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A Fault Tolerance Technique to Improve Routing in MANET

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Abstract

MANETs are active as well as incessantly altering arrangements, having cluster of nodules that are not interiorly managed. Conniving a direction-finding code of behavior for this kind of atmosphere is very demanding task. The circumstances contracts inferior once the defective nodes in the network, since they enhance statistics hammering and disgrace the recital of protocols. To regulate a disciplined communiqué method among the nodules, strapping direction-finding configuration between the transitional nodules are necessitated, also if the transitional nodules perform badly, subsequently the effectiveness as well as presentation of the association is extensively exaggerated. The location of the nodules in MANETs alters ultimately. Moreover, a nodule gathering appropriately at solitary spot in moment can turn into defective shortly. Consequently, a fault-tolerant direction-finding procedure is required on behalf of relocating statistics by unambiguous data liberation velocity. Here projected resolution, LA proposes a liability-liberal direction-finding procedure. LA has been conventionally used to characterize organic knowledge structures. The hypothesis of LA may be useful within troubles intending on verdict the most favorable stroke, pleasing disorganized surroundings into description. The knowledge sequence engrosses two constituents, the arbitrary surroundings and a knowledge machine. The succession of knowledge is achieved via cooperating among RS, as well as calculating its responses to decide the finest (contiguous to most favorable) stroke. More precedence is given to nodes with superior “goodness value” and in sequence mounting the envelope surge in the course of the undeviating lane, which surrounds maximum amount of strong nodules. This guarantees a superior package liberation velocity than any supplementary lane.

Keywords : MANET, Leaning Automata, Random surrounding

1 INTRODUCTION

A mobile ad hoc network (MANET) is a self-configuring transportation less network of portable tools. These appliances are attached through wireless. Each apparatus in a MANET is open to move separately in any track and will consequently transform its links to other machines repeatedly These transportation less networks have no permanent routes, all nodes are proficient of association and can be associated energetically in an random manner. Because MANETS are movable, they use wireless associations to bond to a variety of networks. MANETs are a sort of Wireless informal association that regularly has a routable networking background. An **ad hoc direction-finding procedure** is a principle, or typical determine how to choose nodules, which terminology is used to transmit the packet between the connecting Devices. In ad hoc networks, nodules are not identified by the topology of the networks .Every nodule discovers information about the neighboring nodule and the way to have communication with the new Nodule.

1.1 Properties of Routing Protocol in MANET

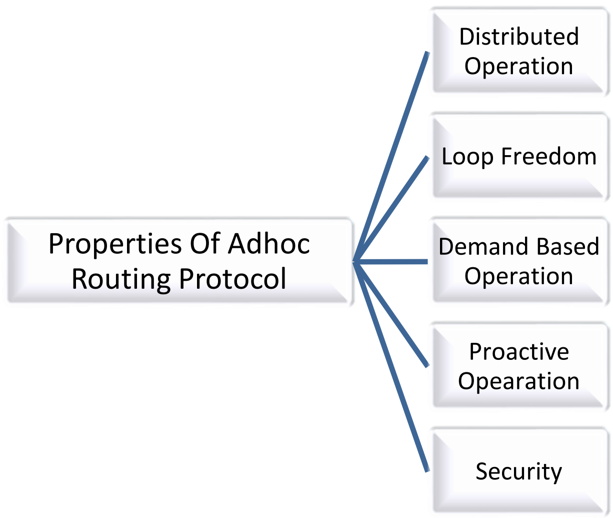

Fig. 1. Properties of AD-hoc Routing Protocol

1.2 Related Work

Security is centered on key based apparatus or third party trust administration structures. Routing security and replications are being projected to prove the enhanced packet delivery ration, throughput, end to end delay and reduced packet drop rate for Ad hoc On Demand Distance Vector. The effects obtained from the simulations are encouraging and demonstrates the improved security do not influence the presentation of the MANET. Implement direction-finding in MANET faced Diverse confronts .special direction-finding measures have been appraised for better management of mobile ad-hoc networks. The parameters used for measuring to performance are delay, throughput, load balancing and congestion control. Multipoint Routing algorithm has discussed load balancing but does not put emphasis on Energy parameter. E-AOMDV presented in this paper has taken into consideration both i.e. energy as well as load balancing. The load at each node is computed. Next, on the basis of certain performance metrics like Packet overhead, Throughput the efficiency of E-AOMDV is analogized with AOMDV .The proposed E-AOMDV depict enhanced performance over existing protocol i.e AOMDV.EAOMDV helps in reducing energy consumption and distributing the load in befitting way.

1.3 Research Objectives

The goodness value of the nodes depends upon the Packet- Delivery ratio of the node. If the node is forwarding the data properly then the node is rewarded else the node is penalized. The integrity rate of the nodule can be considered by summing up reward or the penalty points.

- To decide the path from source to destination Take the package liberation proportion intended for recompense consequence system.
- Use the concept of residual energy for optimizing the reward penalty scheme.
- Direction-finding commencing starting place and target using projected knowledge automata

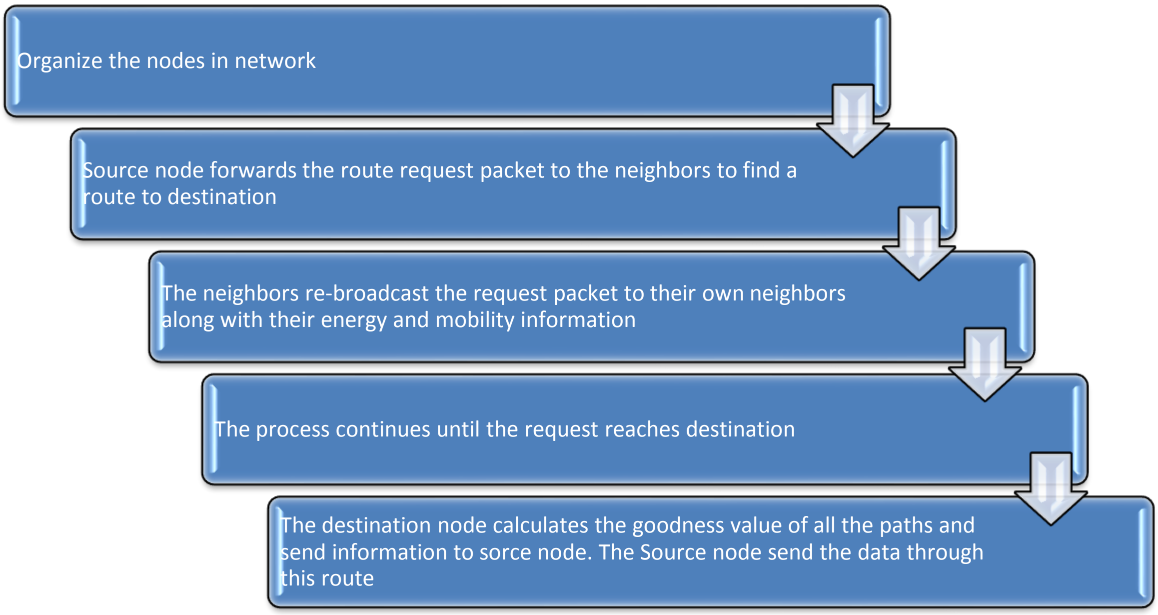

Fig. 2. Anticipated Approach

1.4 Implementation of Anticipated Approach

Step1: Deploy the network

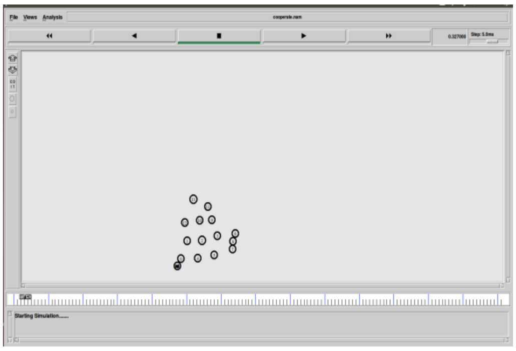

Fig. 3. Deployment of nodes

The first step is the deployment of the nodes in the network. The nodes are deployed randomly with the help of Random Way Point Mobility model. In the above figure, nodules are seen getting organized within the area

Step 2: Source node forward route request to the neighbors to discover a path to target.

After starting nodule has some information to forward to destination node, it begins with the process of broadcasting. Node 0 is taken to be the source node in the above scenario. The destination is assumed to be located at far end of the network, node 48. The nodes which are blue in color represent one hop nodes which received route request packets from the source node. The one hop nodes will further forward the route request packets to its neighbors. Along with the route request packets they will inform the two hop neighbors about their residual energy which is the remaining energy in the nodes and their mobility which is the speed with which they are moving in the network.

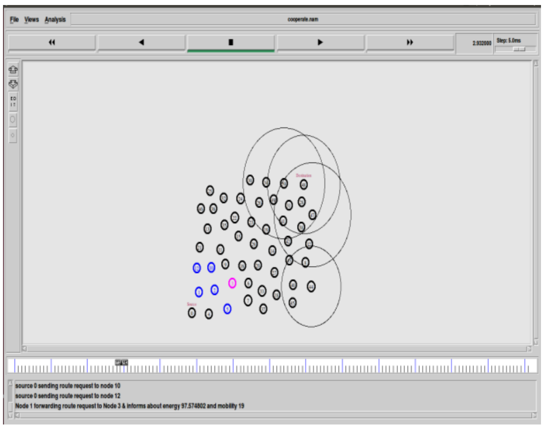

Fig. 4. Broadcasting

Step3: The process continous untill the request reaches a Destnattion.

The process of broadcasting continues until the route to destination is found. The blue color nodes are one hop nodes, pink color nodes are two hop nodes. Green color nodes are three hop nodes.

Step4: The destination node calculates the goodness value and sends information to the source

The destination node will calculate the integrity assessment of each path through which route request came. The route which has highest integrity rate is preferred Highest goodness value would mean that the nodes in the path have lowest mobility and highest energy as compared to other paths available in the network. In the below figure, the destination node replied to the source via node 31 -19 -16 -10 - 0.

The source would send data to the destination node via this optimized path.

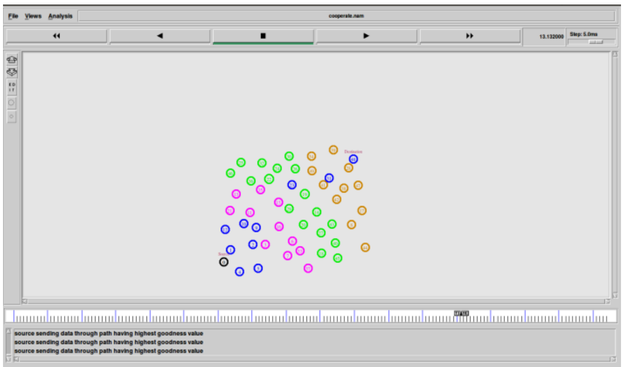

Fig. 5. Checking Of Goodness Value

1.5 Implementation Of The Learning Automata

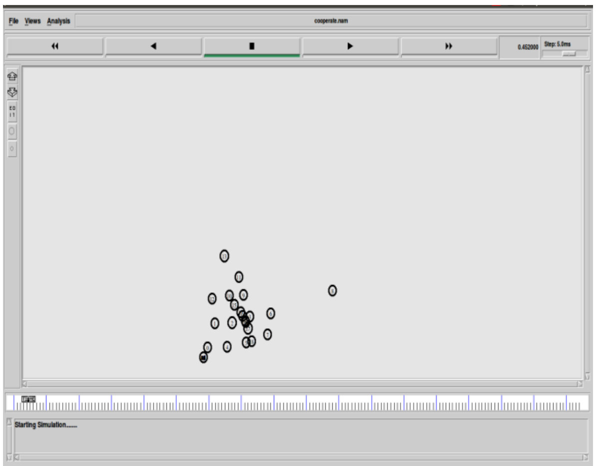

Fig.6. Deployment Of Mobile Nodes

The above figure shows the deployment of the mobile nodes in the network. The total number of nodes are 49. They are deployed in the area of 1100 * 1100 m.

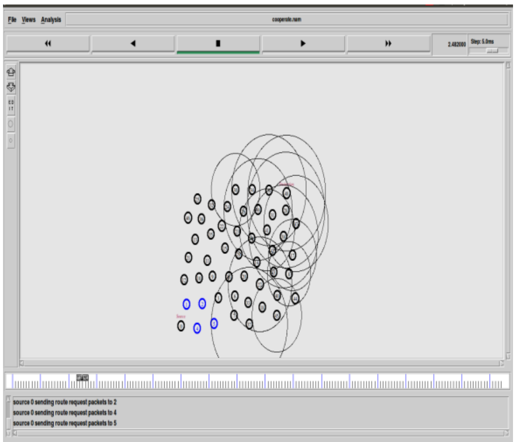

Fig.7. Broadcasting of Packets

The above figure shows the process of broadcasting of the route request packets. The route request packets are forwarded from source 0 to its neighbors which are indicated in blue color.

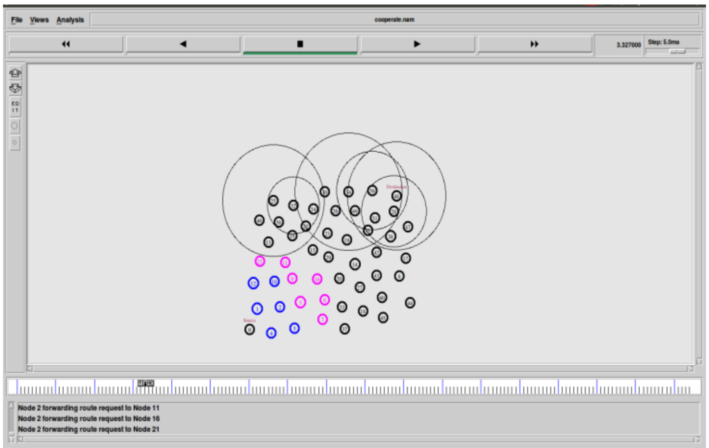

Fig.8. Rebroadcast of Packets

The neighbors if they are not having fresh route to the destination node, they re-broadcast the request packet to its own neighbor nodes. Unlike in the proposed scheme, where the information regarding residual energy of the nodes and the mobility of the nodes is forwarded to the neighbors along with route request, in the basic scheme the nodes simply forward the route request to the destination node.

1.6 Metrics

Following metrics were considered to analyze the performance of the network :

- Routing Overhead: The routing overhead is calculated as the fraction of total control packages transmitted over the network to total data packets collected at target nodule. It signifies how many number to routing packets needs to be forwarded in the network to receive a unit of data packet. Smaller the routing overhead superior is the performance of the network.
- Throughput: sum of information received at the target nodule. It is one of the performance measures of the network; more the throughput indicates better network performance.
- Packet Delivery Ratio: It is ratio of number of data packets received to the number of data packets sent.

1.7 Simulation Result

Table 1. Simulation Result

constraint	assessment
Channel	Wireless
broadcast	Two Ray Ground
Queue	Drop Tail
Antenna	Omni Directional
Number of nodes	50
Initial Energy	100 J
Routing Protocol	AODV

1.7.1 Routing Overhead

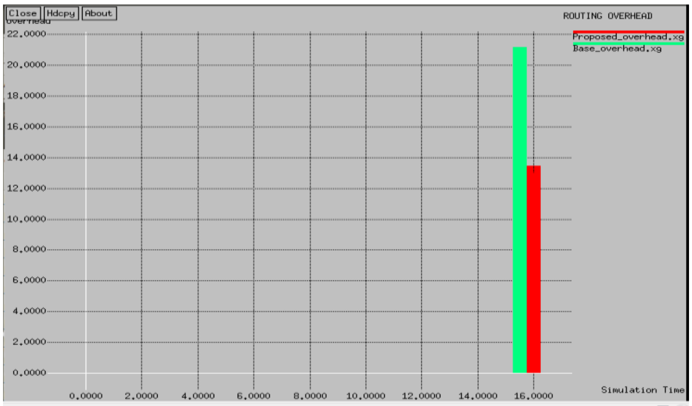

Fig.9 Routing Overhead for LA

1.7.2 Throughput

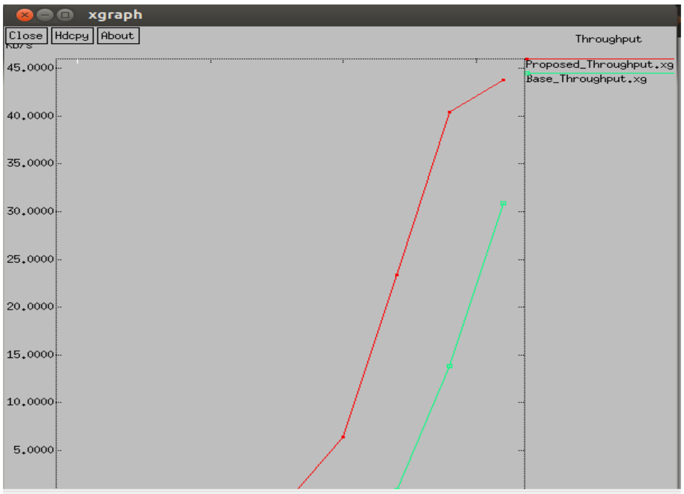

Fig. 10 Throughput for LA

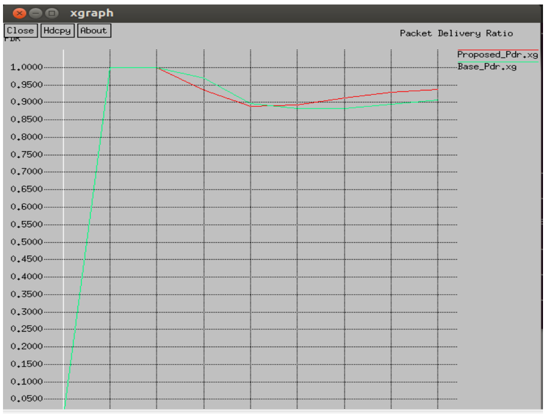

Fig. 11 Packet Delivery Ratio for LA

1.8 Conclusion

The proposed scheme has been shown to demonstrate superior performance in requisites of routing overhead, throughput and packet delivery ratio. The mobility of the nodes should be taken into account in order to optimize the performance of the network. The nodes which are less mobile in nature leads to less link breakage and the nodes having highest energy leads to less fault in the network.

1.9 Future Scope

In future we would like to apply learning automata taking network security into account. Since nodes are susceptible to various types of attack such as black hole attack, wormhole attack etc. an effective intrusion detection system can be implemented using learning automata.

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