An optimization scheme for data transmission in MANET

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***Abstract*- MANET is an important area of research where the packet delivery ratio and overhead ratio relay count is important factor, which claims as routing protocol to work with number of packets and its simulation. In our dissertation the base work is considered as Ant colony optimization from the base paper which works with the phonemes finding and further upon marking the node ,best possible node can be find out and packet transmission process can be perform using existing algorithm. The further issues associate with the existing algorithm is increasing overhead and packet drop while delivering the large number of packet , also while dealing with large size packet , it does not process large data size packet. Thus in order to overcome the dues here EQOS Ant colony optimization technique is proposed by our work, which claims and process the work in divide and conquer paradigm along with the Ant colony feature. As it takes use of the replica based concept and further the packet replication and transmission is performed using the proposed algorithm. The existing and proposed approach were implemented using One simulator and further the algorithm is executed for 5000 second as simulation time and result were observed by the reports module. Finally the result observed as packet delivery ratio, relay and overhead ratio were computed via both the simulated algorithm. Thus the approach driven by us, outperform a best work among the studied in the field of network which make use of Ant colony Approach. A comparison analysis for the existing and proposed technique over the parameters called relay, Overhead and PDR is presented which provides an enhanced QoS (Quality of Service) In MANET.**

Keywords: MANET (Mobile Ad-hoc Network), ACO (Ant Colony Optimization), Clustering, Routing Protocol Routing Algorithm, QOS, Network utility.

I. INTRODUCTION

Mobile ad hoc network (MANET) is a wireless network for mobile devices; it is a self-configurable network which does not use any infrastructure in that network devices are freely moves anywhere in the network. Topology of the frequently changes during the whole process. The major challenge in this network is to maintain links and provide information which is required to control the traffic in this network. There are various type networks are there like VANET (vehicular Ad –hoc network), Smartphone ad-hoc network etc. Routing is the biggest issue in the mobile ad hoc network because normal routing algorithms are not efficient to provide solution to transmit data in mobile ad hoc network.

Routing Protocols:

"Routing is the process of exchanging information from one program to the other program in a network." Routing is the process of forwarding packet from source to its destination using most effective or efficient route. Efficiency of the route is measured in various number of metrics like, Number of hops, traffic, security, etc. In Adhoc network each device node acts as specialized router itself.

There are three types of Routing Protocols in ad hoc networks:
a) Proactive/Table driven routing protocol
b) Hybrid Routing Protocol
c) Reactive Routing Protocol

Ant Colony Optimization

The basic principle of an ant routing algorithm is mainly the depositing of pheromone on the path followed by the ant. They follow simple rule of following the path which has higher concentration of pheromone. The pheromone Concentrations on a path allow the other ants to find their way to the food source. Thereby more ants follow the same path and more and more pheromone is deposited on the path which is the shortest route to the food source.

Ant routing basic principle can be defined as:
1. Each network node sends a number of discovery packets -forward ants (F-ANT) towards the selected destination nodes of the network.
2. The stochastic tables replace the routing at each node in order to choose next hops as per the weighted probabilities available.
3. The routing tables are changed for selection of the next node in the network.
4. When forward ant (F-ANT) reaches the destination node, it generates a backward ant (B-ANT) and then dies. Similarly in MANETs routing, the new packet created and sent back to the source will propagate through the same path selected by the forward ant (F-ANT).

II. RELATED WORK

Mobile ad hoc networks (MANETs) are self-organizing, freelance networks that don't need any centralized infrastructure. When source node has to send data to destination node, it goes for broadcasting of route request messages in the network. The path that is Chosen to send data to destination node is usually the shortest path. . In past many researchers have worked upon optimizing the route selection procedure to find the best possible path to forward the data to the destination node. One of such advancements is inspired from food searching behaviour natural species such as ants. The study so named as Ant Colony Optimization which is inspired from food searching behaviour of ants. To finding the best optimized path to send data from source node to the destination node. The optimization is done by taking into consideration the energy of the nodes, pheromone levels of the paths and the Euclidean distance of the paths. They have defines

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implementation of enhanced ACO and comparison of its performance with ACO routing algorithm is done in terms of packet delivery ratio, throughput and energy level. Performance of EACO algorithm in comparison of ACO is better.

Table 1: Different algorithm been performed in the field of network communication

Algorithm or approach	Description	Advantage	Disadvantage
Ant Based Approach	A real ant's behavior of finding path from the different routes. A significant pheromone trail use for finding the path for other ants.	Two way path traversing is possible. All the other node no need to find path separately.	Once the path is broken or disturbed, it needs to reconfigure the complete path. Does not imply different topology, if required.
IP-based scheme	Single and multiple paths routing IP based scheme is applied in order to transform the packet.	Single path routing is simple and scalable; It is simple because the route between the source node and the destination node can be established in a specific period of time. Multipath routing that uses redundant paths, multipath routing can largely address the reliability, security and load balancing issues of single path routing protocols.	It does not efficiently satisfy the requirements of resource constrained WSNs.
Tree based clustering Approach	This algorithm preserves energy by turning off radio (entering sleep mode) of either impossible or unnecessary nodes, which observe almost the same information, based on their location information to remove redundant data.	The algorithm balances the energy consumption. It increase lifetime by constructing minimized spanning tree in each cluster.	Communication from one node to another node may delay sometime to approach.

III .PROPOSED METHODOLOGY

Here we are Optimizing our technique for routing and after getting a route for the communication we are using particular strategy to transfer the data on to the MANET, which is an efficient technique in order to tackle various attacks on network. In order to increase life time with packet delivery ratio we can further improve the algorithm in following way. We can further proposed a Divide and conquer technique in heavy network where the total number of node can further attempt and divide in less data packet size using which the mechanism along with Ant colony optimization. The algorithm first analyse the packet size which can able to carry with the ant algorithm or not, if the Packet size defined in more than the defined value then packet is divided using the replication factor, here replication factor means number of packet generated from the existing heavy size packet and then further small packets transferred from the communication medium. The reverse process further obtain where the data packet can be retrieved using the reverse conquer strategy in the system.

ALGORITHM

Algorithm Steps –

1. Input phase: in this phase the algorithm is considered to get the input as a packet size to deliver, the packet size can be tread as the function input for erasure provided in algorithm.
2. Second phase considered as replication factor as 5, as the 5 replication factor provides a standard number of packet creation with the current fragmented packets.
3. Process number of packet generation – In this step the number of packet generation is provided which is based on the input packet size and the threshold size of packet which is considered as 15, as the standard size of packet transmission , having the value for packet size as 15 the maximum output is obtained. Based upon the packet size the packet (number of data packet to transfer of desired size) is created.
4. Total packet generation – In this phase the total packet generation based on epacket and replication factor is created, which helps in broadcasting the large number of packets in a network.

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5. Transmission Phase – the total number of packet which are considered as broadcast is further driven to ACO scheme for the transmission on finding the neighbour weight and cost of the node. The data packet is processed via algorithm.
6. Receiving phase – further upon broadcasting the total packets, at receiver end the final data packets computed and verified for the transmitted data received.
7. Result computation – Upon processing the complete algorithm it generates the report with parameter such as delivery probability, overhead, relay and latency.
8. Exit.

IV. EXPERIMENT SETUP

In order to perform the simulation of our existing and proposed work algorithm we have presented using java language, one simulator for the network simulation is used and a routing algorithm has been implemented to work with the security parameters. We have programmed routing table and compared using Free API using java for chart and table. In this experiment we are implemented scenarios for the comparing better results. Here we describe which we implemented in our dissertation is performed, Proposed as well as existing algorithms were applied one by one in same dataset. At last, comparative study was prepared for all algorithms.

In the mentioned table 2 the work framework is specified where the mobile nodes are created and the data transfer can be perform based on the selection of source and sink node and the path, routing table which is build up is designed to perform proper execution of simulation environment.

Simulation parameters

The simulation configuration used for the current analysis summarized in below table:

Parameter	Value
Interface transmit coverage	10 m
Movement Mode	Map Based Movement
Router	Spray And Wait Router
Interface transmit speed	2 Mbps
No of nodes	125
Communication entity buffer size	15m
Total simulation timing relevance parameter	5000s

Table 2: Experimental Simulation Parameters and data transfer between the selected nodes.

V. RESULT ANALYSIS

We have presented and run our simulation for the existing and proposed algorithm for the data transfer with the routing strategy and applied the algorithm for the encryption and digest checking calculation for the accuracy of data thus the result were computed in parameter such as Packet delivery ratio, relay, Overhead.

Over the above parameter a comparison analysis for the existing and proposed technique is presented. Which shows that proposed technique provides better results as compare to the existing technique.

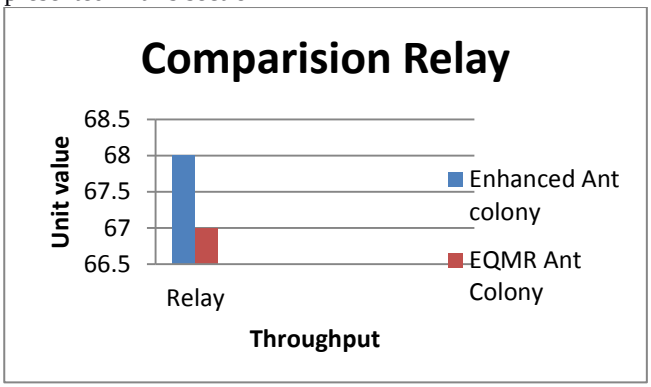
5.1 Statistical Result Analysis

Table 5.1: PDR, relay and Overhead for existing and proposed technique over network.

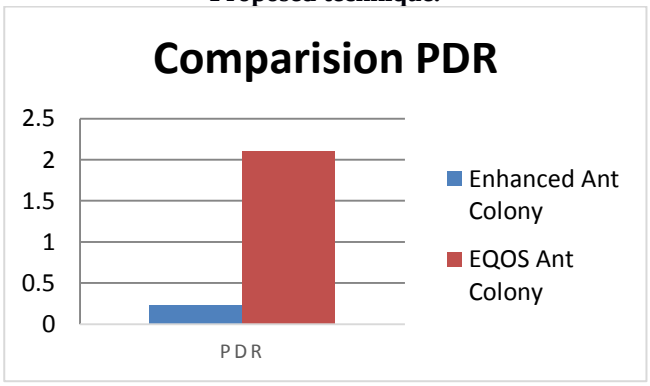
Algorithm	PDR	relay	Overhead
Enhance Ant Colony	0.226	68	17.026
EQOS Ant Optimization	2.106	67	9.72

5.2 Graphical Result Analysis:

A graphical analysis for existing and proposed technique is presented in this section



Graph 5.1: comparison of relay for Existing and Proposed technique.



Graph 5.2: Comparison PDR for existing and Proposed Technique.

As per the result observed using the proposed technique EQOS Ant Optimization provides the better output and result in order to improve the life of network over MANET...

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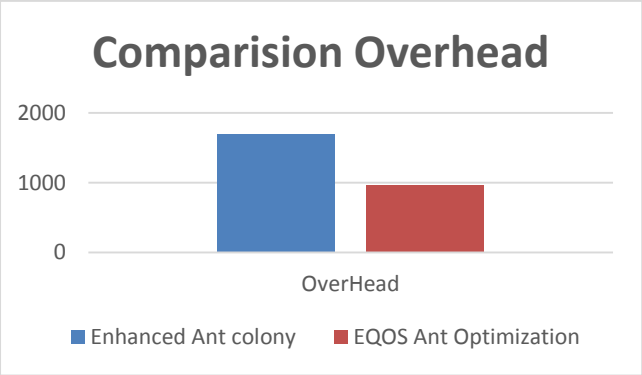

Figure 5.3: Comparison Of overhead for existing and proposed technique

VI. CONCLUSION

MANET is a network deals in communication and transmission of node between sources to sink. There is parameter such as packet delivery ratio, relay, overhead describe the scalability of the network and its routing technique. Different version of Ant has been derived in past to succeed with the routing protocol. In this paper we proposed a Divide and conquer technique in heavy network where the total number of node can further attempt and divide in less data packet size using which the mechanism along with Ant colony optimization. Which is further energy efficient, high performance network is delivered. The experimental results showed the proposed technique perform a large number of node and a computation time in order to deliver the data in efficient manner. Thus our work implies on investigating and applying the recent trend approach for data transmission in the proposed work the focus is given at finding the best optimized path to send data from source node to the destination node. This paper defines implementation of and EQOS Ant Optimization comparison of its performance with EACO routing algorithm is done in terms of packet delivery ratio, throughput and . Performance of our algorithm in comparison of is EQOS Ant Optimization better.

One simulator which works using Java API and further the algorithm is executed for 5000 second as simulation time and result were observed by the reports module. Finally the result observed as packet delivery ratio, relay and overhead ratio were computed via both the simulated algorithm. Thus the approach driven by us, outperform a best work among the studied in the field of network which make use of Ant colony approach. A comparison analysis for the existing and proposed technique over the parameters called relay, Overhead and PDR is presented which provides an enhanced QoS (Quality of Service) In MANET.

REFERENCES

1. Wei Li - QoS Assurance for Dynamic Reconfiguration of Component-Based - IEEE TRANSACTIONS ON SOFTWARE ENGINEERING, VOL. 38, NO. 3, MAY/JUNE 2012.
2. Savanna. A, Sridevi. N, Monica.N, Pazhaniraja.N," NETWORK SECURITY FOR MANET: A SURVEY", International Research Journal of Latest Trends in Engineering and Technology (IRJLTET), Vol.2 No.1 Jan/Feb 2015.
3. S.Divya gnanarathinam, T.Varalakshmi, P. Theerka, "A Survey Report on the Security Threats and Challenges in MANET", IJIRSET, Vol. 4, Special Issue 6, May 2015.
4. Priyanka,Harwant singh, "Enhancing Security in DSR Protocol with Energy and Buffer Control Mechanism", International Journal of Computer Applications (0975 – 8887) Volume 119 – No.8, June 2015.
5. Community-Aware Opportunistic Routing in Mobile Social Networks - IEEE TRANSACTIONS ON COMPUTERS VOL: PP NO:99 YEAR 2013.
6. Tuteja, Asma, Rajneesh Gujral, and Sunil Thalia. "Comparative performance analysis of DSDV, AODV and DSR routing protocols in MANET using NS2."Advances in Computer Engineering (ACE), 2010 International Conference on. IEEE, 2010.
7. Goyal, Priyanka, Vinti Parmar, and Rahul Rishi."Manet: Vulnerabilities, challenges, attacks application."IJCEM International Journal of Computational Engineering & Management 11 . .2011 (2011): 32-37.
8. S. Ajmani, B. Liskov, and L. Shrira, "Modular Software Upgrades for Distributed Systems," Proc. 20th European Conf. Object-Oriented Programming, pp. 452-476, 2006.
9. J.P.A. Almeida, M. van Sinderen, L.F. Pires, and M. Wegdam, "Handling QoS in MDA: A Discussion on Availability and Dynamic Reconfiguration," Proc. Workshop Model Driven Architecture: Foundations and Application, pp. 91-96, 2003.
10. J.P.A. Almeidaa, M. van Sinderena, L.F. Piers, and M. Wegdama, "Platform- Independent dynamic Reconfiguration of Distributed Applications," Proc. 10th IEEE Int'l Workshop Future Trends of Distributed Computing Systems, pp. 286-291, 2004.
11. N. Arshad, D. Heimbigner, and A.L. Wolf, "Deployment and Dynamic Reconfiguration Planning for Distributed Software Systems," Proc. 15th IEEE Int'l Conf. Tools with Artificial Intelligence, pp.39-46, 2003.
12. Adrian Perrig Ran Canetti J. D. Tygar Dawn Song "The TESLA Broadcast Authentication Protocol", UC Berkeley and IBM Research.
13. R. Devisri and R.J. Archana Devy. "Reliable and power relaxation multipath routing protocol for wireless sensor networks". In Proc. of International Conference on Advancement in Information Technology, 2011.
14. Ruiying Du, Chunyu Ai, Longjiang Guo, and Jing Chen. "A novel clustering topology control for reliable multi-hop routing in wireless sensor networks". Journal of Communications, 5, 2010.
15. Stefan Dulman, Tim Nieberg, Jian Wu, and Paul Havinga. "Trade-o between tra-c overhead and reliability in multipath routing for wireless sensor networks". In Proc. of Wireless Communications and Networking Conference, 2003.
16. Arash Nasiri Eghbali and Mehdi Dehghan. "Load-balancing using multi-path directed diusion in wireless sensor network". In Proceedings of the 3rd international conference on Mobile ad-hoc and sensor networks, pages 4455, 2007.
17. Christina Fragouli, Jean-Yves Le Boudec, and Org Widmer. "Network coding: an instant primer. SIGCOMM Comput. Commun". Rev., 36:6368, 2006.
18. Deepak Ganesan, Ramesh Govindan, Scott Shenker, and Deborah Estrin. Highlyresilient, "energy-e-cient multipath routing in wireless sensor networks". SIGMOBILE Mob. Comput. Commun. Rev., 5:1125, 2001.
19. C.F. Garcia-Hernandez, P. H. Ibarguengoytia-Gonzalez, et al. "Wireless sensor networks and application": A survey. International Journal of Computer Science and Network Security, 7:264273, 2007.
20. Ravinder Kaur, Surekha Rani "Improving Lifetime of the MANETs using Enhanced Ant Colony Optimization"2016.

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