International Journal of Advanced Trends in Computer Applications
www.ijatca.com

COMPARATIVE STUDY OF VARIOUS ROUTING PROTOCOL

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Abstract: *Vehicular ad hoc network is a subtype of Mobile ad hoc network, which is design for the communication of vehicles. It is a technology in which moving vehicles create a network for the mobile communication, vehicles in network act as a node. In this network vehicles move rapidly and speed of vehicles in VANET is more than MANET. Some wireless technology support to the vehicle to vehicle (v2v) and vehicle to infrastructure communication (v2I) in VANET. Performance of communication between vehicles depends on the routing protocol. One of the main challenge in the VANET is transmit the data information and search the route. Routing protocols are used in the VANET. One of the most important routing protocols used in Vehicular ad hoc network is GPSR routing protocol is used for the congestion problem. In this paper we study all the routing protocol and comparison between three routing protocol.*

Keywords: *Finger vein; Gabor Filter; Repeated Line Tracking and K-Means.*

I. INTRODUCTION

VANET- VANET is a wireless ad-hoc network, in which vehicles can move and communicate with each other to create mobile network. Vehicles act as nodes in this network. In VANET vehicles can move with high speed, high mobility. Due to the high speed of vehicles easy to access the vehicles position and delivery of packets is efficient, position of vehicles change frequently. So network topology formed by the vehicles in VANET also changes frequently. Size of VANET is not fixed; it may be for one city, several cities and for country. VANET is a technology which supports vehicular application such as traffic control, GPS, congestion avoidance, road safety with the wireless sensor network.

For the more reliable communication in VANET vehicles use intelligent transportation system (ITS). Intelligent transportation system refers to add information and communication technology to transport infrastructure and vehicles. The main aim of ITS is improving safety, communication technology through which vehicles can communicate, reliability, efficiency. In VANET vehicle-to-vehicle (V2V), vehicle-to infrastructure (V2I) communication is used. In V2V vehicles can directly communicate with another vehicle. The goal of V2V communication is send position and speed data from V2V through ad hoc network. It is responsible to send data from 100-300m means peer to peer communication. In vehicle-to- infrastructure (V2I) information is exchange between the road side unit (RSU) with a central server. It contains three parts road side unit, vehicles on board unit, safe communication channel. Protocols are used to establish connection between V2V, V2I.

Applications- A classification of applications is done by as vehicle to vehicle Traffic applications, vehicle to Infrastructure applications.

- Road safety application- it is used to avoid the vehicle accident. A vehicle involved in an accident would broadcast warning messages about its position to trailing vehicles so that it can take decision with time in hand as well as to the highway patrol for tow away support [10].
- Traffic management and efficiency- The real time traffic data can be stored at the RSU and can be available to the vehicles whenever and wherever needed. The cameras can be installed at the RSU that can work as input and act as the latest tool in low or zero tolerance campaign against driving of-fences [10].
- Commercial application

II. LITERATURE REVIEW

SeonYeong Han, Dongman Lee (2013), coveys that in mobile ad-hoc networks, local link connectivity information is extremely important for route establishment and maintenance. Periodic Hello messaging is a widely used scheme to obtain local link connectivity information. However, unnecessary Hello messaging can drain batteries while mobile devices are not in use. This paper proposes an adaptive Hello messaging scheme to suppress unnecessary Hello messages without reduced detectability of broken links. Simulation results show that the proposed scheme reduces energy consumption and network overhead without any explicit difference in throughput.

EhsanMostajeran, RafidahMd Noor et al. (2013), conveys that Ad-hoc On-Demand Distance Vector (AODV) is one of the ad-hoc routing protocols utilized in MANET and VANET. On-Demand routing protocols find their destinations based on the process of flooding a request to neighbours searching for their destinations. Neighbours of nodes are detected based on the neighbour discovery method, which periodically broadcasts HELLO messages to detect available neighbours at time. This paper introduced an innovative, improved neighbour discovery method for Mobile Ad-hoc routing protocols, called Intelligent-AODV. It provides reasonable performance by updating the neighbour list based on routing packets such as RREQ, RREP and RERR.. [2]

Jatinder Pal Singh, Anuj Kr. Gupta (2013), conveys that Mobile Ad-hoc Network is one of the types of Wireless Ad-Hoc Networks which has distinguished characteristics like: self configuring, decentralized and infrastructure less. Mobile nodes in such a network communicate with each other through wireless links since the nodes are always on move, routing in such a set up is always a challenge. To overcome this challenge, Dynamic MANET On-demand (DYMO) routing protocol is used which is successor to the popular Ad-hoc on Demand Distance Vector Protocol(AODV), so it is also known as AODVv2. This paper presents a comprehensive study about the working of the DYMO protocol and comparison with the working of the AODV protocol. Since it is an enhanced version of AODV protocol it is also known as AODVv2, which aims at simplifying AODV by removing unnecessary features and adopting successful features from DSR like path accumulation. Their overall study shows that DYMO is a better protocol when it comes to networks with high mobility and changing topology, moreover its performance outperforms the conventional AODV protocol when it comes to large networks with large number of nodes and changing topology. [3]

Rodolfo Oliveira, Miguel Luis et al. (2010), conveys that several routing protocols for Mobile Ad-hoc Networks (MANETS), including the well known Ad-hoc On-Demand Distance Vector Routing (AODV) and Optimized Link State Routing (OLSR), propose the use of periodic messages (Hello messages) to detect neighbour nodes. After receiving the first Hello message from one of its neighbours, a node starts the link sensing task by setting up a sensing timer. Each time a new Hello message is received from the same neighbour, the sensing timer is restarted and the link duration is prolonged. If the sensing timer expires, it indicates a long time interval without receiving a Hello message and, consequently, the link is considered broken. In this paper, they investigates the relationship between the transmission frequency of the Hello messages and the sensing timer expiration value with the network node's mobility. They formally deduce the probability of link existence after β periods of transmission of the Hello message.[4]

III. ROUTING PROTOCOL

Routing protocol in VANET is classified into following categories:-

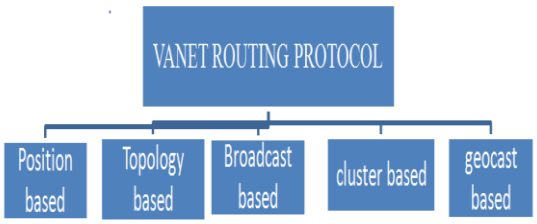


Figure 1

Position based routing protocol

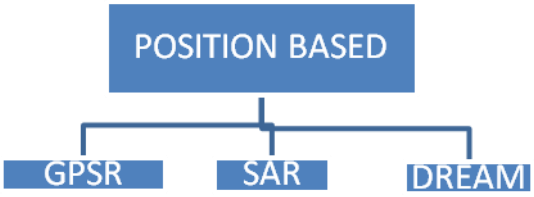


Figure 2

GPSR (Greedy Perimeter Stateless Routing):- . GPSR is a geographic position based routing protocol. In ad hoc network to find the geographic position of nodes it uses the native system like GPS, sender nodes

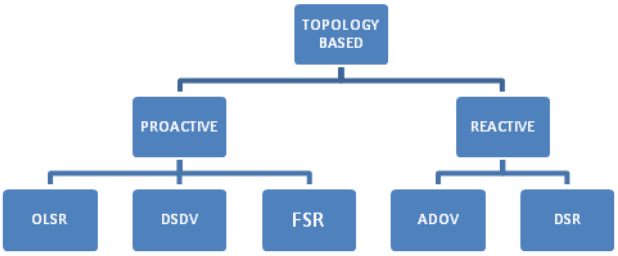
which having the destination address. GPSR is used for dynamic network. It only obtains the information about neighbour node in network topology. It keeps the information about next hop neighbours position and nodes which is immediately added in network. If sender forward some data packet, but these packets directly not send to the destination so it use the GPSR protocol. GPSR forward these data packet to nearest node to the destination. All these data packets works on FIFO (first in first out), stored in FIFO queue after that data packets are forward to destination. Sometimes network congestion will occur when multiple data packets are forward over same forwarding node.

SAR (Security Aware Routing):-For the safe transmission of data packets SAR always find a secure path. When some data packets are forward, SAR find the location of its neighbours node and choose the shortest path to forward the data to its destination with next hop.

DREAM (Distance Effect Algorithm for Mobility):- firstly we determine the direction in which the packet has to be routed. Then data packet is flooded in a restricted directional range without sending a routing packet. [11]

Topology based routing protocol:-

To send the data packet from source to destination a link is used in this network. Topology based routing protocol are further divide into two categories:-



Proactive Routing Protocol:- Each node in the network has table to maintain the topology information. These protocols also called table driven routing protocol. These routing tables are used to create connection between nodes and send the data packets from source to destination. Interchanging the routing information when a new node is entered into network, information in all the routing tables is immediately updated.

OLSR:- Optimized Link State Routing Protocol is a link state protocol, which optimizes the way of broadcast of control messages to save bandwidth consumption through the use of the concept of "multipoint relays".[9]

DSDV (Destination Sequence Distance Vector):- DSDV routing protocol is used to solve the problem of routing loop. In DSDV it use sequence number instead of loop, and shortest path algorithm. It uses multiple-hop strategy for forwarding the data packets. Packet size in DSDV is uniform, having high control on packet overhead. Routing table is updated with the sequence number of node which is entered into the network.
FSR (Fisheye state routing):- FSR frequently update the routing table with the updated information from its neighbour nodes. FSR helps every node in network to exchange the updated routing information with its immediate neighbouring nodes partially, it reduces the consumed bandwidth and provides reduction of routing overhead.[12]

Reactive Routing Protocol: - These protocols are called on-demand protocol. Route is determined only when it is required; nodes communicate with another routing protocol and maintain only the roué that are in current use. It is design to overcome the problem of table driven protocol. Reactive protocols are ADOV, DSR.

ADOV: - Ad Hoc on Demand Distance Vector routing protocol. ADOV is unicast and multicast routing protocol. It works on the demand basis, route request (RREQ), route reply (RREP) and route error (RRER) are the main functions in ADOV. When source wants to send some data it use RREQ, at the destination side route reply is used for acknowledgment. Route error message defines the error in network and maintenance phase for broken links.

DSR: - Dynamic source routing protocol. It is a multi-hop wireless network. Route discovery and route maintenance are used in DSR. Route discovery is used to send packet from source to destination, first it find the route. It is initializing by route request and route reply. Route error is used in route maintenance when a link is broken and sender gets information about the error and find an alternative path.

IV. COMPARISON

SR .NO	Protocol Property	DSR	DSDV	ADOV
1	Route discovery	On demand	Periodic	On demand
2	Protocol type	Reactive	Proactive	Reactive
3	Table driven/source routing	Source routing	Table driven	Both
4	Unidirectional Link support	Yes	No	No
5	Packet length	Non uniform	Uniform	Uniform
6	Network overhead	Low	High	Medium
7	Node overhead	High	Medium	Medium
8	Route overhead	Low	Medium	High
9	Loop status	Loop free	Loop free	Loop free
10	Network status for nodes	Up to 200 nodes	Less nodes	High dynamic
11	Route discovery	Yes	No	Yes
12	Route maintenance	Yes	No	Yes

V. CONCLUSION

In this paper we study an overview of VANET and its application. We review all the routing protocol, position based and topology based routing protocol are described in brief. A different routing protocol provides efficient and reliable way for communication in VANET. Performance of the routing protocol depends on the mobility, packet delivery ratio, collision, latency etc. A comparison table illustrate the three routing protocol ADOV, DSR, DSDV.

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