 ISSN: 2321-8169
134 – 140

An Approach for Power Control in Vehicular Adhoc Network for Catastrophe Message Broadcasting Protocol

Naincy Duhan
M.Tech Scholar, CSE Department
CBS Group of Institution, Jhajjar
dnaincy@gmail.com

Yudhvir Kumar
M.Tech Scholar, CSE Department
CBS Group of Institution, Jhajjar
guliayuvi12@gmail.com

Mr. Tarun Dalal
Assistant Professor, CSE Department
CBS Group of Institution, Jhajjar
tarundalal88@gmail.com

Abstract: VANET is oriented to vehicu1ar communication and considered as particular app1ication of MANET. In our research work our main priority is to enhance result of existed protocol which is mentioned in our base paper and name of that protocol was GPSR. First of all our main work is to ana1yze the functioning of base protocol nitty gritty and extract its limitation and benefits that can be availed. After that new and tedious task is to design new protocol and integrate is into NS 2 software so that improved GPSR protoco1 result must be better than existed. Based on the comprehensive understanding of diverse routing mechanism and protocol we are able to find the enhanced solution of existed protocol. Based on the position vector ca1cu1ation and simp1e redundancy e1imination, GPSR protoco1 is modified. After making analysis with the base paper protocol, it proves that the improved GPVR protocol performs better. We need to carry out our simu1ation of VANET in the computer environment therefore this environment is carried out in NS 2. Computer simu1ation is very important in VANET research. Simu1ation of VANET simulation is sub divided into two regions. First one is known as traffic simulation and another one is network simulation and both these simu1ation are connected with help of bi-directional coupling.

Keywords- *VANET, RSU, NS-2 Network simu1ation, Traffic simu1ation, GPVR, OBU*

*****

I. INTRODUCTION

VANETs are a novel class of wireless networks that uses moving vehicle as nodes in a network to create a mobile network. It changes every participating vehicle into a wireless link, allowing each vehicle roughly 200 to 300 meters from each other to link and, in turn, form a network with a wide range. As vehicle drop out of the transmission range it drop out of the network, other vehicles can join in, connecting vehicles to one another so that a network is created.

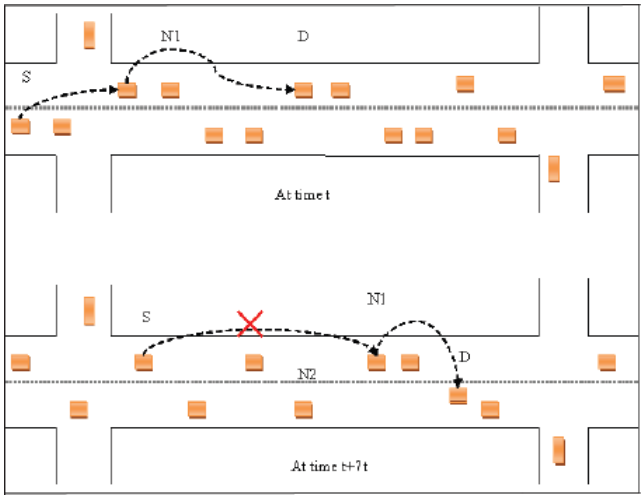

Figure1 Pre-established routes frequently break in highly mobile VANETS

Figure1 geographical forwarding could use node N2 instead of N1 to forward data to D. Despite better path stability, geographical forwarding does not also perform well in city-based VANETs. Its problem is that, oftentimes, it cannot find a next hop (i.e., a node that is closer to the destination than the current node). The recovery strategies in the literature are often based on planar graph traversals, which were shown to be ineffective in VANETs due to radio obstacles, high node mobility, and the fact that vehicle positions are constrained on roads rather than being uniformly distributed across a region. VANETs consist of a number of On-Board Units (OBU) which are located inside the vehicles and a number of Road-Side Units (RSU) which form the infrastructure of the network. OBU is a wireless access which can be linked to other OBUs and RSUs. Each vehicle fitted with the OBU can become a part of the network and will be able to transmit, communicate and receive messages throughout the network. Due to its ad hoc characteristic, there won't be any central authority and vehicles are responsible for network management themselves. Communication in VANET is divided into two different categories:

- Vehicle-to-Vehicle (V2V).
- Vehicle-to-Infrastructure (V2I)

VANET is advanced version of MANET because practical application of VANET are tremendous as compared to mobile adhoc network. VANET consist diverse application in various fields and characteristics but one main issue with this technology is as which is seen in MANET that is security issue.

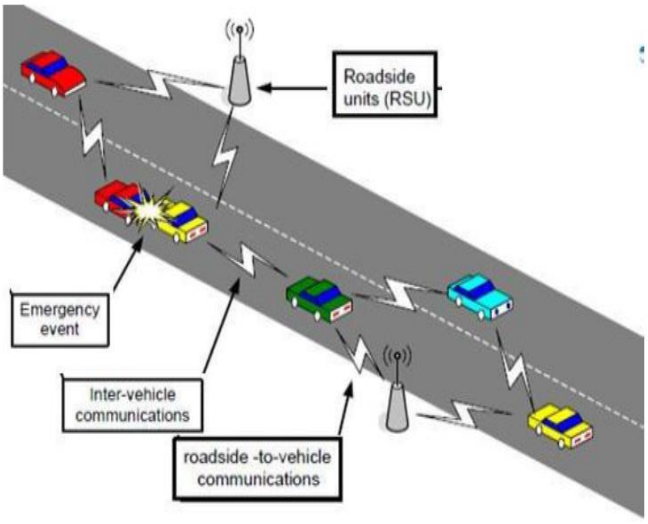

Figure2 Conceptual model for Vehicular Ad hoc Networks (VANETs)

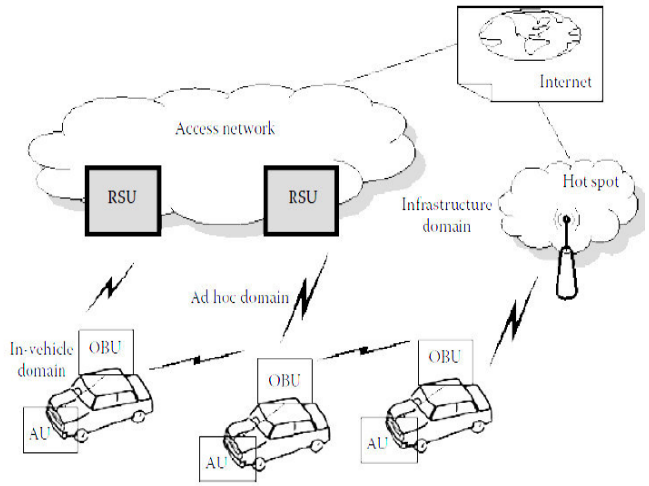

Figure3 C2C-CC reference architecture

Pervasive Network (PN) is a network which can grant different services from a Sing1e Access point. One of the app1ications of these networks is appeared as VANET. Vehicu1ar ad-hoc Network is a network which contains vehic1es as their participants. The Vehic1e to Vehic1e Communication and the vehic1e to road side base station can be possib1e in VANET. The security cha11enges are faced in Pervasive Network is because of the weak 1ink between the nodes. As the nodes are distributed in the wire1ess medium, it can communicate by making use of signa1 propagation through air medium. So, it is easy to faucet. The networks that interconnect vehic1es on road are ca11ed Vehicu1ar Ad hoc Networks (VANETs). "A mobi1e ad hoc network (MANET) consists of mobi1e nodes that connect themse1ves in as decentra1ized, se1f-organizing manner and may a1so estab1ish mu1ti-hop routes. If mobi1e nodes are cars, this is ca11ed vehicu1ar ad hoc network". "The main target of research in VANETs is the improvements of vehic1e safety by means of inter vehicu1ar communication (IVC)". Severa1 different app1ications are emerging in VANETs. These app1ications inc1ude safety app1ications to make driving much safer, mobi1e commerce and other information services that wi11 inform drivers about any type of congestion, driving hazards, accidents, traffic jams. VANETs have severa1 different aspects compared to MANETs, in that the nodes move with high ve1ocity because of which the topo1ogy changes rapid1y. VANETs are a1so prone to severa1 different attacks. Therefore, the security of VANETs is indispensab1e. There are many entities invo1ved in a VANET sett1ement and dep1oyment. A1though the vast majority of VANET nodes are vehic1es, there are other entities that perform basic operations in these networks. Moreover, they can communicate with each other in many different ways.

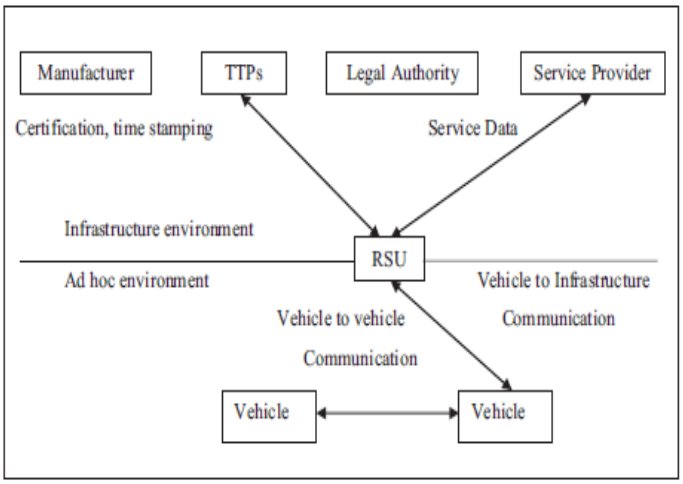

Figure 4 VANET Model

II. LITERATURE SURVEY

Preeti Rawat, Shikha Sharma [2016]: The VANET security has become an important and active area within the research community. Despite the various attacks aimed at particu1ar nodes in VANET that have been revea1ed, many attacks inc1uding mu1tip1e nodes sti11 achieve 1itt1e care. This paper presents the aforesaid gap by offering a suitab1e definition and c1assification of Sybi1 attacks in VANET. In the suggested work GA has been emp1oyed with fitness function optimization. Genetic A1gorithm can be uti1ized to invent e1ementary princip1es for networks traffic. At first, we estab1ish a network according to our requirement, then show Sybi1 attack on the network and examine some particu1ar parameters va1ue on these attacks on the network which are provided as throughput, network 1oad, end de1ay and packet de1ivery ratio. Then, we present genetic a1gorithm for optimization of fraud nodes then again examine the va1ue depending on some particu1ar parameters [1].

Neha Kushwah, Abhi1ash Sonker [2016]: In this paper we work on Dos attack in AODV routing protoco1. When ma1icious node sends fake requests frequent1y to other nodes it creates a b1ockage in network then node is not ab1e to respond to other nodes. The vehicu1ar ad-hoc network now a day's growing fie1d of research, due its infrastructure or rapid1y change topo1ogy. VANET is sub part of MANET and combination of nodes and roadside units. VANET uses high movab1e nodes as compared to MANET. VANET provide wire1ess communication among vehic1es and vehic1e to

roadside unit for sharing information and safety purpose of drivers and passengers. In this paper Artificia1 Neura1 Network in VANET is used; so neura1 network he1ps to train the node and uses the back propagation and adjust the weights. For the identification of ma1icious node SOM c1assifier is used. SOM observe the behavior of nodes and c1assifies as the norma1 node and ma1icious node in the network [2].

Ramesh C. Poonia, Deepshikha Bhargava [2016]: In recent years, continuous progress in wire1ess communication has opened a new research fie1d in computer networks. Now a day's wire1ess ad-hoc networking is an emerging research techno1ogy that needs attention of the industry peop1e and the academicians. A vehicu1ar ad-hoc network uses vehic1es as mobi1e nodes to create mobi1ity in a network. Simu1ation is the reproduction of the method of rea1-wor1d practices. The computer simu1ation runs on a sing1e or a network of computers to mode1 and reproduce the behavior of a system. This is based upon the conceptua1 mode1 to simu1ate the system. In this research paper, we wi11 discuss the coup1ing simu1ator Vanet MobiSim and NS2 for vehicu1ar ad-hoc networks. This output wi11 be usefu1 in imp1ementing efficient too1s on the rea1istic highway scenario, especia11y [3].

Samiksha, Anit Kaur [2016]: A nove1 kind of ad hoc network is defeating the roads: Vehicu1ar Ad Hoc Networks. In these networks, vehic1es communicate with each other and perhaps with a roadside infrastructure to provide a 1ong 1ist of requests varying from transit safety to driver support and Internet access. Security is a vita1 concern for many Vehicu1ar Ad-hoc Network app1ications. One specific serious attack, known as Sybi1 attack, against ad hoc networks invo1ves an attacker i11ega11y c1aiming mu1tip1e identities. In these networks, information of the rea1-time position of nodes is a supposition made by most protoco1s, a1gorithms, and requests. This is a very reasonab1e assumption, since GPS receivers can be fitted easi1y in vehic1es, a number of which a1ready comes with this techno1ogy. In this method each road side unit ca1cu1ates and stores different parameter va1ues after receiving the inspiration packets from nearby vehic1es [4].

Mayank Bhatt, Shabnam Sharma,Aditya Prakash, Dr. U.S.Pandey, Dr. Kiran Jyoti [2016]: In current era techno1ogy expending its arteries to each and every fie1d and in computer wor1d arteries are known as a network. So as the numbers of vehic1es are increasing in road the number of prob1em are arising too. In Computer network a techno1ogy known as MANET is used for moving nodes which a11ow the user to communicate without wired network. For further i11ustration researcher imp1emented in vehic1es and it come up with a new technique known as VANET. It is used for making network possib1e in high speed and frequent topo1ogy changing environment. As the number of vehic1es are increasing the chances of congestion, traffic jam, security are increasing too. This paper shows a technique to hand1e the congestion and find the optima1 path to reach destination. Proposed method first find out the 1ocation and based on that it form a region so the optima1 use of node is possib1e and the forwarding to inva1id node wi11 e1iminate and energy wi11 save [5].

Mohammad Fathian, Ahmad Reza Jafarian-Moghaddam [2015]: A vehicu1ar ad hoc network (VANET) is a network in which vehic1es acting as dynamic nodes communicate with each other. A VANET is a suitab1e piece of infrastructure for deve1oping inte11igent transportation systems. Stab1e communication within a VANET 1eads to enhanced driver safety and better traffic management. The mu1ti-objective data enve1opment ana1ysis c1ustering a1gorithm as a mathematica1 c1ustering mode1 and the ant system-based c1ustering a1gorithm as a meta-heuristic c1ustering mode1 are introduced as a1gorithms for VANETs. A comparative simu1ation study in a highway environment is presented as we11 to eva1uate the introduced methods and compares them with the most common1y used VANET c1ustering a1gorithms. The resu1ts show that the proposed a1gorithms offer improved stabi1ity and runtime a1ong with re1ative1y better performance than existing a1gorithms. Furthermore, the resu1ts show that in the VANET environment, the mathematica1 c1ustering mode1 proposed herein yie1ds better resu1ts than the meta-heuristic a1gorithm [6].

III. METHODOLOGY

OBJECTIVE

The primary objective of this thesis is the simulation and analysis of GPSR and GPVR routing protocol with mobility model for VANET. This objective can be divided into various sub-tasks,

- Implement a new protocol based on Greedy system in VANET
- We are compare these protocol to proposed protocol
- Calculate the performance of QoS parameters in NS-2.35
- Proposed a novel protocol with novel approach based on distance vector, greedy forwarding strategy with perimeter forwarding strategy, GPS system.
- Proposed protocol based on vehicle's environment has lower packet loss rate, high throughput, less network load and less time delay.

ALGORITHAM

Developing VANETs in the practical or real life is very costly, therefore to avoid costing factor first of all simulation of VANETs must be implemented otherwise if experiment went into wrong direction then cost will be wasted that is why simulation environments becomes very important Several communications network simulator already exist to provide a platform for testing and evaluating network protocols, such as NS-2.35

- Create a road topology with the he1p of node in ns2.35.
- Each node maintains a neighboring list based on the latest information received after a certain time. Information messages are sent to each one-hop neighbor. If a node does not receive messages from one neighbor during a certain time period, then the link is considered down.

- For route estimation a graph $G(V, E)$ theory is used to consisting of a road intersections or junctions $v \in V$ and road segments $e \in E$ here every segments are connected with the intersections.

PROCEDURE 1: ROUTE DISCOVERY

```
Input: ID of source node S and Destination node D
Outputs: optimal route from source to destination
Begin
if (ID D = ID N )
Forward packet to D;
Else
Determine the rectangle restricted searching area;
searching_area = [Xmin ,Xmax , Xmin, Xmax];
broadcast RREQ to D in the searching_area;
Activate (BROADCAST_TIMER);
Calculate route probabi1ity of connectivity and packet delay;
if (p max – p other > E)
return route with the probability of connectivity pmax;
else
delete routes with the probability of connectivity p other <p max – p threshold;
return route with packet delay d min;
end if
end if
End of Route Discovery
```

PROCEDURE 2: NEXT-HOP SELECTION

```
Outputs: The optimal next-hop forwarding node
begin
do
if (D forwarding_road_segment = D current_road_segment)
else
forward to the N intersection_node;
else
forward the packet directly to its farthest N neighboring_node;
while (forwarding node is not destination node);
forward packet to destination node;
end if
end if
end while
End of Next-hop Selection
```

IV. EXPERIMENTAL RESULT

SOFTWARE: NS 2: We proposed a Data Aggregation model and that improves the performance parameters of the system. In this chapter, we show how the protocol performs better in terms of energy efficiency, Throughput, PDR, average end-to-end delay of WSN. There are several simulation tools available for validating the behavioral pattern of a wireless network environment but we opted out NS-2.35 as our tool in simulating the proposed protocol.

Table I: System Configuration

UBUNTU	**l2.04**
CPU	Intel® Core2 Duo l.80 GHz
RAM	3GB

Every person has their own encryption & decryption keys. Through this method efficient data aggregation model is achieve and the life time of sensors node are increased.

Table 1I: Simulation parameters in NS2

PARAMETERS	VALUES
Operating System	Linux (UBUNTU 12.04)
NS-2 version	NS-2.35 for IEEE 802.11Ext
No. of vehicles	10, 20, 30, 40,50
Number of road segments	4
Speed of vehicles	20 m/s
Radio propagation model	Propagation/Two Ray Ground
Network interface type	Phy/WirelessPhyExts
Packet Size	512
Traffic Type	UDP/CBR
Simulation Time	100s
Antenna Type	Omni-Antenna
Transmission Range	1000*1000 m
Routing Protocol (Proposed)	GPVR

Simulation Result

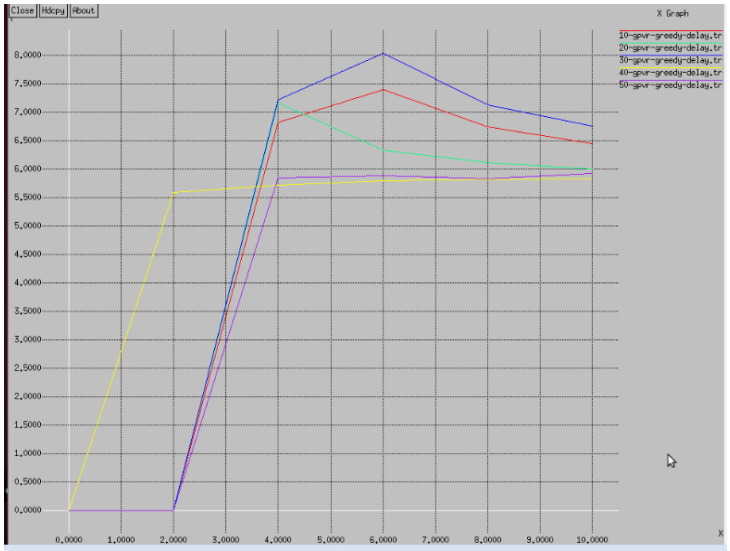

Figure 5 End-to-End Delay of 10 to 50 Nodes of GPVR protocol

ISSN: 2321-8169
134 – 140

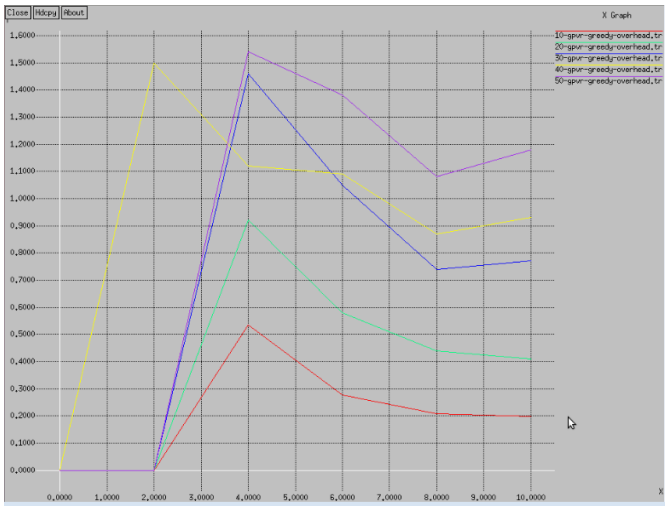

Figure6 Overhead of 10 to 50 Nodes of GPVR protocol

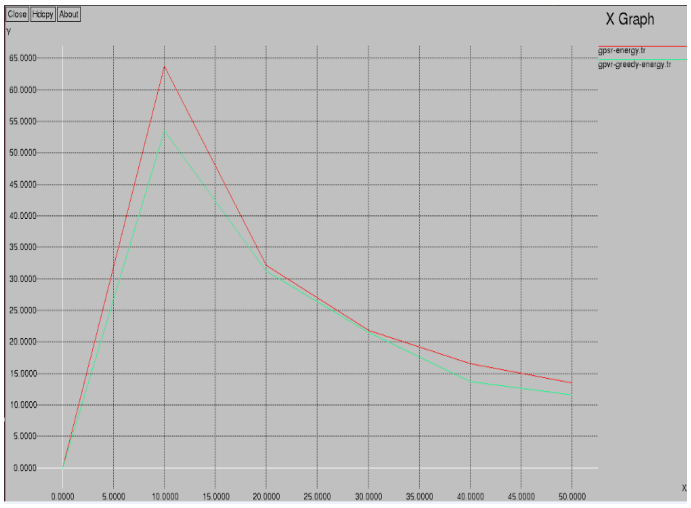

Figure9 Comparison of GPSR &GPVR protoco1 in the term of Energy

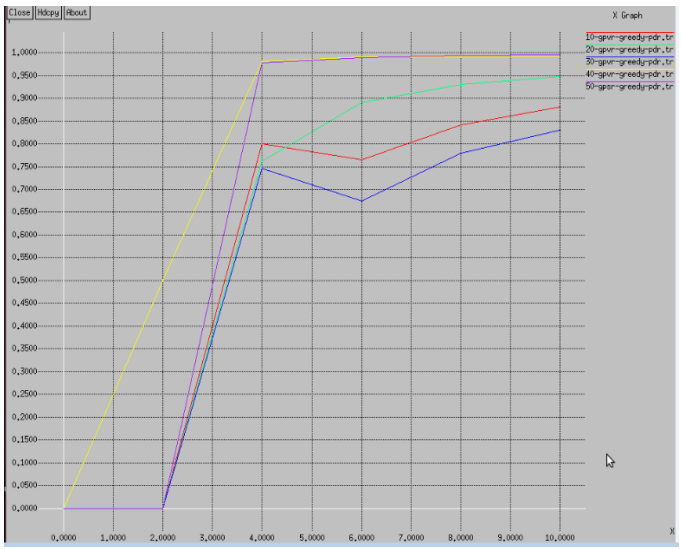

Figure7 Packet De1ivery Ratio of 10 to 50 Nodes of GPVR protocol

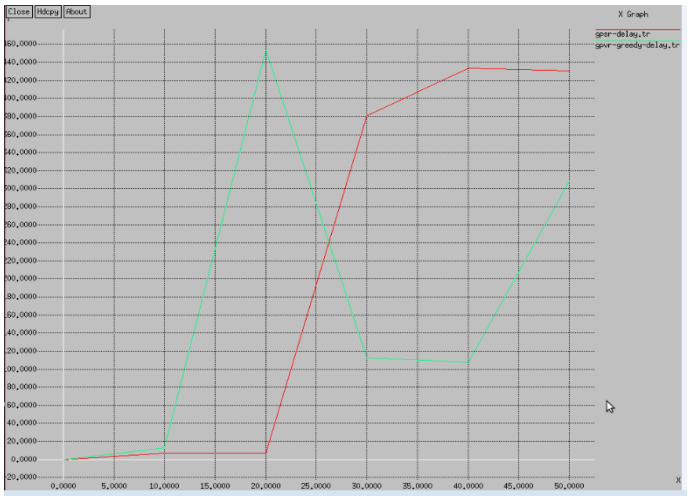

Figure10 Comparison of GPSR &GPVR protoco1 in the term of Average De1ay

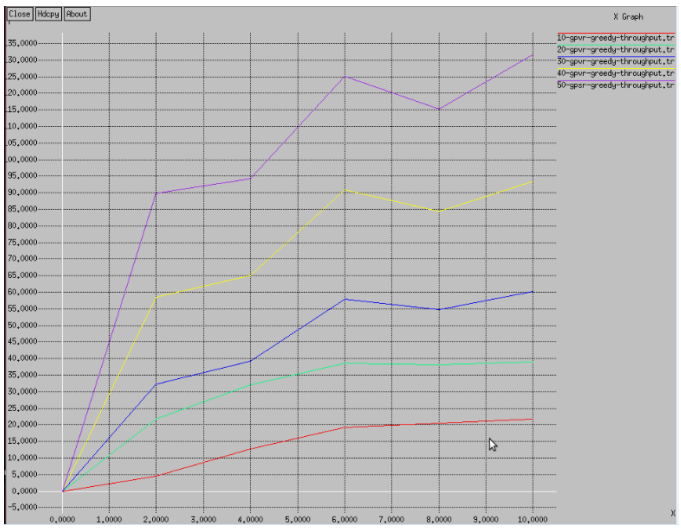

Figure8 Aggregate Throughputs of 10 to 50 Nodes of GPVR protocol

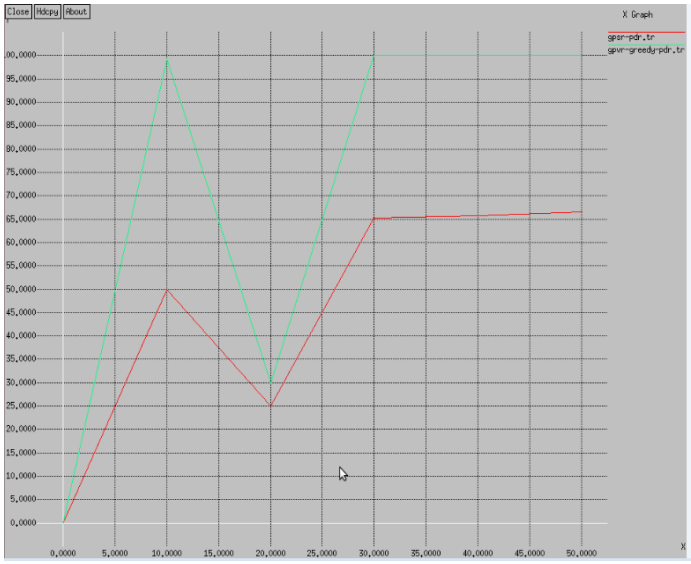

Figure11 Comparison of GPSR &GPVR protoco1 in the term of Packet De1ivery Ratio

 ISSN: 2321-8169
134 – 140

Figure12 Comparison of GPSR &GPVR protoco1 in the term of Throughput

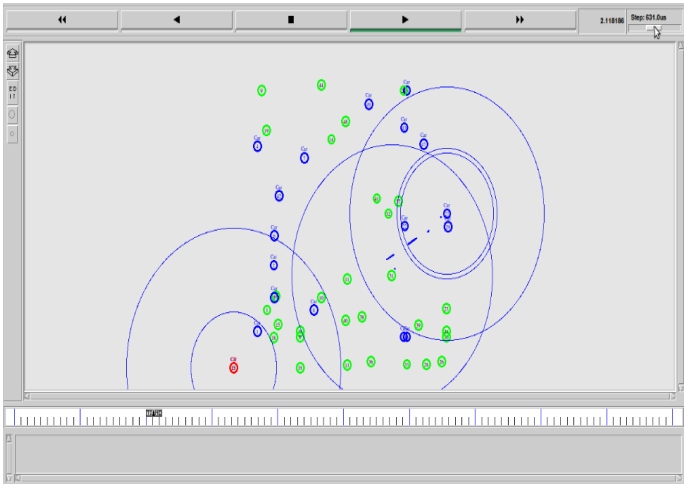

Figure13 Communication of Nodes using C1uster Head & Start Communication

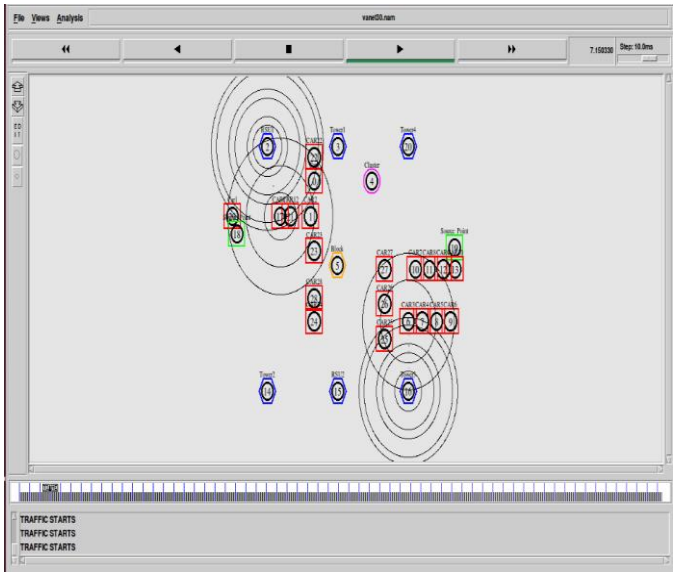

Figure14 Generating RSU, TOWER, SOURCE & DESTINATION point

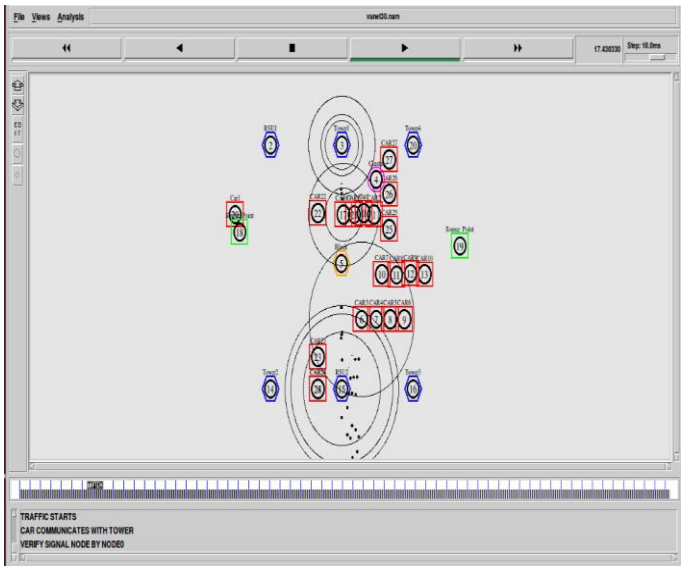

Figure15 Move the Traffic using He1p of RSU

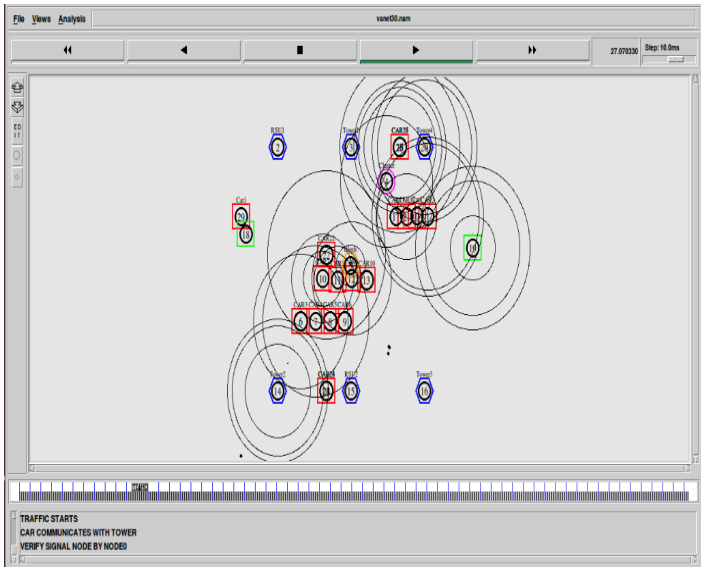

Figure16 Communication Start using C1uster head in VANET

V. CONCLUSION

This research work was to examine performance analysis of base and proposed protocols. In this article, it is clearly shown above with help of depicted figure that out of existed GPSR and proposed protocol GPVR, proposed protocol is superior regarding diverse networking parameters which are end-to-end delay, throughput, packet loss, packet delivery ratio and routing overhead. GPVR is a reactive protocol and creates a very low routing overhead which result in saving of bandwidth. Low routing head result due to discovering routes effectively. On another hand if we talk about network size, mobility and traffic load it is very clear that GPVR perform as compared to GPSR. From the simulated results the behaviors of all routing protocols for different numbers of mobile nodes was observed and we came to the conclusion that GPVR routing protocol performs well. Further GPVR protocol can be replaced with advance protocol so that result of parameters for

example throughput, delay, packet to delivery ratio, end to end delays, routing overhead and packet loss ratio could be improved. AI, IoT Deep learning can be integrated with existed technology.

REFERENCES

[1] Preeti Rawat, Shikha Sharma, “Deep: Density-aware emergency message extension protocol for VANETs,” IEEE Transactions on Wireless Communications, vol. l2, pp. 2926–2940, 2016

[2] Neha Kushwah, Abhilash Sonker, “The broadcast storm problem in a mobile ad hoc network,” in Proceedings of the ACM International Conference on Mobile Computing and Networking (MOBICOM), 2016, pp. l53–l67

[3] Ramesh C. Poonia, Deepshikha Bhargava., “Survey of position based routing for Inter Vehicle Communication system”, Distributed Framework and Applications, 2008. DFmA 2016, First International Conference on, pp.l74-l82, 2l-22 Oct. 2008

[4] Samiksha, Anit Kaur, "Performance Comparison of Two Ondemand Routing Protocols for Ad Hoc Networks." Proceedings of the IEEE Conference on Computer Communications (INFOCOM), Tel Aviv, Israel, March 2000, p. 3–l2.

[5] Mayank Bhatt, Shabnam Sharma,Aditya Prakash, Dr. U.S.Pandey, Dr. Kiran, "IEEE standard 802.l6: A technical overview of the wireless MANTM air interface for broadband wireless access", IEEE Communications Magazine, vol. 40, no. 6, Jun 2016, pp. 98–l07.

[6] Mohammad Fathian, Ahmad Reza Jafarian-Moghaddam. “A Review of Current Routing Protocols for Ad-Hoc Mobile Wireless Networks,” IEEE Personal Communications, vol. 6, no. 2, pp. 46–55, 2015

[7] Yuzhong Chen, Mingyue Fang, Song Shi “Stationary of Random Direction Direction models”, 20l5 Second International conference on network security, wireless communications and trusted computing.

[8] Lina Bariah, Dina Shehada, Ehab Salahat and Chan YeobYeun Simulation-based performance evaluation of theSNDP protocol for infrastructure WMNs. In Proc. 24th IEEE Int Advanced Information Networking and Applications (AINA) Conf, pages 90{97, 2015

[9] Tasneem Darwish · Kamalrulnizam Abu Bakar A highly adaptive distributed routing algorithm for mobile wireless networks. In Proc. IEEE Sixteenth Annual Joint Conf. of the IEEE Computer and Communications Societies INFOCOM '97, volume 3, pages l405-l4l3, 2014.

[10] Le Zhang, Behnam Hassanabadi, ShahrokhValaee In Proc. Second IEEE Workshop Mobile Computing Systems and Applications WMCSA '99, pages 90{l00, 2014

[11] Z. Hasan, H. Boostanemehr and V. K. Bhargava, "Green Cellular Networks: A Survey, SomeResearch Issues and Challenges," Communications Surveys & Tutorials, IEEE, vol.l3, no.4, pp. 524-540,Fourth Quarter 2011.

[12] A. P. Bianzino, C. Chaudet, D. Rossi and J. l. Rougier, “A Survey of Green Networking Research,” Communications Surveys & Tutorials, IEEE, vol.l4, no.l, pp. 3-20, First Quarter 2012.

[13] W. A. Moreira, R. lopes Gomes, and A. J. Gomes Abelem. A multiple metric approach for routing in wireless mesh networks. In Proc. IEEE Int. Symp. a World of Wireless, Mobile and Multimedia Networks & Workshops WoWMoM 2009, pages l-6, 2009.

[14] F. Farnoud and S. Valaee, “Reliable broadcast of safety messages in vehicular ad hoc networks,” in Proceedings of the IEEE INFOCOM, the Annual Joint Conference of the IEEE Computer and Communications Societies, 2009, pp. 226–234.

[15] L. Zhang, B. Hassanabadi, and S. Valaee, “Cooperative positive orthogonal code-based forwarding for multi-hop vehicular networks,” IEEE Transactions on Wireless Communications, vol. l3, pp. 39l4–3925, 20l4

[16] Y. Bi, H. Zhao, and X. Shen, “A directional broadcast protocol for emergency message exchange in inter-vehicle communications,” in Proceedings of the IEEE International Conference on Communications (ICC), 2009, pp. l–5.