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GREEDY PERIMETER STATELESS ROUTING IN MANET

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***ABSTRACT*−** *Mobile ad-hoc network which is infrastructure less in topology. That is MANET does not have any infrastructure based topology. Because the mobiles are in dynamic nature. So MANET are not depend upon the fixed topology. By the dynamic nature of mobile nodes we can't find the exact location of node in the network. In existing system by using adaptive position upadate in MANET they find the position of mobile nodes in the network. But the problem it doesn't find the exact position of the mobile node in network. To overcome this problem we going to implement protocol called GPRS (Greedy Perimeter Stateless Routing).By this we can find the exact location of the node. In this we going to implement TCP protocol for ensure end-to-end delivery.*

Key words: Geographic Routing, Greedy forwarding, Perimeter Routing, Stateless.

Introduction:

The traditional routing in Ad-hoc is based on the address routing. Many well rounded logic could be directly used for the reference of routing tables which consists of IP address of nodes in network, based on the IP address it will route data to destination. It not reach the exact location of the node. Because the nodes where dynamic nature, it where moving in network in particular velocity. So we using geographic routing to route data in MANET. The main advantage of the geographic routing is routing is possible to all nodes of network coarsely know every destination by the main logic "closer to destination". On some cases we may be predict where a destination will be moving. The disadvantage of geographical routing is not guaranteed for the shortest.

A geographical routing is based on two types. One is finding location information and other is the logical of routing to a special destination. An algorithm of finding a location information will be firstly introduced. The forward strategy employed in the aforementioned geographic routing protocols requires the following information :1) the position of the final

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destination of the packet and 2) the position of a node neighbors. The former can be obtained by querying a location service such as the Grid Location System(GLS).

A scalable location service for geographic Ad-Hoc routing created by M.I.T is named as GLS (Grid's Location Service).Its purpose is to realize a distributed location service in a large scaling Ad Hoc network. GLS assumes an Ad Hoc network can be as large as the area of a metropolitan. The core concept of GLS is to divide the whole area of an Ad Hoc network into some order-n squares. An order-1 square represents the area that a mobile node can directly reach each other without an routing. So, all the nodes in order-1 square are neighbors. Whereas, order-n square, just as its name implies, order-n square is not divided dependent on a special node but on the relation to the whole network area. The following Fig.1 shows the basic conception of GLS's partitions.

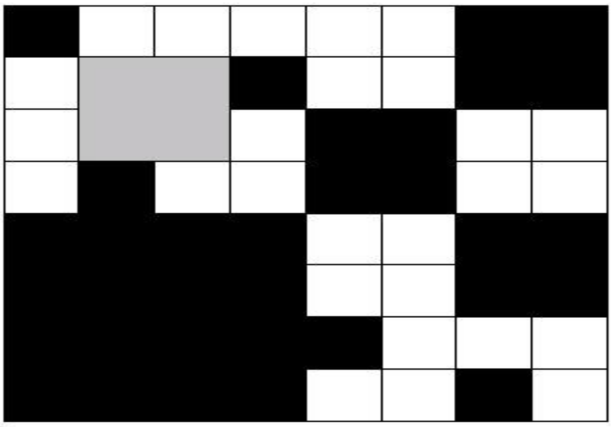

Figure 1: A piece of the global partitioning of the world. A few example squares of various orders are shown with dark shading. The lightly shaded square is shown as an example of a 2x2 square which is not an order-2 square because of its location. An order-n square's lower left corner's coordinates must be of the form $(a2^{n-1}, b2^{n-1})$ for integers a,b.

Each mobile is identified by a unique number(ID). The IDs are generate from a mobile node's unique name, such as, host name and MAC address by employing a strong hashing algorithm.

A mobile node will select its location servers(LS as simple) in all the orders of partitions. The logic of selecting LSs is that one LS in each neighbor order-n square of a mobile node. Routing Table in GLS each mobile node in GLS needs to maintain a routing table that records the routing information to all the nodes within its order-2 square. Location Query in GLS, when a mobile node wants to find the location of another node it will send a request, encoding its own geographical information in the request, to the least node whose ID is greater than or equal to the destination. The receiver node will further forward the request and so on until the request encounters a LS of the destination. Then the LS will directly forward the request to the destination. Because the source's geographical information is in the request, so, the destination can directly respond to the source. A location information query has completed at this stage. Bootstrapping in GLS important bootstrapping issue have advisedly ignored. It has been assumed that nodes select their location servers appropriately and their coordinates to them. This appears to assume that a node can scan an entire square (of arbitrary size) and choose the appropriate node to act as its server. In fact, nodes route update packets to their location servers without knowing their identities. Assume that a node wishes to recruit a location server in some order-n square. A packet sends, using geographic forwarding, to that square. The first node in the square that receives the packet begins a location update process that closely resembles a query for destination location, but this update will actually carry the current location of node along with it. Because the update will arrive at the least node greater than the node before leaving the order-n square containing destination, so, this is exactly the appropriate destination for the location update to go to. The final destination node simply records nodes current location and becomes a location server for node.

The weak points of GLS are, if a packet arrive at one node that doesn't know an nodes closer than itself to the ultimate destination, then a query well simply failed by responding with an error report. In the other word, GLS doesn't offer any strategy for recovering from dead ends, which usually occurs when all the nodes are not evenly distributed in a geographical area.

2. Geographical routing using partial information-GRA:

In geographic routing, the forwarding decision at each node is based on the locations of the node's one-hop neighbors and location of the packet destination as well. A forwarding nodes therefore needs to maintain these types of location.

GRA (Geographical Routing Algorithm) is created by University of California, Berkeley. As its name implies, GRA will mainly concentrate on routing packets from a source to its ultimate destination using partial information.

The basic assumptions of GRA are a mobile node exactly known its neighbors that it can directly reach and coarsely knows the topology outside its own area. Then GRA will use these partial information to complete routing between a source to its ultimate destination.

The routing table structure of GRA takes the format.

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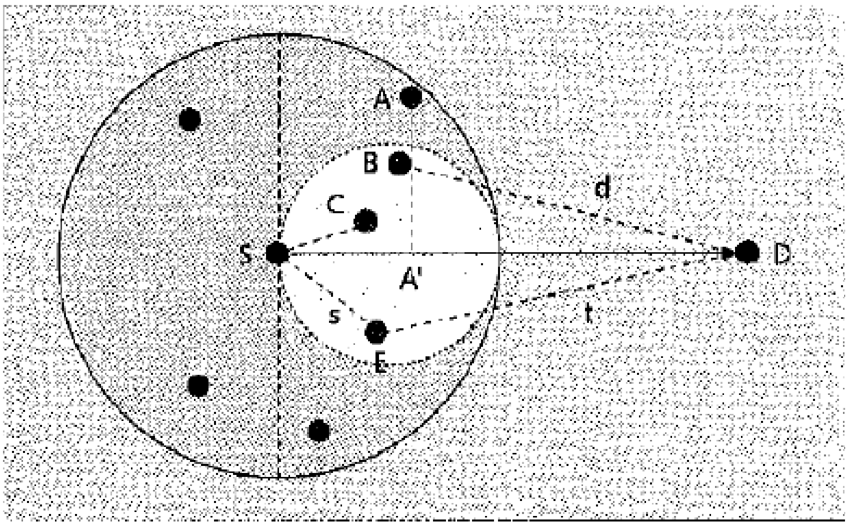
Node	Node Position	Neighbor Node	Time Stamp
S	Pos(S)	S	Ts
N	Pos(N)	N	Tn
S’	Pos(S’)	N’	Ts’

The routing table structure of GRA

The first column is the node’s name, such as , node S and N. The second one is the geographical information of nodes. The third one is the neighbor node to the current node. This is an important conception in GRA. That mean a node A can be best reach b node B if the later is in the third column of node A For example, node S’ will be best reach by node N’. The last one is the time stamp as IP normally does with it. Thus, each routing table entry will be a 4-tuple.

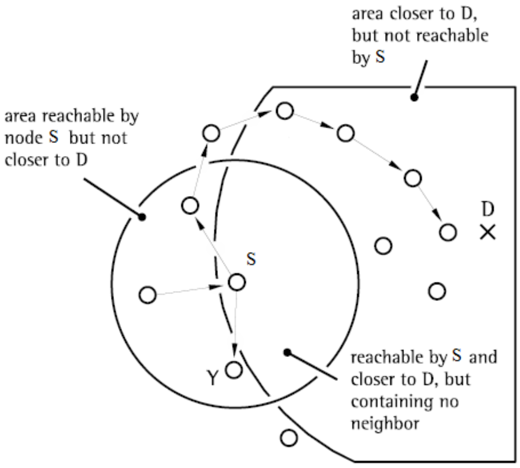
3. GREEDY FORWARDING

There are several greedy routing strategies. They can be defined in terms of progress, distance and direction towards the destination. The progress is the distance between a node S and the projection A’ of a neighbor node A onto the line connecting S and final destination D. The larger this distance, the more progress the corresponding neighbor can make. For instance, the Most Forward within Radius (MFR) scheme is based on this progress notion.



In MFR, the packet destined to destination D is forwarded to the next neighbor who maximizes the progress towards D. This scheme minimize the number of hops to reach D. Under this category, there is another scheme called Nearest with Forward Progress (NFP), which forwards the packet to the nearest neighbor of the sender that is closer to the destination node. It is shown that if all node employ NFP, the probability of packet collision is reduced significantly. Therefore, this strategy performs better than MFR. Another greedy strategy, which is widely used, applies the same principles, but uses the notion of distance, and more accurately, the Euclidean distance. That is, an intermediate node forwards the packet to the neighbor with least distance d to the destination, who is closer to D than S node B. 1) Direction-based schemes, also called compass routing, use the deviation as a criterion. The deviation is defined as the angle between two lines: the current node lines connecting the current node and the next hop, and the line connecting the source and the destination. The deviation is used to select the neighbor closest in the direction to destination D. This scheme aims at minimizing the spatial distance a packet travels.

The main problem with greedy routing is that it does not guarantee delivery to the destination even if there is a path from the source to the destination. This is called a local minimum.



An example of this problem can be found in figure. In this example, node S does not have any neighbor in its vicinity (within its transmission range) that is closer to destination D than S itself. However, Figure shows that a valid path from S to D exists. There were several early proposal to overcome this problem such as forwarding the packet to the least backward (negative) progress or simply not to forward such packets and drop them. The problem with former solution is that looping might occur when there is backward forwarding.

There have also been proposal based on memorization to keep and use the information about past routing tasks that guarantee delivery. However, due to increased communication overhead, stateless algorithm based on routing in planar geometric graphs attracted more attention as recovery mechanism. Therefore, greedy routing is often used in combination with a recovery strategy, which is responsible for handling the packet as long as greedy routing fails. In other words, greed routing continues until it reaches a local minimum and fails. Then it switches to recovery strategy. However, the recovery solution returns to greedy routing after it meets a node that is closer to the destination than the greedy failure node. The return happens either immediately or after some time depending on the type of strategy used. This node may either be the current packet receiver or one of its neighbors. The most prominent recovery strategy is Face Routing.

Greedy Perimeter Stateless Routing (GPSR)

In fact, GPSR protocol is a complete protocol, consisting of a greedy mode and a recovery strategy called perimeter mode. Here, we focus on the functionality of perimeter mode, as a variant to face routing. Every packet sent using GPSR contains a flag, indicating in which of the following modes it is:

1.Greedy mode

2. Perimeter mode

Initially, all data packets are marked as greedy mode by their source nodes. Once the greedy routing fails, the packet is marked as being in perimeter mode.

In perimeter mode, GPSR too, performs a simple planar graph traversal b employing the right hand rule (the same is possible for the left hand rule as well). Suppose the mode changes to perimeter at mode x for a packet destined to D. From here on, the packet is forwarded by employing the right hand rule, traversing the face intersecting the line xD. On each face, the traversal continues until the packet reaches to an edge at crosses line xD. At that edge, the packet moves to an adjacent edge, the first edge of which is determined b simply choosing the edge ling in counterclockwise direction from the intersected edge. Thereafter, as mentioned, the packet is forwarded around that face using the right hand rule. An example of perimeter forwarding starting at node x if it would continue all the way to the destination D. However, as mentioned earlier, true GPSR towards greedily when neighbors closer to destination are available. The sequence of edges traversed b the right hand rule is called a perimeter.

In order to determine, if GPSR can return to greedy mode, a filed called Lp is considered in the packet header, which records the location where the packet entered into perimeter mode (i.e., the location where greedy forwarding failed). This location is used at subsequent hops to determine whether the packet can be returned to greedy mode. That is done by comparing Lp with the location of the current forwarding node. GPSR returns the packet to greedy mode if the distance between the forwarding node and the destination D is less than that from Lp to D. GPSR considers the case when the destination D is not reachable. That is, node x (the location where GPSR entered perimeter mode) and destination D are NOT connected by the graph. GPSR's solution to detect such cases is as follows: the disconnected node lies either inside an interior face, or outside the exterior face. The packet will eventually reach this face and will traverse it completely, without finding any intersection point with the line xD, which is closer to destination D than the location where packet entered current face. Then the packet traverses the first edge it took on this face for the second time. In order to notice the repetition of forwarding on this edge, GPSR employs another field in the packet header (stored for such cases) which is called eo. This field records the first edge traversed on the current face. When the packet traverses the first edge it took on this face for the second time, eo shows that it is the second time the packet is forwarded on edge eo and GPSR drops the packet as the destination is unreachable.

4.CONCULSION AND FUTUREWORK

In this paper introduces the GPSR which is strategy of routing technique used to route the packet in mobile ad-hoc network. By using GPSR routing technique can deliver the packets based the geographic location of the mobile nodes which are in the dynamic nature.

The future work of the paper which is implement the TCP protocol to reliable deliver of packets between nodes. And implement the optimized protocol to overcome the overhead problem using Greedy Perimeter Stateless Routing technique in wireless network.

REFERENCES:

[1]. Geographical Routing In Ad Hoc Network. Yang Fan.

[2]. T. Camp, J. Boleng, B. Williams, L. Wilcox and W. Navili " Performance Comparison of Two Location Based Routing Protocols for Ad Hoc Network" Proc. IEEE INFOCOM, pp.1678-1687, June 2002.

[3]. D. Johnson, Y. Hin and D. Maltz The Dynamic Source Routing Protocol (DSR) for Mobile Ad Hoc Network for IPv4, IETF RFC4728, vol15,pp. 153-181, Feb. 2007.

[4]. C. Perkins, E. Belding-Royer, and S. Das, Ad Hoc On-Demand Distance Vector(AODV) Routing, IETF RFC3561, July 2003.

[5]. J. Li, J. Jannotti, D.S.JD. Couto, D.R. Karger, and R. Morris, "A Scalable Location Service for Geographic Ad Hoc Routing", Proc. ACM MobiCom, pp.120-130,Aug 2000.

[6]. Z.J. Hass and B. Liang, "Ad Hoc Mobility Management with Uniform Quorum System," IEEE/ACM Trans. Networking, vol.7, no. 2 pp.228-240,Apr.1999.

[7].A. Rao, S. Ratnasamy, C. Papadimitrious, S. Shenkaer, and I. Stoica, " Geographic Routing without Location Information," Proc. ACM MobiCom, pp.96-108, Sept.2003.