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A Review : Collision Avoidance and Congestion Control in VANETs

Patel Parita D.*[1], Virendra Barot[2], Amit Chaudhari[3]
*[1]Research Scolar,S.V.I.T, Vasad, Gujarat, India
[2]Professor, S.V.I.T, Vasad, Gujarat, India
[3]Professor, S.V.I.T, Vasad, Gujarat, India

ABSTRACT

Vehicular Ad hoc Network (VANET) is employed by Intelligent Transport System (ITS) and nowadays, increasing a vehicles on road immeasurably. As a result accident and traffic jam is a big problem, so that improving road safety is necessary. This paper provide a some study of challenges in these network, which we concentrate on some proposed techniques and solutions for accident avoidance and congestion control in vehicular ad hoc network.

Keywords : VANETs, Congestion Control, Accident Avoidance, Routing Protocol

I. INTRODUCTION

Vehicular Ad hoc Networks (VANets) are utilized by Intelligent Transport Systems (ITSs) to operate wireless communication in the vehicular Network. VANets are intended to give a dependable and safe condition for drivers by lessening the street accidents, traffic congestion, and fuel utilizations, et cetera. The VANets' drivers can be warned of perilous circumstances by vehicular environments and transfer the information about encompassing situations in nearest environments. VANets are a sort of Mobile Ad hoc Networks (MANets), and the vehicles in VANets are like the mobile nodes in the MANets - Mobile Ad hoc Networks. In spite of the fact that VANets acquire the greater part of the qualities of MANets, VANets have some exceptional attributes, for example, high portability, high rate of topology changes, and high frequency of the network, et cetera. Hence, VANets have different aspects in similarity with MANets.[1]

The device necessities that the VANets should to be equipped for transferring information between the vehicles and between the vehicles and infrastructure. In VANets, the vehicles are set up with On-Board Units (OBUs), And More, Road-Side Units (RSUs) are introduced on the roadsides in interstate and urban areas. The vital necessities are identified with the procedures
the level of organization of VANets (e.g. least limit of penetration).[2]

The advances in mobile communication and the present patterns in vehicle environments permit different arrangement designs for vehicular systems in interstates, urban and rustic areas to help numerous applications with various QoS requirements. The objective of a VANET architecture is to permit the correspondence among adjacent vehicles and amongst vehicles and settled roadside equipments three potential outcomes (as appeared in Figure 1):

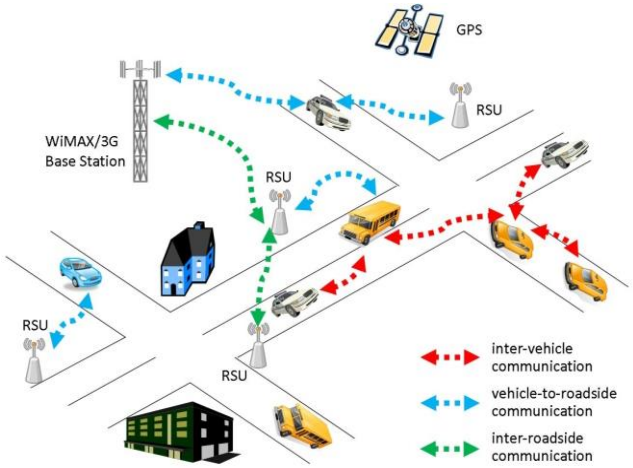

Figure 1. Communication in VANET

Vehicle-to-Vehicle (V2V) ad hoc network : allows the direct vehicular correspondence without depending on a fixed infrastructure support and can be basically utilized for safety, security, and scattering applications;

Vehicle-to-Infrastructure (V2I) network : enables a vehicle to communicate with the roadside infrastructure for the most part for information gathering applications;

Hybrid architecture: consolidates both Vehicle-to-Vehicle (V2V) and Vehicle-to-Infrastructure (V2I) .In this situation, a vehicle can communicate with the roadside infrastructure either in a single-hop or multi-hop form, depending upon the distance, i.e., in the event that it can or not get to specifically the roadside unit. It empowers long distance connection with the Internet or to vehicles that are far away.[3]

Major standardization groups (e.g. IEEE, IETF, and ISO) and consortia (e.g. car-to-car communication consortium (C2C-CC)) define standards for vehicular communications. In North America, the Federal Communication Commission (FCC) defined a new standard for VANets that called Dedicated Short Range Communication (DSRC) [5], [6]. This standard allocates a 75 MHz of spectrum in 5.9GHz bandwidth for carrying out the vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communications. In DSRC, the defined transmission range and rate are 10-1000 m and 3-27 Mbps, respectively. Wireless Access in a Vehicular Environment (WAVE) is employed in DSRC standard to generate a norm for the performance of communications of VANets in PHY and MAC layers. WAVE is composed by two protocols of IEEE standard including IEEE 802.11p and IEEE 1609 protocols that are defined to manage the network services, resources, security services, and multi-channel operations, and so on [8], [7].

In this paper, some important information and methods to avoid accident and congestion control. The paper is structured as follows: Section II provides a brief review of literature; Section III gives a conclusion of this paper.

II. LITERATURE REVIEW

In this method [9], absolutely depends on GPS receiver equipped OBU installed the vehicle inside VANETs so as to give the utility data required. Since GPS isn't continuously accessible i.e. Because of High buildings in the area, even the grounds, trees and etc, GPS signals can't be received. So exact information of vehicles at their present location can't be given. In addition this method, the vehicle did not take into account the conduct of neighbourhood to pick the following packet to be transmitted.

In [10] this paper, where thickness of vehicle is high to provide a efficient method in this type of high dense areas a congestion control method was proposed. Using this Method, improvement in packet loss and also enhanced packet delay but there are disadvantage that scheme needs to enhance thinking about dynamic nature of nodes in the VANET.

A procedure to reduce traffic congestion with the assistance of periodically emitted beacons to analyze traffic flow and so that to warn other vehicle's driver of a possible traffic breakdown is delineated by Florian Knorr et al. [11]. In this paper, drivers who

get such a warning message are informed to keep a larger gap to their antecedent with the destination that they are more averse to be the wellspring of annoyances, which can cause a traffic breakdown. The limitation is that this method not pays focus on prioritizing event-driven message over beacon message.

In VANET, a novel proactive congestion control was proposed by Miguel Sepulcre et al. [12] for every vehicle's communication each vehicle's correspondence parameters are adjusted in light of their individual application prerequisites. Regardless of different methodologies, where transmission assets are probably going to be assigned based on system level execution measurements, the strategy proposed in this research aims to exclusively fulfill the objective application execution of every vehicle, while all-inclusive limiting the channel load to forestall channel congestion.

To assess the part of a neighborhood in VANETS, Stibor et al. [13] approximate the area idea of VANETs inside a four roadway paths setting (two paths for each bearing). Their simulations and investigation demonstrates that the average number of potential correspondence neighbors is roughly four. What's more, in half of all events, the most extreme potential communication span is 1 sec; in 90% of the events, the upper limit for the communication time is 5 sec.

Zeadally S. et al [14], clarified VANET, its working procedure and different fields where VANET is connected. Paper depicts about the specialized strategies in VANET. By and large there is three kinds of communication is available those are between vehicle communication (it utilizes multihop to transmit the data to the next destination part), Vehicle to roadside communication ((in this it utilize single jump communicate to the all possible vehicle. In this message send in a multi-jump from till the message not came to the exact destination). Routing protocols are clarified in paper is Proactive routing protocols (it utilize the connection state routing and remove vector routing methodologies ,these are utilized to influence system to refresh on routing among all nodes of a system regardless of whether organize isn't in as of now use),Reactive routing protocols(dynamic source routing and AODV(ad hoc on request separate vector)),these both are utilized to keep up the main course which is as of now in use),Position Based routing(it just used to keep up the physical area data of partaking neighbor nodes, Greedy Perimeter stateless routing and Distance Routing Effects calculation for versatility characterizes the position based routing)). For application imminent Reactive routing protocols have greater need since they just centered around request course which spare the transmission capacity of the system, for demand route and looking bases the position based routing have a noteworthy part. Conclusion of this paper is that it gave a presentation of VANET and appearing in which the VANET is missing and the different arrangements that can be conceivable to take care of the issues of VANET.

The procedure proposed in [15] to utilize traffic information sharing and route determination systems to address the issue of vehicle traffic jam. In light of the activity data shared, the traffic congestion is chosen utilizing the route selection methodology. A critical parameter to capture congestion is the vehicle speed. In [16], a blockage is ordered into three diverse threshold values in view of vehicle speed. These are free flow, moderate moving and heavily congested. In light of the received data from camcorders and GPS gadgets, the threshold value is chosen and answered to the public.

This paper [17], has displayed an efficient solution for accident avoidance and congestion control on street in city condition. In this proposed approach, before getting any message each vehicle checks whether the message as of now has been gotten, so the procedure is equipped for keeping away from message

duplication that decreases network overhead. So one might say that this paper gives a speedier and productive procedure to accident avoidance and congestion control.

In [18], this paper the proposed calculation considers congestion control in VANET by disposing of similar type of messages. Here messages are separated into three sorts. The formats of the proposed messages have been appeared in the paper. In genuine circumstance, different responses from drivers will create numerous messages. Every node (vehicles) has a neighbor table which is used to check comparable kind of messages. On the off chance that the messages are as of now in the table then they are disposed of else they are included in the table. Additionally we have utilized hop count and On the off chance that hop count is zero messages are disposed of. In our proposed framework, the deferral of messages is limited when contrasted with the delay in [18].

III. CONCLUSION

We conclude that every solution and method for accident avoidance and congestion control in VANETs has its own advantages or limitation.

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