A review on cluster based VANET with Integrated design

Ms. RANJINI.B, Mrs. NASLIN SITHARA.N

M.tech Student, Dept.of Electronics and Communication Engineering, ranjinioffi@gmail.com

Asst.Professor, Dept.of Electronics and Communication Engineering, nazlin.sithara@yahoo.com

Abstract **- Vehicular Ad Hoc Networks (VANETs) is intelligent vehicular communication systems consist of a Road Side Unit (RSU) as main propagation module. Modeling based clustered VANET processed under three factors such as Media Access Control (MAC), channel status and traffic separately. The proposed model of VANET comprises the three factors. The comprehensive model dispenses an efficient wireless network for data exchange in the domain of vehicles. In this paper we are pointing the Cluster based communication and overall performance is efficient in proposed system under the reference of packet loss probability and MAC operations. Adding privacy and security using a special verification scheme is our future research.**

Keywords: channel status; media access control; traffic; VANET

1. INTRODUCTION

Vehicular Ad Hoc Networks (VANETs) is a intelligent communication system which is completely dedicated for vehicles and road topology. It offers efficient and validated models for Real Time Transportation System (RTTS) and provides smart and secure traffic experience. The main aim of VANET is to enable communication between the nearby nodes or vehicles to limit road accidents. Differ from other networks the nodes in the architecture are limited to road topology. Briefly, if the road information is available we can predict the future position of the vehicle with the help of GPS.

Sustained mobility is a virtue of VANET; the communication is facilitated by clusters and Road Side Unit (RSU). By considering the clusters, it is a group of vehicles driving in the same direction. Grouping the vehicles under a network called clustering. In cluster based VANET the active member is a cluster head (CH). Energy efficient and highly active node is selected as CH. The messages or information is validated by cluster head. Road Side Unit is considered as a base station which is connected to internet via gateway. Messages send through clusters are controlled by the base station.

Four verities of communication modes are available in VANETs. 1) In vehicle communication (IVC), 2) Vehicle to Vehicle communication (V2V), 3) Vehicle to Road infrastructure; 4) vehicle to broad band cloud. All the above categories can derive the vehicle performance and all communication modes are designed well for public safety. The design of cluster is fully depending upon the size and communication quality. During the cluster design, the size of cluster and geographical span has to be considered. If it is not designed properly there should have some serious network issues.

Protocol operations, wireless channel status and traffic conditions are decided the cluster performance. The design of the intelligent transportation system affected by the above factors. Predominantly the analytical models of

VANET were focused on the wireless channel fading effects between moving vehicles or the traffic conditions or MAC protocol operations. The separate analysis or modeling has many drawbacks because it is vigorous only on the single factor the remaining factors are not in the consideration. So it is more challenging to procure a comprehensive design. The cohesive model integrated the three factors in to one model and increases the communication quality and packet loss proportionality will be very low it will raise the overall performance physically and mathematically. In this paper we are comparing the benefits of integrated model with the existing model and pointing the propound system.

2. RELATED WORKS

The IEEE has stated 802.11p [2] as the MAC and PHY standard for communication between high speed nodes. At MAC, data are transmitted by broadcasting which is the subsection of IEEE 802.11 distributed coordination function (DCF). That is most existing VANETs are the extensions of DCF models. In the early states derived a markov model for enhanced distribution channel access (EDCA) mechanism. This chained modeling is only considered MAC operations in the data link layer under saturated mobility conditions. The next researches were pointed on the one dimensional markov model for analyzing the VANET performance mathematically where the mobility conditions are unsaturated. Researches extended and derived a two dimensional markov queueing model with finite buffer to characteristic the broadcast execution. This model designed under ideal channel conditions. But in the real world applications it is not always true.

Other works modeled and analyze channel fading between moving nodes. Actual path loss models were developed in four disparate vehicle to vehicle territories (Highways, rural urban and suburban).

An analytical model was prepared to explore the connectivity of VANET in the presence of Rayleigh, Ricien and Weibull channels. The output was fine but this model concentrated only on packet loss rate. Studies have also been carried out on the basis of the traffic. Studied geometric connectivity of VANET under heavy traffic condition. The above models individually characterized the MAC protocol operations, wireless channel conditions and mobility patterns.

The proposed system integrated the three factors in to one to increase the efficiency of the system and to reduce packet loss and security issues. Continuous networking and consideration of all parameters will helps to overcome the drawbacks of the existing model.

3. MODEL VALIDATION AND COMPARISON

Figure.1 plotes the packet loss probability in VANET of n nodes and the distance between vehicles is β meters. In the figure the result of integrated model marked using solid lines and circles are described the simulation outputs. Dashed lines are traditional MAC model results for comparison. From the plotes the packet loss probability increased due to heavy traffic. The inter-vehicular distance β and the packet loss probability are proportional because of the poor signal strength. We can see in the proposed model the simulation results are accurate.

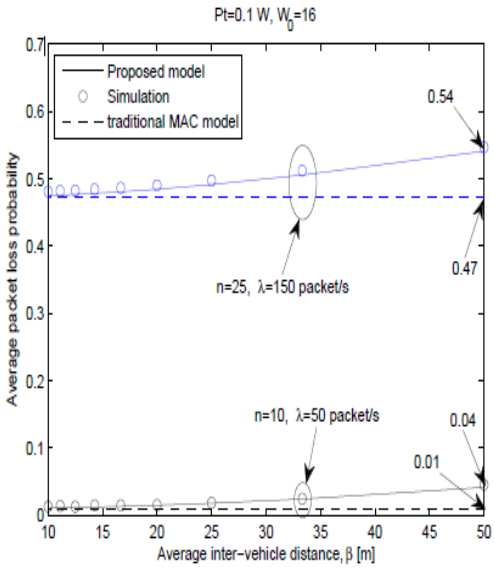

Figure 1 model validation and comparison

Channel fading effects are comparatively very low because the inter-vehicular distances are deduced and the PHY coding failure made independent in the new model.
Another finding from the figure 1 is that the cluster size and path loss are inverse with each other. When cluster size n is small the packet loss is dominant. In other words, if β and n are large then the packet collision will be up to 80% due to the poor signal strength.
The above results and analysis show the cluster size is important factor in VANET. In the integrated model the cluster size is well derived and that maximizes the throughput under practical conditions.

4. CONCLUSION

In this paper, we found the integrated model of VANET that combines MAC operations, wireless channel conditions and mobility patterns in to one model. The proposed technology gives raise in system throughput, typical network span and adequate data traffic control. Because of the benefits in integrated model, VANETs maintain acceptable communication performance and also the proposed system shows accurate simulation results than the existing.
In our future work, we are planning to apply some cryptographic schemes to the integrated model of VANET to avoid security and privacy issues. Researches and studies are going on to add a standard validation schemes to overcome attacks and fault messages from unauthorized networks.

REFERENCE

[1] "Secuirity challenges, issues and their solutions for VANET", Ram shingar rao, Manish kumar and nanhay singh, International Journal Of Network And Secuirity And Its applications (IJNSA), Vol 5,No.5, September 2013

[2] "Mobility – Based clustering in VANET Uusing affinity propagation", C.Shea, B.Hassanabadi and S.Valaee, in proc IEEE GLOBECOM,pp.1-6,2009

[3] "Analytical study of the 802.11p MAC sub layer in vehicular networks", IEEE transactions on intelligent transportation system, Vol 13, No.2,pp, 873-886, june 2013.

[4] http://www.sciencedirect.com/science/article/pii/S2214209614000187