International Journal of Futuristic Research Evaluation in Engineering (IJFREE)
Volume: 2 Issue: 4 August 2020

Innovations of Routing and Secure Dispatching of Packets in MANET

Rajalakshmi D[1]
[1]Assistant Professor
[1]Department of Computer Science and Engineering, Chennai, India
Sri Sai Ram Institute of Technology, Chennai

Abstract: *There are incredible influence 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 mixed network routing facilities and maintenance. In spite of this, modification and intrusion in connection caused by node mobility and wireless channels sharing undermine communication paths, which makes in constructing routing protocol greatest incitement 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.*

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

I.INTRODUCTION

MANET is a self-organizing, infrastructure less network, where each participating device is able to send and receive data with independent mobility model. A MANET is a type of ad hoc network that can change locations and configure itself. Because MANETS are mobile, they use wireless connections to connect to various networks. This can be a standard Wi-Fi connection, or another medium, such as a cellular or satellite transmission. Some MANETs are restricted to a local area of wireless devices (such as a group of laptop computers), while others may be connected to the Internet. MANETs can be defined by several characteristics and properties:

- Dynamic Topologies
- Bandwidth-Constrained, Variable Capacity Links
- Energy-Constrained Operation
- Limited Physical Security

Routing protocols for MANETs must discover paths and maintain connectivity when links in these paths break due to effects such as node movement, battery drainage, radio propagation, and wireless interference.
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 net-work for improving connection path variation and performance.

In MANET number of nodes forms a cluster. To find the attack within the cluster is called as local detection to detect the attack in another cluster is called as the global detection. In ad hoc networks, nodes do not start out familiar with the topology of their networks; instead, they have to discover it.

Received on: 05.06.2020
Accepted on: 06.08.2020
Published on: 25.08.2020

Corresponding Author: **Rajalakshmi. D** [rajalakshmi.cse@sairamit.edu.in]

International Journal of Futuristic Research Evaluation in Engineering (IJFREE)
Volume: 2 Issue: 4 August 2020

Due to the fact that mobile nodes are dynamic and they constantly move in and out of their network vicinity, the topologies constantly change. The basic idea is that a new node may announce its presence and should listen for announcements broadcast by its neighbors. Each node learns about nodes nearby and how to reach them, and may announce that it, too, can reach them.

Pro-active (table-driven) routing:

This type of protocols maintains fresh lists of destinations and their routes by periodically distributing routing tables throughout the network example is DSDV -Destination-Sequenced Distance Vector routing protocol.

Reactive (on-demand) routing:

This type of protocols finds a route on demand by flooding the network with Route Request packets. Example is AODV-Ad Hoc on Demand Vector.

Hybrid routing:

This type of protocols combines the advantages of proactive and of reactive routing. The routing is initially established with some proactively prospected routes and then serves the demand from additionally activated nodes through reactive flooding. The choice for one or the other method requires predetermination for typical cases initially; MANET was designed for military applications, but in recent years has found new usage. For example, search and rescue mission, data collection, virtual classes and conferences where laptops, PDA or other mobile devices are in wireless communication. Since MANET is being used widespread, security has become a very important issue. The majority of routing protocols that have been proposed for MANET assumes that each node in the network is a peer and not a malicious node. Therefore, only a node that compromises with an attacking node can cause the network to fail. Intrusion detection can be defined as a process of monitoring activities in a system which can be a computer or a network. The mechanism that performs this task is called an Intrusion Detection System (IDS) [5]-[6].

II.RELATED WORKS

Mobile Ad hoc Network (MANET) is a collection of mobile nodes outfitted with both a wireless transmitter and a receiver that communicate with each other via bidirectional wireless links either directly or indirectly. Unfortunately, the open medium and remote distribution of MANET make it vulnerable to various types of attacks. 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 pre coding in downlink transmission. Mostafa Dehghan et al in [3] paper prearrangement about channel variation with cooperative routing. It initially formulates the energy constraint cost of formation of the cooperative link between two nearby 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 users communicate with each other. And also deals with saving energy and time constraint. Ritesh Madanatal has proposed Energy-Efficient Cooperative Relaying over Fading Channels with Simple Relay Se-lection [5]. It deals channel state information in with the selection rules. Christina Fragoulietal has proposed Network Coding [6].

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.

International Journal of Futuristic Research Evaluation in Engineering (IJFREE)
Volume: 2 Issue: 4 August 2020

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.

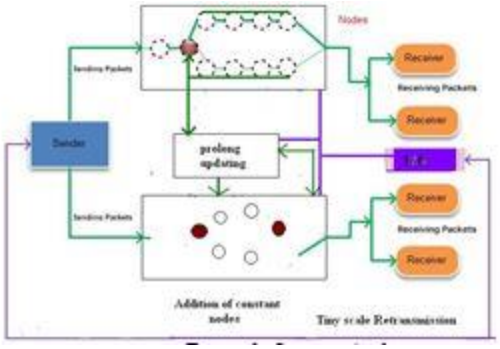

Figure 1. System Architecture

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 overplay 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 pro-active source routing. The following figure Fig 2. Shows this dedicated routing. The following figure Fig 2. Shows this dedicated routing.

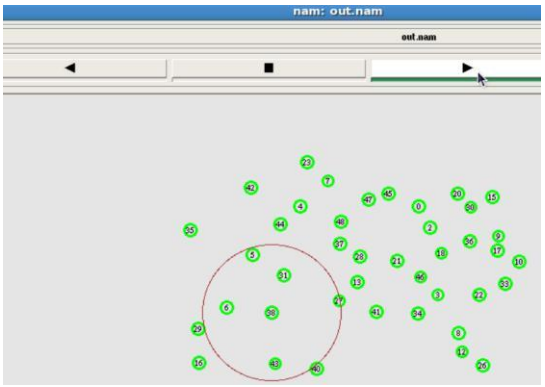

Figure 2 Dedicated Routing

International Journal of Futuristic Research Evaluation in Engineering (IJFREE)
Volume: 2 Issue: 4 August 2020

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 re-transmission 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 extent of connectivity and small amount of cost. Based on the above two issues the number of constant nodes and location will be selected.

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 neighbors that are not in the MPR set to read the message without transmission, this avoids over-flow of network. Here all nodes must choose an MPR subgroup among its neighbors 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.

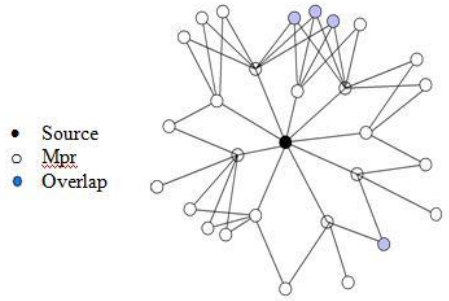

Figure 3. MPR selection

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 broad-casts the hello messages for the link sensing, neighbor detection and MPR selection process. Each node selects set of neighbor nodes as MPRs from among one hop neighbors with symmetric link, which covers all the two hop neighbors and records in MPR selector table. MPR is recalculated when a change in one hop or two hops neighbor topology is detected.

International Journal of Futuristic Research Evaluation in Engineering (IJFREE)
Volume: 2 Issue: 4 August 2020

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 behaviors 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_Fishwarm_Algorithm
::AF_init();
while the result is not satisfied do
  switch (::AF_evaluate())
        case value1:
              ::AF_follow();
        case value2:
              ::AF_swarm();
        default:
              ::AF_prey();
  end switch
  ::AF_move();
  get_result();
end while
end Artificial_Fishwarm_Algorithm
```

SIMULATION RESULTS & PERFORMANCE COMPARISON

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, and Interface queue type & packet size. Below graph shows the comparison of packet delivery with the existing OLSR protocol, the proposed method DPTC improves PDR. The following figure 6 illustrates the comparisons of packet delivery.

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

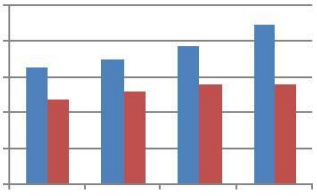

Figure 6. Packet Delivery Comparison

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.

International Journal of Futuristic Research Evaluation in Engineering (IJFREE)
Volume: 2 Issue: 4 August 2020

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

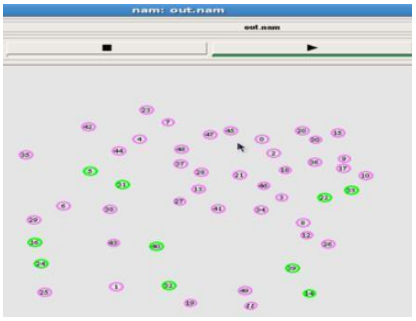

Figure 5.Addition of Constant Nodes

CONCLUSION

In this paper, 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.

REFERENCES

[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 2 012" 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 Astaneh and Saeed Gazor IEEE Transactions on wireless communications,VOL. 8, NO.12, DECEMBER 2009 :|"Resource Allocation and Relay Selection for Collaborative Communications".

International Journal of Futuristic Research Evaluation in Engineering (IJFREE)
Volume: 2 Issue: 4 August 2020

[5] Ritesh Madan and et al, IEEE TRANSACTIONS ON WIRELESS COMMUNICATIONS, VOL. 7, NO. 8, AUGUST 2008 3013"Energy-Efficient Cooperative Re-laying 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 "Po-sition based Opportunistic Routing for Robust Data De-livery 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 Con-nectivity in Mobile Ad-hoc networks by adding static nodes based on a realistic mobility model".

[9] Zehua Wang; Cheng Li; Yuanzhu Chen, GLOBAL TEL-ECOMMUNICATIONS CONFERENCE (GLOBECOM 2011), 2011 IEEE , VOL., NO., PP.1,6, 5-9 DEC. 2011 "PSR: Proactive Source Routing in Mobile Ad Hoc Net-works".

[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, Ap-proximation algorithms for NP-hard problems. PWS Pub-lishing Co., 1996.

[12] Elhadi M.Shakshuki , Nan Kang and Tarek R.Sheltami, "EAACK – A Secure Intrusion Detection System for MANETs" in Industrial Electronics, Vol 60, No.3, 2013.

[13] M. Romoozi and H. Babaei, and M. Fathi, "A clus-ter-Based Mobility Model for Intelligent Nodes in Ad hoc Networks", ICCSA ,LNCS, 2009, VOL.5592, PP. 804–817.

[14] N. Kang, E. Shakshuki, and T. Sheltami, "Detecting forged acknowl-edgements in MANETs," in *Proc. IEEE 25th Int. Conf. AINA*, Biopolis, Singapore, Mar. 22–25, 2011, pp. 488–494.

[15] Hung - Min Sun, and et al., "Dual RSA and its Security Analysis", IEEE Transaction on Information Theory, Aug 2007, pp 2922 – 2933,2007

[16] H.-M. Sun, M. J. Hinek, and M.-E. Wu, On the design of Rebalanced- RSA, revised version of [37] Centre for Applied Cryptographic Research, Technical Report CACR 2005-35, 2005.

[17] S. Marti, T.J. Giuli, K. Lai, and M. Baker. "Mitigating routing misbehavior in mobile ad hoc networks," in *Proc. 6th Annual Int. Conf. on Mobile Computing and Networking (MobiCom'00),* Boston, MA, August 2000, pp.255-265.

[18] K. Kuladinith, A. S. Timm-Giel, and C. Görg, "Mobile *ad-hoc* commu-nications in AEC industry," *J. Inf. Technol. Const.*, vol. 9, pp. 313–323, 2004.

[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 net-works,"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.