iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 3 **Issue:** III **Month of publication:** March 2015

DOI:

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

Volume 3 Issue III, March 2015
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

Survey of Ant net based routing over mobile Ad hoc network

Mandeep Singh
Student M.Tech (CSE), Department of Computer Science, Lovely Professional University, Phagwara, India

Abstract- Ad hoc ant net based routing has extended the capabilities of ad hoc networks. Combination of these methods can enhance the network performance but the security threats for ad hoc routing are also exists for this type of hybrid routing. Solution for security threats contains the combination of detection & prevention algorithms. In this survey paper, we will explore the efforts made by the researchers to explore the threats that can degrade the network performance and the developed solutions for the same.
Keywords- Ad hoc Networks, Antnet Routing, QoS, MANET, Security

I. INTRODUCTION

MANET is a self-configuring network that does not have any central authority. Nodes act as transceiver which can send and receive the packets at same time. MANET supports the military applications, rescue operations, commercial applications. Limited capabilities of the MANETs can be extended by introducing the feature of Ant net based algorithms; called ad hoc ant net based MANETs. Routing protocols for this type of network contains the features of both protocols and with the features of ant net algorithms, ad hoc protocols can perform well.[3][11]. Following table:1 shows the Ant Algorithms & their characteristics.

Algorithm	Routing approach	Ant type	Problem	Energy aware	Path type
ABC	Proactive	Exploratory ants	Congestion	-	Single Path
Ant net	Proactive	FANTs& BANTs	Delay	-	Single Path
ARA	Reactive	FANTs& BANTs	Cache pollution	-	multipath
Ant AODV	Hybrid	FANTs& BANTs	Route Error	-	Single Path
AntHocNet	Hybrid	FANTs& BANTs	Overhead	-	multipath

Table:1 Ant Algorithms & their characteristics[7]

MANET based security threats can be subdivided into two main categories i.e. Active attacks & Passive attacks. In active attacks the hacker does analysis, watches network's performance, tries to get information and tamper it. Active attack can be external or internal. Active attack means to decay the performance; in this case it acts as the internal node. As the node becomes an active part of the system it becomes easier for it to destroy it. When the attacker gains power it can fabricate, alter and replay messages. Passive attack does not interrupt the normal network. In these kinds of attacks the attacker observes the communication in order to gain the valuable information. They want all the information related to the network, like how it works? Where does the data go and come from? Etc. This technique is quite helpful for the attacker as before it does harm the system it has a complete analysis of the communication of the network or its complete structure. [1][5]

II. LITERATURE REVIEW

Researcher have developed a new concept of routing by combining the concept of ad hoc network routing with the ant net

©IJRASET 2015: All Rights are Reserved

algorithm, called ad hoc ant net based routing/swarm intelligence but combination of these two routing technologies still suffer from the security threats because if a security threat exists against the ad hoc routing protocol, there may be a probability that same threat can degrade the performance of the ad ant net routing protocol also. So researchers further introduced some methods to detect/ prevent/ secure the ad hoc ant net routing. Now will discuss the efforts made by them to secure the network.

Kashif Saleem et.al [1] presented the Biological inspired Self-Organized Secure Autonomous Routing Protocol (BIOSARP). Its routing decisions depend on improved ant colony optimization (IACO) that calculates the optimal routing based on the link packet reception rate (PRR), remaining battery power and delay, which are acquired from neighboring nodes in the boot process and saved in a neighbor table for onward data forwarding. The storing process under BIOSARP helped to reduce the huge processing delay and traffic overhead. Extensive simulations were performed to analyze and compare the performance of BIOSARP. Simulation results show the efficiency the proposed scheme as compared to other methods i.e. E&D ANTS, SRTLD, and IEEABR etc.

Qinghua Shi et.al [2] proposed a secure QoS algorithm that uses ant colony optimization algorithm along with credit evaluation mechanism. Acceding to proposed method, nodes are introduced as the control factor in ant colony algorithm. This method discards all the nodes those cannot fulfill the QoS requirements and selected nodes are further optimized and finally an optimal route is selected by the ACO algorithm. Creditworthiness for the nodes is calculated on the basis of packet loss rate, energy and time delay of link, as ant colony optimization control factor etc. Node with high creditworthiness is select as the next hop, thus this algorithm can avoid some attack and the optimal route has higher reliability. Finally, the security of the algorithm is analyzed from a variety of network attack.

Suparna Biswas et.al [3] presented a secure check pointing way by electing gateway nodes and cluster head using model based on trust factor and ACO. They used ACO to check about availability and selfishness of nodes. MANET has various applications in different areas such as military, battlefields, disaster management, m-commerce application, controlling of mining activities, controlling of air traffic, etc. An efficient fault tolerant algorithm recovers the application so that the system should be available to the users. Proposed solution is based on ant colony that utilizes trust model so that checkpoint routing goes through only nodes which are trusted. It does not use any cryptography methods.

H. Simaremare et.al [4] proposed a secure protocol by using an ant algorithm. Ant agent put a positive pheromone when the node is trusted. Path communication is chosen based on pheromone value. They evaluated the performance of proposed protocol with/without using ant algorithm under DOS/DDOS attack. Simulation results show the performance of proposed protocol increases while using ant algorithm in term of packet delivery ratio and throughput but it could not manage the end-to-end delay.

Nabil Ali et.al [5] presented a secure routing protocol for sensor networks which uses ant colonization algorithm. Neighbor discovery is done using hello packets. It utilizes forward ants to gather and addition of reputation values in the path. Then, destination node utilizes backward ants to carry data and instructions of destination for security of route purpose. Proposed scheme takes two paths for data forwarding to resolve node failure. Simulation results show that as compared to iACO and LEACH protocols, the proposed scheme gives better performance in case of overheads and forwarding efficiency and can maintain better data delivery rate if there is malicious node present.

Vivekanand Jha et.al [6] did a survey of the different nature inspired routing algorithms developed for the MANETs those work in high mobile environment and having changing topology with restrictions on bandwidth and energy. These all are included in Swarm Intelligence. Swarm intelligence has many properties which are needed to deal with problems of this type of networks. They reviewed the major routing protocols inspired by collective behaviors observed in nature's self-organizing systems of ant and bee colonies, termite hills and bird flocks.

A. K. Abdelaziz et.al [7] discussed the vulnerability of MANET to security threats. It includes all types of threats belonging to malicious nodes as well as selfishness of node. There are many techniques developed in recent years to counter these attacks. Some of them are cryptography based solutions and trust based solutions etc.

Arafat S.M et.al [8] proposed a secured link quality, delay and energy conscious routing approach based on ACO . Route information is built up on the basis of link quality, delay and residual energy of the nearby nodes. It selects the efficient node based on the ANS mechanism and sends the data packets through that node. Ad hoc security algorithms incorporated for making the transmission more secured.

Anuj K Gupta et.al [9] discussed ant based routing protocols. It comes under the category of Swarm Intelligence. These protocols use behavior of ants to find path from their nest to food. Ants track a substance (pheromone) on the ground left by other ants to find shortest route. Comparison between ant based protocols and other protocols has done, which shows that ant based protocols outperform other MANET protocols in many ways.

©IJRASET 2015: All Rights are Reserved

Parisa Memarmoshrefi et.al [10] presented a self-organized public key authentication scheme using antnet algorithm. key pair are generated by each node itself and security certificates is assigned to each neighboring node Value of Pheromone related to certificate chains represent the node's trust level. Simulation results show the path identification and its trust on the basis of certificate chains which are capable enough to protect the network from malicious nodes.

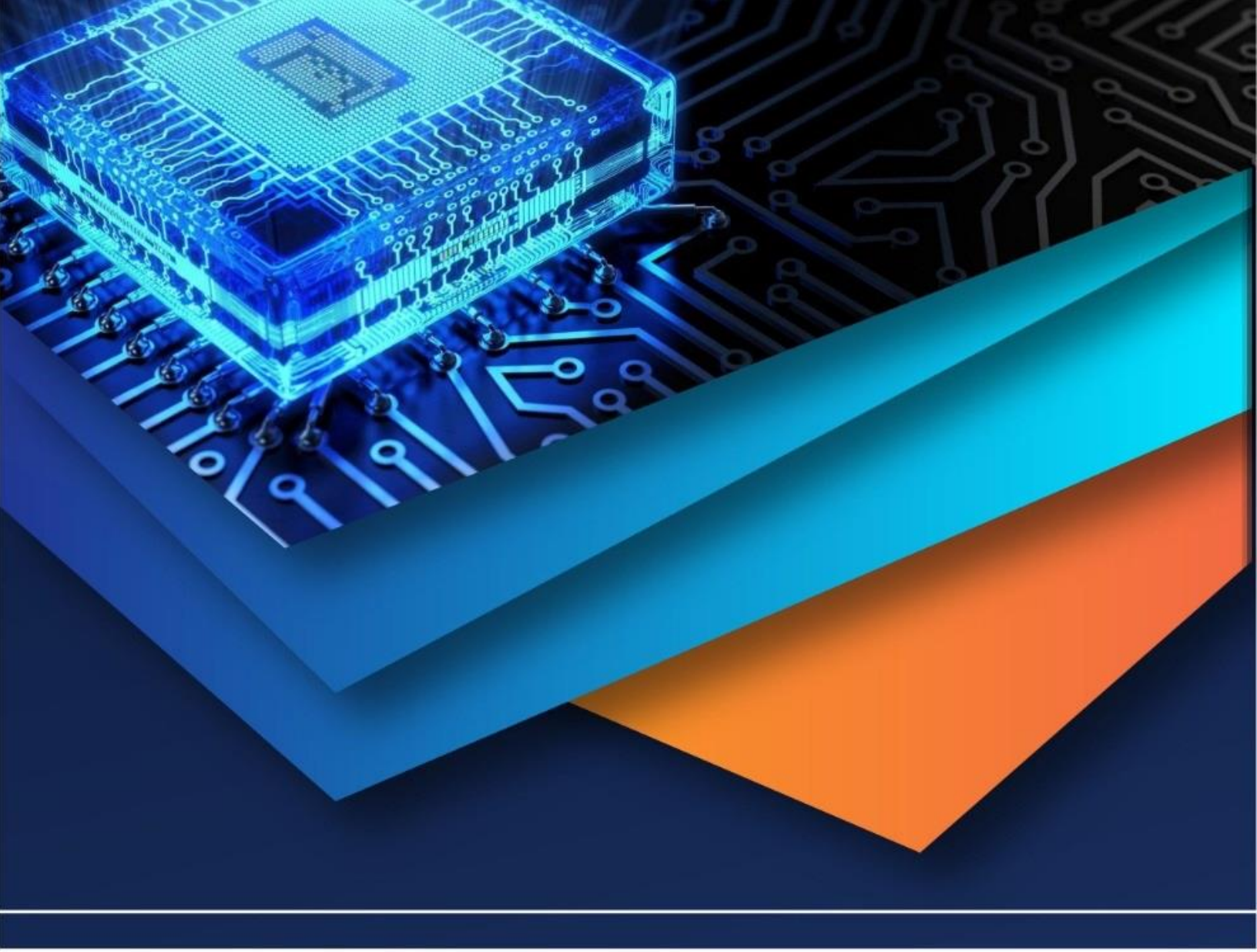
III. CONCLUSION

Researchers have developed a new concept of routing called ad hoc ant net based routing/BeeHoc/Ant Hoc/Swarm intelligence. Various security threats are available those can degrade the ad hoc routing protocol's performance. This new type of routing technology also suffers from the security threats which were developed for the MANET's routing protocols. Authors addressed the issues related to security threats and proposed some methods to secure the network. Their proposed solutions include Secured QoS link, Self-Organized Secure Routing Protocol, secure check point, malicious nodes prevention, public key cryptography etc, in order to secure the Ad hoc ant net based network. As per this survey, we can conclude that there is need to explore the security threat detection and prevention schemes for such type of network because these days, research is limited up to the MANET based security threats only which can be launched over Ad hoc ant net based networks.

REFERENCES

[1] Kashif Saleem, Norsheila Fisal, Member, IEEE, and Jalal Al-Muhtadi, "Empirical Studies of Bio-Inspired Self-Organized Secure Autonomous Routing Protocol", IEEE SENSORS JOURNAL, VOL. 14, NO. 7, JULY 2014, pp 2232-2239.
[2] Qinghua Shi, Zhong Li, "A Secure QoS Routing Algorithm Based on ACO for Wireless Sensor Network", IEEE International Conference on High Performance Computing and Communications & 2013 IEEE International Conference on Embedded and Ubiquitous Computing, IEEE-2013, pp 1241-1245.
[3] Suparna Biswas, Priyanka Dey, Sarmistha Neogy, "Trusted Checkpointing Based on Ant Colony Optimization in MANET", Third International Conference on Emerging Applications of Information Technology (EAIT), 2013, pp 433-438.
[4] Simaremare, H. ; Univ. of Haute Alsace, Colmar, France ; Abouaissa, A. ; Sari, R.F. ; Lorenz, P., "Performance analysis of optimized trust AODV using ant algorithm", ICC, IEEE-2014, pp 1843 – 1848.
[5] Nabil Ali Alrajeh, Mohamad Souheil Alabed, and Mohamed Shaaban Elwahiby, "Secure Ant-Based Routing Protocol for Wireless Sensor Network", International Journal of Distributed Sensor Networks Volume 2013, Article ID 326295,pp 1-9.
[6] Vivekanand Jha, Kritika Khetarpal , Meghna Sharma, "A Survey of Nature Inspired Routing Algorithms for MANETs", IEEE,2011 pp 16-24.
[7] W. Zhang*a, P. Passow*b, E. Jovanovc, R. Stolla and K. Thurow, "A Secure And Scalable Telemonitoring System Using Ultra-Low-Energy Wireless Sensor Interface For Long-Term Monitoring In Life Science Applications", CASE-2013, pp 617-622.
[8] Arafat S.M. Qaed, T. Devi, "Secured Link Quality, Delay and Energy Aware Routing Protocol (SLQDEARP) For Mobile Ad Hoc Networks", IEEE International Conference on Intelligent Interactive Systems and Assistive Technologies, IEEE-2013, pp 15-20.
[9] Anuj K. Gupta, Harsh Sadawarti, and Anil K. Verma, "MANET Routing Protocols Based on Ant Colony Optimization", International Journal of Modeling and Optimization, Vol. 2, No. 1, February 2012, pp 42-49
[10] Parisa Memarmoshrefi, Roman Seibel, Dieter Hogrefe,"Bio-inspired Self-organized Public Key Authentication Mechanism for Mobile Ad-hoc Networks ",Bio-Inspired Models of Network, Information, and Computing Systems Social Informatics and Telecommunications Engineering Vol. 87, Springer-2012, pp 375-386
[11] Pimal Khanpara, Sharada Valiveti,K. Kotecha, "Routing in Ad Hoc Network Using Ant Colony Optimization", Communication and Networking Communications in Computer and Information Science Volume 120, 2010, pp 393-404

©IJRASET 2015: All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)