information formula which measures the uniformity of attributes domain to find DC probability.

Also, FACO-Miner has some new features that make it different from existing classifiers based on ACO meta-heuristic. To classify test samples we have defined the new fuzzy reasoning method based on averaging which takes account both the number of rules and the covering value to classify the input samples. To evaluate the performance of FACO-Miner, we use several well-known medical data sets from UCI repository. Our experiments have confirmed that FACO-Miner leads us to significant results and outperforms several famous methods in classification accuracy for medical classification

6. Proposed Work

Hybrid Algorithm

The following algorithm presents the fundamental frame of GA & ACO

Step 1: Define numbers of nodes.
Step 2: Applying optimization algorithm in hybrid algorithm.
Step 3: GA & ACO.

- Define chromosomes and ants are equal to numbers of nodes.
- Apply nodes fitness or check distance and energy factor.
- Share pheromones or shortcut distance take maximum ants or leader ants.
- Check fitness and select node.
- Find crossover results or
- Accordingly to fitness selection, find mutation result.
- Combine both pheromone and P best value.
- Find G best value according to above condition.
- End.

Parameters

1. Delay
Transmission delay is a function of the packet's length and has nothing to do with the distance between the two nodes. This delay is proportional to the packet's length in bits,

It is given by following formula:
Dt= N/R, seconds
Where Dt is the transmission delay in seconds
N is the number of bits, and
R is the rate of transmission (in bits per second)

2. Throughput

In communication networks, network throughput is the rate of successful message delivery over a communication channel. This data may be delivered over a physical or logical link, or pass through a certain network node. The throughput is usually measured in bits per seconds (bits/s or bps), and second or data packets per time slot.

3. Cost

The minimum-cost flow problem is to find the cheapest possible way of sending a certain amount of flow through a flow network. Solving this problem is useful for real-life situations involving network with costs associated (e.g. telecommunications networks)

7. System Framework

To generate the MANET environment first we initialized the mobile nodes. With the help of mobile nodes the MANETs network is created.

To choose the optimized route between the mobile nodes energy efficient hybrid algorithm used by using GA & ACO (Ant Colony Optimization) which to increase the efficiency and lifetime of the system.

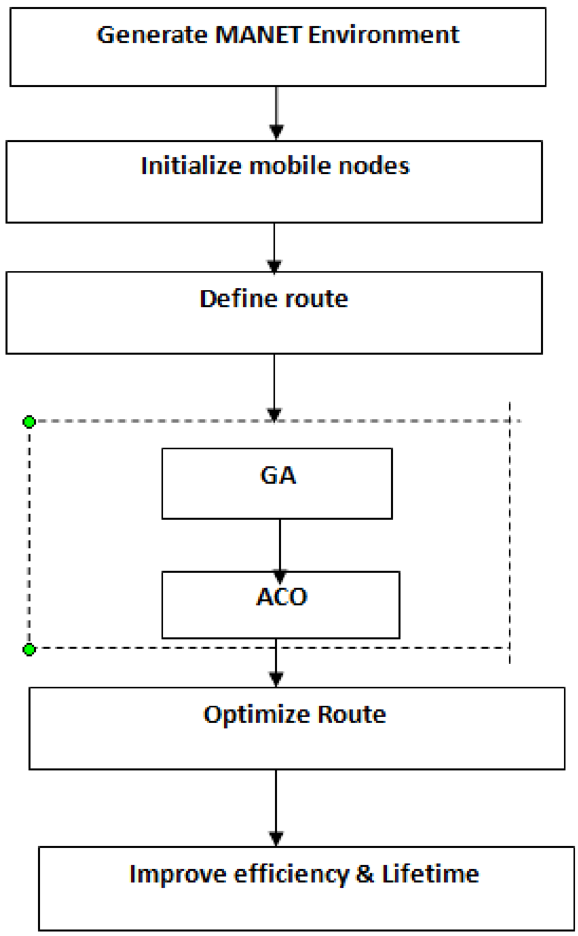

Figure 2: Flow of Work

8. Related Work

Energy consumption in wireless ad hoc networks prevents the problem of the network exhausting batteries, thus partitioning the entire network. Power-aware multicasting is proposed to reduce the power consumption. This paper has proposed an efficient power saving protocol for multi-hop mobile ad hoc networks, called p-MANET. The main goals of p-MANET protocol are to reduce significant power consumption and transmission latency and to achieve efficient power saving [17].They has addressed the problem of energy efficient multicast routing in wireless Mobile Ad-hoc Network (MANET). It is a challenging environment because every node operates on limited battery resource and multi-hop routing paths are used over constantly changing network environments due to node mobility [13]. In this work lifetime of network is improved by optimizing the route and this can be done by using artificial intelligence algorithms named genetic algorithm (GA) and ant colony Optimization (ACO). Firstly scenario is generated by introducing number of nodes and then optimized route is found out with the help of artificial intelligence scheme by doing hybridization of GA and ACO and in this way lifetime is increased.

9. Results

Table 1: Simulation Table

Parameter Name	*Value*
Channel	Wireless channel
Number of Nodes	20
Antenna	Omni antenna
Network Simulator	NS2.35
Mac version	802.11
Simulation Time	90s
Area	640m*640m
Packet Size	512
Hello Interval	2s
Traffic Rate(packets/s)	10s
Network Interface	Physical

Figure 1: Scenario containing nodes

Figure 2: Comparison of throughput of GA & 3GA-ACO

This graph shows that the proposed appearance using GA-ACO has better throughput than GA.

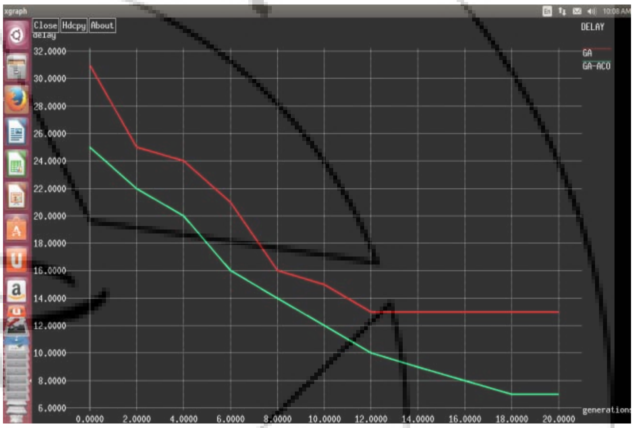

Figure 3: Comparison of Delay of GA & GA-ACO

In above graph delay is shown for both case that is for GA and GA-ACO.

Graph shows minimum delay that means GA-ACO gives better result because minimum the delay better the system.

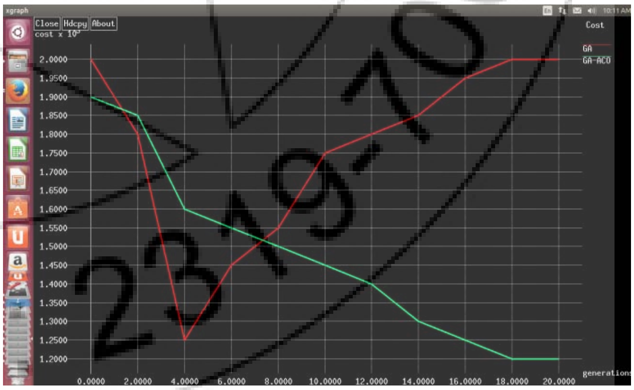

Figure 4: Comparison of Cost of GA & GA-ACO

Above graph shows cost occurred during the system which include both hardware and software system. From above graph it is clearly shown that when we are using GA-ACO the cost occurred is low as compare to using GA.

10. Conclusion

A mobile ad-hoc network (MANET) is a self-configuring network of mobile routers and associated hosts connected by wireless link. To increase the energy efficiency of MANET, many routing protocols have been developed. In this work lifetime of network is improved by optimizing the route and this can be done by using artificial intelligence algorithms named genetic algorithm (GA) and ant colony Optimization (ACO). Firstly scenario is generated by introducing number of nodes and then optimized route is find out with the help of artificial intelligence scheme by doing hybridization of GA and ACO and in this way lifetime is increased. We can enhance the performance of our work by using Hybrid algorithm to get more efficiency in results. Performance will be evaluated on the basis of three parameters named as throughput, cost, and delay. In future this can be better enhance by using fuzzy set or some another artificial intelligence scheme.

References

[1] Mobile Ad-hoc Networking. In IETF MANET Working Group.
[2] Ying-xin Hu, Yu-feng Jia, "Improvement of Wireless Multicast Routing with Energy-efficiency based on ODMRP" IEEE 2009, pp.1-4, DOI:10.1109/CNMT.2009.5374571
[3] R.Manoharan, E. Ilavarasan, "Impact of Mobility on the performance of Multicast routing protocols in MANET", International Journal of Wireless & Mobile Networks (IJWMN), Vol.2, No.2, May 2010.
[4] Maqsood Razi, Jawaid Quamar, "A Hybrid Cryptography Model for Managing Security in Dynamic Topology of MANET", IEEE 2008, pp.1-7, DOI:10.1109/ISBAST.2008.
[5] Shruti Sharma and Manisha Sharma, "Comparative Analysis of Multicasting Routing Protocols With Security Model In MANETs", International Journal of Engineering Research & Technology (IJERT), Vol. 2, Issue 5, May – 2013, ISSN: 2278-0181.
[6] Kai Zeng, "Opportunistic Routing in Multihop Wireless Networks: Capacity, Energy Efficiency, and Security",ISBN:978-0-470-66617-3, July-2011.
[7] Ren-Hung Hwang, Chiung-Ying Wang,Chi-Jen Wu and Guan-Nan Chen, "A novel efficient power-saving MAC protocol for multi-hop MANETs", International Journal of Communication Systems (2011), Wiley Online Library (wileyonlinelibrary.com). DOI: 10.1002/dac.1328.
[8] Ashim Kumar Ghosh, Anupam Kumar Bairagi, Dr. M. Abul Kashem, Md. Rezwan-ul-Islam, A J M Asraf Uddin, "Energy Efficient Zone Division Multihop Hierarchical Clustering Algorithm for Load Balancing in Wireless Sensor Network", (IJACSA) International Journal of Advanced Computer Science and Applications, Vol. 2, No. 12, December 2011.
[9] Divya Sharma and Ashwani Kush, "Performance comparison of energy efficient AODV protocols", International Journal of Computing and Business Research (IJCBR), vol. 2, Issue 1, 2011.
[10] Thriveni Ja, Anita Kanavallia, K. R. Venugopala and L. M. Patnaik, "Probabilistic Mean Energy Flooding to increase the survivability of MANET", Proceedings of the International MultiConference of Engineers and Computer Scientists, pp. 19-21, vol. 2, Hong Kong, March 2008.
[11] A. K. Yupta, H. Sadawarti, and A. K. Verma, "Performance analysis of AODV, DSR & TORA routing protocols," IACSIT International Journal of Engineering and Technology, vol.2, no.2, pp.226-231, 2010.
[12] S. Priyadsrini, T. M. Navamani, and Venkatesh Mahadevan, "An Efficient Route Discovery in MANETs with Improved Route Lifetime", International Journal of Information and Electronics Engineering, Vol. 2, No. 4, July 2012.
[13] Intae Kang and Radha Poovendran, "On Lifetime Extension and Route Stabilization of Energy-Efficient Broadcast Routing over MANET" ,WA.98195-2500, U.S.A.
[14] Suvarna P. Bhatsangave and V. R. Chirchi, "OAODV Routing Algorithm for Improving Energy Efficiency in MANET" , International Journal of Computer Applications (0975 – 8887) Volume 51– No.21, August 2012.
[15] Yu Du, "Improving On-Demand Data Access Efficiency in MANETs With Cooperative Caching" Journal Adhoc Network, Vol. 7, Issue-3, pp.579-598, May 2009.
[16] Mrs. Shilpi Jain and Mr. Sourabh Jain, "Energy Efficient Maximum Lifetime Ad-Hoc Routing", IRACST – International Journal of Computer Networks and Wireless Communications (IJCNWC), ISSN: 2250-3501. Vol.2, No4, August 2012.
[17] Chiung-Ying Wang, Chi-Jen Wu, Guan Nan Chen, Ren-Hung Hwang, "p-MANET: Efficient Power Saving Protocol for Multi-Hop Mobile Ad Hoc Networks" Proceedings of the Third International Conference on Information Technology and Applications (ICITA'05) 0-7695-2316-1/05 $20.00 © 2005 IEEE.
[18] Danai Chasaki and Tilman Wolf, "Evaluation of Path Recording Techniques in Secure MANET" Vol.2, Issue 2, pp. 15-21, 2012.
[19] H. Tian and H. Shen, "Multicast-based inference of network-internal loss performance," in Proc. of 7th International Symposium on Parallel Architectures, Algorithms and Networks (ISPAN 2004), Hong Kong, China, Vol.6 pp. 288–293, May 2004,.
[20] J. Liebeherr, J. Wang, and G. Zhang," Programming overlay networks with overlay socket", In Proc. 5th COST 264 Workshop on Networked Group Communications (NGC 2003), LNCS 2816, Vol.7, Issue 4, pp. 242–253, Sep. 2003.
[21] Kartik Kumar Srivastava, Avinash Tripathi, and Anjnesh Kumar Tiwari, " Secure Data Transmission in MANET Routing Protocol", International journal Computer Technology & Applications,Vol.3, Issue 6,pp. 1915-1921, Nov-Dec 2012.
[22] Merin Francis, M. Sangeetha, and Dr. A. Sabari, "A Survey of Key Management Technique for Secure and Reliable Data Transmission in MANET", International Journal of Advanced Research in Computer Science and Software Engineering, Vol.3, Issue 1,pp.40-49, January 2013.
[23] N. G. Duffield and F. Lo Presti, "Network tomography from measured end-to-end delay

covariance," IEEE/ACM Transactions on Networking, Vol.12, Issue 6, pp. 978–992, Dec. 2004.
[24] Ranjeet Singh, and Prof. Harwant Singh Arri, "Comparison of AAMRP and IODMRP using SBPGP", International Journal of Computer Science and Management Research, Vol.2, Issue 3,pp.54-68,March 2013.
[25] Vineetha S. H. and Shebin Kurian, " Performance Analysis of Cluster Based Secure Multicast Key Management in MANET" International Journal of Computer Science and Telecommunications, Vol.4, Issue 4, pp.1-14, April 2013.
[26] Ting Lu and Jie Zhu,"Genetic Algorithm for Energy-Efficient QoS Multicast Routing", IEEE Communication Letters, Vol.17, no.1, January 2013.
[27] http://www.google.com

Author Profile

Sonia Ahuja is Student of M.Tech in the department of Computer Science and engineering at Shri Guru Granth Sahib World University (SGGSWU), Fatehgarh Sahib, Punjab. She has done M.SC from Baba Zorawar Singh Fateh Singh Khalsa Girls College, Morinda under Punjabi University, Patiala.

Sukhpreet Kaur received the B. Tech degree in Computer Science and Engineering from Punjab Technical University, Punjab, India in 2007 and M.Tech Degree in Computer Engineering from Punjabi University, Patiala, India in 2010. She worked as an Assistant Professor at Department of Computer Science and Engineering in Baba Farid College of Engineering and Technology,Punjab, India till 2012. She is working as Assistant Professor at Department of Computer Science and Engineering, Shri Guru Granth Sahib World University Fatehgarh Sahib, Punjab, India since July 2012. She has published more than 30 research papers in different international journals and conferences. Her research areas include Software Engineering and Data mining.