

Advancement of routing and forwarding in MANET

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Abstract

There are tremendous impact on broadcasting and the ways in which people use it, One kind of technology area, considered here is mobile ad hoc networking (MANET).It is useful in self constructing and multi-hop heterogeneous network routing facilities and maintenance. In spite of this, mitigation and intervention in connection caused by node mobility and wireless channels sharing destabilize communication paths, which makes in creating routing protocol greatest provocation such as broadcast severe link quality variation and delay. Unlike the OLSR and AODV protocol this proposed approach can provide better performance. The adverse effect of link on communication is relieved by using the following techniques such as dedicated routing, prolong updating, tiny scope retransmission and appending of constant nodes. The simulation results shows improvement of packet delivery ratio, reduced delay and node overhead.

Keywords: Mobile ad hoc network, dedicated routing, prolong updating, tiny scope retransmission, constant node.

1. Introduction

The field of mobile ad hoc networking has emerged out recent years with a large variety of applications, where mobile nodes that are not within bounded transmission range and always mobility in nature. And all nodes with each other will require to forward data. It can operate without any existing infrastructure, supports mobile users, multi hop dissimilar wireless networking. This motivates a wide variety of research in mobile ad hoc network for improving connection path variation and performance.

2. Related work

In this section, we shortly see the previous work related to this paper in mobile ad hoc network. Investigation of resource allocation is carried out in Cooperative Transmission for Wireless Networks Using Mutual-Information Accumulation [1]. In this paper, given a network with a pair of source and destination, and objective is to reduce end-to-end transmission delay by incorporating all the techniques given below in these proposed techniques. Jae-Woo Kwon et al in [2] paper they shown a problem of optimizations to solve multiple user diversity and their capacity of using precoding in downlink transmission. Mostafa Dehghan et al in [3] paper prearrange

ment about channel variation with cooperative routing. It initially formulates the energy constraint cost of formation of the cooperative link between two near by nodes based on a two-stage transmission strategy assuming that based only upon statistical knowledge and behaviour data about channels is available. Saeed Akhavan Astaneh and Saeed Gazor have proposed Resource Allocation and Relay Selection for Collaborative Communications [4].It identifies the problem of selection of relay in a network where many user communicate with each other. And also deals with saving energy and time constraint. Ritesh Madan at al have proposed Energy-Efficient Cooperative Relaying over Fading Channels with Simple Relay Selection [5]. It deals channel state information in with the selection rules. Christina Fragouli et al have proposed Network Coding [6].

3. System Architecture

This system is implemented using this four following techniques. The proposed aim of this is to lessening the variant of link path and improving connectivity problem. The Mechanisms are: 1) Dedicated Routing, 2) Prolong Updating, 3) Tiny Scale Retransmission, 4) Addition of Constant Nodes. Dedicated Routing is exploiting the selection of the best route for sending data from source to destination. Prolong Updating has much faster than dedicated routing for updating advancement list. Tiny Scale Retransmission is used to resend the data whenever the data loss occurs in a network. Addition of Constant Nodes improves connectivity where often packet loss occurs due to node movement and event of barrier. In this proposed method, we are going to associate the above techniques.

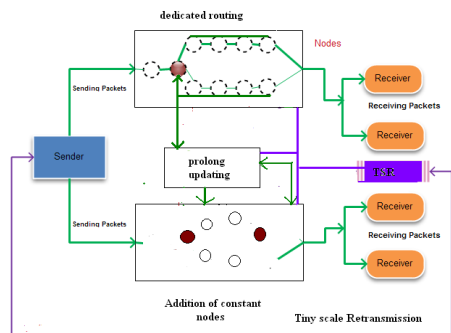


Figure 1. System Architecture

3.1 Dedicated Routing

In dedicated routing BFST is implemented in every node. While implementing the following tasks are encounter,

1. Contraction processing: As a Dedicating Routing protocol, we must reduce overlap of nodes.

2. Large volume of data transfer enactment: Due to the reduction of overplay, it should not castigate the network ability.
3. Avoidance of loop: Intermediate nodes can analyse and update new path carried by data packets according to structure information.

This should avoid loops after the construction of BFST in every node it episodically refreshes the network structure. The construction of BFST is done same earlier proactive source routing. The following figure Fig 2. Shows this dedicated routing.

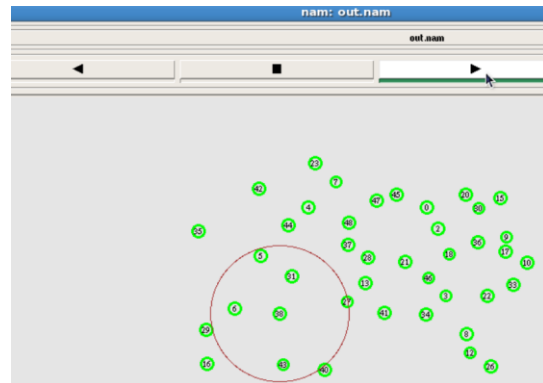


Figure 2 Dedicated Routing

It calculates BFST by using the union graph of all trees. In this below figure shows the simulation of dedicated routing. In dedicated routing it contains 50 nodes

3.2 Prolong Updating

After the dedicated routing the data packets are transferred in the network as per the advancement list. While progression of date packets traverse through the network, the nodes which are selected as advancement list that has been observed in the topology structure. This is called as prolong routing. As a group of packets are forwarded along the path towards destination node, if any advancement is aware a new best path to reach the destination sooner, then that advancement node change the advancement list in first to high stream neighbours to the destination. Afterwards it has to be generated backwards to the source. So this renovation of advancement list is much faster than routing.

3.3 Tiny Scope Retransmission

To increase the trustworthiness of packet transference in the middle of two advancement nodes, tiny scale retransmission is applied here. The nodes which are not described as advancement nodes by source are assigned for retransmitting nodes. That's why it is represented as tiny scale re transmitter. And also choice is made based on signal strength of node.

3.4 Appending of Constant Nodes

Adding up of constant nodes with the existing network based upon the issues such as great extend of connectivity and small amount of cost. Based on the above two issues the number of constant nodes and location will be selected.

4. ALGORITHM SPECIFICATION

4.1 Approximation Algorithms for Multi-Point Relay Selection

The main purpose of multipoint relays is to decrease the amount of broadcasting data and control packets in the network by reducing the identical resident transmission. Every node makes subgroup of adjoined members called multipoint relays to retransfer broadcast packets. This makes resident neighbours that are not in the MPR set to read the message without transmission, this avoids overflow of network. Here all nodes must choose an MPR subgroup among its neighbours that helps all two hop away from nodes will understand the packets. In this design, every node periodically transfers the information about its immediate neighbours which have been chosen as an MPR. Upon reception of this information, each node determines and up to date It's path information to each destination target. The list of hops via the progressive MPRs from origin to target, that nearby nodes discovery overdo is remain unchanged and its residency made ease to execute in effective way.

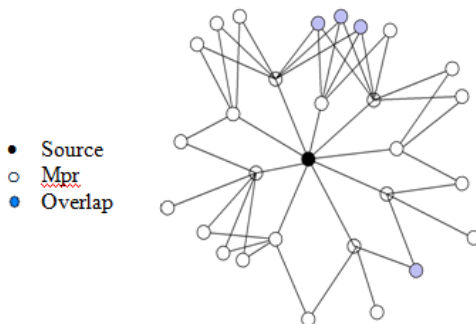


Figure 3. MPR selection

Multipoint Relays are nodes in the wireless adhoc networks that do the job of relaying messages between nodes, they also have the main node in the routing and selecting the proper route from any desired destination node. MPR advertise link state information for their MPR selectors periodically in their control messages. MPRs are also used to form a route from given node to any destination route calculation. Each node periodically broadcasts the hello messages for the link sensing, neighbour

detection and MPR selection processes. Each node selects set of neighbour nodes as MPRs from among one hop neighbours with symmetric link, which covers all the two hop neighbours and records in MPR selector table. MPR is recalculated when a change in one hop or two hops neighbour topology is detected. Every node periodically broadcasts list of its MPR selectors instead of the whole list of neighbours. Upon receipt of MPR information each node recalculates and updates routes to each known destination. In order to exchange topological information, tc messages broadcasted throughout the network.[7]

4.2 An Artificial Fish Swarm Algorithm for Finding constant node Positions

Artificial Fish Swarm Intelligence Algorithm (AFSA) is a swarm intelligence optimization algorithm. Fish usually stay in the place with a lot of food, so this algorithm simulates the behaviours of fish based on this characteristic to find the global optimum by optimizing local optimum. Below code describes how this algorithm works. [8]

Procedure Artificial Fishswarm Algorithm

```

::AF_init();
while the result is not satisfied do
  switch (::AF_evaluate())
    case value1:
      ::AF_follow();
    case value2:
      ::AF_swarm();
    default:
      ::AF_prev();
  end switch
  ::AF_move();
  get_result();
end while
end Artificial Fishswarm Algorithm

```

5. SIMULATION RESULTS AND PERFORMANCE COMPARISON

In this section, the testing and simulation of proposed system is done using NS2 simulator. The purpose of this simulation is to evaluate this method and compare with the previous methodologies. The following table shows the default values for simulation. Network simulator uses tool command language and c++ for execution environment. TCL

uses a faster and convenient way for configuration parameters and simulation values. Here simulation parameters considered here are channel type, Radio propagation, MAC type, Interface queue type and packet size.

SIMULATION PARAMETERS	VALUE
Channel type	Wireless channel
Radio propagation	Two ray ground
MACType	802-11
Interface Queue type	Queue/ Drop Tail/ Priority queue
Antenna model	Omni Antenna
No of mobile nodes	50
Packet size	256

Table 1. Classification Result

Here below figure shows the analysis of network model for finding the place for locating the constant nodes as well as number of constant nodes, in accordance with setting out cost constraint. This has been shown in the figure, Figure 4 (Analysis of node’s position).

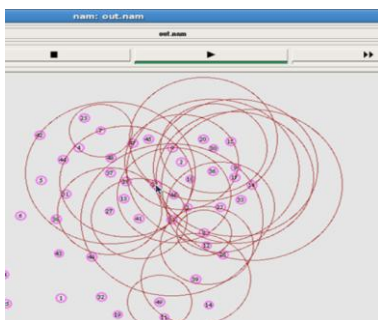


Figure 4. Analysis of Nodes Position

In the analysis phase the lagging or sparse position of nodes has found. After this analysis of network the static nodes are deployed in network. It has shown in figure 5

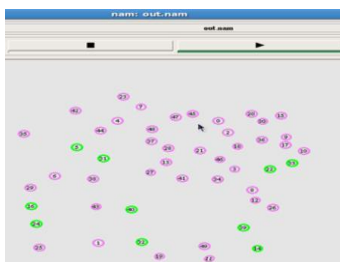


Figure 5. Addition of Constant Nodes

Below graph shows the comparison of packet delivery with the existing OLSR protocol, the proposed method DPTC improves the PDR. The following figure, Figure 6 explains the comparisons of packet delivery.

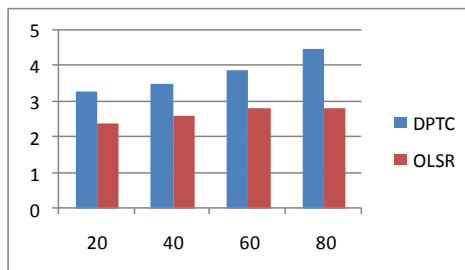


Figure 6. Packet Delivery Comparison

5. CONCLUSION

In this thesis, it attempts to enrich the attachment of node issues. That has done by the procedures such as dedicated routing, prolong updating, tiny scale retransmission and addition of constant nodes. By using the above procedures attachment issue gets alleviated somewhat. And the ratio of packet delivery increases. That is shown in the above simulation. This above methods can regulate the effects of connectivity problem. Analysis of node position comprises of dedicated routing , prolong updating and tiny scope retransmission as well as cost and accomplishment of addition of constant nodes. That is illustrated above with the help of network simulator.

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REFERENCE

- [1] Stark C. Draper and et al, IEEE TRANSACTIONS ON INFORMATION THEORY, VOL. 57,NO. 8, AUGUST 2011:”Cooperative Transmission for Wireless Networks Using Mutual-Information Accumulation”.
- [2] Jae-Woo Kwon and et al, IEEE TRANSACTIONS ON WIRELESS COMMUNICATIONS, VOL. 11, NO. 10, OCTOBER 2012” Cooperative Joint Precoding in a Downlink Cellular System with Shared Relay:Design and Performance Evaluation” .
- [3] Mostafa Dehghan and et al,“IEEE TRANSACTIONS ON WIRELESS COMMUNICATIONS, VOL. 10, NO. 11, NOVEMBER 2011 3813 “Minimum-Energy Cooperative Routing in Wireless Networks with Channel Variations”.
- [4] Saeed Akhavan Astanah and Saeed Gazor IEEE TRANSACTIONS ON WIRELESS COMMUNICA-

- TIONS, VOL. 8, NO.12, DECEMBER 2009 :]"Resource Allocation and Relay Selection for Collaborative Communications".
- [5] Ritesh Madan and et al, IEEE TRANSACTIONS ON WIRELESS COMMUNICATIONS, VOL. 7, NO. 8, AUGUST 2008 3013"Energy-Efficient Cooperative Relaying over Fading Channels with Simple Relay Selection".
- [6] Shengbo Yang, Feng Zhong, Chai Kiat Yeo, Bu Sung Lee IEEE transactions-2009 ISBN: 978-1-59593-713-1 "Position based Opportunistic Routing for Robust Data Delivery in MANETs".
- [7] Bernard Mans "Approximation Algorithms for Multipoint Relay Selection in Mobile Wireless Networks", ISSN 0429-6399.
- [8] Moretza Romoozi,Hamideh Babaei IJCSI ,VOL.8,ISSUE4,NO2,JULY 2011:"Improvement of Connectivity in Mobile Ad-hoc networks by adding static nodes based on a realistic mobility model".
- [9] Zehua Wang; Cheng Li; Yuanzhu Chen, GLOBAL TELECOMMUNICATIONS CONFERENCE (GLOBECOM 2011), 2011 IEEE , VOL., NO., PP.1,6, 5-9 DEC. 2011 "PSR: Proactive Source Routing in Mobile Ad Hoc Networks".
- [10] F.Xue, and P.R.Kumar, WIRELESS NETWORKS2004, VOL.10(2),PP.169-181, "The number of neighbours needed for connectivity of wireless networks.
- [11] S.Khuller, "Approximation algorithms for finding highly connected subgraphs", In D.S.Hochbaum, editor, Approximation algorithms for NP-hard problems. PWS Publishing Co., 1996.
- [12] H. Babaei, and M. Fathi, and M. Romoozi, "Obstacle Mobility Model Based on Activity Area in Ad Hoc Networks", ICCSA, LNCS.2007, Vol.4706, pp. 804–817.
- [13] M. Romoozi and H. Babaei, and M. Fathi, "A cluster-Based Mobility Model for Intelligent Nodes in Ad hoc Networks", ICCSA ,LNCS, 2009, VOL.5592, PP. 804–817.
- [14] T. H. Cormen, and C. E. Leiserson, and R. L. Rivest, and C.Stein, "Introduction to Algorithms" (3rd ed.),MIT Press.ISBN 0-262-03384-4, 2009.
- [15] C. R. Reeves, and J. E. Rowe, "Genetic Algorithms - Principles and perspectives A Guide to GA Theory (Operations Research/Computer Science Interfaces Series)", Vol. 20, pp.344., Hardcover ISBN: 978-1-4020-7240-6)
- [16] a. Bash, and j. Desnoyers, "Exact Distributed Voronoi Cell Computation in Sensor Networks", IPSN'07, 2007.
- [17] X.L.Li, and Z.J.Shao, and J.X.Qian, "Anoptimizing method based on autonomous animals: fish-swarm algorithm", Systems Engineering Theory & Practice, 2002, vol.22, no.11, pp. 32-38.
- [18] C. E. Perkins, and E. M. Belding-Royer, "Ad Hoc On Demand Distance Vector (AODV) Routing", 2nd IEEE Workshop on Mobile Computing Systems and Applications,1999, pp. 90-100.
- [19] L. Bajaj, and M. Takai, and R. Ahuja, and K. Tang, and R.Bagrodia, and M. Gerla, "GlomoSim: A Scalable Network Simulation Environment", Technical Report CSD, #990027, UCLA, 1997

- [20] A. Wood and J. Stankovic, "Denial of service in sensor networks,"Computer, vol. 35, no. 10, pp. 54–62, Oct 2002
- [21] H. Safa, H. Artail, and D. Tabet, "A cluster-based trust-aware routing protocol for mobile ad hoc networks,"Wirel. Netw., vol. 16, no. 4, pp. 969–984, 2010.
- [22] W. Gong, Z. You, D. Chen, X. Zhao, M. Gu, and K. Lam, "Trust based routing for misbehavior detection in ad hoc networks,"Journal of Networks, vol. 5, no. 5, May 2010.

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