Continuous Connectivity Aware Routing In VANET Using Hybrid Protocol

Ms. Bhagyashri Pete
Department of CSE
G.H.R.C.E. Nagpur, India
bhagyashri.pete@gmail.com

Ms. Prachi Jaini
Department of CSE
G.H.R.C.E. Nagpur, India
jaini14prachi@gmail.com

Abstract- **A position base routing protocol for vehicular ad-hoc network (VANET) is challenging task due to rapidly changing topology and frequent path disconnection problem in network and safety application. Also a position base routing protocol for vehicular ad-hoc network is propose to ensure connectivity of route with more successfully delivered packet. Consider both cars and buses as vehicular nodes running in both clockwise and anticlockwise direction in city scenario and highways. A hybrid protocol, using both greedy forwarding approach and store-carry-and forward approach reduce the packet drop rate. Now, solution to situation, when the network is sparse and when any (source or destination) node left its initial position, make the protocol better in city scenario and highway. Consider Vehicle to vehicle (V2V) communication or Vehicle to infrastructure (V2I) communication for moving or stationary vehicles. Also the paradigm of cross layer design allows information to be exchange and shared across layer boundaries in order to enable efficient and robust protocol.**

Key Words: **Vehicular ad hoc network (VANET), Road side unit (RSU), Store carry forward (SCF), Greedy forwarding,**

I. INTRODUCTION

Vehicular ad hoc network (VANET) up-coming technology it is a combination of ad-hoc wireless network, cellular technology & wireless LAN. Vehicles connected to each other through an ad hoc formation form a wireless network called "Vehicular Ad Hoc Network". In which the wireless technology is implemented in vehicles & each vehicle acts as a mobile node that can forward data packets towards the destination, thereby, forming an ad-hoc network [1]. It includes V2V communications and V2R communications [2]. It is estimated that the first system will integrate this technology are police and fire vehicles to communicate with each other for safety purposes [3]. VANETs have become popular due to their more range of applications. Routing in VANET is a current area of research, both in academia and industry. Efficient routing is a key challenge for highly dynamic nature of the nodes. So, there is need for a routing protocol which provides better information delivery without path disconnection during communication. Routing protocols for VANETs are classified into five main categories [3]. 1) Ad hoc/topology-based 2) Position-based/geographic 3) Cluster-based 4) Broadcast 5) Geocast routing. Among all these, position-based and geocast routing protocols are best [4] for VANETs, Also the other protocols have delay and overhead problems in packet transmission. Geocast routing is used for the delivery of packets from source to an exact geographic region. Consider an unicast routing i.e. from a single source to a single destination. Therefore, consider only position-based routing.

Position-based routing depends on the position of the destination. It is proposed for ad hoc networks and does not use network addresses to send a message from source to destination [4]. A novel position-based routing protocol is proposed for use in the city and highways. It considers both buses and cars as vehicular nodes moving in both clockwise and anticlockwise directions. Buses are defined as city buses and cars running on to predefined routes. As in previous work junctions are consider as "anchors," where the decision is taken. The decision means the selection of neighboring node to trace the source or destination node. This is a hybrid protocol in which both the greedy forwarding approach and the store-carry-and-forward approach are used. Consider two scenarios: when the network is fully connected though wireless technologies and when the network is sparse.

The rest of the paper is organized as follows: Section 2 presents literature survey also protocol is introduced. In Section 3 provides our concluding remarks.

II. LITERATURE SURVEY

Position-based routing depends on the geographic position of the destination. It is mainly proposed for ad hoc networks and does not use network addresses to send a message from source to destination. In VANET there is a frequent failure in the routing paths due to lower transmission range. Also, disconnections due to gaps and failure in the network. Fading effect in highway and urban environments such as tall buildings, tunnels, severe signal degradation/loss. End to end delivery delay problem during transmission. Problems in secure data transmission during V2V communication also V2R communication Less energy efficiency large packet loss problem. Position-based routing is divided into three main categories [5].

    A. Non delay tolerant
    B. Delay tolerant
    C. Hybrid

A. Non delay tolerant network

Non-delay tolerant network mainly based on greedy forwarding. In non-delay tolerant network Greedy perimeter stateless routing (GPSR) [6] is a routing protocol that uses greedy forwarding. The Problems like routing loops, the formation of longer paths, wrong packet directions are perform better when using GPSR in city scenarios only. GPSR has a low packet delivery ratio and basically was proposed for MANETs. Anchor-based street and traffic aware routing (A-STAR) for connectivity-aware routing protocol which uses the city buses for route information [7]. The algorithm finds the shortest path by considering connectivity between the vehicular nodes. Landmark overlays for urban vehicular routing environments (LOUVR) [8], road-based using vehicular traffic-reactive routing (RBVT-R), road-based using vehicular traffic-proactive routing (RBVT-P) [9], edge node based greedy routing (EBGR) [10], and border-node based most forward within radius routing (B-MFR) [10] are other existing protocols for VANETs in this category. EBGR and BMFR have very low delivery ratios.

B. Delay Tolerant Network

Delay Tolerant Network also called as disruption tolerant network [11], it is mainly based on the store-carry-and-forward mechanism. In this category Most of the existing protocols for VANETs were proposed for static destinations. Vehicle-assisted data delivery (VADD) [11] is based on a carry-and-forward mechanism. This protocol considers sparse network conditions but was proposed for static destination of nodes [11]. A protocol connectivity-aware minimum delay geographic routing (CMGR) using the same as VADD for carry-and-forward scheme to deliver packets from a moving vehicle to a fixed destination. Compared CMGR with VADD and shown that CMGR performs better. Similarly, other routing protocols in this category are static-node assisted adaptive routing protocol in vehicular networks (SADV) [12]. Also propose for static node and carry and forward mechanism.

C. Hybrid protocol

Hybrid protocol is a combination of a non-delay tolerant network and a delay tolerant network. GeoDTN+Nav [13] for geographic transmission is an example of a hybrid protocol. Assume that the destination is static. Switching from one mode to another can cause delay. In GeoDTN+Nav, packet first switches to perimeter mode before moving to the delay tolerant network for better transmission of data packet.

Table 1:- Comparative analysis

SR.	Algorithm	Description
1.	VADD: Vehicle-assisted data delivery	Forward the data packet to the best road which has lowest data delivery Delay. The VADD protocols have better outperform as compare to existing solutions in terms of packet delivery ratio, data packet delay and traffic Overhead
2.	Greedy perimeter stateless routing	GPSR gives improved strategy aiming to provide a effective and reliable Routing. Also avoid any critical situation during vehicle to vehicle information exchanges e.g., road accidents, traffic jams, speed violation, and unseen obstacles etc.
3.	Distance Based Routing (DBR) protocol	DBR provide Communication facilitates in reducing number of accidents, avoiding traffic congestion, enhancing the transport facility.