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Virtual Force Geometric Routing Protocol In Non Planar Graphs

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ABSTRACT: *Routing is the foremost issue in mobile ad hoc networks (MANETs). An ad hoc routing protocol is a convention or standard that controls how nodes decide which way to route packets between computing devices in a mobile ad hoc network. Here first, we construct a virtual small-world network by adding virtual long links to the network to reduce the number of local minima. Second, we use the virtual force method to recover from local minima without relying on face routing. Combining these two methods, we propose a purely greedy routing protocol.*

KEYWORDS: *mobile ad hoc networks (MANETs), small-world model, virtual force.*

I. INTRODUCTION

A mobile ad hoc network (MANET) is comprised solely of wireless stations. The communication between two nodes may require a traversal of multiple hops due to a limited range. Existing routing algorithms can be broadly classified into topology-based and position-based routing protocols. Topology-based routing determines a route based on complete network topology as state information.

In order to recover from a local minimum most existing protocols switch to a less efficient mode known as face routing. Face routing runs on a planar graph (a graph without crossing edges), in which the messages is routed around the perimeter of the face (an area surrounded by the edge in the planar graph) which intersects the line between the source and the destination.

In this project, we are going to remove the local minimum problem (face routing) by using two new methods.

1. Construct a virtual small-world network

Specifically, each node in the network constructs some remote contacts connected by virtual long links (VLLs). Each VLL consists of multiple consecutive physical links. By using these VLLs is to reduce the number of local minima for each destination and increase the success rate of the greedy routing.

2. Virtual force (VF)-based greedy routing

It can recover from local minima without resorting to face routing. In this method, a message is forwarded along the increasing gradient of the composition of the VFs. Each VF has a source. The destination is the only source of an attractive (positive) VF. Whenever the greedy method fails in a local minimum under the composition of the VFs, a new source of a repulsive (negative) VF is added to the loacal minimum to expel the message from it. Thus, the local minimum is removed, and greedy routing is recovered. This method is an iteration of greedy forwarding and local minimum removal.

II. CONCEPT

A MANET is a peer-to-peer network that allows direct communication between any two nodes, when adequate radio propagation conditions exist between these two nodes and subject to transmission power limitations of the nodes. If there is no direct link between the source and the destination nodes, multi-hop routing is used. In multi-hop routing, a packet is forwarded from one node to another, until it reaches the destination. Appropriate routing protocols are necessary to discover routes between the source and the destination, or even to determine the presence or absence of a path to the destination node. Because of lack of central elements, distributed protocols and algorithms have to be used.

The data is passing in MANETs by using in distributed routing protocols which are having the both features.

- Proactive

Route is maintained in tables at each node resulting in quick routing.

- Reactive

Route is found when we want to send a packet to its destination.

In MANETs the geographic routing nodes could get their location information either by global positioning system (GPS) or localization algorithm. In geographic routing, a node makes routing decisions according to its neighboring nodes location information. Since contemporaneous source to destination node connection may not exist in disruption (Delay) Tolerant Network (DTN), location inaccuracy and network disruptions have to be properly dealt with if geographic routing is applied on the network. And different DTN networks have different network characteristics, such as different node densities and node communication ranges a uniform routing approach is not the best choice in dealing with different situations.

III. PROPOSED WORK

1. Network Formation

A VLL can be considered as a virtual path between an arbitrary pair of nodes in the network, rather than as a path for a specific pair of source and destination as in traditional routing such as DSR and AODV. Considering scalability, the length of each VLL is under the power-law distribution. In our algorithm, each node periodically sends out VLL discovery messages which go away and then come back to report a VLL. The first problem here is the determination of maximum hop and direction of a message

2. Greedy Routing

Extending the traditional greedy protocol to our small world greedy routing, which uses VLLs and VF, is straightforward. First, we define a general set of links of a node to be the set of links of the node containing both the physical links to its neighbors and its VLLs. Thereafter, we use links to refer to the links in this general set of links without causing confusion. We define the force of a VLL as the maximum force of the nodes in the VLL.

3. SWING+ protocol

It is inherited from the family of greedy algorithms that may go to a local minimum and fail. The best part of SWING+ is the iterative method that allows the message to continue to travel to the other parts of the network after greedy failures in local minima. In order to recover from local minima, a list of VR is maintained in each message which contains the positions of the encountered local minima that will exert repulsive (negative) VFs to the message.

Algorithm for SWING+ Protocol

1: while the current node vi is not vd do
2: while the current node vi is a local minimum under
The force comp. do
3: Add vi to list VR.
4: end while
5: List the links which contain the physical links to all
Neighbors and all VLLs.
6: Calculate the virtual force (VF) on these links.
7: Send the message to the next node along the link
With the largest VF.
8: end while

IV. PROPOSED SYSTEM ARCHITECTURE

Source can check they neighbor nodes and send data by using VF geometric routing.

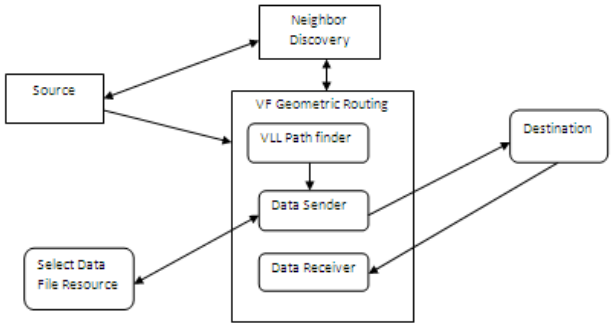

Fig. 1 Message sending process

V. EXPERIMENTAL RESULT

Java swings concept is used to implement the proposed method.
User can create a node by clicking the batch file in bin folder.
He creates number of nodes as he whish.
The output is displayed in two types.

Type 1:
User can gives distance of the nodes and then discover neighbor nodes.
If the source distance is less than the destination distance then reverse routing is implemented.
So here the communication between destination and source is implemented.

Type 2:
User can gives distance of the node and then discover neighbor nodes
If the source distance is greater than the destination distance then normal routing is implemented.
So here communication between source and destination is implemented.
By using this proposed system user can implement the routing process effectively and can be done in non planar graphs.

VI. CONCLUSION

The proposed system provides the more security and effectively.It takes the local minimum problem from two new angles: constructing a virtual small-world network and using a VF-based greedy protocol to recover from local minima. It combined these two methods and proposes the purely greedy routing protocol SWING+, which is the first geometric routing protocol applicable in 3D networks.

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