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Enhanced Energy Efficient Routing for Self Adapive Geographic Routing In Manet's

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ABSTRACT

Geographic routing has been widely used as the most important approach to wireless routing. It has been a big challenge to develop a routing protocol that can meet different application needs and optimize routing paths according to the topology changes in mobile ad hoc networks. In existing system searching of neighbors that are close to the destination was taking lager range of hops which was inefficient due to loss of energy. In this work, we propose an enhanced energy efficient self adaptive geographic routing protocol which reduces the hops count and it is energy efficient compare with existing geographic routing solutions. Our simulations results shows better performances than those with previous approaches..

KEYWORDS: *self adaptive, beacon, wireless communication, Geographic routing, self adaptive, ad hoc network, Greedy, zones.*

I. INTRODUCTION

A Mobile Ad Hoc Network, also called a MANET, is an autonomous collection of mobile nodes forming a dynamic wireless network. The administration of such a network is decentralized, i.e. each node acts both as host and router and forwards packets for nodes that are not within transmission range of each other. A MANET provides a practical way to rapidly build a decentralized communication network in areas where there is no existing infrastructure or where temporary connectivity is needed.e.g. emergency situations, disaster relief scenarios, and military applications.The topology of a Mobile Ad Hoc Network (MANET) is very dynamic, which makes the design of routing protocols much more challenging than that for a wired network. The conventional MANET routing protocols can be categorized as proactive[1] , reactive[5][6][7] and hybrid[2][3][4] .The proactive protocols maintain the routing information actively, while the reactive ones only create and maintain the routes on demand. The hybrid protocols combine the reactive and proactive approaches. The proactive protocols incur high control overhead when there is no traffic, while for on-demand protocols, the network-range or restricted-range flooding for route discovery and maintenance limits their scalability, and the need of search for an end-to-end path prior to the packet transmission also incurs a large transmission delay.

In recent years, geographic unicast[10][11] and multicast routing[12] have drawn a lot of attentions. Location based routing protocols are the kinds of routing protocols, which use of nodes' location information ,instead of links' information for routing. They are also known as position based routing. In position based routing protocols, it is supposed that the packet source node has position information of itself and its neighbors and packet destination node. In geographic unicast protocols, an intermediate node makes packet forwarding decisions based on its knowledge of the neighbors' positions and the destination's position inserted in the packet header by the source.

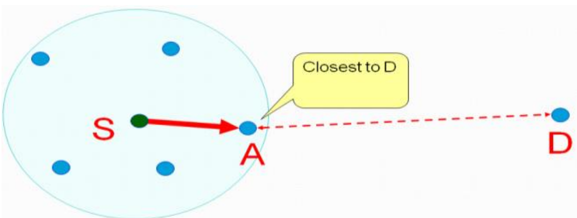

Figure .1. Example of geographic routing.

By default .the packets are transmitted greedily to the neighbor that allows the packet forwarding to make the greatest geographic progress towards the destination.

In existing system schemes[13] we will search route in Network with these conditions:-

In SOGR-HR scheme

- 1-Hop neighbor information.
- 2-Hop neighbor information.
- Until max hops.

In SOGR-GR scheme

- It adopts a reactive beaconing mechanism which is adaptive to the traffic need. Which is more overhead.

The problem with our existing system is searching of hops range is larger due to not finding the neighbors that are close to destination but still it consumes a lot ofenergy.

Figure.2.Problem with existing system

In our work SOGR-EE, the total network is split into many regions. Each Region has a fixed BS. All nodes entering the region send a register message to the BS and BS forwards it to the centralized location service. BS is connected to Centralized location service through a different network (say DSL etc). In the Centralized location service, the region in which the node is present is stored.When any node wants to send data to another node, he can query for the location using the BS in region he stays. BS queries the Centralized location service to provide the region. Source nodes send the data using GPSR routing to the BS in which destination node is residing. From that BS, the message reaches to the destination node according to the SOGR-HR routing mechanism defined in existing solution.

II. RELATEDWOK

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 two types of locations. Many works have been proposed to discover and maintain the location of destination. However, the maintenance of one-hop neighbors' location has been often neglected. .Some geographic routing schemes simply assume that a forwarding node knows the location of its neighbors. While others uses periodical beacon broadcasting to exchange neighbors' locations. In the periodic beaconing scheme each node broadcasts a beacon with a fixed beacon interval.In the discussion of geographic routing mechanisms we use the following assumptions:

[1] Each node knows its geographic location using some localization mechanism [8][9]. Location awareness is essential for many wireless network applications, so it is expected that wireless nodes will be equipped with localization techniques. Several techniques exist for location sensing based on proximity or triangulation using radio signals, acoustic signals, or Infrared. These techniques differ in their localization granularity, deployment complexity, and cost. In general, many localization systems have been proposed in the literature: GPS (Global Positioning System), infrastructure based localization systems and ad-hoc localization systems .

[2] Each node knows its direct neighbors' locations. This information could be obtained by nodes periodically or on request broadcasting their locations to their neighbors.

[3] The source knows the destination location.

A proactive fixed-interval beaconing scheme commonly adopted in existing geographic routing protocols may not only result in a high signaling cost but also outdated local topology knowledge at the forwarding node, which leads to non-optimal routing and forwarding failures. we consider a reference transmissions range to analysis[14] .To explain why the outdated local topology knowledge may lead to non-optimal routing, let us look at the example in Node B just moved into A's transmission range, which is unknown to A before B sends out its next beacon message. Without knowing any neighbors closer to the destination G,

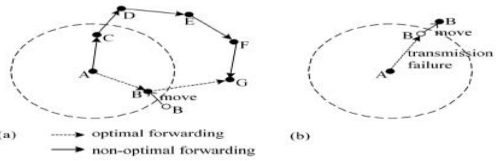

Figure.3.Negative effects of outdated topology information geographic routing.

The resulted path has five hops, while the optimal path between A and G should have only two hops after B bridges the void between A and G. Due to the lack of timely and larger range topology information, the inaccuracy of the local topology knowledge greatly affects the geographic routing performance.In a neighbor's information will be removed if not updated within the timeout interval, which is often set to be multiple beacon intervals. As a result, a node may hold an outdated neighbor information, thus resulting in forwarding failure (e.g., Fig. 3 (b)). This would lead to packet dropping or rerouting [19]. More severely, before detecting the unreachability, the continuous retransmissions at MAC layer reduce the link throughput and fairness, and increase the collisions. This will further increase the delay and energy consumption.
Even though geographic routing has many advantages in existing system schemes.

1. SOGR-HR(SOGR with hybrid reactive mechanism).
2. SOGR-GH(SOGR with Geographic based reactive mechanism).

Both protocols contain an adaptive route optimization component which the position of a next-hop node is estimated before the transmission to avoid position outdate and transmission failure, and the route is optimized according not only to the topology change but also to the actual data traffic requirements.In First scheme the forwarding node forwards the packet to neighbors that are close to the destination with keeping condition hop count H=1 if we are not finding the closest neighbors to the destination with one hop condition then again it searching for Hop count H=2 still if it not finds clostest neighbors it reaches max hops which is more overhead in MANETS. In this scheme we are calculating backoff period for each node to determine whether neighbors nodes closer to destination reply sooner and suppress other's reply..

$$T_{fb}^{N}=\alpha*h*I_{bf}*\left(1-\frac{dis_{(F,D)}-}{h*}\frac{dis(N,D)}{R}\right)$$

where *R* is the reference transmission range of mobile nodes.

In Second scheme (SOGR-GR) it adopts a reactive beaconing Mechanism which is *adaptive* to the traffic need. The periodic beacon is used only when a node overhears data from its neighbors first time. The beaconing is stopped if no data is heard for a predefined period even if it is efficient mechanism cost of beaconing message is more. In Both the scheme the cost of beaconing and route searching is energy consuming. To overcome the drawbacks of both scheme we are using the proposed Energy efficient algorithm (SOGR- EE) which reduces the searching of hops count in network. Our performance studies demonstrate that our algorithm achieve higher delivery ratio, lower control overhead and delay, and energy efficient mechanism in all scenarios tested, with the variations of mobility, traffic, node density and Inaccuracy of destination position. The procedures for finding the next-hop forwarders proposed by existing beaconless schemes may be used with our algorithms and protocols which will help to support more robust and efficient transmissions in various Dynamic conditions.

III. PROBLEM WITH EXSITING SYSTEM

The problem with both existing system scheme's is due to forwarding node F will try to forward a packet to a neighbor closest to the destination D .In this hop number is restricted to 1 i.e.; h=1.This method has no particular IP address or it has no particular topology if we are not able to find the any neighbors which are more optimum close to destination again it goes for second condition. In this hop number is not restricted, initially hop is set as h=2,it can reach to until maxhops.

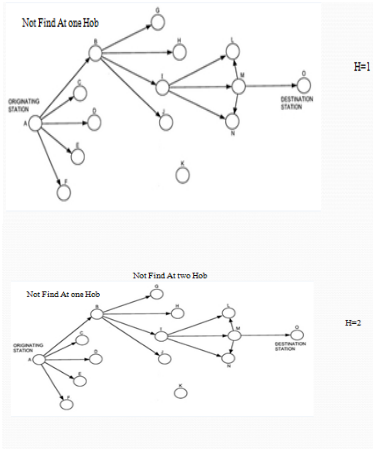

Figure.4.Hops condition

In both protocols the cost of beaconing and route search is energy consuming And Lot of inconsistent routes remain cached in intermediate route which leads of high probability of routing failures. Hop searching range will be larger because of no closer neighbor.

IV. PROPOSED SYSTEM

The aim of the project work is to design an architectural framework for creating the environment of mobile ad hoc to design the enhanced energy efficient routing for self adaptive geographic routing in MANETs in order to avoid the max hop count with using energy efficient routing. The main objectives of the proposed research work can be briefed as following:

- To design a novel energy efficient routing for Geographic routing (SOGR-EE) in the MANET.
- The number of messages on network (beacons and search messages) are less compared to other messages, so there is less congestion in the network.
- By avoiding beacons [energy reduces due to transmission of beacon packets, receiving of beacon packet] energy consumption is also reduced.
- In a limited zone, the maintenance of routing information is easier.
- All nodes proactively store local routing information, route requests can be more efficiently performed without querying all the network nodes.
- Our proposed routing mechanism helps us to reduce energy consumption due to splitting of entire network into zones .so hop search range will be in smaller range .
- To analyze the throughput with respect to packet delivery ration, energy consumption, Overhead.

In proposed system User configures the system as well as the view the output results using the viewer. User can configure the node movement, location to be present for the Node. User configures the location of the base station. User configures the location service with the expiry timer for the cached entries. Node sends location update to the Base Station, which forwards to the Location service. Two routing engines are present in the system which each Node can use. GPRS routing engine is used to deliver message to the base station GPSR allows nodes to figure out who its closest neighbors are (using beacons) that are also close to the final destination the information is supposed to travel and the SOGR-HR is used to deliver message from base station to the target node. Nodes communicate with each other using wireless channel simulator module. Statistics module collects energy consumed reports from the nodes and delivery reports from the wireless channel simulator and provides to the viewer for presenting to the user.In our work SOGR-EE, the total network is split into many regions. Each Region has a fixed BS. All nodes entering the region send a register message to the BS and BS forwards it to the centralized location service. BS is connected to Centralized location service through a different network (say DSL etc). In the Centralized location service, the region in which the node is present is stored.

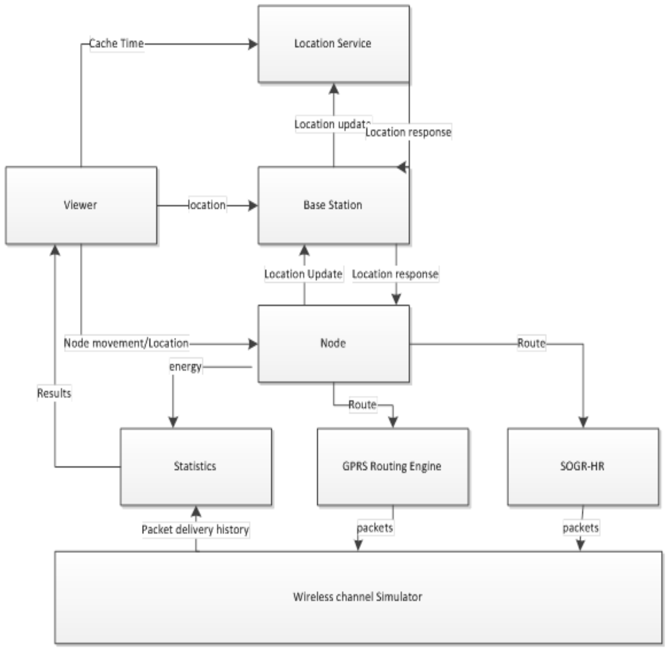

Figure. 5. Proposed Architecture for SOGR-EE

When any node wants to send data to another node, he can query for the location using the BS in region he stays. BS queries the Centralized location service to provide the region. Source nodes send the data using GPSR routing to the BS in which destination node is residing. From that BS, the message reaches to the destination node according to the SOGR-HR routing mechanism defined in existing solution.

4.1.Pseudo code for SOGEE

doRoutingin SOGR-EE(int from , int to)
Input: Source, Destination Output : path
Step 1: Find the current Zone Base Station (B1) of the Source node
Step 2: Find path to base station of the current Zone.
Step 3: Source node query for path to destination node with base station (B1).
Step 4: Base station (B1) gets the destination address (Zone which it is present) from the central station
Step 5: Packet Sent directly to the Base station (B2) of the destination node Zone.
Step 6: B2 sends packet to destination.

V. PERFORMANCE EVALUATION

In this section, we evaluate the performance of SOGR-HR and SOGR-EE with packet delivery ration, Energy Consumed, Latency. The simulations were run with 100 nodes randomly distributed in an area of 100*m** 100*m*. We chose a rectangular network area to obtain a longer path.
We study the following metrics:-

Packet delivery ratio :-.the ratio of the number of delivered data packet to the destination. This illustrates the level of delivered data to the destination.

Energy consumption:- Energy consumption is the consumption of energy or power.

Latency :-how much time it takes for a packet of data to get from one designated point to another.
To demonstrate the effectiveness of our algorithms and protocols in supporting robust communications under various conditions, we have performed extensive simulations with packet delivery ratio, energy consumption and latency. In each performance study, only the parameter to evaluate is varied, and the remaining parameters are set to the default values.

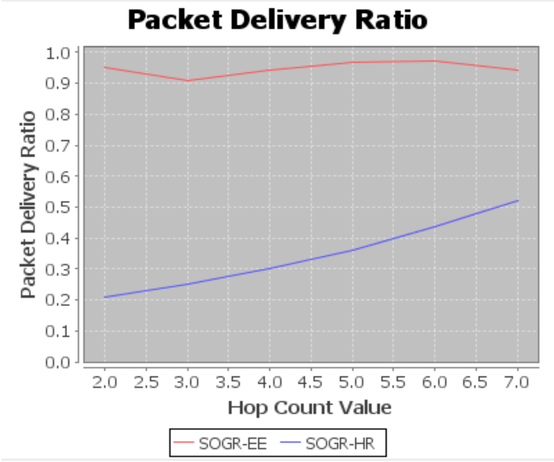

Figure 6.a Packet delivery ratio

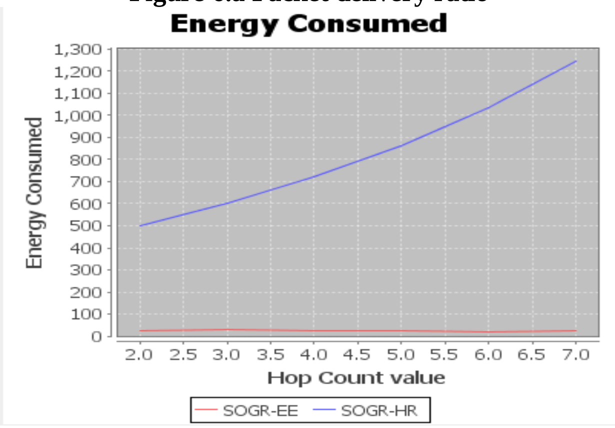

Figure 6.b Energy consumed

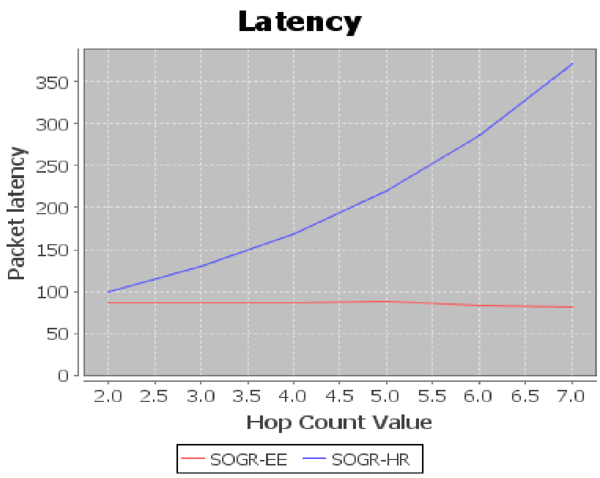

Figure 6.c Latency

In figure 6.(a) the packet delivery ratio of SOGR-HR is reduced as the hop count value increase dramatically but in the case of SOGR-EE with the less hop count value the packet delivery ratio is more and much fig 6.(b)Energy consumption is less in case SOGR-EE even with the increasing hop count value but it is not same in case of SOGR-HR with more hop count value the energy consumption is also more and in fig 6.(c) with more hop count value even with packet latency is more in case of SOGR-HR but in case SOGR-EE with large hop count value the more packet latency is more**.** The simulation results shows that SOGR-EE is much more efficient than SOGR-HR and it consumes less energy during routing process.

VI. CONCLUSION N FUTUREWORK

We proposed energy efficient self adaptive geographic routing mechanism which is energy efficient routing in mobile ad networks. We compared our simulations results with existing system SOGR-HG. Our proposed routing mechanism helps us to reduce energy consumption due to splitting of entire network into zones .So hop search range will be in smaller range and it helps us to calculate data deliver ration, latency and energy consumption. In future we can extend the work for multicast communication among different zones for efficient routing.

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