Available Online at www.ijcsmc.com

International Journal of Computer Science and Mobile Computing

A Monthly Journal of Computer Science and Information Technology

ISSN 2320–088X

IJCSMC, Vol. 3, Issue. 5, May 2014, pg.1068 – 1073

RESEARCH ARTICLE

Analysing Geographic based Routing Protocols in Manets

Shelja Malhotra, Prof. Nasib Singh Gill
DCSA, MDU, Rohtak
Email id: shelja.mal75@gmail.com, Email id: nasibsgill@gmail.com

Abstract: Mobile adhoc network contain wireless nodes with infrastructure less or without base station self configurable nature. These can forward the data via other nodes as relays. In Manets as packet travel through multihop it faces the problem of link failure due to high mobility. Topology based protocols become unsuitable when nodes mobility is high and topology changes. Geography based protocols proves to be more efficient than topology based when mobility is high .In this paper we will discuss same of the geography based protocols.

Keywords: Geography based protocols, GPSR, DREAM, LAR, GSR, EGR, SAR beacon

1. Introduction

In geography based protocols routing is based on the location of destination and intermediate nodes. The location is updated using GPS, base station or other services. Position based services require no establishment or maintenance of routing a table, packet is forwarded in a given geographic way in a natural ways known as geocasting[1]. Beackoning packet contains the loc information of neighboring nodes and is periodically updated to know more accurate position before forwarding it. The position of node is learned through one hop broadcast and divided into Greedy Forwarding, Restricted Flooding and hierarchical approaches [2].

1.1 Forwarding strategies

A Greedy Forwarding: Source uses the location of destination to forward the packet. It chooses an intermediate node which is lying in the direction of receipt and the process is repeated until destination is reached. Greedy has two strategies one is most forward within r is used to minimize the no of hops to reach the destination and other is nearest forwarded progress to chose the intermediate node nearest to the destination. The average progress is calculated as p.f(a,b) where p is the probability of transmission of packet without collision and f(a, b) is successful transmis-

sion from a to b. In restricted flooding the packet is flooded to one or more nodes in the direction to destination [2]. Hierarchical consists of two blocks location service and forwarding strategy. In location service it provides current location of a node. Mobile node register the current position with the service .When a node does not know the location; it contacts the service and asks for the information [2].

2. Geographic routing protocols

2.1 GPSR

In Greedy Perimeter Stateless Routing, the current forwarding node forwards a packet to an intermediate node which is geographically closer to the destination node.

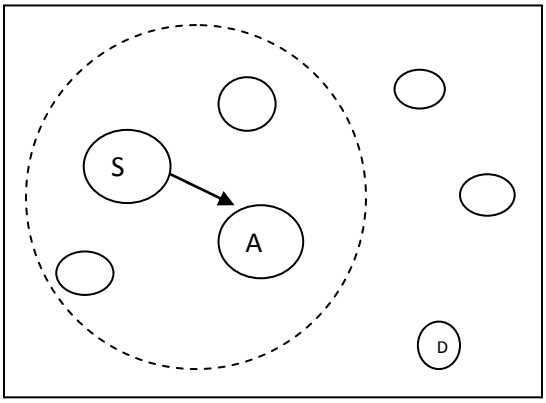

Figure 1: S selects A as the next hop since Y is closest to D

This mode of forwarding is termed greedy mode. There may arise a situation when there is no other node closer to destination than the current forwarding node.This is known as local maxima. When a packet reaches a local maximum [3], a recovery mode is used to forward a packet to a node that is closer to the destination than the node where the packet encountered the local maximum. GPSR recovers from a local maximum using perimeter mode based on the right-hand rule. The rule states that when a node x first enters into the recovery mode, it forwards to next hop y the node which is sequentially counterclockwise to the virtual edge formed by x and destination D. Afterwards, the next hop z is sequentially counterclockwise to the edge formed by y and its previous node x. While walking the face, however, if the edge YZ formed by the current node and the next hop crosses the virtual edge XD and results in a point closer than the previous intersecting point x, perimeter mode will perform a face change in that the next hop w is chosen sequentially counterclockwise to the edge yz where the closer intersecting point was found. Such routing is known as face routing because the packet traverses many faces formed by nodes in the network until it reaches a node closer to the destination than where the packet entered in the perimeter mode or where the face routing started [4].

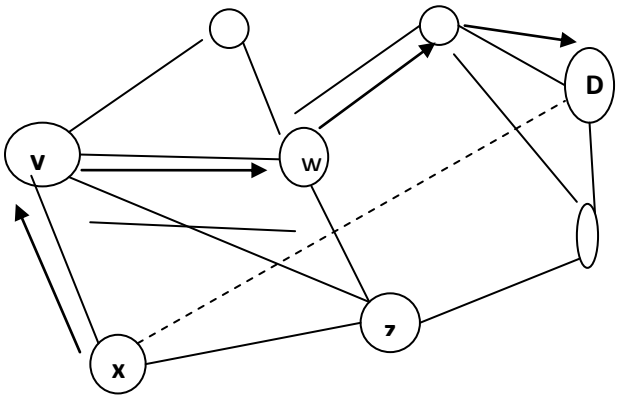

Figure 2: Perimeter mode

The arrows represent the path traversed by the packets in face routing.

2.2 LAR

The location aided routing protocol does not define a location based routing protocol instead proposes the use of position information to enhance the route discovery phase of reactive adhoc routing approaches. The location information is obtained by GPS. It uses two flooding region forwarded and expected region. Reducing the search space results in fewer route discovery messages. When source node wants to send a data packet, first it will request for the destination's location to the location service, which cause contacting and tracking problem [5]. Two different LAR algorithms have been proposed LAR scheme1 and LAR scheme2 [6]. LAR scheme 1 uses expected location of destination to determine the request zone at the time of route discovery. The request zone is a rectangle with the source and expected zone of destination. The sides of rectangle request zone are parallel to x and y axis. In route discovery phase, source transmits the route request message including four corner of request zone, intermediate node decides whether to transmit the message or not. Using the position from scheme LAR scheme 2 using distance as parameter for defining request zone. The intermediate node transmits it to a node if it is closer to the destination previous location than the node transmit the request packet, it is repeated until not received by receipt.

2.3 DREAM

Distance Routing effect Algorithm for mobility introduces new routing information using distance and mobility. At the same time no route discovery is required for the protocol. Each node is update the location on the basis of mobility, faster nodes update frequently and slower node less often. The source node floods the packet to all one hop neighbors in the direction of D. To determine this direction, the node calculates the region containing d is known as expected region. As the information may be outdated ,the radius r of the expected region is set (t1-t0)max, where t1is current time ,t0 is time stamp of position of Sand D, and v_{max} is the maximum speed a node may travel within the network [2][7]. In the diagram, circle defines the expected region, the line joining S and D with angle. The neighboring hops repeat until destination is reached. If a node has no one hop neighbor than recovery stage is started and this is not a part of dream specifications. Dream has following properties they are bandwidth, loop free, energy efficient, robust and adaptive to mobility.

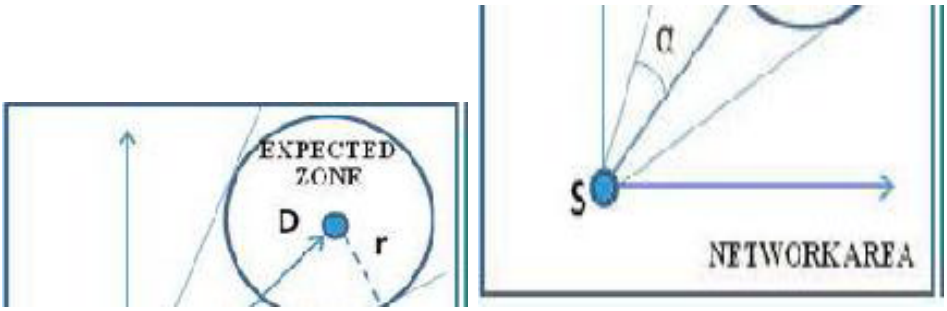

Figure 3: Dream

2.4 Geography Source Routing

In GSR, source node computes the shortest path to the destination using dijkstra's algorithm based on distance metrics. It computes distance from source to intermediate nodes through which data is to be forwarded [8] .Source node query for the location and floods the packet to nodes which wastes bandwidth.

Spatially Aware Routing: It uses GSR packet forwarding strategy, an attempt to overcome the problem of recovery strategy in GPSR. It calculates the shortest path using dijkstra's algorithm. Source sets GSR consists of list of intermediate nodes embedded in the header of all data packet by source. Each forwarding node maps the position of its neighbors into graph nodes and chooses the next node having shortest path from destination and then packet will be forwarded to next hop and hence data will move closer to the destination.

2.5 Energy Aware Geography Routing

In EGR, each node broadcast its beacon message to all neighboring node having information of ID, location and residual energy. At first the information of destination is updated at t0.At t1 (t1-t0<t) a source node wants to transmit the packet via P. The direction to the destination is the expected region [9]. The center point is the destination location and the circle region is expected distance of d's movement. The flooding of packet is done only in the expected region which reduces the cost of flooding compared to LAR and DREAM

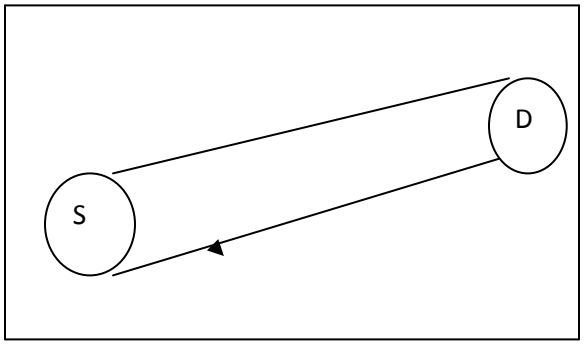

Figure 4: EGR

3. Tabular review

Comparative study of these protocols on basis of advantages and disadvantages [10]:

Routing technique	Advantages	Disadvantages
GPSR Protocol	Data forwarding overhead is low. Local Maxima are easily found	Group Leader is Single Point of Failure. Its packet delivery ratio is less than EGR.
Location Aided Routing	It has minimized the size of the route discovery process by defining the range of the destination node.	Control complexity is higher than GPSR.
DREAM Routing Protocol	This kind of forwarding effectively guarantees delivery. Its energy use is notably high, especially in large-scale networks.	Packet loss is higher than GPSR
Geographic Source Routing	No beaconing. Periodically updates not required	Flooding burdens the network. Poor performance in high mobility
Energy Aware Geographic Routing Protocol	It has higher packet delivery ratio when compared with GPSR	It suffers from diffusion hole problem

4. Conclusion

This paper studies various basic concept and functionalities of geographic routing protocols in area of Manets. It also tabulates some of the characteristics of these protocols. The future scope is we can add other geography protocols and also study them on different parameters.

References

[1] J.C Navas and T.imielinski,"geographic addressing and routing"proc.3rd ACM/IEEE int.conf.mobile Comp.Net.,mobicom'97,sept.1997.
[2] Martin Mauve and Jorg Widmer "a survey on position based routing in mobile adhoc network"proc in IEEE Network Dec 2011.
[3] B. Karp , "GPSR, Greedy perimeter stateless routing for wireless networks", 2000.
[4] Kevin C. Lee, Uichin Lee, Mario Gerla, "Survey of Routing Protocols in Vehicular Ad Hoc Networks".
[5] Y.B.Ko. and N.H.Vaidya,"location –aided routing (LAR)in mobile adhoc networks"in proc. 4 th annual ACM/IEEE international conference on mobile computing and networking,1998.
[6] Mohd.A.Mikki "Energy Efficient Location aided Routing Protocol for Wireless Manets"in IJCSIS VOl.4,no1&2,2009.
[7] Divya wadhwa and Rajesh tyagi"a review of comparison of geographic routing protocols in manets"proc in advance in electronic and electrical engineering ISSN 2231-1297,VOL 4,no 1 in 2014.
[8] Lichuan Liu, Zhigang Wang, Wern-Kueir Jehng, "A geographic source routing protocol for traffic sensing in urban environment," Automation Science and Engineering, 2008, IEEE International Conference on , vol., no., pp.347,352, 23-26 Aug. 2008 .
[9] j.Tian,L.han ,K.Rothermel,c.cseh,"spatially aware packet routing for mobile adhoc inter vehicle radio network"in proc.of the IEEE intelligent Transportation system,oct 2013.
[10] Gaurav sachin,D.K.sharma"Enhanced energy Aware Geography Routing Protocol in manets:A review"ISSN 2249-6645 International journal of Modern Engineering Reseach Vol.3, Issue.2, March-April. 2013

