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Energy Efficient MAC Protocol for Mobile Wireless Sensor Networks

Gorli Satyavathi, Ch.Sitha Kumari
PG Student of IT Department, Assistant Professor of IT Department
Gayatri College of Engineering
Vishakhapatnam, AP,India.
[1]satyasrinalam@gmail.com
[2]sitha-kumari@gvpce.ac.in

***Abstract*— In Mobile wireless sensor networks (MWSNs) one major finding is that these networks suffer from energy consumption following reasons. Idle listening to the channel, retransmitting data, overhearing, and packet overhead etc.This will increasing the power usage and reduces network lifetime. For this reason we proposed a method in which network routing is enhanced using AOMDV (*Ad hoc On-demand Multipath Distance Vector Routing)* protocol which can accurately solves link failures problems in routing of mobile wireless sensor networks by finding multipath route from source to destination on demand. For this reason retransmission of data, packet delay, and packet overhead will decreased. Power management with S-MAC (Sensor Medium Access control) protocol by turning off/on radio frequencies through this saves energy and life of network.**

Key Terms: **Energy consumption, Mobile Wireless Sensor Network, Packet overhead, Mobile nodes, AOMDV, S-MAC.**

I .INTRODUCTION

Mobile Wireless sensor network is collection of sensor nodes which having mobility .Mobile wireless sensor network can be divided in to two categories: Limited mobility and Random mobility .Limited mobility means specific nodes that roam around the network to perform an exclusive task (e.g., mobile sink nodes) and Random mobility where the nodes (sensor nodes) roam around the area of deployment to collect the data needed for the application. By applying mobility to sensor nodes the scope of applications will be enlarging and to implement WSNs. (eg: social activity monitoring, cattle monitoring). Mobility can introduce a critical challenge to the operation of the deployed network if mobility is random. i.e., sensor nodes are also mobile in the network, the effect is greater as the network topology changes become rapid and that affects the connectivity of the nodes because we can't predict in which direction the mobile nodes will move. Topology changes have an effect on the routing operation as the links need to be rebuilt frequently; therefore, there is an increase energy consumption of the nodes. Mobility affects the MAC protocol operation because the connectivity can suffer from broken connections due to the transmission range of the wireless interface. The location of the sensor node(s) in random mobility is of importance because the sensed event is attached to the location of the sensor node.

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II. EXISTING SYSTEM

Existing System is a cross-layer operation model for IEEE 802.15.4 based on mobile wireless sensor network. In which four module Network initialization in this module we identify source and destination in which network by sending neighbour discovery(ND) message to its neighbours from this we know which node is interest to send data to destination and this message also stores neighbours information with location in NB-List of ND-message .after this second module is neighbour node finding in which by sending route request(RREQ) message to its neighbours for establishment of route from source to destination and also they broadcasting Hello messages which having source address ,next hop, residual energy and destination address .when destination node receives RREQ message they send route replay (RREP)message through unicast route in reverse order module .third module is distance calculation by Euclid distance measures and establish route with shortest distance and transfer data from to source to destination. Final module is only route will be active remaining nodes will be going to periodically listen and sleep. In existing system there is no clustering mechanism and is best energy efficient routing compare with standard IEEE802.15.4 routing. There also Some disadvantages In existing system they use only unicast path. If route fails we are consider another route. For that in existing system creating new route by using network reinitialized hence the overall energy consumption cannot be manageable. They take some time for network reinitlization for alternative path hence Packet delivery will be delay. If we want send same data to two different Destinations existing system does not support.

III. PROPSED SYSTEM

In this propose system we use same process but adding new routing protocol which we use multipath routing protocol from source to destination route establishment process i.e.., AOMDV routing protocol which will avoid overheads in routing procedure, reducing packet delay and SMAC protocol is used for to increase the network life time by periodically listen to sleep the nodes.

AOMDV: Adhoc on demand multipath distance vector routing(AOMDV) is extension the Adhoc on demand distance vector routing(AODV).In AOMDV routing an intermediate node maintains the multipath entries of routing information Unlike AODV. It is the hop-by-hop routing protocol. The main difference between primary and an alternate path is hop count is equal to one. AOMDV routing have main two steps route discovery and route maintains. In route discovery process source node send route request (RREQ) message to its neighbours they check neighbour next hop is destination or not. If no they again broadcast RREQ message until RREQ message reaching to destination node when reaching the next hop is destination node send back route replay (RREP) message to source node in the same reverse route order. Next step is route maintains in this stage transfer data source to destination if route fails in this routing they send route error (RERR) message to source and where the route fails from that doing same above process and establish another route and transfer data.

Sensor MAC (S-MAC): uses a synchronized duty cycle and schedule periodic wake and sleep. SYNC packet to exchange periodically sleep schedules with its neighbours. It contains transmitter address and the next sleep time. For the above

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reasons smac is reducing energy consumption and minimizing idle listening to channel by making sleep and listen periods predefined and constant.

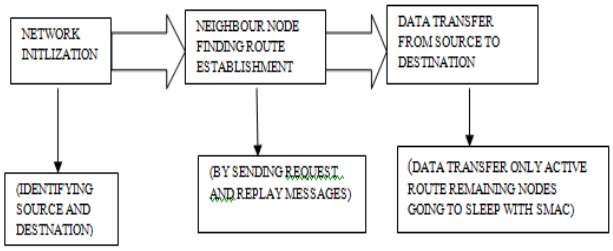

Fig 1: Overview Proposed system

IV.RESULT AND ANALYSIS

TABLE1

Number of nodes	30
Initial energy	1000
Mobility	2m/s
Propagation Model	Two Ray Ground
Simulation Time	10 seconds
Mac Protocol	IEEE 802.15.4
Routing Protocol	AOMDV
Transport Protocol	UDP
Application	CBR
Packet size	1000 bytes

We run the simulation environment area is 1000*1000 and simulation time is 10 seconds we observe the following scenarios.

Scenario 1: Network simulator with 30 nodes

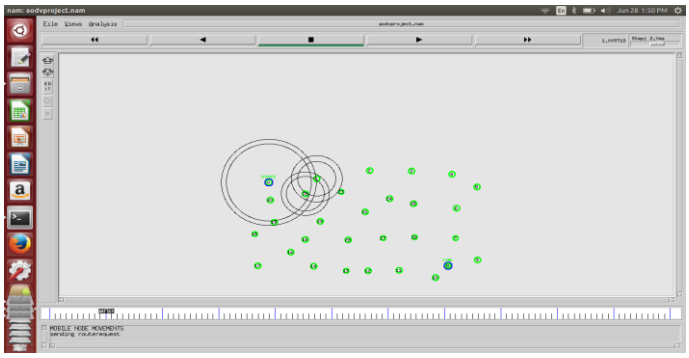

Fig 2. Broadcasting RREQ message to Neighbour nodes

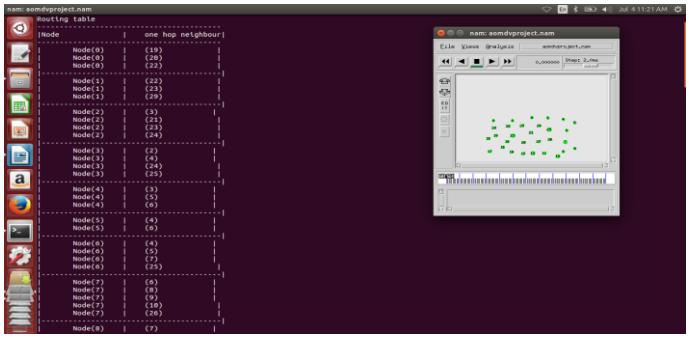

Fig 3: Routing table of network

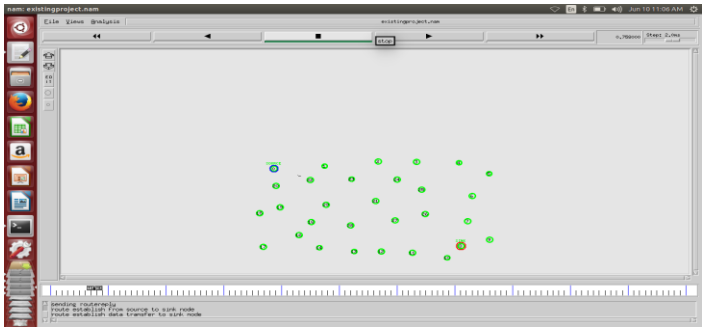

Fig 4: Datatransfer from source to destination through only active route

The proposed operational model consumed energy lower than the existing model because there is no initialization of whole network. In proposed model when route will fails they send route error message where route fails and establish route from source to destination and transfer data only through active route the remaining nodes going to periodically listen & sleep

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with smac protocol. In which we have taken two On-demand (Reactive) routing protocols, namely Ad hoc On-Demand Distance Vector Routing (AODV) and Ad-hoc On-demand Multipath Distance Vector Routing (AOMDV)and The mobility model used is Random waypoint mobility model because it models the random movement of the mobile nodes We ran the simulation environments for 10 sec. Packet delay, packet loss and throughput are calculated for AODV, AOMDV. The results are analyzed below with their corresponding graphs from studying AOMDV is better performance.

Scenario 2: packet delay comparison

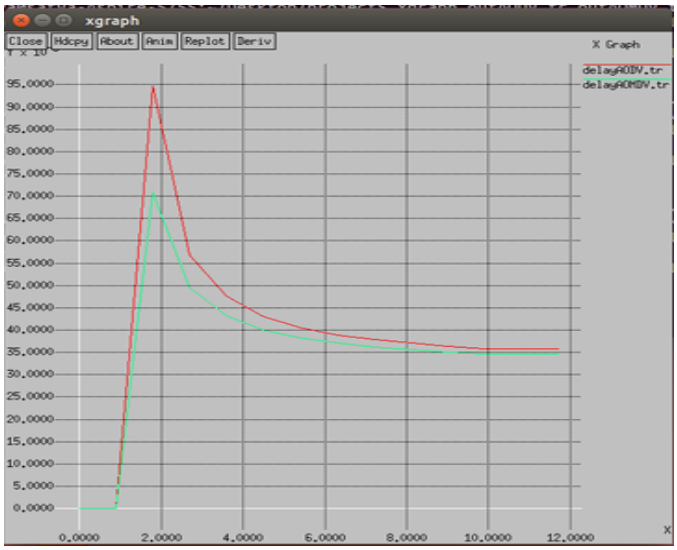

Fig 5: Comparison of AODV and AOMDV packet delay vs... Time

Scenario 3: Throughput comparison

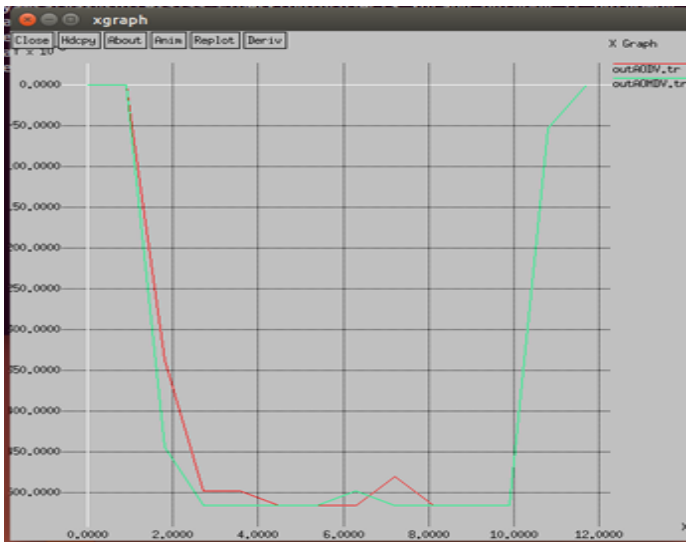

Fig 6. Comparison of AODV and AOMDV throughput vs... Time

Scenario 4: Energy consumption comparison

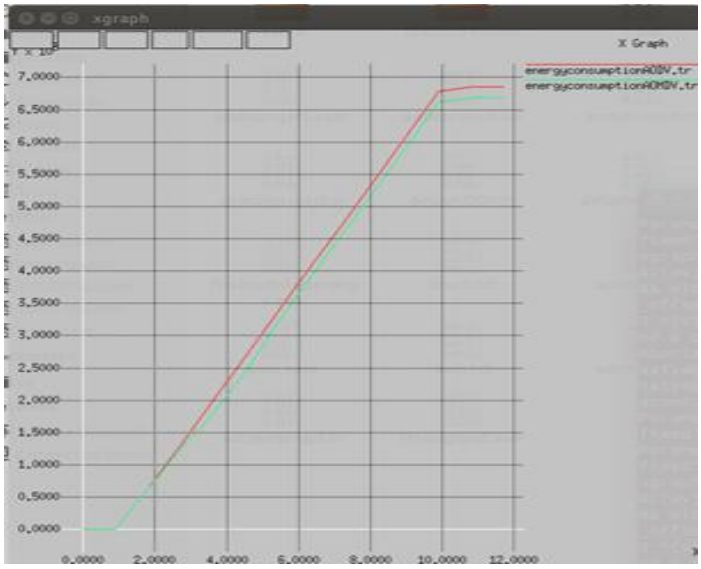

Fig7. Comparison of AODV and AOMDV energy consumption vs... Time

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Scenario 5: Packet loss comparison

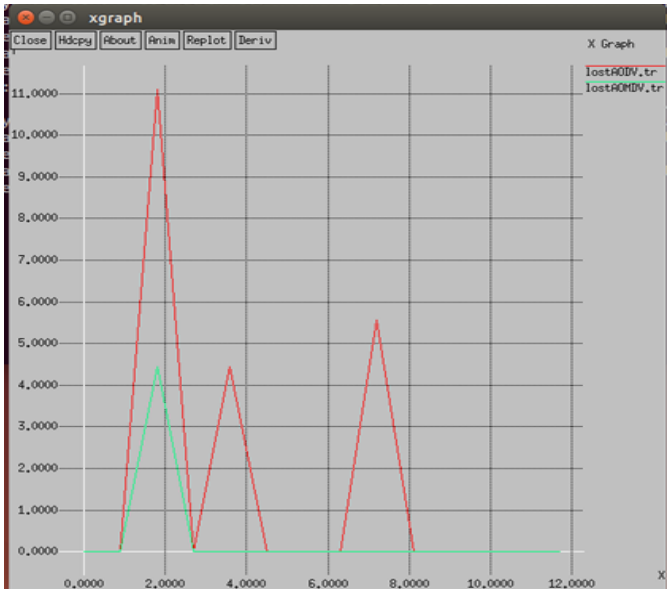

Fig 8: Comparison of AODV and AOMDV packet loss vs...Time

V. CONCULSIONS

This paper evaluated the performances of AODV and AOMDV using network simulator (NS-2)they comparison based on of packet delay, routing overhead incurred, energy consumption and number of packets loss, we conclude that AOMDV is better than AODV. AOMDV Out performs AODV due to its ability to search for alternate routes when a current link breaks down. Though AOMDV incurs more routing overheads while flooding the network and packet delays due to its alternate route discovery mechanism, it is much more efficient when it comes to packet delivery for the same reason. Hence, we can say that when network load tolerance is of no consequence, AOMDV is a better on-demand routing protocol than AODV since it provides better statistics for packet delay and number of packets loss. But if routing overhead is a concern, then AODV is preferred over AOMDV.

REFERNCES

1. Marwan -Jemeli, Fawnizu A. Hussin, Marwan Al-Jemeli, and Fawnizu A. Hussin," An EnergyEfficient Cross- Layer Network Operation Modelfor IEEE 802.15.4- Based Mobile Wireless Sensor Networks," ," *IEEE SENSORS JOURNAL, VOL.*15, NO. 2, FEBRUARY 2015.
2. E. Felembanet al., "SAMAC: A cross-layer communication protocol for sensor networks with sectored antennas," IEEE Trans. Mobile Comput.,vol. 9,, Aug. 2010.
3. S. A. B. Awwad, C. K. Ng, N. K. Noordin, and M. F. A. Rasid, "Clusterbased routing protocol for mobile nodes inwirelesssensor network," inProc. Int. Symp. Collaborative Technol. Syst. (CTS), 2009.
4. S. Gowrishankar, S.K. Sarkar, and T.G. Basavaraju, "Performance analysis of AODV, AODVUU, AOMDV and RAODV over IEEE 802.15.4in wireless sensor networks," in Computer Science and Information Technology, 2009. ICCSIT 2009. 2nd IEEE International Conference on, Aug 2009.
5. K. Vanaja , Dr. R. Umarani" An Analysis of Single Path AODV Vs Multipath AOMDV on Link Break Using ns-2" International Journal of Electronics and Computer Science Engineering.

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