ISSN2394-3777 (Print)
ISSN2394-3785 (Online)
Available online atwww.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 5, Special Issue 12, April 2018

Energy Efficient ExtendedFine Grained Analysis in Mobile Ad hoc Network

Kavya vijayan[#1], A.Balakumaran[*2]

M.Tech Student[1], Assistant Professor [2]

M Tech Communication, ECE Department, A P J Abdul kalam Technological University
[1]kavyavijayan476@gmail.com

[2]meshachpaul1@gmail.com

***Abstract*— Mobile adhoc network is a group of wireless mobile nodes which makes a temporary network.In most of the trust based security schemes for MANET's packet loss is considered as the major limitation.With a fine grained analysis scheme most of the issues causing packet loss can be avoided by using certain network parameters such as MAC layer information, QUEUE overflow and the rate of link changes.It includes malicious nodes,node mobility,and interference. In the existing schemes energy is not considered as the main parameter for packet loss. In this paper we propose a new multipath routing protocoli.e. FF-AOMDV which is a combination of fitness function and the AOMDV protocol and can optimize the energy consumption which is the extended FGA algorithm.By implementing the proposed algorithm the route selection will be totally different.This reduces the energy consumption by considering certain information about the nodes energy level.The proposed protocoli.e. extended FGA algorithm is compared with the basic FGA scheme**

Key words: mobile adhoc network,fitness function, MAC, fine grained analysis,AOMDV

I INTRODUCTION

Mobile Adhoc Network(MANET) is a collection of wireless mobile nodes with an infrastructure less network.Each device in a MANET is free to move in any direction and therefore change its link to other devices frequently.Various routing protocols are used in MANET for the routing purpose.This topologies will possibly be composed of wireless links that are relatively bandwidth constrained. AOMDV(Adhoc ondemand Multipath Distance Vector Routing Protocol) is the main multipath routing protocol that we used in this paper.The main limitation in the MANET is the packet loss caused by several attacks such as interference.Most of the existing schemes are considering packet loss as the main limitation.

In mobile adhoc networks nodes rely on batteries as the energy source and when these batteries get exhausted then the complete network will breakdown.Therefore we should consider energy as the main parameter in order to avoid the problem due to energy consumption.Various power aware routing protocols are available which minimizes the energy consumption by considering the nodes energy level. Multipath routing protocols are used to choose the best route from several available routes. By using these protocols more energy is consumed at the time of route discovery process and thus can minimizes the energy consumption at the time of data transfer.

A fine grained analysis is performed at the time of data transfer to avoid the packet loss due to various reasons such as malicious nodes, QUEUE overflow and interference. Without such analysis most of the malicious nodes may be undetected and thus the innocent nodes may punished.In MANET trust can be defined as to what extent a node can fulfill the expectation of other node.Each node maintains a trust table to store the trust values of the neighboring nodes.Based on these trust values the routing decisions are taken.In most of the traditional non-FGA scheme,these accurate trust based scheme is not found,so that the whole misbehaving nodes may be undetected.The attacks caused on the nodes to become malicious nodes are the node drops data packet due to misbehaving characteristics,and wireless link transmission errors,mobility and congestion.

Routing is the act of moving information from source to destination in an internet network.During this process at least one intermediate node within the internetwork is encountered.So detecting and reacting to packet losses is an important component of any comprehensive security current FGA scheme solution.There are scenarios,however in which current trust based scheme fail to capture the real causes for packet loss.This leads to the introduction

ISSN2394-3777 (Print)
ISSN2394-3785 (Online)
Available online atwww.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 5, Special Issue 12, April 2018

of new algorithm which proposes the energy efficient routing protocol i.e. FF-AOMDV.

The rest of the paper is organized as follows. Section II discusses literature survey. Section III presents the proposed extended FGA scheme.

II LITERATURE SURVEY

In this section we discuss existing trust based security schemefor MANET Muhammed Salim Khan [5] proposed a new technique i.e., Fine Grained Analysis which minimizes the packet loss in MANET.To analyze malicious nodes and to avoid the packet loss by using the network parameters and the attacks due to the misbehaving characteristics of several nodes are minimized by this proposed scheme. In this scheme only the packet loss due to malicious nodes are considered some another important issues are remain undetected.

Mueen Uddin [4] proposed a new multipath routing protocol i.e. FF-AOMDV, which is the combination of fitness unction and the adhoc on demand multipath routing protocol.This protocol not only considering the energy consumption but also the route discovery process i.e. this scheme finds new route after failed to capture the existing routes.This protocolincreases the network lifetime as well as its route discovery process

III PROPOSED SYSTEM

In this paper we proposed a new multipath routing protocol FF-AOMDV in addition to the Fine Grained Analysis and thus extended FGA is used. FF-AOMDV is the combination of fitness function and the ad hoc on demand multipath distance vector routing protocol. It is a popular multipath routing protocol. The fitness function provide route discovery process.In this system energy is considered as the main parameter while selecting new routes for the packet forwarding.In this system several paths are available in between the source and destination nodes.AOMDV protocol provides two services that is route discovery and route maintenance,so AOMDV is considered as the main protocol used in MANET.

DESTINATION
SEQUENCE NUMBER
ADVERTISED_HOPCOUNT
ROUTE LIST {(hop count1,next hop1),(hop count2,next hop2)}
EXPIRATION_TIMEOUT

Fig 1: AOMDV routing table

In the existing scheme a Fine Grained Analysis is performed to find the reason for packet loss while forwarding the data packets and with certain network parameters such as MAC layer information,QUEUE overflow and node mobility,the actual reason for packet loss is discovered.3 main types of packet losses are considered.

1. Node related losses
2. Congestion related losses
3. Mobility related losses

These losses are mainly occur because of the misbehavior of nodes and those nodes are termed as malicious nodes.Some nodes which are not participate in the route discovery process in order to save its own energy and some nodes give falsified information about the routing process.So these types of nodes which misbehavior in their character is known as malicious nodes. After all the FGA only take care of packet forwarding and solving the packet loss due to malicious nodes.

FF-AOMDV protocol introduced in the FGA scheme and make it as extended FGA algorithm and thus considering energy consumption as the main parameter. Fitness function includes the route discovery process and route maintenance.By implementing the new scheme the route selection will be easier than the existing.When a source node initiate RREQ i.e. route request to other nodes,the source node will have 3 types of information about the neighboring and can find the shortest and optimized route path with minimized energy consumption.The information's are

1. Information about each nodes energy level.
2. The distance of every route
3. The energy consumed by each node at the time of route discovery process

With these information assume that the route with less energy could possibly the

(a) The route that has the shortest distance
(b) The route with the highest level of energy
(c) Or both

So the source node send data packet to the node have the highest level of energy after it calculating the energy consumption. Like other multipath routing protocol AOMDV initiates the route discovery process. When all the routes fails to carry the packets and source node select next route after checking the energy level of each node from the routing table which has the shortest route and minimum energy consumption. Finally the system is compared with FGA scheme parameters control

ISSN2394-3777 (Print)
ISSN2394-3785 (Online)
Available online atwww.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 5, Special Issue 12, April 2018

overhead, energy consumption, average delay, detection ratio, throughput, false detection ratio. Packet delivery ratio with same number of nodes.

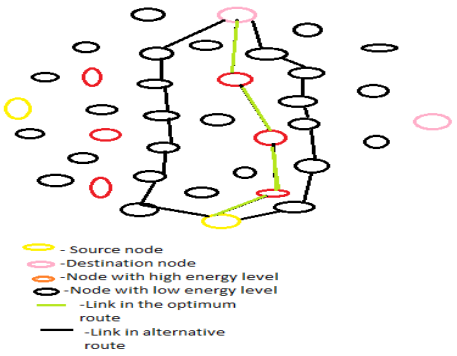

Fig 2: Optimum route selection in FF-AOMDVV

IV RESULT AND DISCUSSION

This section shows the clear analysis about the performance of the existing and proposed system.The graphical representations are based on certain parameters which is used to describe the complete analysis, they are energy consumption, routing overhead ratio, packet delivery ratio and throughput.

ENERGY CONSUMPTION

Energy consumption refers to the amount of energy that is spent by the network nodes within the simulation time.The energy is calculated by considering the initial and final values of energy that consumed by each node.Using the equation (!) energy consumption can be correctly calculated.

$$EnergyConsumption = \sum_{i=1}^{n} (ini(i) - ene(i)) \quad \ldots\ldots(1)$$

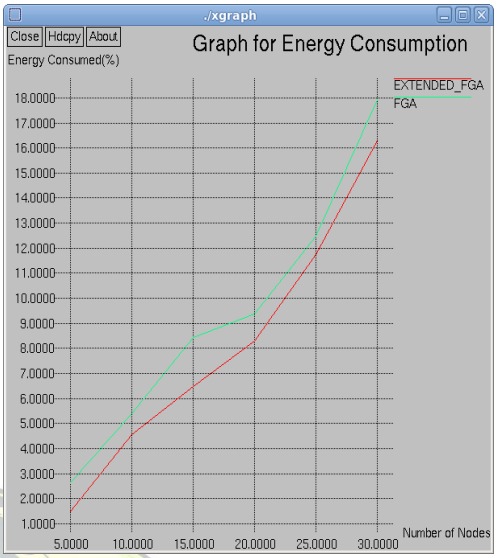

Fig 3:comparison of FGA and extended FGA scheme in case of energy consumption

The graph shows that the comparison for two system that is extended FGA and FGA scheme with varying the number of nodes.From this we can correctly identify that the proposed scheme that is extended FGA shows good performance than the existing scheme and which minimizes the energy consumption.When sending the data packets, the source node distributes the packets through the routes with a high level of energy and the average one to balance the load on more than one route. This process consumes less energy than sending the traffic through one route.

ROUTING OVERHEAD RATIO

The routing overhead ratiometric is the total number of routing packets, which is divided by the overall number of data packets that were delivered. This metric offers an idea about the extra bandwidth that is consumed by the overhead in order to deliver data traffic. The routing overhead ratio should be minimized to improve the performance.The following formula represents the computation of the routing overhead.

Routing overhead (%) = No of routing packets/ (No of routing packets+No of data packets sent)*100 ……...(2)

The routing overhead has an effect on the network's robustness in terms of the bandwidth utilization and battery power consumption of the nodes.This study analyzed the average number of routing packets that is required to deliver a single data packet. Fig 4 gives the complete overview of the routing overhead

ISSN2394-3777 (Print)
ISSN2394-3785 (Online)
Available online atwww.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 5, Special Issue 12, April 2018

ratio which is the comparison of the extended FGA and FGA.

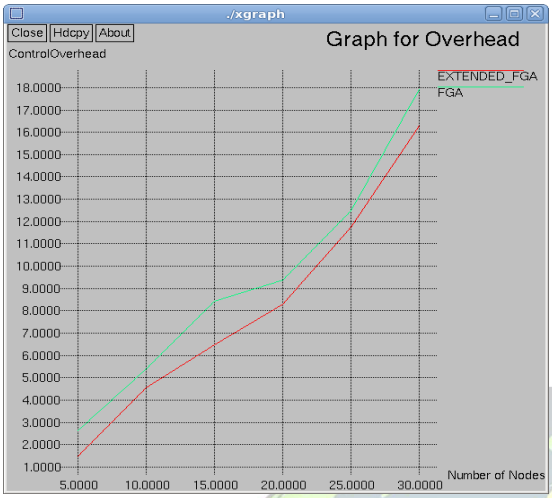

Fig 4: Routing overhead ratio for extended FGA and FGA

With varying the node speed the figure shows the difference routing overhead and identify that the extended FGA scheme possess lower routing overhead ratio than the FGA scheme.

PACKET DELIVERY RATIO

This means the ratio of the data packets that were delivered to the destination node to the data packets that were generated by the source.The higher the ratio, the better the performance of the routing protocol. PDR is calculated by.

PDR = (number of packets received/number of packets sent}*100
……. (3)

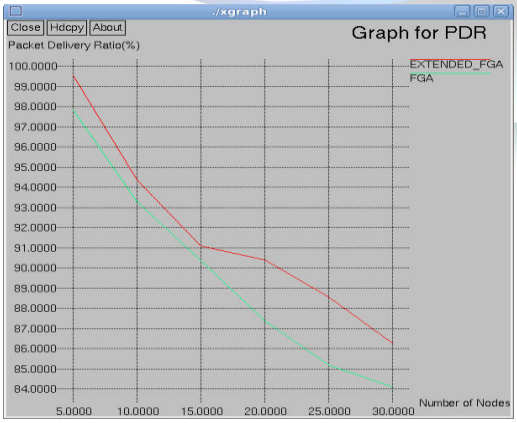

Fig 5: Variation of packet delivery ratio for extended FGA and FGA

Graph shows the clear analysis of packet delivery ratio of the extended FGA andFGA scheme. Packet delivery ratio is high for the extended FGA.

THROUGHPUT

Throughput is known as the number of bits that the destination has successfullyreceived.

TP = (number of bytes received *8/simulation time) *1000kbps
……..(4)

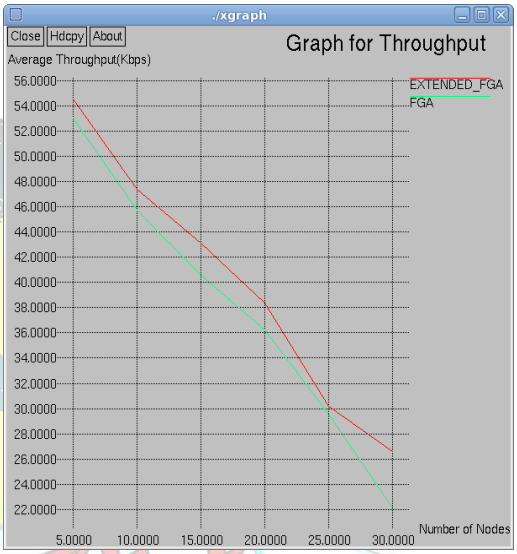

Fig 6: Throughput for extended FGA and FGA scheme

Throughput can be increased with this protocol and the high throughput gives better network lifetime.

V CONCLUSION

In this research,we proposed a new energy efficient routing algorithm which is the extended Fine Grained Algorithm which is the combination of fitness function and ad hoc on demand multipath distance vector routing and the FGA scheme is simulated using NS-2.The analysis shows that the proposed extended FGA algorithm outperformed the existing FGA algorithm in terms of packet delivery ratio,average delay,route overhead ratio,energy consumption. These are the parameters used to analyze two schemes.By taking the nodes with high energy level for the routing purpose and thus can maintain the energy and improve the route discovery process.The main benefit obtained is the high network lifetime.FF-AOMDV protocol introduced in the FGA and thus obtain the improved version of fine grained analysis after all the energy consumption is minimized.

ISSN2394-3777 (Print)
ISSN2394-3785 (Online)
Available online atwww.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 5, Special Issue 12, April 2018

ACKNOWLEDGMENTS

It is my pleasure to be indebted to various people,who directly or indirectly contributed in the development of this work.I thank the authors of the papers which I have referred while doing this work and I sincerely thank my lecturers for the great support and guidance.

REFERENCES

[1] S. Corson and J. Macker, *Mobile Ad Hoc Networking (MANET): Routing Protocol Performance Issues and Evaluation Considerations*. RFC Editor,1999.

[2] Q.-A. Zeng and D. P. Agrawal, *Handbook ofWireless Networks and Mobile Computing*. New York, NY, USA: Wiley, 2002. C. E. Perkins, ``Ad hoc networking: An introduction," in *Proc. Ad Hoc Netw.*, 2001, pp. 20_22.

[3] S. Zheng, W. U. Weiqiang, and Q. Zhang, ``Energy and link-state based routing protocol for MANET," *IEICE Trans. Inf. Syst.*, vol. 94, no. 5,pp. 1026_1034, 2011.

[4] M. K. Marina and S. R. Das, ``Ad hoc on-demand multipath distance vector routing," *Wireless Commun. Mobile Comput.*, vol. 6, no. 7, pp. 969_988,2006.

[5] M. Tekaya, N. Tabbane, and S. Tabbane, ``Multipath routing mechanism with load balancing in ad hoc network," in *Proc. Int. Conf. Comput. Eng.Syst. (ICCES)*, Nov. 2010, pp. 67_72.

[6] L. Gatani, G. L. Re, and S. Gaglio, ``Notice of violation of IEEE pub-lication principles an adaptive routing protocol for ad hoc peer-to-peer networks," in *Proc. 6th IEEE Int. Symp.WorldWireless Mobile Multimedia Netw.*, Jun. 2005, pp. 44_50.

[7] Y. Chaba, R. B. Patel, and R. Gargi, ``Issues and challenges involved in multipath routing with DYMO protocol," *Int. J. Inf. Technol. KnowlManage.*, vol. 5, no. 1, pp. 21_25, Jan./Jun. 2012.

[8] S. Mueller, R. P. Tsang, and D. Ghosal, ``Multipath routing in mobile ad hoc networks: Issues and challenges," in *Performance Tools and Applications to Networked Systems*. Berlin, Germany: Springer, 2004,pp. 209_234.

[9] V. Balaji and V. Duraisamy, ``Varying overhead ad hoc on demand vector routing in highly mobile ad hoc network," *J. Comput. Sci.*, vol. 7, no. 5,pp. 678_682, 2011.

[10] M. Poonam and D. Preeti, ``Packet forwarding using AOMDV algorithm in WSN," *Int. J. Appl. Innov. Eng. Manage. (IJAIEM)*, vol. 3, no. 5,pp. 456_459, May

