A New Technique for Reducing Routing Overhed in Manet Using Ncpr

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Abtract-Mobile ad hoc networks consist of a collection of mobile nodes which can be dynamically self-organized into arbitrary topology networks without a fixed infrastructure. Due to large mobility of nodes in mobile ad hoc networks, here exist repeated link breakages which direct to frequent path failures and route discovery. The overhead of a route discovery cannot be neglected. Proposed a new technique for reducing routing overhead in Manet's using Ncpr. In order to efficiently develop the information of nearby coverage, The method NCPR is to determine rebroadcast delay in the rebroadcast order, and get the additional accurate coverage proportion by sensing neighbor coverage information.

Index Terms—increase the quality of service, reduce the overhead, avoid the network congession, Route discovery by RREQ , Failure detection by Err, Calculating rebroadcasting delay, Route recovery by RREQ and RREP

INTRODUCTION

MANET is a special type of wireless mobile network in which mobile hosts can communicate without any aid of established infrastructure and can be deployed for many applications such as battlefield, disaster relief and rescue, etc. In a MANET, in particular, due to host mobility, broadcastings can be applied to many areas, such as paging a particular host, sending an alarm signal, and finding a route to a particular host, etc. If there is link failure then device ll re-broadcast request to all other node to find the destination.Many routing protocols, such as Ad hoc On-demand Distance Vector Routing (AODV) and Dynamic Source Routing (DSR) have been proposed for MANETs. The above two protocols are on-demand routing protocols, and they could improve the scalability of MANETs by limiting the routing overhead when a new route is requested. Due to node mobility in MANETs, repeated connection breakages might direct to regular path failures and route discovery, which could raise the overhead of routing protocols and decrease the packet deliverance ratio and increase the end delay. Thus, reducing the routing overhead in route discovery is an essential problem.

I. Ad Hoc On-demand Distance Vector Routing

The mobile ad hoc networks (MANETs), do not have fixed infrastructure. On Demand Distance Vector routing protocol is One of the most widely used routing protocols for an ad hoc network is the Ad hoc, abbreviated as AODV. In the AODV routing protocol, source node forwards RREQ (Route Request) packet to discover path to the destination node. The intermediate node having less lifetime, also forwards RREQ. As lifetime or energy expires after some time, the node goes failure; it could not forward RREP (Route Reply) on reverse path. Therefore, source node has to resume RREQ rebroadcast to communicate with destination, which results in needless RREQ rebroadcast, less Packet Delivery Ratio (PDR) as well as more end to end delay and throughput.

II. Dynamic Source Routing protocol (DSR)

The Dynamic Source Routing protocol (DSR) is a simple as well as efficient routing protocol. Mostly same as AODV routing protocol .The rebroadcast possibility would be small while the number of nearby nodes are high which means host is in opaque area .The possibility will be large when the amount of neighbor nodes are small which means host is in low area.

The contributions of this paper:

The propose method NCPR is to determine rebroadcast delay in the rebroadcast order, and obtain the more exact additional coverage ratio by sensing neighbor coverage knowledge. The advantages of the neighbor coverage knowledge probabilistic mechanism, is significantly decrease the number of retransmissions and reduce the routing overhead, also improve the routing performance.

To calculate the rebroadcast probability:

The rebroadcast probability is composed of two parts

1) The extra exposure ratio, it is the ratio of the number of nodes that should be covered by a single broadcast to the total number of neighbours.

2) The connectivity factor, it is reflect the association of network connectivity and the number of neighbours of a specified node.

III. NEIGHBOR COVERAGE BASED PROBABILISTIC REBROADCAST (NCPR) PROTOCOL

To calculate the rebroadcast delay and rebroadcast probability of the proposed protocol. Using the upstream coverage ratio of an RREQ packet received from the previous node to calculate the rebroadcast delay and use the additional coverage ratio of the RREQ packet and the connectivity factor to calculate the rebroadcast probability in our protocol, which requires that each node needs its 1-hop neighborhood information.

A. Rebroadcast Delay and Uncovered Neighbours Set

The node receives the RREQ packet from its earlier node s, to use the neighbour list in the RREQ packet to estimate how many its neighbours have been not covered by the RREQ packet from s. The node ni has more neighbours not covered by the RREQ packet from source, and the RREQ packet can reach more additional neighbour nodes when node ni rebroadcasts the RREQ packet,. To quantify of the Uncovered Neighbours (UCN) set U(ni) of node ni as follows:

$$U(ni) = N(ni) - [N(ni) \cap N(s)] - \{s\}, (1)$$

The N(s) and N(ni) are the neighbours sets of node. s is sends an RREQ packet to node ni. According to Eq. (1),

The broadcast characteristics of an RREQ packet, node ni can receive the duplicate RREQ packets from its neighbours. Node ni could further adjust the U(ni) through the neighbour knowledge. In order to sufficiently exploit the neighbor knowledge and avoid channel collisions, each node should set a rebroadcast delay. The choice of a proper delay is the key to success for the proposed protocol because the scheme used to determine the delay time affects the dissemination of neighbor coverage knowledge. When a neighbor receives an RREQ packet, it could calculate the rebroadcast delay according to the neighbor list in the RREQ packet and its own neighbor list. The rebroadcast delay Td(ni) of node ni is defined as follows:

$$Tp(ni) = 1 - \frac{|N(s) \cap N(ni)|}{|N(s)|}$$

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$$Td(ni) = MaxDelay \times Tp(ni),(2)$$

Where Tp (ni) is the delay ratio of node ni, and MaxDelay is a small constant delay. | · | is the number of elements in a set.

The above rebroadcast delay is defined reasons: First, the delay time is used to determine the node transmission order. To sufficiently exploit the neighbour coverage knowledge. The Eq. (2) is, node nk has the lowest delay. Once node nk rebroadcasts the RREQ packet, here more nodes to receive it, because node nk has the largest number of common neighbours. Then there are more nodes which can exploit the neighbor knowledge to adjust their UCN sets. Of course, whether node nk rebroadcasts the RREQ packet based on its rebroadcast possibility calculated in the subsequent section. The aim of this rebroadcast hold-up is not to rebroadcast the RREQ packet to more nodes, but to disseminate the neighbour coverage knowledge more quickly. After determining the rebroadcast delay, the node can set its own timer.

B .Neighbour Knowledge and Rebroadcast Probability

The node which has a more rebroadcast delay might listen to RREQ packets from the nodes, which have lesser one. For example, if node ni receives a duplicate RREQ packet from its neighbour nj , it knows that how many its neighbours have been covered by the RREQ packet from nj . Thus, node ni could further adjust its UCN set according to the neighbor list in the RREQ packet from nj .
Then the U(ni) can be adjusted as follows:

$$U(ni) = U(ni) - [U(ni) \cap N(nj)]. (3)$$

After adjusting the U(ni), the RREQ packet received from nj is discarded. Do not need to adjust the rebroadcast delay because the rebroadcast delay is used to determine the order of disseminating neighbor coverage knowledge to the nodes which receive the same RREQ packet from the upstream node. Thus, it is determined by the neighbours of upstream nodes and its own. When the timer of the rebroadcast delay of node ni expires, the node obtains the final UCN set.

The nodes belonging to the final UCN set are the nodes that need to receive and process the RREQ packet. Note that, if a node does not sense any duplicate RREQ packets from its neighborhood, its UCN set is not changed, which is the initial UCN set. Now we study how to use the final UCN set to set the rebroadcast probability.

The additional coverage ratio Ra(ni):

$$Ra(ni) = \frac{|U(ni)|}{|N(ni)|} , (4)$$

$$Fc(ni) = \frac{Nc}{|N(ni)|} \quad , (5)$$

Nc = 5.1774 log n, the n is the number of nodes inthe network. The Eq. (5), observe that when |N(ni)| >Nc, Fc(ni) < 1. The means node ni is in the dense area of the network, then only part of neighbours of node ni forwarded the RREQ packet could keep the network connectivity. And |N(ni)| < Nc, Fc(ni) > 1.

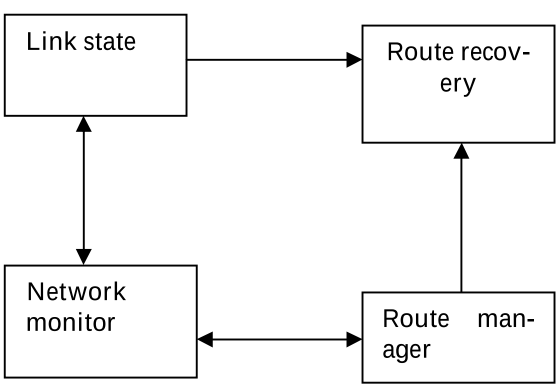
The means of node ni is in the sparse area of the network, then node ni should forward the RREQ packet in order to approach network connectivity. Combining the additional coverage ratio and connectivity factor, to obtain the rebroadcast probability Pre (ni) of node ni:

$$Pre\ (ni) = Fc(ni) \cdot Ra(ni) \quad , (6)$$

Where, if the Pre (ni) is > 1, to set the Pre (ni) to 1.

IV.MODULES WORK

Module parts followed by
1) Route discovery by RREQ, 2) Failure detection by Err
3) Calculating rebroadcasting delay, 4) Route recovery by RREQ and RREP



Module Block Diagram

1. Route discovery by RREQ

Route Discovery is used each time a source node needs a route to a target node. Initially, the resource node looks up its route cache to find out if it already contains a route to the target**.** Initially all nodes collecting the data about neighbor nodes. The network monitors having the detailed information of neighbor nodes such as routing table. It provides the connection information to Route manager.

2. Failure detection by Err

The network monitors only provide the information about node details. Channel analyzer collecting detail about channel capability. If there is any problem with link channel then node will generate error message for inform about failure.

3. Calculating rebroadcasting delay

When a neighbor receives an RREQ packet, it could calculate the rebroadcast delay according to the neighbor list in the RREQ packet and its own neighbor list.

The rebroadcast possibility would be low when the amount of neighbor nodes is large which means host is in dense region. The probability will be large when the amount of nearby nodes is small which means source is in sparse region. We are considering the duplicate packet while transferring the RREQ. So we can avoid the overhead in rebroadcasting.

4. Route recovery by RREQ and RREP

In this section the signal handoff is done with the knowledge of route plan. (RREP)The route manager informs the channel fading.

TABLE1

Simulation Parameter	Value
NODES	50
Linux OS	(Ubuntu 10.04)
Simulator NS-2	(v2.34)
Interface Queue Length	50
Packet Size 512 bytes	Packet Size 512 bytes

SIMULATION RESULTS

INITIAL WINDOW

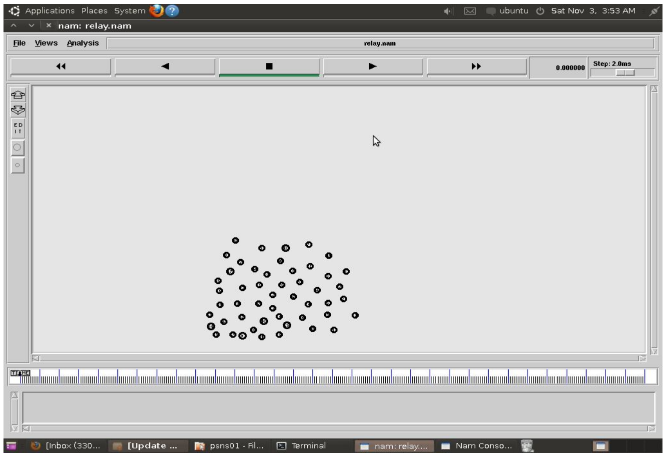


Fig 1: Starting stage nam window

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Specified nodes are available at nam window after the execution of program at initial stage.

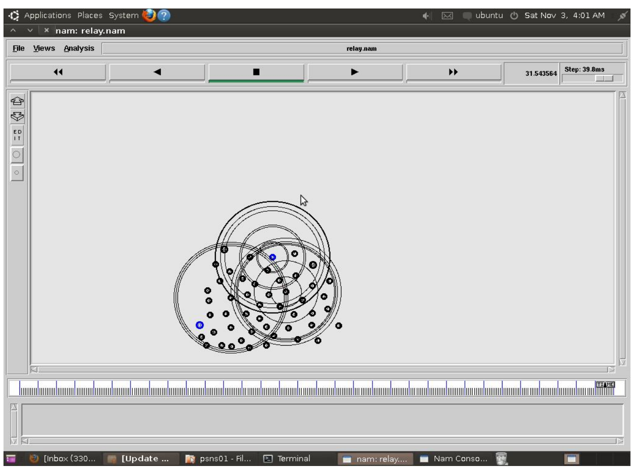

Fig2 : Send a packet source to destination.

Highest probability of nodes chosen and thus transmission of packets from source to destination takes place.

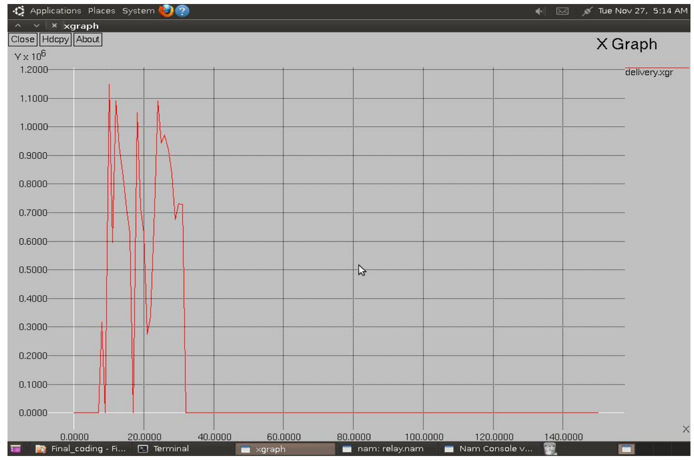

Fig3 : Xgraph for efficient transmission

Conclusion is that the system is reliable and quality assured because of high packet delivery ratio which is above shown in Xgraph. All the above considerations are achieved by reducing the overhead.

V.CONCLUSION

In this paper, I proposed a new technique for reducing routing overhead in manet using NCPR. Simulation results show that the proposed protocol generates less rebroadcast traffic. Because of less redundant rebroadcast, the proposed protocol mitigates the network collision and contention, so as to increase the packet delivery ratio and decrease the average end-to-end delay and reduce the routing overhead.

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