

# INVESTIGATION INTO QOS ROUTING PROTOCOL OPTIMIZATION USING GENETIC ALOGRITHM

\*Ritu \*\*Swati Gupta

*Department Of Computer Science And Engineering*

*Bahra Institute Of Management And Techology, V.P.O. Chidana, Gohana*

*(Affiliated To Dcrust, Murthal-131039, Sonipat)*

**Abstract:** Research on Mobile Ad Hoc Networks has been ongoing for decades. The history of mobile ad hoc networks can be traced back to the Defense Advanced Research Project Agency (DAPRPA) packet radio networks (PRNet), which evolved into the survivable adaptive radio networks (SURAD) program. Mobile Ad-hoc Networks are a collection of two or more devices equipped with wireless communications and networking capability. These devices can communication with other nodes that immediately within their radio range or one that is outside their radio range. For the later, the nodes should deploy an intermediate node to be the router to route the packet from the source toward the destination. The Mobile Ad-hoc Networks do not have gateway, every node can act as the gateway.



**Keywords:** DSDV, HSR, WRP, ZRP, AODV, DSR, TORA  
Adhoc Network

## I. Introduction

MANET stands for "Mobile Ad Hoc Network." A MANET is a type of ad hoc network that can change locations and configure itself on the fly.. A mobile ad-hoc network is a collection of autonomous mobile nodes that communicate with each other over wireless links without any central administration. In ad-hoc networks, each host has to act as a router for itself to communicate with hosts outside its transmission range due to the limited range of each host's wireless transmission.



## II. Quality –of –service Routing

Quality of service (QoS) is the performance level of a service offered by the network to the user. Most of the multimedia applications have stringent QoS requirements that must be satisfied. The goal of QoS provisioning is to achieve a more deterministic network behavior so that information carried by the network can be better delivered and network resources can be better utilized. Quality of Service (QoS) involves adding mechanisms to control the network activity such as transmission and error rates, to assure certain level of service parameters. After accepting a service request from the user, the network must ensure to provide a set of service guarantees while transporting a flow

QoS routing is “a routing process that guarantees to support a set of QoS





parameters during establishing a route”. The QoS routing in MANETs is needed only to support the multimedia real-time communications like video-on-demand, news-on-demand, web browsing, traveler information system etc.

### III. Literature Review

In dec. 2010, J. Abdullah, proposed “Multi-objective GA-Based QOS Routing Protocol for Mobile Ad-Hoc Network”. This paper presents Qos routing protocol for MANET with specialized encoding, initialization, crossover, mutation, fitness selection and route search using genetic algorithm with multiple objectives. The aim is to find best QoS route in order to optimize the design of MANET routing protocol.

In aug.2009 R.Leela and S.Selvakumar, proposed “QoS Routing using Genetic Algorithm (QOSGA)”. The focus of the paper is to develop a GA based routing algorithm that satisfies multiple constraints requirement of the multimedia applications. The aim of routing algorithm is to aid the fast selection of a feasible path, which should be adaptive, flexible, and intelligent for efficient routing algorithm. It describe GA based QOS Routing Algorithm i.e. a)GLBR(Genetic Load Balancing routing Algorithm),b) ARG(AAdaptive Routing method based on Genetic Algorithm), c) ARG(AAdaptive Routing method based on Genetic Algorithm with two QoS constraints.

In 2007, Dr. Ketan Kotecha, Sonal Papat, proposed “Multiobjective Genetic Algorithm based Adaptive Qos routing in MANET”. In this paper strength of GA is applied in MANET. Lots of work has been done for routing in MANET but QoS requirements are not yet supported that way and to fine optimal path is a problem of NP class. In this they applied Multiobjective

genetic Algorithm: to optimize four QoS parameters bandwidth constraints, delay, traffic adaptive route in manet.

In 2007, J. Abdullah, D .Parish proposed “Effect of Mobility on the performance of GA-based QOS Routing in Mobile Ad-Hoc networks”. The aim of QoS routing is to ensure an application gets a connection which can sustain bandwidth, delay, and mobility. QOSRGA was designed to utilize several feasible multiple paths discovered in MANET searching for the optimal route. The paper addressed the problem of QoS routing for MANET with node mobility.

In 2011, Amarjeet Sangwan, Alisha Saini, Rajni Sharma proposed “Mobile Ad Hoc Networks Security and Protocol - A Survey”. In this paper we review the security requirements and challenges of the secure Ad hoc routing protocol. Apart from this we study the classification of Ad hoc network routing protocols. Here main stress is given on the routing protocol and vulnerabilities. Finally surveying the current security solutions and major protocols for Mobile Ad hoc network. In this survey paper, author tries to inspect the security issues and routing protocols of Mobile ad hoc network.

In 2003, Lenoard Barolli, Akio Koyama, Norio Shiratori “A QoS Routing Method for Ad-Hoc Networks based on genetic Algorithm”. In this paper author proposed a new QoS routing approach for MANETs. The proposed GAMAN (Genetic Algorithm based routing method for Mobile Ad-Hoc Network) algorithm has has following features .

1 GAMAN is source based routing algorithm.





2 GAMAN algorithm can be applied for small and medium networks.

The simulation results shows.

a) GAMAN has a good response time.

B) it has good gene coding scheme and simple genetic operations. c) GAMAN can support two QoS parameters. But the problem is that In order to deal with large scale networks and also to routes which support more than two QoS parameters, we have to proposed method in parallel GA.

#### IV. Proposed Work

QOS is one the basic requirement of a network and when we talk about the Mobile Network this is the highly constraint requirement of a user. To improve the quality of service we use different changes in MANET protocols, its parameter, routing algorithm etc. In this proposed work we also improve the QOS by modifying the routing algorithm. The proposed routing algorithm is inspired from the genetic approach. The proposed algorithm will follow all the basic steps of routing algorithm in the sequence. As in initializing phase we will select the shortest path and one alternative path. The shortest path selection always returns the congestion over the network. Instead of using the shortest path we will select a genetic inspired path. As the selection process is done we will perform the crossover to select the most promising nodes. Finally mutation will be performed. The whole process will optimize the process of QOS. We will also perform the comparison with shortest path algorithm.

#### V. Tool & Technology Used

- Study and Build the Mobile Network
- Study Different MANET Protocol

- Study and analysis of Basic Routing Algorithm
- Implementation of Genetics for the routing algorithm to improve the QOS in MANETS.
- Comparative analysis of proposed system

#### VI. Conclusion

The step-by-step methodology to be followed for improving efficiency by optimizing routing protocol using genetic algorithm in mat-lab.

MATLAB (Matrix Laboratory), a product of Math works, is a scientific software package designed to provide integrated numeric computation and graphics visualization in high-level programming language. MATLAB has a wide variety of functions useful to the genetic algorithm practitioner and those wishing to experiment with the genetic algorithm for the first time.

.A **genetic algorithm (GA)** is a search heuristic that mimics the process of natural evolution. This heuristic is routinely used to generate useful solutions to optimization and search problems.

Genetic algorithms belong to the larger class of evolutionary algorithms (EA), which generate solutions to optimization problems using techniques inspired by natural evolution, such as inheritance, mutation, selection, and crossover.

#### VII. Reference

[1] J. Abdullah, "Multi-objective GA-Based QOS Routing Protocol for Mobile Ad-Hoc Network" International Journal of Grid and Distributed computing Vol.3 No. 4, December 2010

[2] R.Leela and S.Selva Kumar, proposed "QoS Routing using Genetic Algorithm (QOSGA)".International Journal of computer and Electrical Engineering.Vol.1, No. 3, August 2009





- [3] Dr. Ketan Kotecha, Sonal Papat, member, IEEE “Multiobjective Genetic Algorithm based Adaptive Qos routing in MANET”. Evolutionary Computation, 2007. CEC 2007. IEEE Congress on 25-28 Sept. 2007 at Singapore
- [4] J. Abdullah, D .Parish “Effect of Mobility on the performance of GA-based QOS Routing in Mobile Ad-Hoc networks” IEEE International Conference on intelligent and Advanced System 2007.
- [5] In 2011, Amarjeet Sangwan, Alisha Saini, Rajni Sharma proposed “Mobile Ad Hoc Networks Security and Protocol - A Survey” NCAC11
- [6] C.Siva Ram Murthy & B.S Manoj.”Mobile Ad Hoc Networks-Architectures & Protocols”, Pearson Education ,New Delhi,2004
- [7] S. Corson and J.Macker, “Mobile Ad Hoc Networking Routing Protocol Performance Issues and Evaluation Considerations”, RFC2501, Jan. 1999
- [8] D.Suresh Kumar, K.Manikandan, M.A.Saleem “Secure On-Demand Routing Protocol for MANET using Genetic Algorithm”IEEE International Journal of Computer Applications (0975–8887)
- [9] HaoYang, James Shu, Xiaoqiao Meng, and SongwuLu,“SCAN: Self-Organized Network-Layer Security in Mobile AdHoc Networks”, inproc.IEEE, IEEE journalonselectedareas in communications, vol.24,no.2,February2006.pp.261-273
- [10] C.R.Lin and J.S.Liu,“QoS routing in adhoc wireless networks”, IEEE J.Select. Areas Commun., vol.17,pp.1488-1505,1999.
- [11] Chien-hung Liu;Tzu-Chiang Chiang;Yueh-Min Huang “A near-optimal multicast scheme for mobile ad hoc networks using a hybrid genetic algorithm” IEEE Advanced Information Networking and Applications, 2006. AINA 2006
- [12] J.N.Al-Karaki and A.E.Kamal,“Quality of Service routing in mobile adhoc networks:Current and future trends” In Mobile Computing Handbook, CRC Publishers, 2004
- [13] S.Chen and K.Nahrstedt,“Distributed quality-of-service routine in adhoc networks” IEEE J.Select.Areas Commun., vol.17, pp.1488-1505, 1999
- [14] S.H.Shah,K.Nahrstedt, “Predictive location-based QoS routing in mobile ad-hoc networks”, in:Proceeding of IEEE ICC 2002, vol.2,pp.1022-1027,2002
- [15] Mobile ad hoc [network](http://en.wikipedia.org/wiki/Mobile_ad_hoc_network) - Wikipedia, the free encyclopedia  
en.wikipedia.org/wiki/Mobile\_ad\_hoc\_network
- [16] MATLAB - The Language Of Technical Computing  
<http://www.mathworks.in/products/matlab/index.html>
- [17] QUALITY OF SERVICE IN MOBILE AD HOC NETWORK  
<http://www.scribd.com/doc/25063350/Qos-in-Manet>
- [18] Genetic algorithm  
[http://en.wikipedia.org/wiki/Genetic\\_algorithm](http://en.wikipedia.org/wiki/Genetic_algorithm)
- [19] Lajos Hanzo Ii And Rahim Tafazolli “A SURVEY OF QOS ROUTING SOLUTIONS FOR MOBILE AD HOC NETWORKS” IEEE communication survey 2nd Quarter 2007, Volume 9, No. 2 available at <http://epubs.surrey.ac.uk/2124/1/SRF002122.pdf>
- [20] MR Pearlman, ZJ Haas, P Sholander “On the impact of alternate path routing for load balancing in mobile ad hoc networks” IEEE Mobile and Ad Hoc Networking and Computing, 2000. MobiHOC.2000
- [21] Sung-Ju Lee;Gerla, M.Ching-Chuan Chiang;Dept. of Comput. Sci., California Univ., Los Angeles, CA “On-demand multicast routing protocol” Wireless Communications and Networking Conference, 1999. WCNC.1999 IEEE
- [22] Chang,H.R.;Liang,M.G.;Wang, Z.W” Performance Analysis of Vector Address Routing Protocol for MANET” IEEE Internet Technology and Applications (iTAP), 2011
- [23] Chang Wook Ahn; Ramakrishna, R.S.; “A genetic algorithm for shortest path routing problem and the sizing of populations” Evolutionary Computation, IEEE Transactions on dec 2002

