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ACO BASED LOCALITY CENTRALIZED SERVICE ROUTING PROTOCOL FOR MANETS

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Abstract: Mobile ad hoc network (MANET) has multiple intermediate nodes, constant changes & it is non-centralized with tiniest i.e. minimal infrastructures. These kinds of networks are very flexible, so that they not need any existing infrastructure. Therefore for temporary communication links MANETs are appropriate. But finding a path between the communication end points is the biggest challenge. Due to this, they should be able to arrange spontaneously components in a purposeful manner under appropriate conditions & also they should make necessary adjustments to restore itself to normal operation, with adjustability to continual changes in network. Ant Colony Optimization (ACO) provides a typical pattern as solution for always changing & motility of MANETs. Here we put forward a new AntHocNet- Locality Centralized Service. Protocol furnished with position facility, influenced by AntHocNet algorithm for mobile, multi-hop, ad-hoc networks. The introduced routing protocol is highly adaptive, efficient & scalable. To reduce the routing overhead is the main goal of this algorithm. We refer this algorithm as ACO based Locality Centralized Service Routing Protocol.

Keywords: Agglomerative Clustering Algorithm, URL Mining, Re-ranking, Query Log analysis.

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INTRODUCTION

Mobile Ad hoc NETwork (MANET) [1] is a collection of wireless mobile nodes in which all nodes is mobile and communicates with each other via wireless connections. Nodes can connect or disconnect at any time. MANET dynamically forms a temporary network, with no fixed infrastructure. In ad hoc networks, nodes are not intimate with their network topology. Instead, they have to locate it. Typically, a new node reports its existence and listens for announcements broadcast by its neighbors. No dedicated routers are used in MANET. All nodes can act as routers for each other, in multi-hop manner packets are delivered from one node to another node. Here router connectivity changes frequently. Because of limited strength and vitality of nodes identifying non-disturbed paths is important to avoid retransmission [2].

In last few years many number of MANET routing protocols have been put forwarded which deal with dynamic aspects of MANETs using on-demand (reactive) or table-driven (proactive) or hybrid (both reactive and proactive) approach. In on-demand i.e. in reactive routing protocol it finds a route on demand by flooding the network with Route Request packets that means it start path searching when a node needs to communicate with other node without keeping routing information. So it minimizes use of many control packets. AODV and DSR are examples of on-demand routing algorithm.

In table-driven i.e. in proactive routing protocol it maintains fresh lists of destinations and their routes by periodically distributing routing throughout the network that means it uses routing tables and routing information. These algorithms keep record of route from any node to other node in routing table, so there is need to keep tables fair and accurate as the network's configuration changes. Examples of table-driven algorithm are DSDV and OLSR [2]. In hybrid i.e. in both reactive and proactive routing it combines the advantages of proactive and reactive routing, the routing is initially established with some proactively prospected routes and then serves the demand from additionally activated nodes through reactive flooding, and the choice of one or the other method requires predetermination of typical cases [3].

Ant Colony Optimization (ACO) becomes apparent from the nature of social insects like ant colonies. ACO is the best example of how studies aimed at understanding and modeling the behavior of ants and other social insects can provide inspiration for the development of computational algorithms for the solution of difficult mathematical problems. In this paper in section 2, we discuss about basic of Ant Colony Optimization. In section 3, we discuss about related literature. In section 4, we discuss about basic AntHocNet protocol. In section 5, we put forward our protocol. Section 6 provides conclusion of our work in section 7.

2. BASIC OF ANT COLONY OPTIMIZATION

Ant Colony Optimization provides a pattern for scheming a higher-level procedure or heuristic designed to find, generate or select a lower-level procedure or heuristic i.e. partial search algorithm that may provide a sufficiently good solution to an optimization problem. The essential characteristic of ACO algorithms is the mixing of priori information about the structure of a promising solution with a posteriori information about the structure of previously obtained good solutions.

The depiction of the involving combinations issue utilized by ant-like creatures is divided in two segments; one segment covers the practicability or usefulness and another standard of the solving problem they construct.

Multi-representative style built ACO metaheuristic. System's representatives called ants have two essences. At the one side, they deals with ideas rather than events of relating characteristics of real creatures like ants which are the centre of the locating smallest route performance noticed in real ant colonies. On the other side, when the system is applied to tough optimization jobs, they have been improved with potentials which are in general important to gain good performance.

Ant Colony Optimization gives absolute pattern to solve difficult optimization tasks such as routing and congestion overhead, load balancing in MANETs, where Ant Colony Optimization has extraordinary qualities arising from creatures like ants. Jointly ants can execute jobs like building roosts, finding meal. Ants have the potential of finding smallest route from roost to meal. This knowledge shared by ants by producing and releasing a chemical substance on the route. A chemical substance produced and released by ants is called pheromone. This chemical substance i.e. pheromone can aware by ants, with the help of this awareness about pheromone along the route ants can indirectly communicate with each other. The principle is that the trace left along the path by lying pheromone stimulates the performance by the ants. [4]

Ants provide augmentation schemes, like when large amount of ants travel on any one route then the amount of pheromone increases on that route, which gives addition of reward following a desired behavior, called positive augmentation. And less newly used route receives negative augmentation. With jointly try they finds best solution for the difficult job [5]. In MANETs, best routes are always found by unnatural ants called mobile representatives or agents. Through secondary or subordinate disclosure like feeling pheromone along route, mobile representatives work smoothly together.

For keeping gathered data in MANETs the above mentioned traits of Ant Colony Optimization can be utilized in routing protocols by designing ant control packets with the lay of policies and a particular way of organizing data so that it can be used efficiently. The unnatural ants negotiate with no specific pattern into the network and list useful data. The constructed protocols based on Ant Colony Optimization are essentially dispensed and capable of accepting continuous differences in topology of network. [5]

There are mainly two types of unnatural ants used, their names are further ants and reverse ants. While path searching stage further ants works and has heap to keep the collected data. They get converted into reverse ants when they hit target junction or node and at every junction in the route they update routing tables. Some ants obtain new paths which can be good than prior paths by frequently inspecting the network for searching newborn paths and maintaining routing tables up to date. Ant Colony Optimization with several routes as a benefit reduces time needed to recuperate from non-success.

1. RELATED LITERATURE

For wired, wireless and for MANETs many protocols based on Ant Colony Optimization were designed by many researchers. Baras JS, Mehta H.A. [6] gives focus on a probabilistic emergent routing protocol for MANETs. Dorigo M, et al. [7] presents ant algorithms for discrete optimization which provides focus on many efficient protocols for critical optimization tasks.

Sharvani G.S., et al. [4] introduces variety of swarm intelligence protocols for routing. Tiago Camilo, Carreto, Jorge et al. [9] gives focus on an energy-efficient ant-based routing protocol for wireless sensor networks. B. Chandra Mohan, R. Baskaran [10] confers a survey: ant colony optimization based recent research and implementation on several engineering domain. G.A. Di Caro et al. [8] confers AntHocNet, which is an algorithm for routing in MANETs based on ideas from ant colony optimization. This protocol contains both table-driven and on-demand elements. Shanmugasundaram Radhakrishnan et al. [13] proposed multi objective QoS routing for MANETs which is based on ant colony.

4. HYBRID ACO BASED PROTOCOL

AntHocNet is characterized routing protocol for MANETs inspired by traits from Ant Colony Optimization. It found that in mobile ad hoc networks AntHocNet is called hybrid ACO based protocol because it combines table-driven and on-demand routing policies. Specifically the protocol is on-demand because it focuses on communication sessions takes place between two nodes, it does not maintain up to date routing information between all the nodes in the

network. It is table-driven because for the underway communication sitting, it frequently takes efforts to maintain and enhance currently routing information related with network changes for both topology and traffic. Two complementary processes used by the AntHocNet protocol to collect routing information. One is the repetitive end to end route sampling using unnatural ant representatives. The other is scattering special chemical substance i.e. pheromone that means process of information spreading from start along the path in MANET in an efficient way. Ant based sampling is the symbolic way of operation of Ant Colony Optimization based routing protocols, where process of information spreading along the path is same as Bellman-Ford routing protocol. In order to acquire data or information collecting process that is at the similar time coherent, adaptive and resilient, Ant Colony Optimization based hybrid AntHocNet protocol combines the above explained both processes. With the hello packets (hello packets are small packets which are sent periodically by all nodes in the network) or using failed transmissions of data or control packets link failures can be detected in this hybrid ACO based protocol.

5. PROPOSED PROTOCOL

As we know that the disadvantages of the previous algorithms are the inspiration of the new algorithm. Great change in the execution of the ACO based hybrid protocol i.e. AntHocNet can be introduced just by some simple additions or supplements. Network topology should be reconditioned through link restore or new path search process when network topology changes. The network burden for keeping the path information could take large amount of time and at the similar time this information would be heavy on the nodes, this happens in closely compacted network and proposed protocol considers such closely compacted network. At each step we have to regulate the smallest route and keep the complete routing tables and send packet ahead. By making use of locality centralized service we propose to improve this. The locality centralized service has the overall details of the network topology and the routing routes and it is a one of the main nodes in MANETs. Location centralized service can accept the request from any node in MANET and provide response with all necessary information required to that node to select adjacent node to reach the target node.

In the proposed protocol we unite basic AntHocNet with locality centralized service. In the proposed protocol we arrange locality centralized service nodes in order of rank. At lower stage locality centralized service node keep information of the other nodes in its area for position of a node; outside their area they make connection with locality centralized service node at higher stage. Origin node gathers position related information from locality centralized service node. It takes all the positions and the computes reliability of adjacent node. It interrogates locality

centralized service node for the position information when it has data to send. Locality centralized service node finds its structured set of data if there is no appearance it contacts locality centralized service node of higher stage and so on. This helps to keep algorithm powerful.

6. CONCLUSION

Here we proposed ACO based Locality Centralized Service routing protocol for MANETs. To minimize the overhead introduced by the packets to improve complete performance of the system by taking benefit of the nodes' location is the aim of proposed protocol. As per the result analysis and simulation experiments, the proposed protocol can handle the routing overhead and enhance the packet sending proportion effectively.

7. REFERENCES

1. J Macker, S Coron, Mobile Ad Hoc Networks (MANET), IETF WG Charter. http://www.ieft.ort/dyn/charter/manet-charter.html (1997)

2. Hui Xu; Xianren Wu; Sadjadpour, H.R.; Garcia-Luna-Aceves, J.J.;"A unified analysis of routing protocols in MANETs," Communications, IEEE Transactions on , vol.58, no.3, pp.911-922, March 2010

3. Hinchey, M.G.; Sterritt, R.; Rouff, C.; , "Swarms and Swarm Intelligence," Computer , vol.40, no.4, pp.111-113, April 2007

4. Sharvani, G.S.; Cauvery, N.K.; Rangaswamy, T.M.; , "Different Types of Swarm Intelligence Algorithm for Routing," Advances inRecent Technologies in Communication and Computing, 2009.ARTCom '09. International Conference on , vol., no., pp.604-609, 27-28 Oct. 2009

5. Dressler, F.; Akan, O.B.; , "Bio-inspired networking: from theory to practice," Communications Magazine, IEEE , vol.48, no.11, pp.176-183, November 2010

6. Baras JS, Mehta H. A probabilistic emergent routing algorithm for mobile ad hoc networks. In proceedings of wiOpt03: Modelling and Optimization in Mobile,Ad Hoc and Wireless Networks, 2003.

7. Dorigo M, Di Caro G, Gambardella LM. Ant algorithms for discrete optimization. Artificial Life 1999; 5(2):137-172.

8. G.A. Di Caro, F. Ducatelle, and L.M. Gambardella. "AntHocNet: anant-based hybrid routing algorithm for mobile ad hoc networks." In Proceedings of PPSNVIII, volume 3242 of LNCS, pages 461-470.Springer, 2004

9. Tiago Camilo, Carreto, Jorge Sa Silva, Fernando Boavida. “an energy-efficient ant-based routing protocol for wireless sensor networks.” 5th International Workshop, ANTS 2006 Brussels, Belgium, September 4-7, 2006.

10. B. Chandra Mohan, R.Baskaran, “A survey: Ant Colony Optimization base recent research and implementation on several engineering domain”, Expert Systems with Applications March 2012.

11. Anuj K. Gupta, Harsh Sadawarti, “Manet Routing protocols base on Ant Colony Optimization”, International Journal of Modeling and Optimization (IJMO).

12. S.K. Nivetha, R. Asokan, N. Senthilkumaran, “A Swarm-based hybrid routing protocol to support multiple Quality of Service (QoS) metrics in mobile ad hoc networks”, 2013 Fourth International Conference on Computing, Communication and Networking Technologies (ICCCNT) 7/2013.

13. Perumalsamy Deepalakshmi .; Shanmugasundaram Radhakrishnan.; ,"An ant colony-based multi objective quality of service routing for mobile ad hoc networks" EURASIP Journal on Wireless Communications and Networking, springer 2011

14. P Jacquet, P Muhlethaler, T Clausen, A Laouiti, A Qayyum, L Viennot, Optimized link state routing protocol for ad hoc networks, in proceedings of the 5th IEEE International Multi Topic Conference (INMTC 2001), Le Chesnay, France (2001).

15. Ye Z, Krishnamurthy SV, Tripathi SK. A framework for reliable routing in mobile ad hoc networks. In Proceedings of IEEE INFOCOM, 2003.

16. Theraulaz G, Bonabeau E. A brief history of stigmergy. Artificial Life, Special Issue on Stigmergy, 1999; 5:97-116.