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PERFORMANCE STUDY OF AODV ROUTING PROTOCOL USING SUMO ON NS2 SIMULATION

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Abstract— ***In Critical view of AODV, that network is not active when establishes the network. In these situations nodes need a connection to Adhoc network. So AODV have played an important role for established the strong connection between the two nodes or more. The important task is how to find busy nodes and allocate to next nodes with new routes through a protocol. A various numbers of routing protocols with different network situations are analyzed to find maximum or minimum path from a Start to End. This paper highlighted evaluation of routing protocol AODV protocol on VANET. For simulation of VANET the real time traffic scenario file has been generated using SUMO and the network simulation has been performed using NS2 Visualize software.***

Keywords—AODV, Speed, Throughput, NS 2, Jitter.

I INTRODUCTION

Vehicular ad hoc network is a promising Intelligent Transportation System, which empowers vehicles to speak with each other and roadside station [3]. Both vehicle-to-vehicle and vehicle-to-road-side-unit interchanges are upheld in VANETs to proficiently gather/report activity refreshes from/to vehicles and also road side units. It can bolster basic vehicular security applications such as crisis cautioning, impact shirking, road condition broadcast, and path changing help. The gathered continuous movement data can be used for expressway movement stream administrations, individualized vehicle way arranging, and vehicle limitation. In any case, the greater part of the related works expects that the joined VANETs have adequately little conveyance delay for real time data gathering [2, 8]. All things considered, as VANETs depend on short-run multi-jump interchanges, the end-to end transmission deferral can be non-neglect able in a few situations [4]. Consequently, assessments ought to be directed to ponder how the end-to-end transmission execution of vehicular interchanges impacts on the execution of way arranging in various situations and how to outline the transmission components to diminish the postpone when delay isn't disregard capable. Vehicular correspondence system is uniquely described by its rapid of vehicular hubs, extensive variety of relative paces among vehicles hubs and as often as possible changes in network topology and show in figure 1 [1].

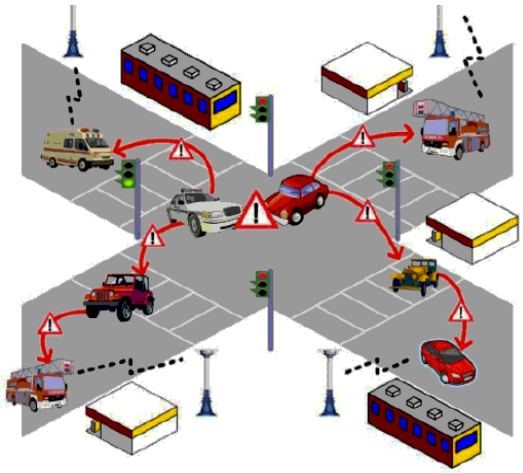

Fig 1 Adhoc Network Copied from [Yu Qiao, 2013]

II ADOV ANALYSIS

It is most important key routing protocol, which objects that whenever there is require a free route has to be recognized between start to end [5]. The AODV protocol still slow, when no need of route. It consists of a number of tables for routes and given the complete information about the source to destination [6]. But the table have not updated according to changes. The research of ADOV performance has done through these parameters.

1. Number of nodes
2. Number of servers
3. Throughput

4. Jitter
5. Simulations Time
6. Scale Parameters
7. Distance
8. Time Duration
9. Delay

The AODV (Ad-Hoc On-Demand Distance Vector) steering protocol is a responsive steering protocol that uses a few qualities of proactive steering protocols. Courses are set up on-demand, as they are required. Notwithstanding, once settled a course is kept up as long as it is required [7]. The data have taken from online traffic simulation through SUMO software and converted Aodv.tcl and Aodv.tr extension. After converting, evaluate the performance of Adhoc network and presented the evaluation in graphical view. Node No. 21 has been explained and evaluate through the NS 2 and Details are shown in figure 2 and 3. Effective parameters are shown in table 1.

Table 1 Simulation Scenario

Parameters	Values
No of Nodes	23
No of Servers	2
Distance	3303
Vision Angle	35
Width	1800
Height	840
Route Type	2
General Packets	606
General Bytes	592

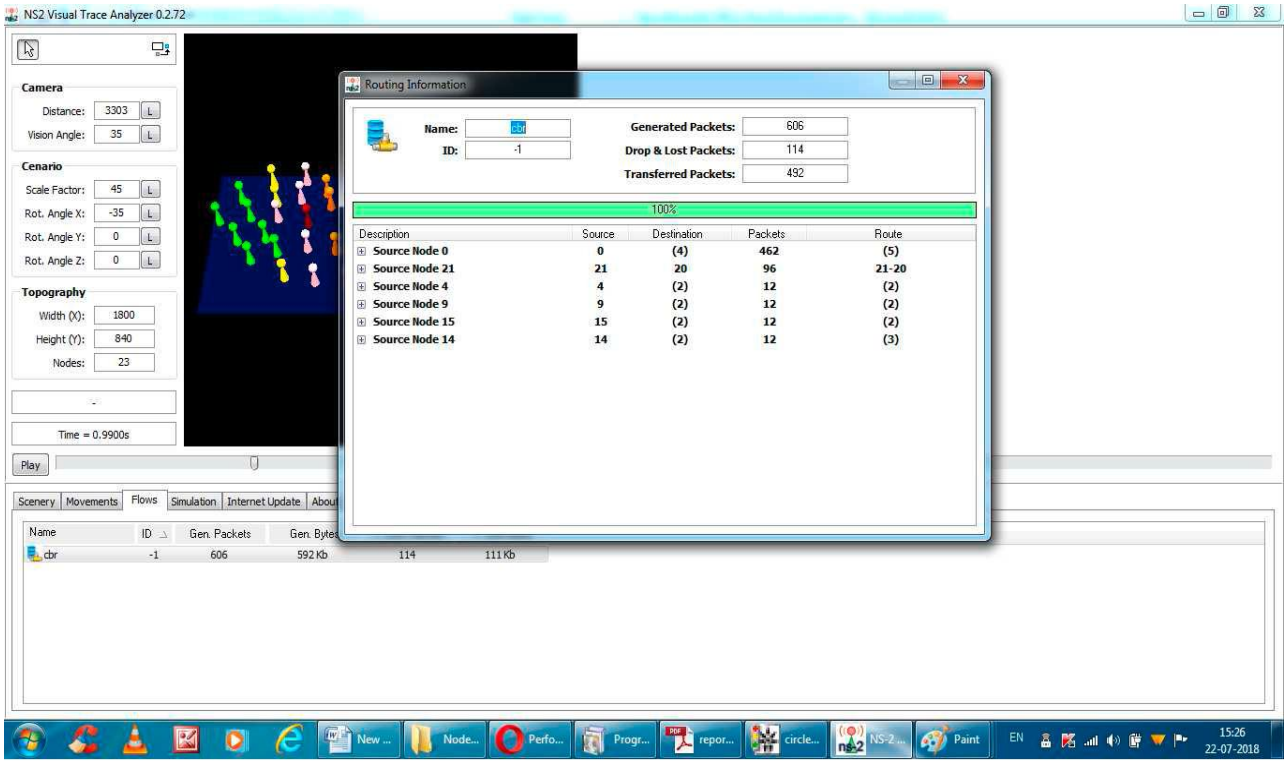

Fig 2 Path shifts Details View

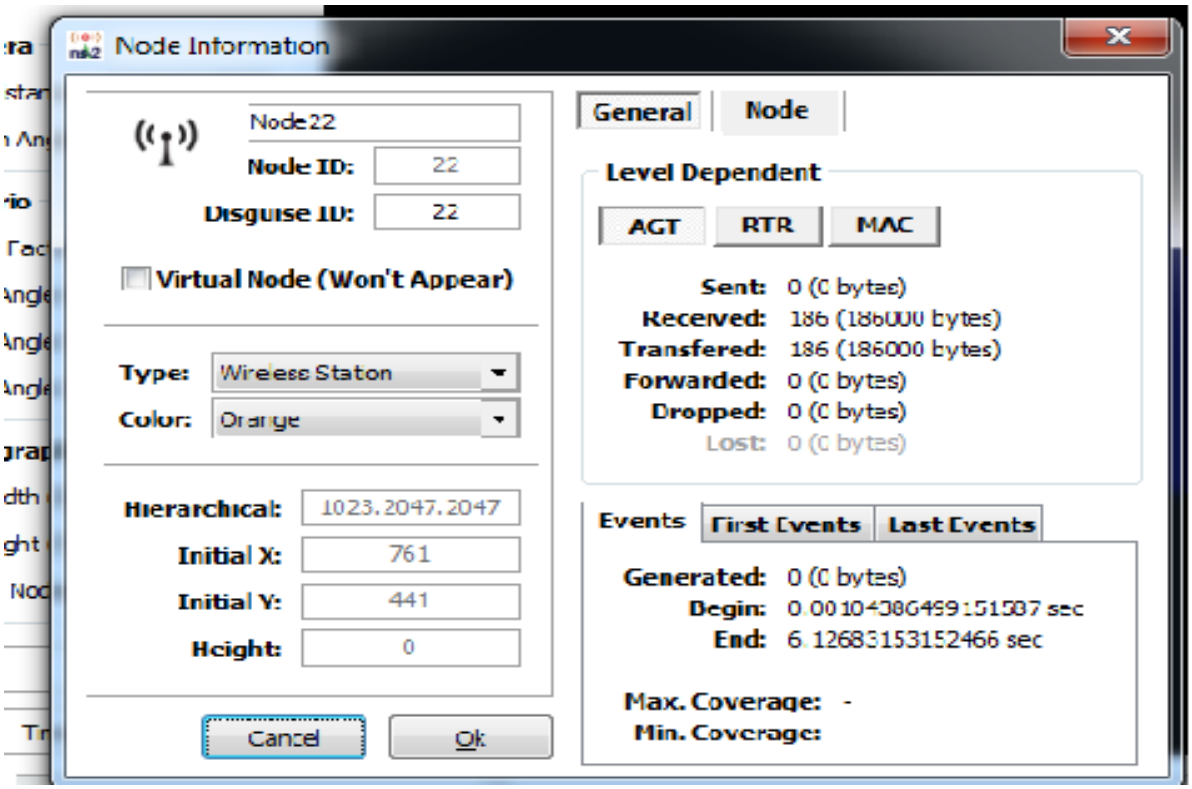

Fig 3 Node Information

Figure 3 show the evaluation the every node and show the best performance evaluation of Adhoc network. Figure 2 shows the Number of packets dropped of AODV protocols with constant node speed and number of mobile nodes and varying pause time from initial x 761 Seconds. X-axis represents simulation time & Y-axis represents Delay time. Investigational results show that more efficient AODV network because packets are dropped at maximum mobility. Figure 4 and figure 5 have presented the delay, packet and throughput evaluation Adhoc network [9].

III. PERFORMANCE ANALYSIS OF AODV METRICS

We have considered the three primary parameters as metrics to evaluate the performance of the AODV protocol while implementing it in live traffic of city. These parameters help us to measure the effect perfectly. These are as follows:

A. PACKET DELAY ANALYSIS FOR AODV

The average time it takes a data packet to reach the destination. This includes all possible delays caused by buffering during route discovery latency, queuing at the interface queue. This metric show the delay of packets over time, here time is in millisecond (ms) at the interval of 5 millisecond each and calculated accordingly. The time interval is given in the table 1 below for the maximum 23 no of nodes in the real time traffic.

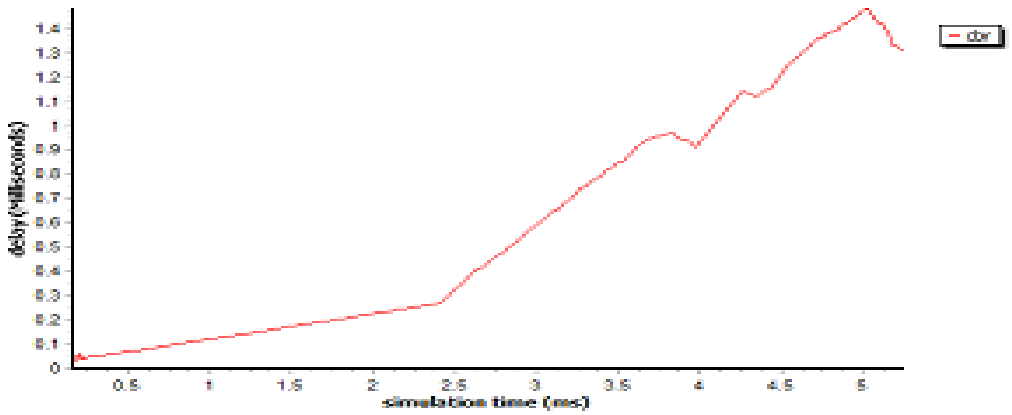

Fig 3 Simulation time Vs delay

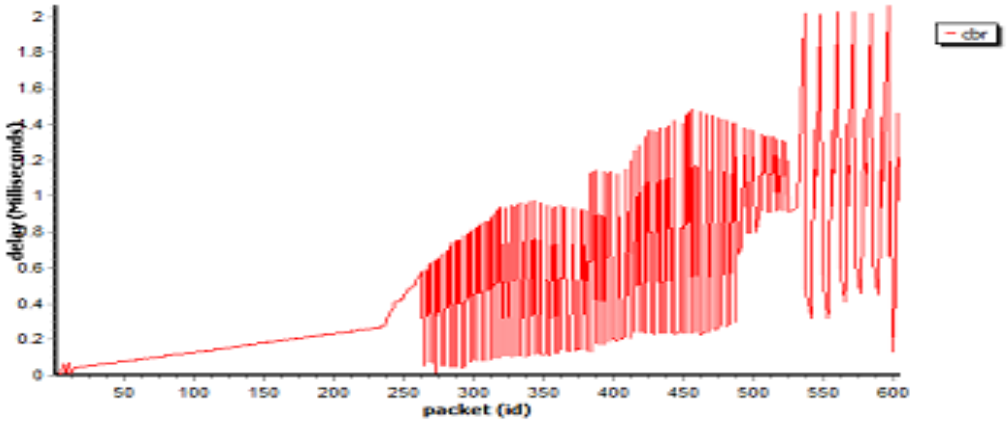

Fig 4 Packet V_s Delay

Table 1 Delay

Delay over time	
Time(ms)	**Delay**
1	0.016314
5	0.009582
10	0.067408
15	0.044984
20	0.047041
25	0.055587
30	0.058212
35	0.064769
40	0.066825
45	0.070111
50	0.076408
55	0.079453
60	0.08637
65	0.094316
70	0.098001
75	0.104898
80	0.108084
85	0.117937
90	0.120543
95	0.124983
100	0.12676

B. THROUGHPUT ANALYSIS FOR AODV

Throughput is defined as the total number of packets delivered over the total simulation time. The throughput comparison shows that the three algorithms performance margins are very close under traffic load of 1 to 22 nodes and two servers in Real Time Traffic scenario and have large margins when number of nodes increases to 200. Mathematically, it can be defined as:

Throughput= N/1000

Where N is the number of bits received successfully by all destinations.

In the table 2 throughput analysis of the time interval is taken in milliseconds and the respective packet is calculated in bytes/ s for all the nodes and servers that was considered for the real time city traffic.

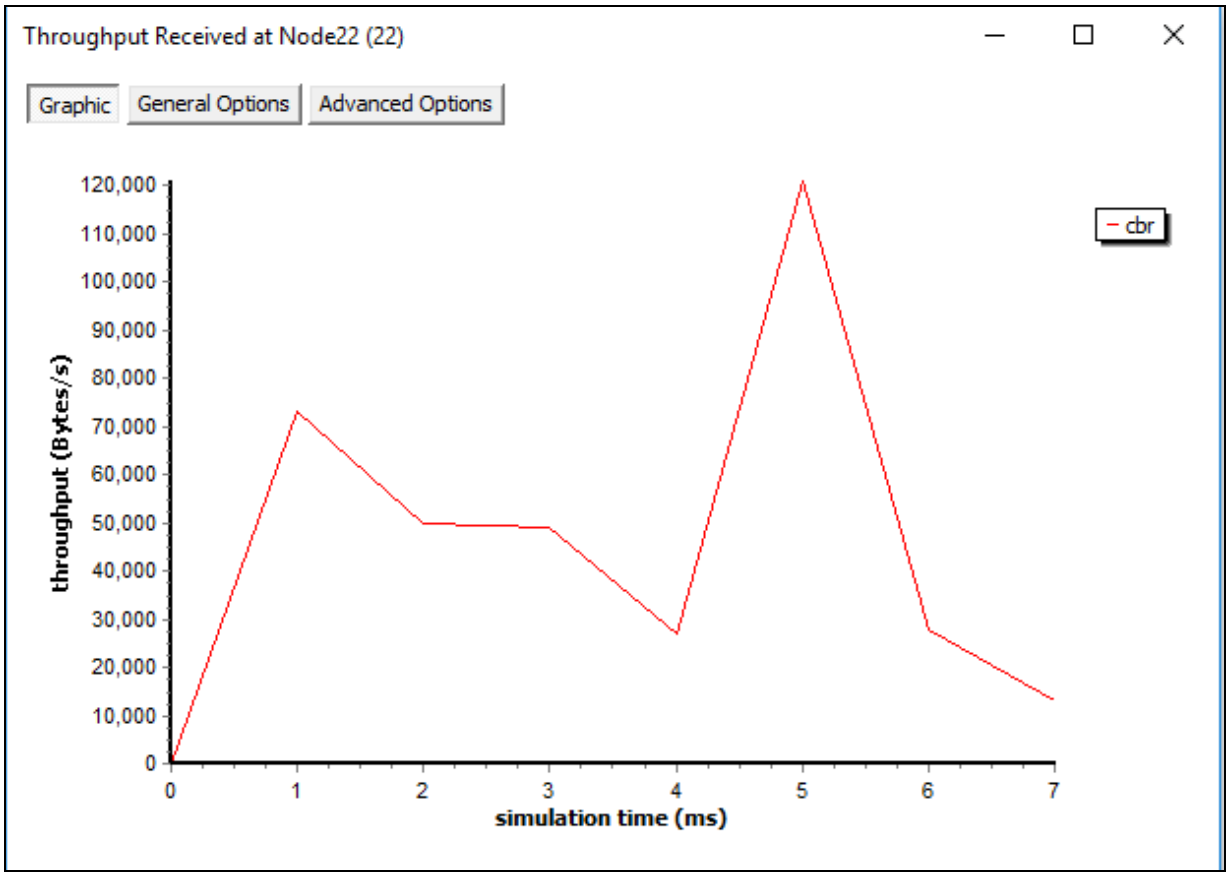

Fig 5 Throughput

Table 2 Throughput of Nodes

Time	bytes/sec	Nodes/Server
0	0	Server0
1	0	
2	2000	
3	0	
4	0	
5	0	
6	2000	
7	3000	
8	0	
1	28000	Serveer1
2	0	
3	12000	
4	0	
5	100000	
6	14000	
7	13000	

0	0	Start node
4	0	
5	6000	
6	0	
7	0	
0	0	End node
1	73000	
2	50000	
3	49000	
4	27000	
5	121000	
6	28000	
7	13000	

C. JITTER ANALYSIS FOR AODV

Table 3 and Figure 6 show jitter against time. They show jitter rate in the regular AODV routing protocol in Figure 6, which getting worst over time. Jitter is higher in the AODV routing protocol than other protocols. If we look average jitter of performance metric that means, jitter is very important and crucial network performance indecent as it directly affects the buffering(jam) requirements for all nodes in the city, and away from the source or with the current network.

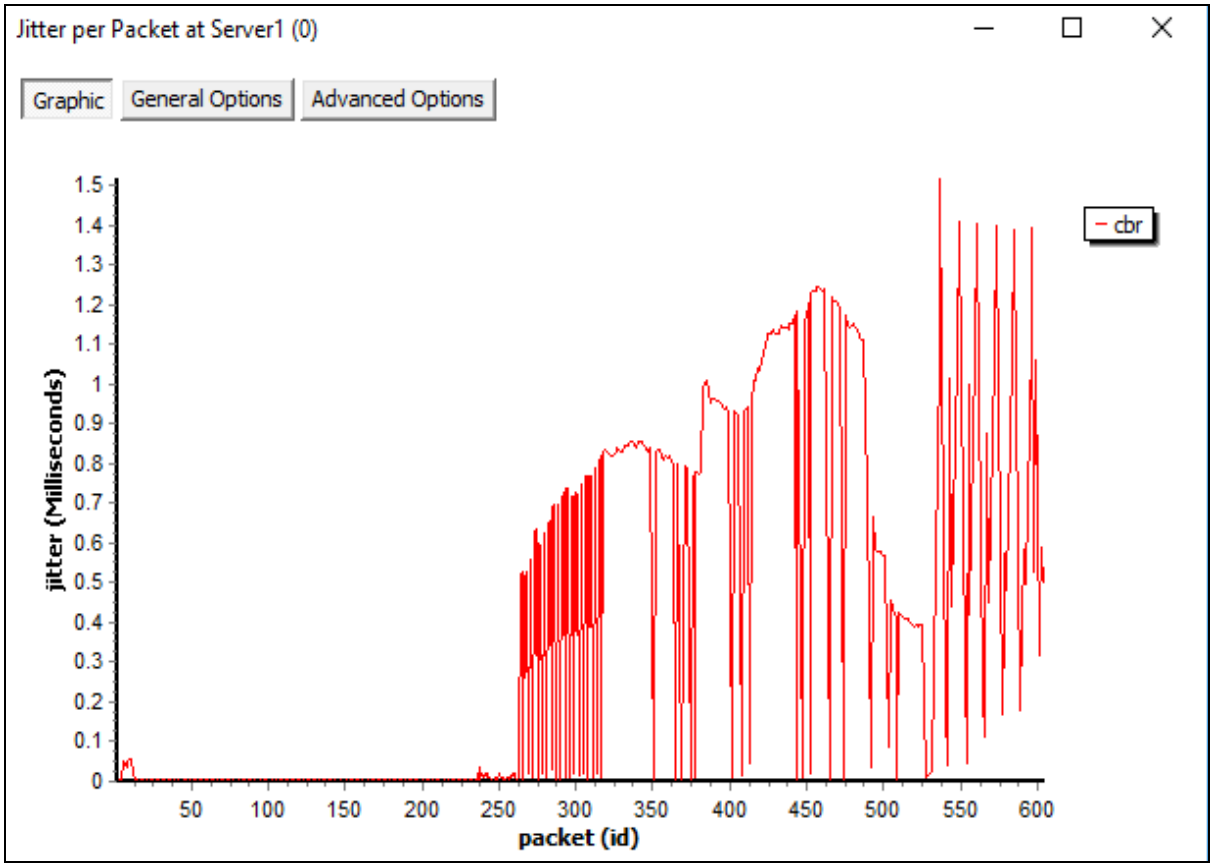

Fig6 Jitter per packet

Table 3 Jitter per packet

Jitter(ms)	Packets
0.005722	0.00271
0.008105	0.002384
0.009064	0.000958
0.010004	0.00094
0.011567	0.001563
0.012805	0.001238
0.015089	0.002284
0.05029	0.010645
0.108407	0.00094
0.136875	0.02078
0.141671	0.000979
2.421863	0.002202
2.441214	0.00096
4.009658	0.000939
4.024432	0.001324
4.03955	0.000919
4.064466	0.002458
4.101601	0.003589
4.138394	0.001287
4.198654	0.000959
5.258306	1.960704

IV DISCUSSION

Here we evaluated the routing protocols with the help of three metrics, by these three metrics we have analysed the following:
1. Packet delivery fraction : It is the ratio of packets delivered to that generated by the traffic generator.
2. Routing load: It is the number of routing packets required to be sent per data packet delivered.
We have simulated first routing protocol, and analysed the scenario. Wireless routing is much more challenging than wired networks due to the mobility involved. Hence, it is important to understand the performance of routing protocols with variation in mobility. The metrics we have used here are the basic ones and you can think of others too.
One other metric used to evaluate routing protocols is Average End to End packet delivery time. After calculating it for the trace file you have obtained. And we can also suggest that in this type of dense traffic situation one of the best algorithms is AODV routing protocol. In near future we will implement other protocols like DSDV and DSR as well to systematically compare the effect of these on the city live traffic.

V CONCLUSION

In this research paper, execution of the AODV has been assessed under divergent condition of network, load. The appraisal comes about have demonstrated that AODV has the ideal execution regarding throughput, re-enactment time, and deferral. It neglects to outflank AODV perform great just in little scale networks and when the versatility is low. Henceforth it is presumed that AODV is the imperative as far as little scale networks with any portability or speed and AODV is considered when the load of the network is expanded.

REFERENCES

1. Yu Qiao, “Using Tall Vehicles as next Relay Hops catiIn Vanet Multi Hop Communication Channel”, Thesis report on March 2013.
2. Amendment 6: Wireless Access in Vehicular Environment (Part 11: Wireless LAN medium access control (MAC) and physical layer (PHY) speci-fications).

3. Chao, C.M., Sheu, J.P., and Hu, "Energy conserving grid routing protocol in mobilead hoc networks," in IEEE Proceedings of the 2003 International Conference on Parallel Processing (ICPP'03).
4. C. Profentzas, "Studying routing issues in vanets by using ns-3," Master's thesis, Alexander Technological Educational Institute of Thessaloniki, November 2012.
5. Das M. et. al "Analysis of Effect of Mobility on Performance of AODV in Mobile Ad hoc Network " International Conference on Computer Communication and Informatics (ICCCI) , 2012.
6. Panda B.K. et. al, "Mobility and its impact on Performance of AODV and DSR in Mobile Ad hoc Network " IEEE, 2012.
7. Anand V. et. al "Performance of AODV, DSR and DSDV Protocols under varying node movement " World Congress on Information and Communication Technologies , IEEE, 2012.
8. Bhatt U. R. et. al , "Performance analysis of AODV & DSR Routing protocols for MANET " Fourth International Conference on Communication Systems and Network Technologies , IEEE, 2014.
9. Perti A. "Evaluate Dynamic Source Routing Protocol Performance in Wireless MANET " International Journal Advanced Networking and Applications , Vol. 5, No. 5, pp. 2056-2059 , 2014.