor node. It tells the position and presence of the node.
- **OVERLAY**: It is a network that every node is connected by existing logical links.

![Figure 1: Routing Protocols in VANET](image)

- **VADD**: VADD stands for vehicle-Assisted Data Delivery. It is based upon the carry and forward approach.
- **GeOpps**: It stands for Geographical Opportunistic Routing. In this process, the node has minimum arrival time the packet will be sent to that node.
- **GPSR**: It stands for Greedy Perimeter Stateless Routing. It selects a node which is closer to the destination node through which the packet will travel. If it fails to select a node then it uses the perimeter forwarding to select the node.
- **GPSR+AGF**: The advanced greedy forwarding approach is proposed to select the node.
- **PBR-DV**: It consists of different approaches like greedy, position-based and a reactive, topology-based routing strategy.
- **GRANT**: It stands for Greedy Routing with Abstract Neighbor Table. It divides the space into areas and includes per area only one neighbor.
- **GPCR**: It stands Greedy Perimeter Coordinator Routing. It is a position-based routing protocol uses greedy algorithm to forward the packet based on the pre-selected path.
- **STBR**: In Street Topology Based Routing, one node is act as master and other act as slaves and the intermediate nodes between junction acts as forwarders.
- **LOUVRE**: Landmark Overlays for Urban Vehicular Routing Environments is a geo-proactive overlay routing protocol in which packet delivery ration is higher than GPCR AND GPSR.
- **CBF**: Contention based forwarding is a geographic routing protocol. If there is a packet to send, the sending node will sent the message to all direct neighbors and these neighbors will find the node that will forward the packet.
- **TO-GO**: It stands for Topology-assist Geo-Opportunistic Routing which improves the packet delivery ration.
- **Geo-DTN + Nav GpsrJ**: It is a position based routing protocol which reduces the dependency on junction node and calculates the correct routing path.
- **CAR**: It stands for Connectivity-Aware Routing which uses AODV for path discovery.
- **GyTAR**: GyTAR stands for Greedy Traffic Aware Routing Protocol. It reduces the control message and end-to-end delay.
- **GSR**: GSR stands for Geographic Source Routing. It was developed for Vehicular ad-hoc network which is combination of position based routing and topological routing. It uses the greedy forwarding technique to find the shortest path and calculated by Dijkstra algorithm.
• **A-STAR**: It stands for Anchor-Based Street and Traffic Aware Routing. It is position based routing protocol which is used to create the inter-communication between the vehicles.

• **GeoDTN+Nav**: It is a combination of DTN and Non-DTN and switch from Non-DTN to DTN mode. This approach uses VNI (virtual navigation interface) to provide the necessary information for Geo-DTN+Nav to determine its routing mode and forwarder.

### 4. PROBLEM FORMULATION

![Flowchart of System](image)

In this paper, we are representing the automatic route finding. To represent the proposed work, we consider the city area to represent the vehicles as moving nodes. The vehicle will search their path by shortest route finding. If the vehicle finds the accident or congestion on the network then a message will be generated and sent to the base station and other vehicles coming on the road in the same direction. After receiving the messages the vehicles will search their path automatically. The major problem is to find the appropriate path. In our research, we are introducing the 8 bit information of data in message header to maintain the reliability. In case of loss of data, bit information will be used to create the traces for data and the duplication of data will be completed. This research will avoid the big overhead. The flowchart of the system as shown in Figure 2.

### 5. PROPOSED WORK

We will develop an algorithm to find the shortest path from source to destination. If the path will be shortest then it will automatically reduce the congestion, travelling time by vehicles. We will also compare the proposed system to the existing system. We will also use the simulation tool to find the shortest path by the vehicle.

### 6. CONCLUSION

This system has been designed to provide the information to the drivers on time. With this system people can avoid traffic very easily and make their journey more comfort and reach their destination quickly. In our research, Vehicles can easily share their information with each other and control the traffic congestion.

### REFERENCES

[5] [Jas] JasonCarbaugh et.al.”A survey of inter vehicle communication”.