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Dynamic Node Energy & link stability Management in Wireless Sensor Network

Bhupendra Prajapati[1], Prof. Nirupma Tiwari[2]

PG Student, Department of CSE, RGPV University, Shri Ram College of Engineering & Management, Gwalior, M.P, India[1]

Professor, Department of CSE, RGPV University, Shri Ram College of Engineering & Management, Gwalior, M.P, India [2]

ABSTRACT: The main challenging task in WSN is routing. There are various types of routing protocols available for WSN. Ad hoc On-demand Distance Vector (AODV) routing protocol is one of routing protocols for mobile sensor networks. Energy efficient Ad hoc On-demand Distance Vector (NAODV) routing protocol is developed by incorporating energy aware algorithm along with the shortest route in the existing Ad hoc On-demand Distance Vector Routing protocol to reduce battery power and lifetime of WSN. The simulation results obtained show that the combination of the both bandwidth and energy in management performs better than the existing protocols the routing protocols have been proposed considering mobile nodes in the network focusing on research issues like packet loss, energy consumption, and delay. In this paper, the cluster based routing protocols that have been proposed for mobile wireless sensor network comparison is done among them the simulation result shows that the proposed energy efficient routing algorithm consumes low energy and gives high throughput In this paper, throughput performance of AODV protocol has been examined, packet rate, coverage area and number of packets. Our simulation results show that network lifetime significantly without sacrificing packet delivery performance the simulation is run on NS-2.34 with 11 nodes in total.

KEYWORDS: AODV (Ad Hoc On-Demand Distance Vector), Residual energy (Remaining Energy), NAODV (New Ad Hoc On-Demand Distance Vector).

I. INTRODUCTION

The energy model calculates the residual energy of a node by subtracting energy consumed by a node. There are various routing protocols for all packets sent, received, forwarded and drop. While data transmission from source to destination node. This residual energy of the node is used as a routing measurement in the packet header and is used to move towards selection of an energy efficient path from the source to destination node. It is noticed that this selected path may not resemble the minimum energy path but the path will utilize maximum remaining energy of the nodes. A dedicated protocol to maximize the lifetime of the network is different from minimum energy routing method. Minimum energy routes attract more congestion and the nodes along these routes suffer rapid battery exhaustion and die in a short period of time which causes a complete network failure. However, routes selection by maximum residual energy of nodes results in increase in network lifetime by minimum node load throughout all the routes.

A dynamic power management (DPM) strategy ensures that power is consumed economically. The strategy can have a local or global, or both. A local DPM strategy aims to minimize the power consumption of individual nodes by providing each system with amount of power that is sufficient to carry out a task at hand. When there is no task to be processed, the DPM strategy forces some of the systems to operate at the most economical power mode or puts them into a sleeping mode [6]. A global DPM strategy attempts to minimize the power consumption of the overall network by defining a network-wide sleeping state.

II. DESIGN OBJECTIVE AND PROPOSED ALGORITHM

While considering a design objective and a new approach it should be understood that the two objectives of routing i.e. minimum total energy consumption and lifetime of the network can be mutually contradictory. Consider, a case, when a common node lies on several paths from various nodes, then the battery power of this node quickly runs into depletion. This leads to a particular node into a condition of battery drain out, which in turn shortens the network lifetime. For an appropriate path implementation, the existing routing protocol chooses the path with the minimum number of hops. For NAODV, the path chosen is based on residual energy. First, the residual energy level for each

node is calculated, and then the lowest residual energy of a node on a particular path is calculated. Finally the selection is made by choosing the path with the maximum lowest residual energy.
The main objective of energy metric is to achieve energy efficiency by minimizing the variance in the residual energies of all the nodes and thus improve the network lifetime. This approach follows a load balancing approach that avoids power/traffic congested paths and chooses paths that are lightly loaded. This helps EEPR (Energy Efficient Routing Protocol) achieve less variance in energy levels of different nodes in the network and thus maximizes the network lifetime. Network Simulator version2 (NS2) software has been used to carry out all the simulations for AODV and the proposed NAODV routing protocol which is a modification of AODV protocol.

III. SIMULATION LAYOUT

The model of wireless sensor network using AODV and NAODV protocol is simulated by using ns-2 [15]. The simulation model is performed for 11 nodes by considering the coverage area of 773×571(m2) and simulation time of 100 seconds. Each sensor node in the network is assumed to have an initial energy level of 0.5 Joules. A node consumes the energy power of 175mW on packet transmission and energy power of 175mW on packet reception.Problem associated in the network when central nodes get fully discharge than whole network get shut down.

Steps to develop simulation Results on NS2 Software:
Step1: This script is created by NSG2 beta1
Step2: Simulation parameters setup
Step: 3 create an ns simulator
Step: 4 Setup topography object
Step: 5 open the NS trace file
Step: 6 open the NAM trace file
Step: 7 Create wireless channel
Step: 8 Agents Definition new Agent/UDP or new Agent/Null
Step: 9 Applications Definition as a CBR Application over UDP connection
Step: 10 define a finish procedure

Table 1: Simulation parameters

Parameter	Value
Channel	Wireless Channel
Propagation	Two Ray Channel
Antenna	Omni directional Antenna
Terrain Area	1500 m x 1500 m
Simulation Time	60 s
MAC Type	802.11
Application Traffic	CBR
Routing Protocol	AODV
Data Pay load	512 Bytes/Packet
Number of Nodes	20
No of Destination/Control Nodes	1
Initial Energy of Nodes	100,00 Joules
Transmit Power	2.0 Watts
Receive Power	1.0 Watts
Idle Power	0.5 Watts

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IV. SIMULATION RESULTS

The energy consumption evaluation during simulation using AODV and NAODV routing protocols was carried out for typical MANET deployed for scenario for 12 nodes.

A dynamic power management (DPM) strategy ensures that power is consumed economically. The strategy can have a local or global, or both. A local DPM strategy aims to minimize the power consumption of individual nodes by providing each system with amount of power that is sufficient to carry out a task at hand. When there is no task to be processed, the DPM strategy forces some of the systems to operate at the most economical power mode or puts them into a sleeping mode [6]. A global DPM strategy attempts to minimize the power consumption of the overall network by defining a network-wide sleeping state

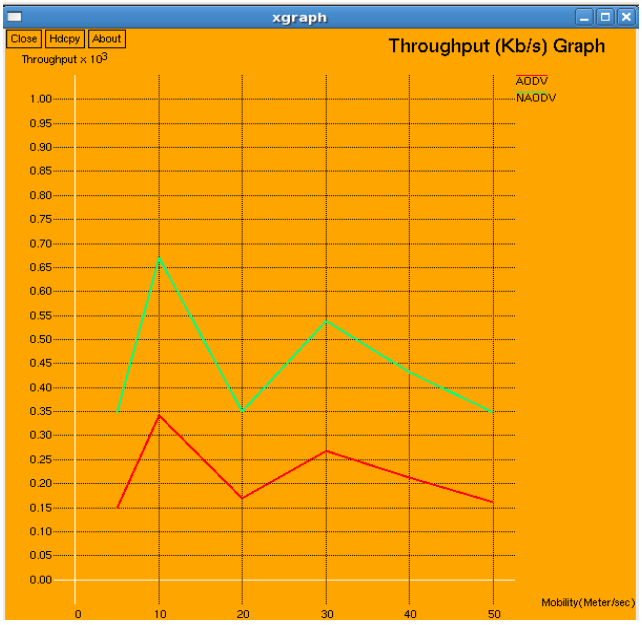

Fig 1: NAODV v/s AODV Throughput analysis at node 20

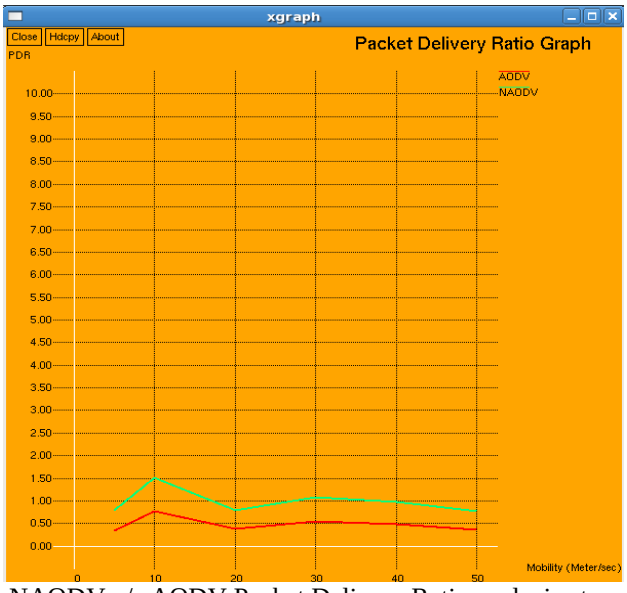

Fig 2: NAODV v/s AODV Packet Delivery Ratio analysis at node 20

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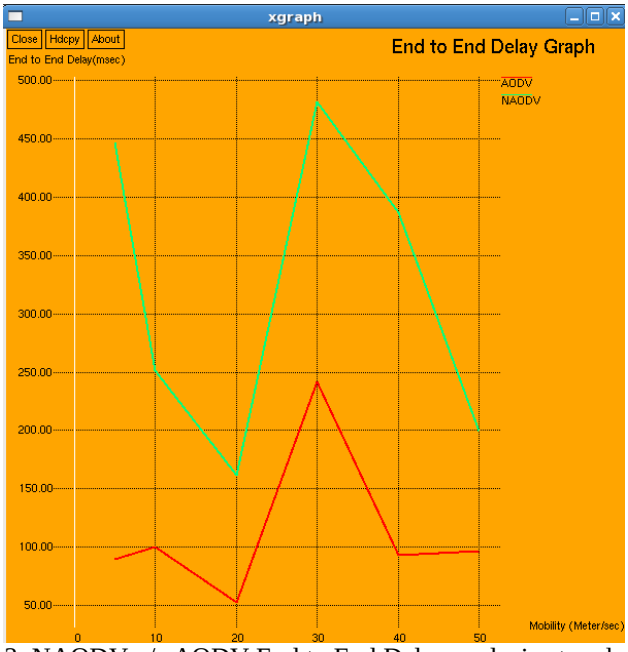

Fig 3: NAODV v/s AODV End to End Delay analysis at node 20

V. CONCLUSION

Energy efficient Ad hoc On-demand Distance Vector (NAODV) is thus a decentralized energy aware routing protocol which can be implemented for wireless sensor networks by using ns-2. NAODV uses the residual energy along with the hop count. It extends network lifetime by arranging almost all nodes to involve in data transfer. By varying the packet size, packet rate, coverage area and no. of maximum of packets in queue length and packet rate in the simulation, the throughput performance of WSN by using the AODV and NAODV is analyzed and compared for 50 nodes with the simulation time of 20 seconds .From the simulation results it can be concluded that the throughput performance of NAODV is much better than the AODV routing protocol. The throughput of the NAODV routing is 40-65% higher than the AODV routing. Thus NAODV can be implemented with the improved routing performance in terms of throughput

REFERENCES

[1] Pallavi S. Katkar and Prof. (Dr.) Vijay R. Ghorpade" A Survey on Energy Efficient Routing Protocol forWireless Sensor Networks" (IJCSIT) International Journal of Computer Science and Information Technologies, Vol. 6 (1) , 2015, 81-83.

[2] Samira Kalantary and Sara Taghipour " A survey on architectures, protocols, applications, and management in wireless sensor networks" Journal of Advanced Computer Science & Technology, 3 (1) (2014) 1-11

[3] Zain ul Abidin Jaffri and Sundas Rauf" A Survey on "Energy Efficient Routing Techniques in Wireless Sensor Networks Focusing On Hierarchical Network Routing Protocols" International Journal of Scientific and Research Publications, Volume 4, Issue 2, February 2014 1 ISSN 2250-3153

[4] Y. Wu, B. Rong, K. Salehian and G. Gagnon, "Cloud Transmission: A New Spectrum-Reuse Friendly Digital Terrestrial Broadcasting Transmission System," IEEE Transactions on Broadcasting, vol. 58, no.3, pp. 329-337, Sept. 2012.

[5] Kecheng Liu,and Yu Cheng "Demo: Enabling data sharing and multimedia applications over a multi-hop ad hoc network formed by unrooted smartphones." IEEE INFOCOM 2018 - IEEE Conference on Computer Communications Workshops (INFOCOM WKSHPS) IEEE,2018.

[6] Liu, Li , Y. Jing , and Y. Zhang . "A study on P2P file sharing methods on MANET." International Conference on Consumer Electronics IEEE,2012.

[7] Hayes, A , and D. Wilson . "Peer-to-peer information sharing in a mobile ad hoc environment." IEEE Workshop on Mobile Computing Systems & Applications IEEE, 2004.

[8] Hoh, Cheng Chang, and R. H. Hwang. "P2P File Sharing System over MANET based on Swarm Intelligence: A Cross-Layer Design." Wireless Communications & Networking Conference 2008.

[9] Chen, Kang , H. Shen , and H. Zhang . "Leveraging Social Networks for P2P Content-Based File Sharing in Mobile Ad Hoc Networks." IEEE International Conference on Mobile Adhoc & Sensor Systems IEEE,2011.

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | Impact Factor: 7.488 |

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[10] Nguyen, Dinh Nghia , X. H. Tran , and H. S. Nguyen . "A cluster-based file replication scheme for DHT-based file backup systems." International Conference on Advanced Technologies for Communications IEEE, 2016..
[11] Xu rui, D. Wunsch, "Survey of clustering algorithm", IEEE Transaction on Neural Networks, vol. 16, no. 3, May 2007.
[12] Zeng, Yingpei , et al. "SWCA: A Secure Weighted Clustering Algorithm in Wireless Ad Hoc Networks." IEEE Conference on Wireless Communications & Networking Conference IEEE Press, 2009.
[13] Mangai, S., and A. Tamilarasi. "Hybrid location aided routing protocol for GPS enabled MANET clusters." International Conference on Communication & Computational Intelligence IEEE, 2011.
[14] Basu, P. . "A Mobility Based Metric for Clustering in Mobile Ad Hoc Networks." IEEE International Conference on Distributed Computing Systems Workshops, 2001 IEEE, 2001.
[15] Yang, Hua , and Z. Li . “A clustering optimization algorithm based on WCA in MANET." 2015 6th International Conference on Computing, Communication and Networking Technologies (ICCCNT).2015 .

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