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RESEARCH ARTICLE

Investigating the Impact of Pause Time and Terrain Regions on the Performance of AODV and FLBNTTPEAODV for MANETs

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Abstract*— *The mobility nature of the nodes in the Mobile ad hoc network leads to dynamic topology. Establishing proper paths among the nodes for communication in this kind of network is really a challenging aspect. In this paper, the impact of pause time and terrain regions on AODV and FLBNTTPEAODV routing approaches are investigated using network simulator version 2.34. Significant performance improvement is observed in packet delivery ratio and a huge reduction in end-to-end delay with FLBNTTPEAODV.

Keywords*— *AODV, FLBNTTPEAODV, MANETs, Performance, Routing Protocols

I. INTRODUCTION

Mobile Ad-hoc network [1][2][3] is an infrastructure-less network consisting of mobile nodes connected by wireless links. The mobile nodes establishes the dynamic topology due to their mobility feature. The mobility models [4] describes the movement behaviour of the mobile nodes in the network. Thus the routing in the mobile ad hoc network became a challenging issue[5]. Various routing protocols [6][7][8] are proposed and developed to find a better route for communication among the nodes. The following sections i.e., sections 2 describes AODV on-demand routing protocol, section 3 illustrates the importance of FLBNTTPEAODV, Section 4 deals with the Simulation parameters used in the experiment, presentation of the results are done in section 5 and conclusion is described in section 6.

II. AD-HOC ON DEMAND DISTANCE VECTOR ROUTING PROTOCOL(AODV)

AODV [9][10] works on the principle of on-demand routing i.e., the nodes will find the routes when it is necessary. The two main mechanisms responsible for the route establishment and maintenance are route discovery and route maintenance. The route discovery mechanism utilizes the RREQ (Route Request) packets . The source node initiates a control message called RREQ to find a route to the destination..Route Reply(RREP) messages are delivery from the destination to the source about the path establishment. Then Data Packets will travel over the established paths. The link failures in the network are intimated to the other nodes through Route Error (RERR) messages in the route maintenance mechanism.

III. FUZZY LOGIC BASED NODE TRAVERSAL TIME PERFORMANCE ENHANCED AODV (FLBNTTPEAODV)

The AODV routing protocol maintains constant values for some of the parameters during its configuration. One of the parameter in this category is Node Traversal Time. The Fuzzy Logic Based Node Traversal Time Performance Enhanced AODV (FLBNTTPEAODV) [11] indicates that the Node Traversal Time must be a suitable value with respect to the Network size. Previously, the FLBNTTPEAODV is evaluated in small, medium, large and very large network sizes. It was found that, it is highly suitable for medium size networks. The present work deals with the impact of pause time and terrain regions on both AODV and FLBNTTPEAODV in medium network size.

IV. SIMULATION ENVIRONMENT

Network simulator version 2.34 [12] is used to evaluate the FLBNTTPEAODV and AODV. The simulation parameters used in the pause time experiment 1 and terrain region experiment2 evaluate performance [13][14][15][16] are elaborated in the tables 1 and 2 respectively.

A. Experiment 1

The performance of the two routing approaches AODV and FLBNTTPEAODV are evaluated in various pause timings with the simulation parameters prescribed in table 1.

Table 1 : Simulation Parameters used in the Pause Time Experimental Evaluation

Routing Protocols / Approaches	AODV, FLBNTTPEAODV
Simulation Time	360 s
Area (sq.m)	1000 x 1000
Propagation Model	Two Ray
Traffic	CBR
Packet Size	512 bytes
Number of Packets	100
Nodes	47
Antenna Type	Omni directional
Transmission range	250m
Receiver range	250m
Mobility Model	RandomWayPoint
Pause Time	0,360 s
Speed	10 m/s
Node Deployment Model	Random

B. Experiment 2

The performance of the two routing approaches AODV and FLBNTTPEAODV are evaluated in various terrain regions with the simulation parameters prescribed in table 2.

Table 2 : Simulation Parameters used in the Terrain Regional Experimental Evaluation

Routing Protocols / Approaches	AODV, FLBNTTPEAODV
Simulation Time	360 s
Area (sq.m)	500 x 500, 1000 x 1000, 1500x 1500, 2000x2000
Propagation Model	Two Ray
Traffic	CBR
Packet Size	512 bytes
Number of Packets	100
Nodes	47
Antenna Type	Omni directional
Transmission range	250m
Receiver range	250m
Mobility Model	RandomWayPoint
Pause Time	0 s
Speed	10 m/s
Node Deployment Model	Random

V. RESULTS

The performance metrics namely packet delivery ratio, Throughput, end-to-end delay, jitter, Routing overhead and normalized routing load are considered to evaluate the two routing Approaches AODV and FLBNTTPEAODV. The percentage of packet delivery ratio with respect to pause time is shown in the figure 1 and with respect to the terrain region is shown in the figure 7. The average throughput with respect to pause time is shown in the figure 2 and with respect to the terrain region is shown in the figure 8. The average end-to-end delay with respect to pause time is shown in the figure 3 and with respect to the terrain region is shown in the figure 9. The average jitter with respect to pause time is shown in the figure 4 and with respect to the terrain region is shown in the figure 10. The routing overhead with respect to pause time is shown in the figure 5 and with respect to the terrain region is shown in the figure 11. The normalized routing load with respect to pause time is shown in the figure 6 and with respect to the terrain region is shown in the figure 12.

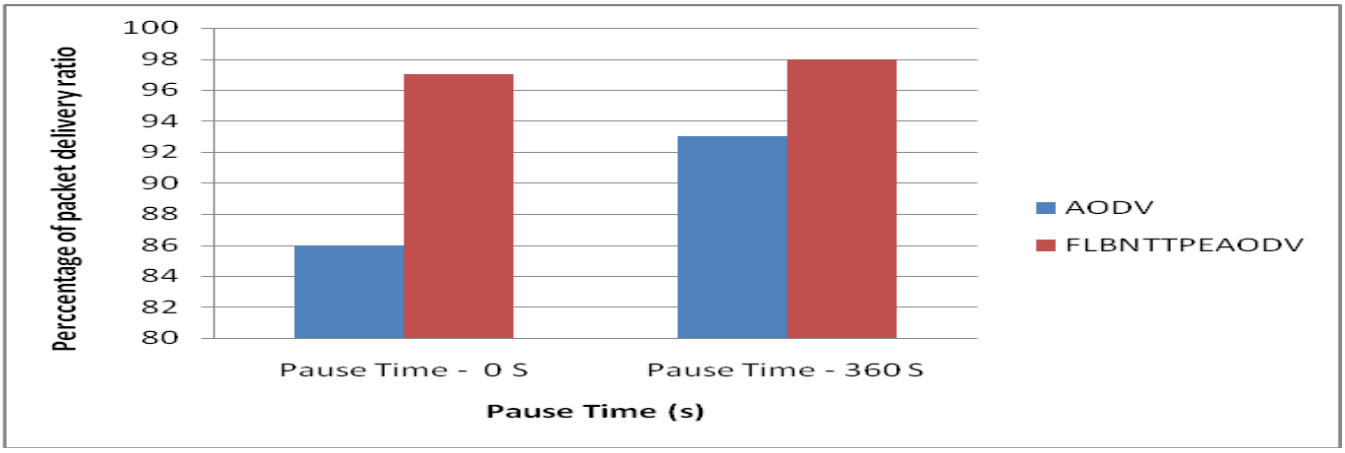

Figure 1: Percentage of Packet delivery ratio with respect to pause time

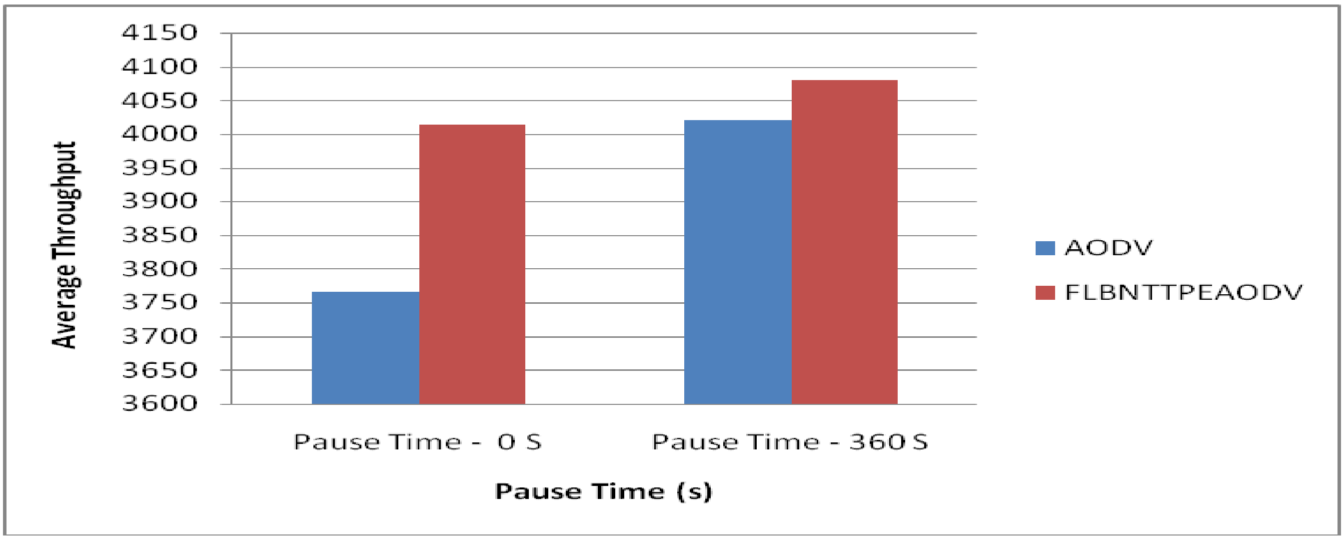

Figure 2: Average Throughput with respect to pause time

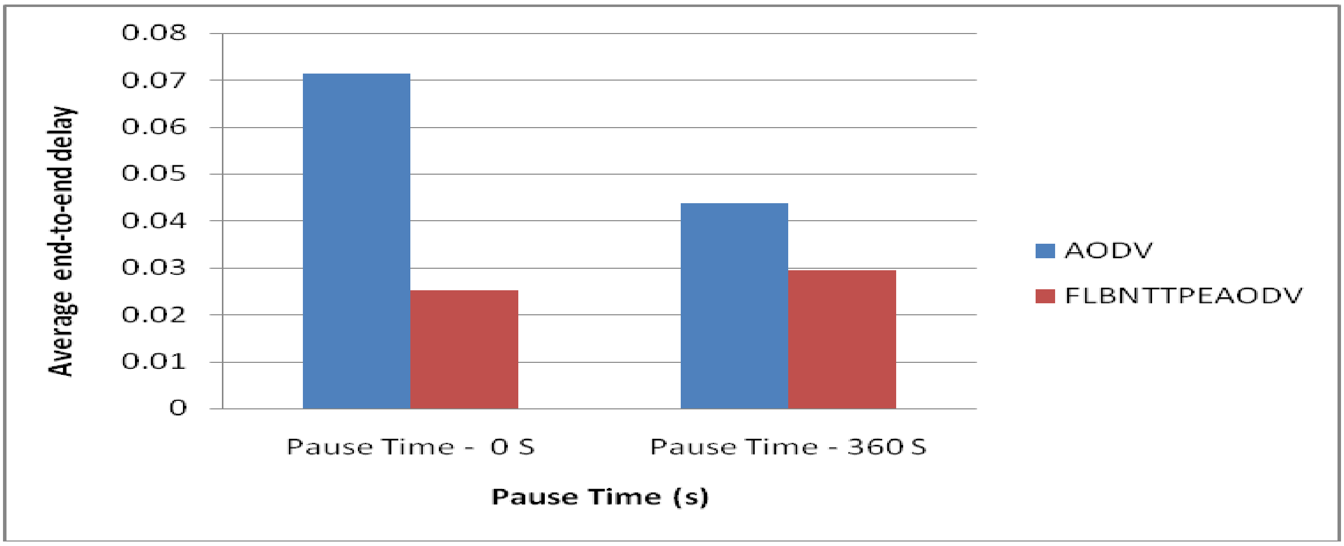

Figure 3: Average end-to-end delay with respect to pause time

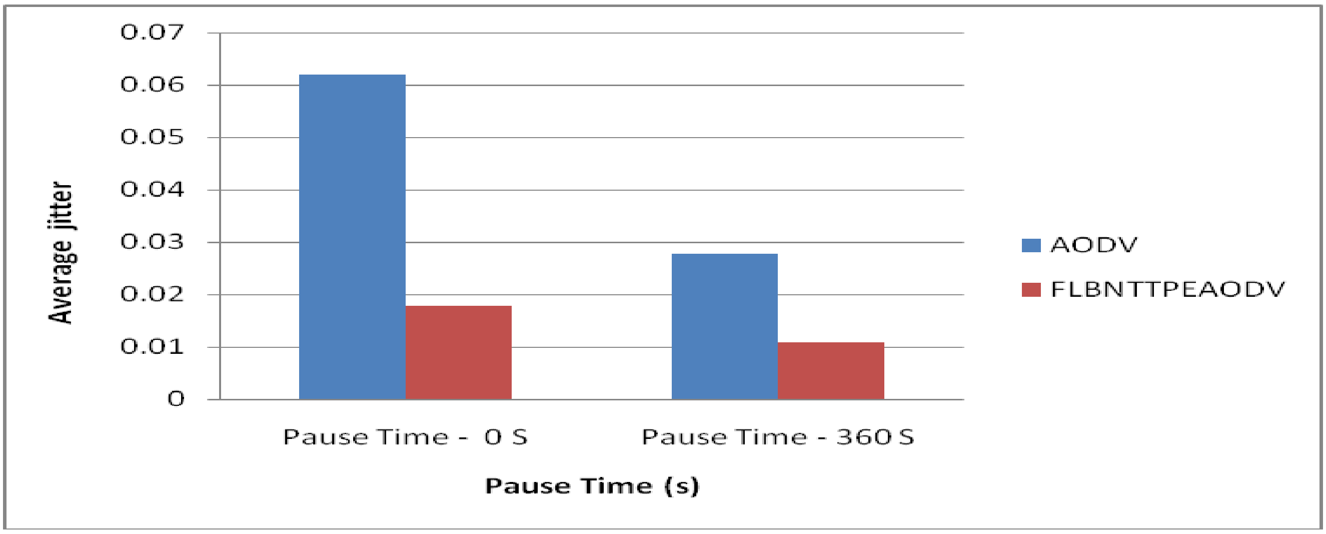

Figure 4: Average jitter with respect to pause time

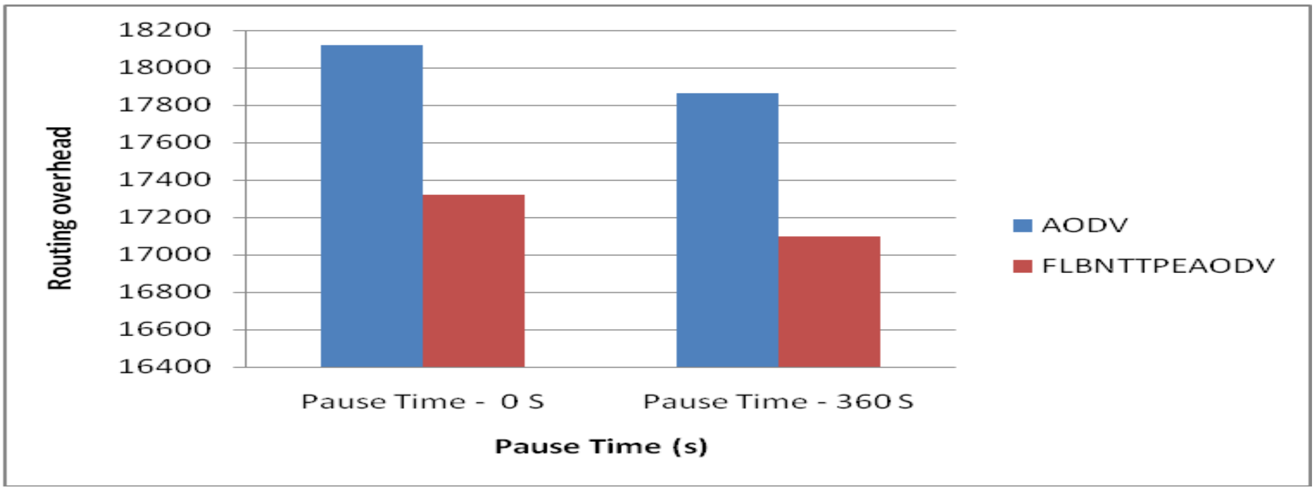

Figure 5: Routing Overhead with respect to pause time

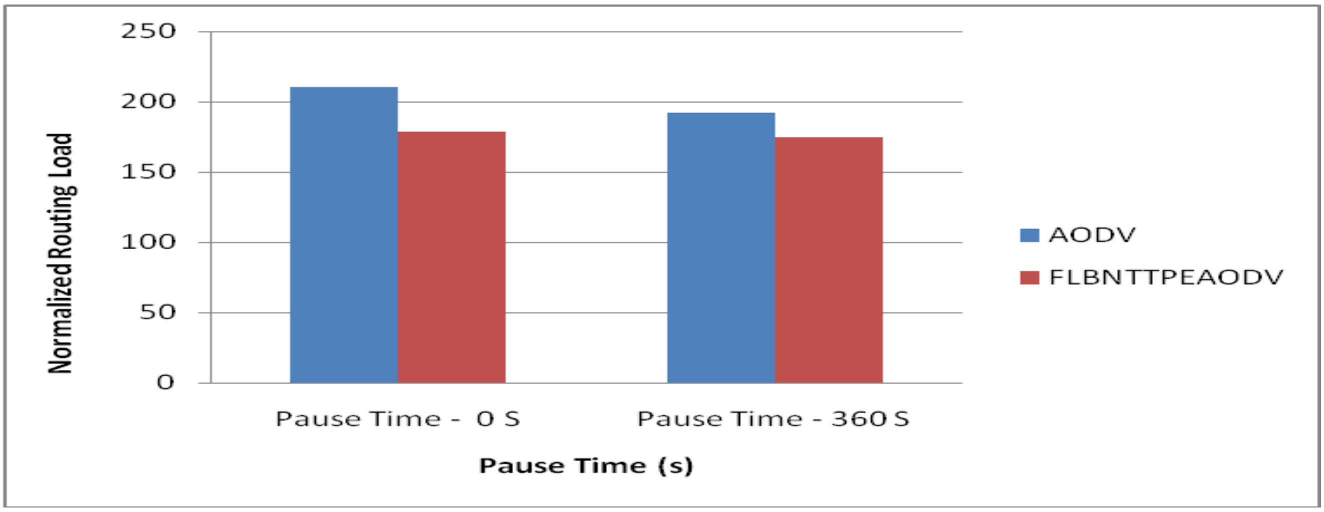

Figure 6: Normalized routing load with respect to pause time

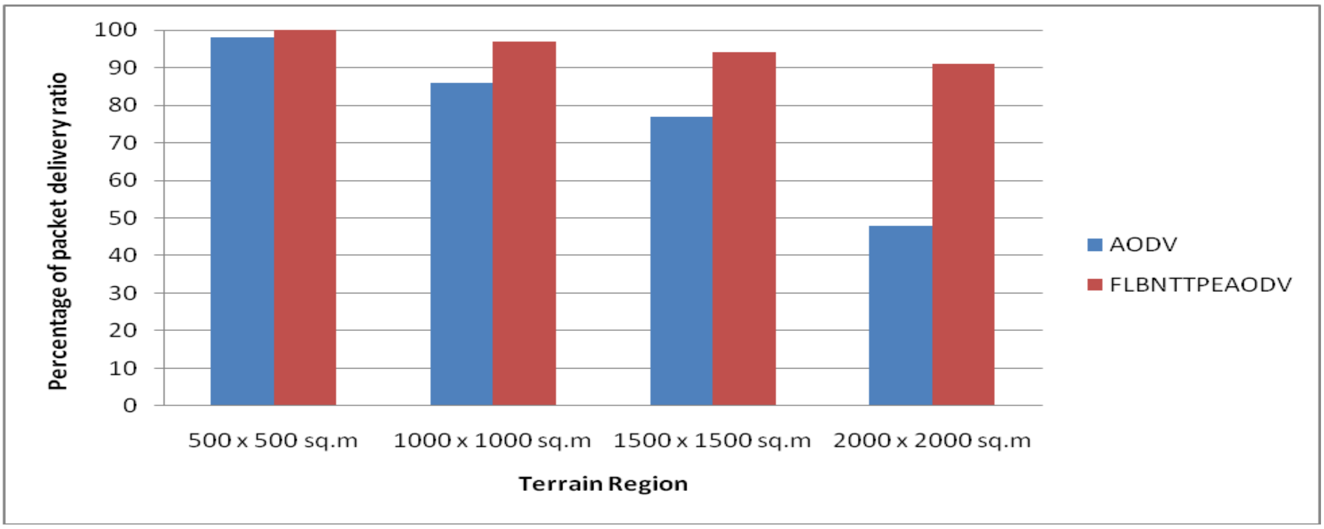

Figure 7: Percentage of packet delivery ratio with respect to terrain region

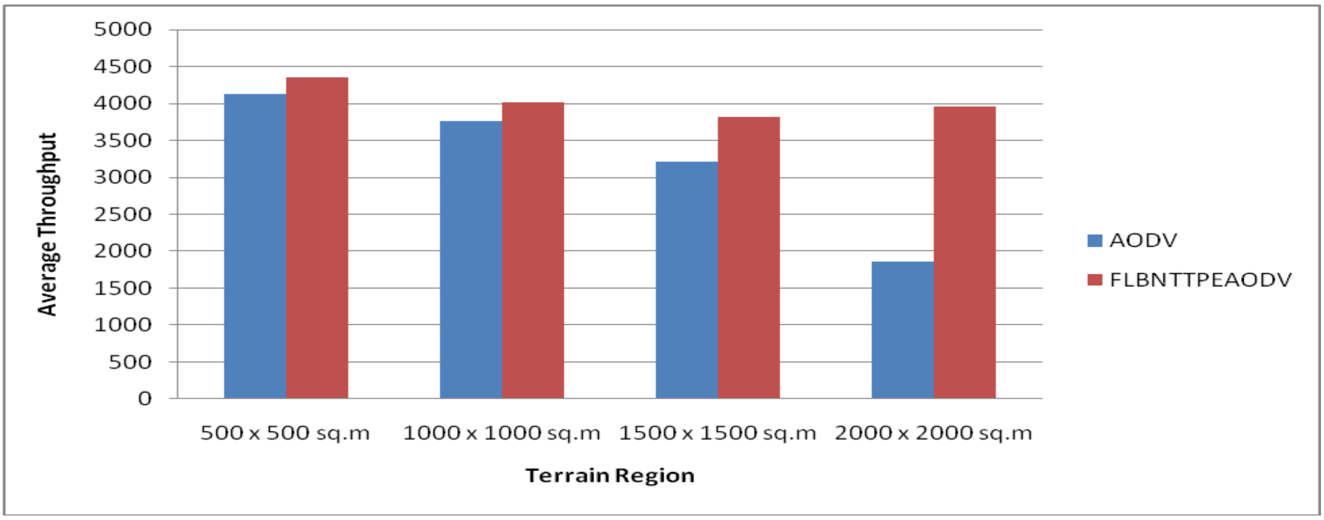

Figure 8: Average throughput with respect to terrain region

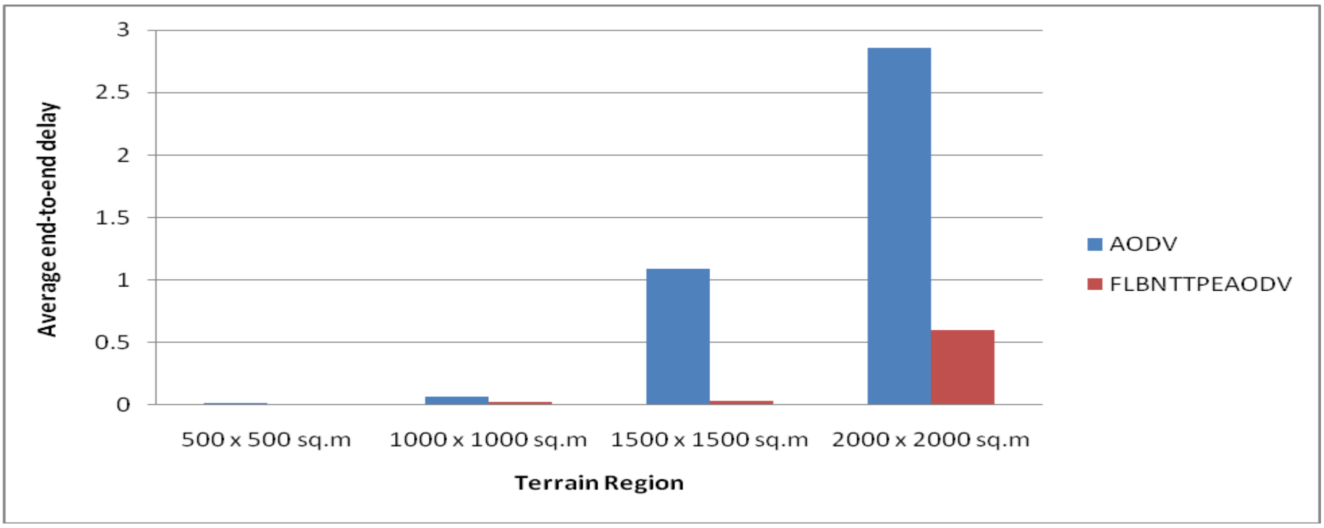

Figure 9: Average end-to-end delay with respect to terrain region

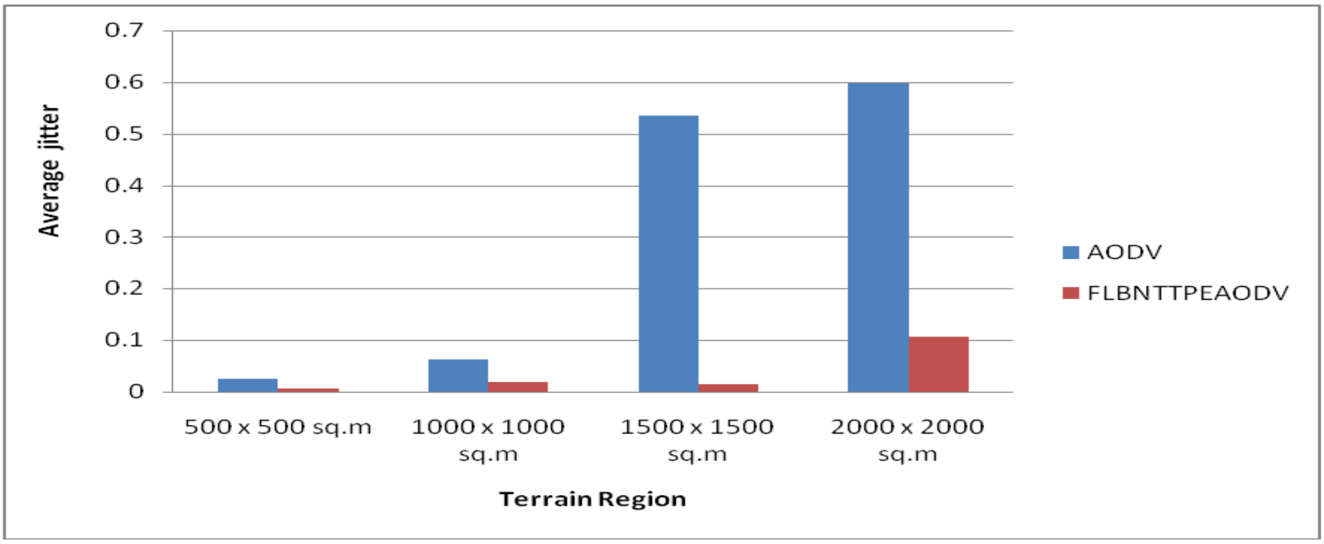

Figure 10: Average jitter with respect to terrain region

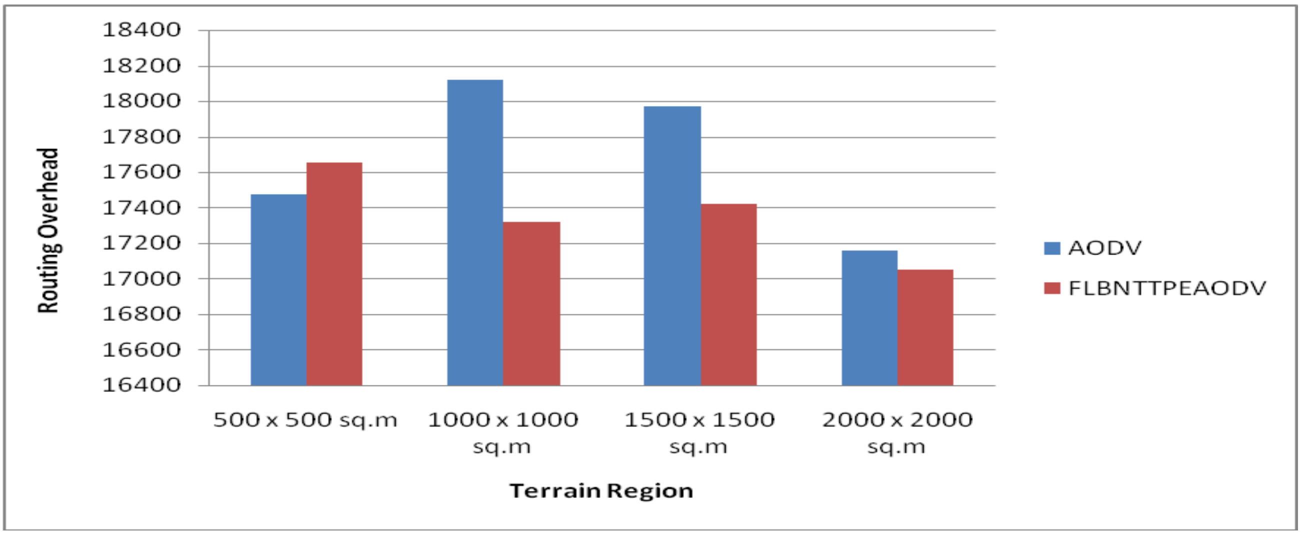

Figure 11: Routing Overhead with respect to terrain region

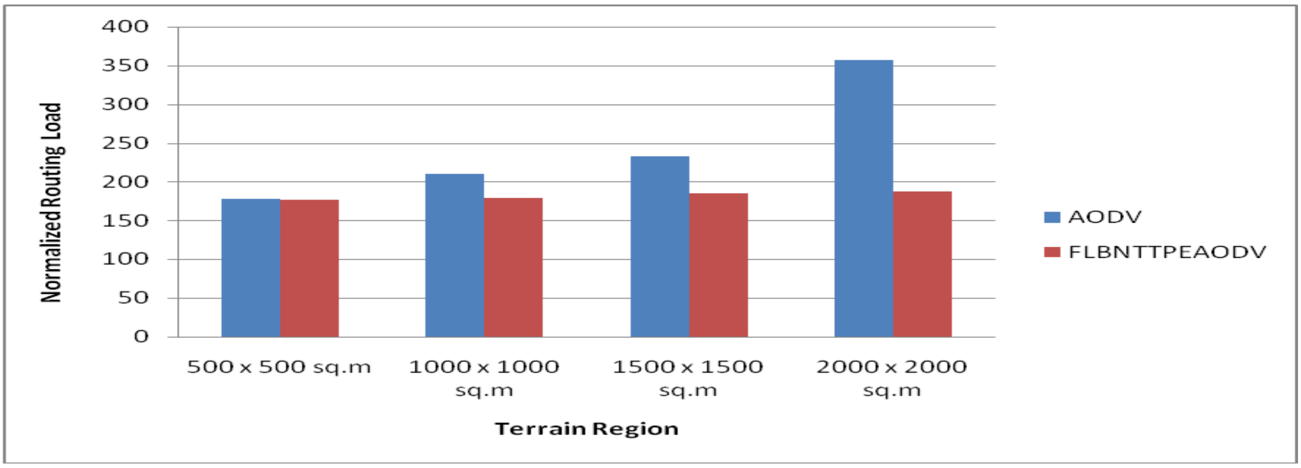

Figure 12: Normalized Routing Load with respect to terrain region

VI. CONCLUSIONS

From the simulation results, it was observed that FLBNTTPEAODV performs better than AODV in the above QOS metrics. It is also observed that it shows better performance in the above terrain regions. Significant improvements are the percentage of packet delivery ratio was enhanced by 12.79 % and 5.37 % at low and high pause timings. Another improvement is 64.96% of average end-to-end delay was reduced by FLBNTTPEAODV than AODV in the case of 1000 x 1000 terrain region.

REFERENCES

[1] Iiyas, M., 2003. The Hand Book Of Ad Hoc Networks, CRC Press.

[2] Perkins C., Ad Hoc Networking, Addison Wesley, 2001

[3] D. P. Agrawal and Q-A Zeng. “Introduction to Wireless and Mobile Systems,” Brooks/Cole Publishing, ISBN No. 0534-40851-6, 436 pages, 2003.

[4] T. Camp, J. Boleng, and V. Davies, A Survey of Mobility Models for Ad Hoc Network Research, in Wireless Communication and Mobile Computing (WCMC): Special issue on Mobile Ad Hoc Networking: Research, Trends and Applications, vol. 2, no. 5, pp. 483-502, 2002

[5] S. Giordano and W. W. Lu, “Challenges in mobile ad hoc networking,” IEEE Communications Magazine, vol. 39, no. 6, pp. 129–181, June 2001.

[6] Hongbo Zhou, “A Survery on Routing Protocols in MANETs,” Technical. Note March 2003.

[7] David B. Johnson ,”Routing in Ad Hoc Networks of Mobile Hosts,” in Proceeding of the IEEE workshop on Mobile Computing Systems and Application , Dec 1994.

[8] E. M. Royer, and C.-K. Toh, “A review of current routing protocols for ad hoc mobile wireless networks”, IEEE Personal Communications, Apr. 1999, pp. 46–55

[9] C.E. Perkins, E.M. Royer & S. Das, Ad Hoc On Demand Distance Vector (AODV) Routing, IETFInternet draft, draft-ietf-manet-aodv- 08.txt, March 2001

[10] Perkins C. and Royer E.M., “Ad-Hoc on-Demand Distance Vector Routing,” in Proceedings of the 2nd IEEE Workshop on Mobile Computing Systems and Applications, New Orleans, LA, pp. 90-100, February 1999.

[11] K. Narasimha Raju and Dr. S.P.Setty, “Design and Implementation of Fuzzy Logic Approach for fine tuning of configuration parameters in AODV to enhance the performance in MANETs”, International Journal of Computer Networks and Wireless Communications (IJCNWC),Vol.5- No.4,August, 2015.

[12] Network simulator -2. http://www.isi.edu/nsnam/ns/

[13] A. Nasipuri, R. Castaneda, and S. R. Das, “Performance of multipath routing for on-demand protocols in ad hoc networks,” Mobile Networks Applicat. (MONET) J., vol. 6, no. 4, pp. 339–349, 2001.

[14] C.-E. Perkins, E.-M. Royer, S.-R. Das, and M.-K. Marina, “Performance comparison of two on-demand routing protocols for ad hoc networks,” IEEE Personal Communications, vol. 8, no. 1, pp. 16–28, Feb 2001.

[15] J. Broch, D. Maltz, D. Johnson, Y.-C. Hu, and J. Jetcheva, “A Performance Comparison of Multihop Wireless Ad Hoc Network Routing Protocols”, ACM/IEEE Mobile Computing and Networking, October 1998.

[16] S.P.Setty et.al, “Performance Evaluation of AODV in different Environments”, International Journal of Engineering Science and Technology (IJEST), Vol.2(7), 2010 , 2976-2981.

