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Survey of Location Aided Routing Protocol for Wireless Sensor Network

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Abstract— A Wireless Sensor Network contains wireless nodes which will move usually. Movement of nodes ends up in alteration of routes, requiring some mechanism for deciding new routes. There are number of routing protocol that are used in network to send packet to a different node .But those nodes geographically locality are static. In this paper we tend to discuss Location aided routing (LAR) protocol which might get geographical location of moving nodes. By using location info with LAR the major reduction within the number of routing message.

Keywords: AODV, DSR, Expected Zone, LAR, Request zone, WSN, ZRP

I. INTRODUCTION

Wireless sensor network (WSN) is wide thought-about as one of the foremost necessary technologies for the twenty-first century. Within the last decades, it's received tremendous attention from each academe and business all over the world. A WSN usually consists of an oversized range of low-priced, low-power, and multifunctional wireless sensor nodes, with sensing, wireless communications and computation capabilities. These sensor nodes communicate over short distance via wireless medium and collaborate to accomplish a common task, for example, environment monitoring, military surveillance, and industrial process control.

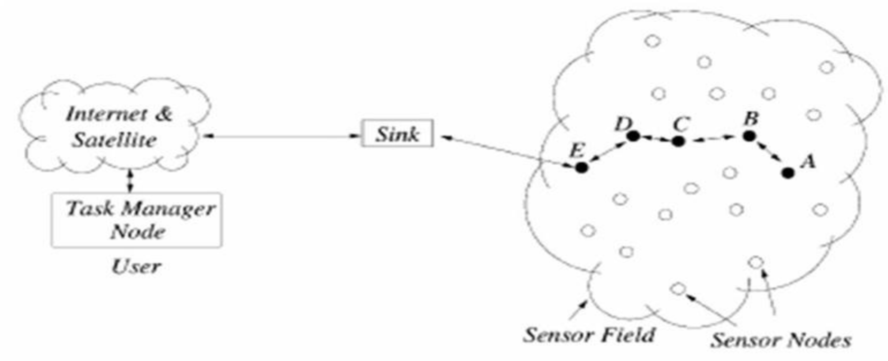


Fig. 1 Wireless sensor network

A sensor node may vary in size from that of a shoebox right down to the size of a grain of dirt, although functioning "motes" of real microscopic dimensions have yet to be created. The price of sensor nodes is equally variable, starting from a couple of too many bucks, depending on the standard of the individual sensor nodes. Size and price constraints on sensor nodes result in corresponding constraints on resources like energy, memory, computational speed and communications bandwidth.

Wireless sensor network are divided into two classes: Static and mobile. In static WSN's sensor node position might not modification once it's become a part of the network. In mobile WSN's sensor node are move every which way. Static network haven't massive issues compared to mobile network issues. So during this paper we'll discuss on the mobile network. Many routing protocol are used for static network, with goal of achieving efficient routing. But this algorithmic program is totally different within the approach used for looking out a new route and/or modification familiar route once node moves.

The rest of paper is organized as follows. Related work is given in Section II. Section III describes the location aided routing algorithm. Conclusion is mentioned in Section IV.

II. RELATED WORK

Several routing algorithms are developed (e.g., [5, 6, 7, and 8]). On-demand routing is more appropriate for wireless sensor network as a result of its frequent topological dynamic environment. Point out that typical routing protocols are inadequate for ad hoc networks, since the amount of routing related traffic would possibly waste an oversized portion of the wireless bandwidth, particularly for protocols that use periodic updates of routing tables. They planned using Dynamic source Routing (DSR), that depends on on-demand route discovery. A number of protocol optimizations also are planned to cut back the route discovery overhead. An efficient Ad-hoc On-demand Distance Vector (AODV) routing protocol for ad-hoc network is planned in [9]. AODV consists of three phases that's route discovery, route repair and route maintenance. In route discovery phase, the end-to-end path establishment between source and sink is finished by flooding the route request packets in the network. This process results in significant increase in energy consumption that limits its adoption for wireless sensor network. Attempt to mix proactive and reactive approaches within the Zone Routing Protocol, by initiating route discovery part on-demand, however limiting the scope of the proactive procedure only to the initiator's native neighbourhood [6].

The previous MANET routing algorithms don't take under consideration the physical location of a destination node. Location aided Routing for ad hoc networks are planned in [2] executes route discovery through restricted flooding. This leads to reduction in control overhead when compared to AODV. But it doesn't think about the link reliability, delay and energy constraints.

In general, Non-geographic routing protocols like DSR[11] and AODV suffer from a large quantity of control overhead for route setup and maintenance because of the frequent topology changes which they typically depend upon flooding for route discovery or link state updates that limit their scalability and energy efficiency. In sensor networks wherever thousands of nodes communicate with one another, broadcast storms may lead to significant power consumption. On the other hand, geographic routing protocols [10] need only native information and therefore are additional appropriate for wireless sensor networks. As only the location information of their direct neighbours are needed to forward packets the amount of memory and bandwidth utilization is incredibly abundant reduced.

III. LOCATION AIDED ROUTING

In this paper mobile nodes are moving in two dimensional. Therefore difficult to urge the precise location of the destination node. But Location aided routing protocol estimate the present position of destination node from history information see in figure 2.

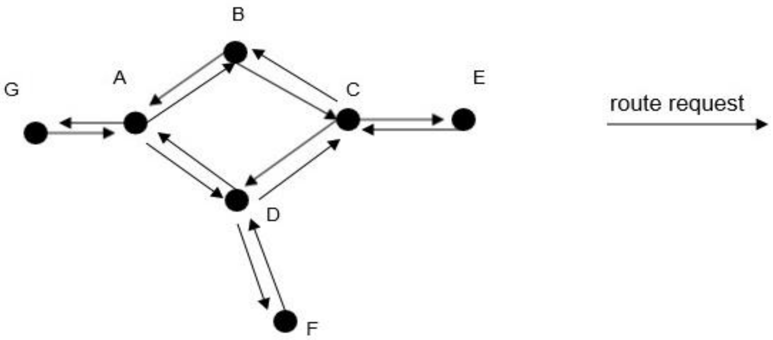


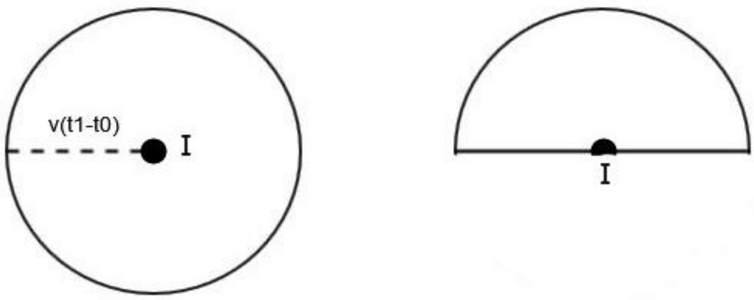
Fig. 2 flooding in network

A. Expected Zone

Consider a node A that has to realize a route to node E. Assume that node A is aware of that node E was at location I at time t0, which the current time is t1. Then, the "expected zone" of node E, from the perspective of node A at time t1, is that the region that node A expects to contain node E at time t1. Node A will confirm the expected zone based on the information that node E was at location I at time t0. For example, if node A is aware of that node E travels with average speed v, then A might assume that the expected zone is that the circular region of radius v (t1-t0) targeted at location I. If actual speed happens to be larger than the typical, then the destination may very well be outside the expected zone at time t1. Thus, expected zone is barely an estimate made by node A to see a region that probably contains E at timet1. In general, it's additionally potential to define v to be the maximum speed (instead of the average) or another measure of the speed distribution.

If node A doesn't recognize a previous location of node E, then node A cannot moderately confirm the expected zone. In this case, our algorithm reduces to the fundamental flooding algorithm.

In general, having a lot of data relating to mobility of a destination node can result in a smaller expected zone. For example, if A is aware of that destination E is moving north, and then the circular expected zone in figure 3(a) is reduced to a semi-circle, as in figure 3(b)



(a) (b)

Fig. 3 Expected Zone

B. Request Zone

Again, think about node A that has to determine a route to node E. The planned LAR algorithms use flooding with one modification. Node A defines (implicitly or explicitly) a request zone for the route request. A node forwards a route request as long as it belongs to the request zone to extend the chance that the route request can reach node E, the request zone ought to include the expected zone (described above). In addition, the request zone may include different regions around the request zone. That node doesn't present within the request zone that node don't forward route request to its neighbour. If node is within the requested zone then LAR will define two schemes which may help in to cut back the flooding within the network.

1) LAR Scheme1: When intermediate node receives a route request, it discards the request if the node isn't within the rectangle given by the four corners enclosed within the route request. To boost the performance of the routing protocol, we can following enhancement:

- When an intermediate node C (inside the request zone of node A for destination node E) receives the route request from the neighboring node A in figure 4, node C replaces the request zone within the packet because the new rectangle process for node C.

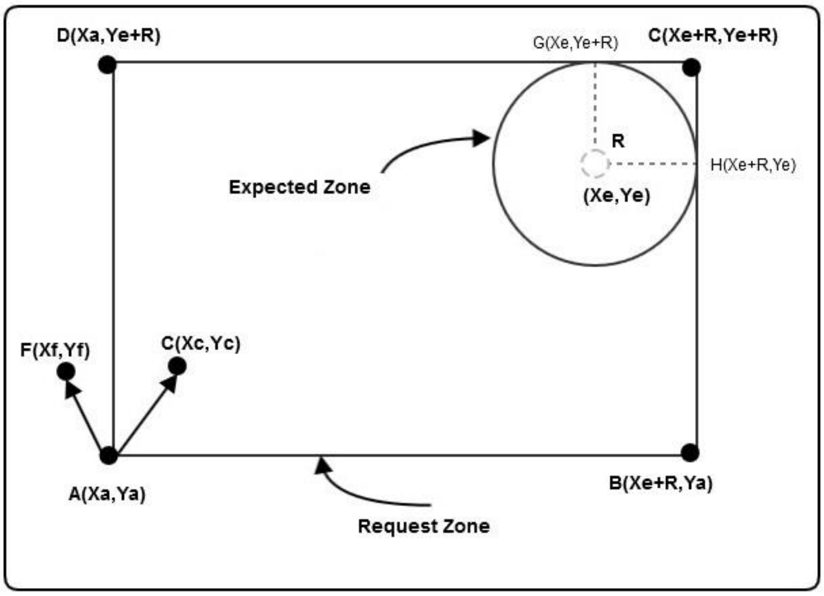


Fig. 4 Request Zone

When this strategy is employed, the request zone can generally shrink quickly when the route request packet forwarded toward the destination node. There are two reasons for this:(1) the gap between E and C smaller and ,thus, the diagonal of the rectangular are going to be smaller; and (2) the expected zone for destination node E becomes smaller because C is nearer to E(thus usually can have newer location information of destination node E).

2) LAR scheme 2: In this scheme, node A includes two pieces of data with its route request:

- Assume that node A is aware of the location (Xe,Ye)of node E at a while t0– the time at that route discovery is initiated by node A is t1,where t1>t0. Node A calculates its distance from location (Xe,Ye), denoted as DISTa, and includes this distance with the route request message.
- The coordinates (Xe,Ye) also are enclosed with the route request.

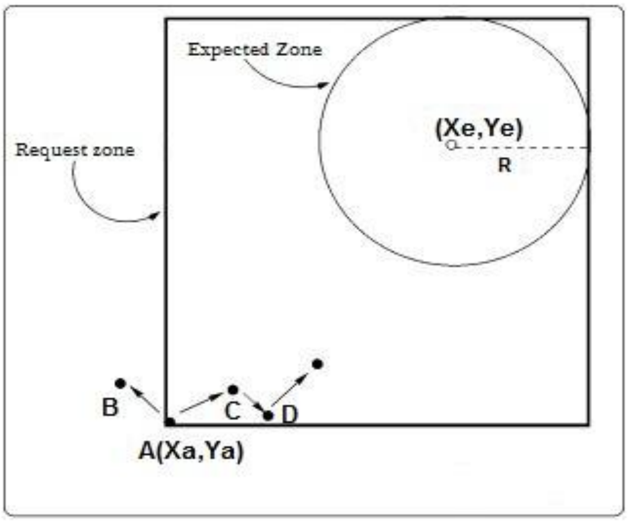
When a node C receives the route request from sender node A (e.g. Fig. 4), node C calculates its distance from location (Xe,Ye), denoted as DISTc, and:

- For a few parameters α and β,if α (DISTa)+ β >DISTc, then node C forwards the request to its neighbors. Once node C forwards the route request, it currently includes DISTc and (Xe,Ye) within the route request (i.e., it replaces the DISTa value received within the route request by DISTc, before forwarding the route request).
- Else α (DISTa) + β<DISTc, during this case, node C discards the route request.

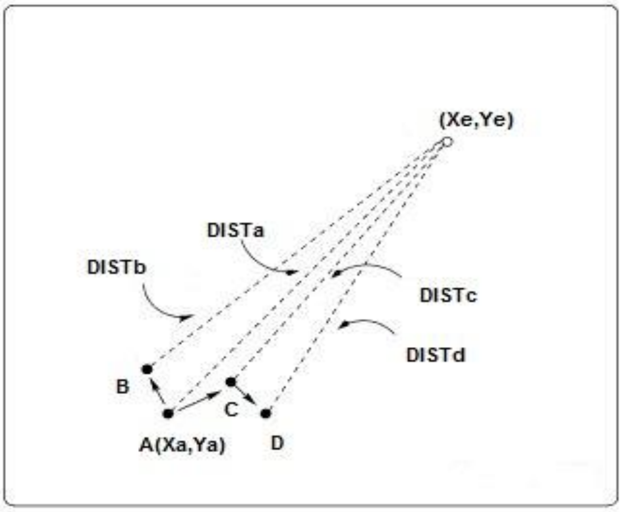
When some node F receives the route request (originated by node A) from node C, it applies a criterion just like above: if node F has received this request antecedently, it discards the request. Otherwise, node F calculates its distance from (Xe,Ye), denoted as DISTf .

- Now, the route request received from node C includes DISTc. If α(DISTc)+β>DISTf, then node F forwards the request to its neighbours (unless node F is that the destination for the route request). Before forwarding the request, F replaces the DISTc value within the route request by DISTf.
- Else α (DISTc) +β <DISTf, during this case, node F discards the request.

Figure 5 illustrates the distinction between the two LAR schemes. Contemplate figure 5(a) for LAR scheme 1.When nodes C and D receive the route request for node E (originated by node A), they forward the route request, as both C and D are inside the rectangular request zone. On the other hand, once node B receives the route request, it discards the request, as B is outside the rectangular request zone. Now contemplate figure 5(b) for LAR scheme 2 (assume α=1and β=0). when nodes B and C receive the route request from node A, both forward the route request to their neighbours, as a result of B and C are both nearer to (Xe,Ye) than node A. when node D receives the route request from node C, node E discards the route request, as D is farther from (Xe,Ye) than node C. Observe that nodes B and D take totally different actions when exploitation the two LAR schemes.



(a)LAR Scheme1



(b)LAR scheme 2

Fig. 5 comparison of two LAR schemes

The comparison between the protocols has been table given below.

TABLE-1

Protocol property	**Protocols**		
	AODV	**ZRP**	**LAR**
Type	Reactive	Hybrid	Geographic
utilise ID	Yes	Yes	Yes
Flooding	High	High	Less
bandwidth use	High	High	Low
node mobility	No	No	Yes

IV. CONCLUSION

Location data will be utilized to help in decreasing the route discovery area. In this paper, we survey a routing technique, which use specific location query to cut back route question flooding and find out the fresh information after some time interval. Then we investigate a routing algorithmic program LAR which can use the history location of node to cut back the overhead and the above given protocol study that LAR technique less congestion over the ZRP's protocol and AODV's protocol due to performance measures. Whereas LAR scheme 1, output efficiency quit higher over LAR scheme 2. The great performance in idle situation provides us with great motivation to research this algorithmic program in VANET in the future.

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