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Geo-Location Based Light Weight Bunching Algorithm for Hetro MANETs

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Abstract: ***In MANETS, networks might carries with it devices with heterogeneous characteristics in terms of transmission power, energy, capacity, radio, etc. In such heterogeneous network, nodes are doubtless to transmit at completely different power levels, thereby inflicting communication links of variable vary. This causes link spatial property downside. Also, attributable to interference raised by high power nodes, the out turn of such networks is going to be severely affected. Literature survey of current works, counsel ways that to solely notice the simplex links and to avoid transmissions through such links. They are doing not contemplate the advantages of high-energy nodes. This paper highlights strategies to enhance the routing performance of power heterogeneous MANETs by with efficiency exploiting the benefits and avoiding the disadvantages of high-energy nodes.***

Keywords: Mobile Adhoc Networks (MANETS), Heterogeneous Routing, Link Asymmetry.

1. Introduction

Mobile adhoc networks (MANETs) plays a very important role in future communications attributable to the increasing use of wireless transportable devices like mobiles and laptops. MANETs don't have a set infrastructure. It consists of mobile nodes that communicate wirelessly.

Nodes that area unit among every other's vary will discover and communicate directly. However, for communication between nodes that area unit out of vary, intermediate nodes act as routers that forward packets to the destination.

MANETs are often heterogeneous in nature, in terms of node characteristics like transmission power (range) [1] [2], energy [3], capability [4], radio [5], etc. so nodes might transmit at totally different power levels, thereby inflicting communication links of variable vary. This causes link spatiality that ends up in many problems like one-way link drawback, heterogeneous hidden and exposed issues that severely affects the network performance.

The benefits of high-power nodes are the enlargement of network coverage and even have benefits in power and data transmission rate. So, researchers have created efforts to look at these benefits, like backbone construction i.e., virtual backbone is made in a very distributed and localized fashion whereas considering several incompatible objectives like quick convergence, and low computation value [2]. Topology management helps in protective the energy by either reducing transmission power per node or protective energy-efficient routes for the whole network [3]. But, the large transmission varies of high power nodes results in massive interference that reduces the spacial utilization of network channel resources. Because of completely different transmission power, uni-directional links can occur in MANETs. Hence our aim is to interchange unidirectional links with duplex links. Many routing protocols in power varied MANETs are designed solely to seek out the uni-directional links and to avoid the transmissions supported these links while not creating use of the advantages of dynamic nodes. The routing performance of power heterogeneous MANETs ought to be improved by considering the benefits and neglecting the disadvantages of high- power nodes. Hence, during this paper we have a tendency to projected routing protocol for power varied MANETs that achieves higher output. We have a tendency to build LVC to notice one-way links by creating use of the advantages of high power nodes. Cluster may be a theme to boost the performance of the network. In order to realize optimized cluster, a hierarchic co-operation scheme is employed. The quantity of hierarchic stages and the connected cluster sizes that maximize the overall output is chosen. This theme is applied for random networks by developing cluster formula within which the whole network is split into quadrilateral clusters, each with equal variety of nodes [6]. Within the existing cluster schemes, every node within the network plays a particular role as cluster head, member, or gateway. Because of cluster formation, a hierarchic routing is finished within which routes are recorded between clusters rather than between nodes. So, there's an increase in route life, so decreasing the quantity of routing management overhead [7].In our cluster theme, a loose coupling relationship is established between nodes because the price of cluster construction and maintenance decreases. High-power nodes are used for cluster formation but they're avoided for packet forwarding to cut back interference.

In this paper, we develop a GEOGRAPHIC BASED (GBRPH) routing protocol for power heterogeneous MANETS. It relies on geographic information [6], [7] or multiradio multichannel [7], [8], and can be deployed on general mobile devices, including laptops, personal digital assistants, etc.

2. Related Work

In [8] author used the comprehensive outline of the routing protocols for MANETs during which the nodes are mobile, the configuration changes chop-chop, touching the provision of routing methods. So, vital challenge within the style of algorithms for a mobile unintended network is that its topology is dynamic. Comparison of the performance of the subsequent routing protocols AODV, CBRP, DSR, and DSDV are studied and compared supported quality, load and size of the unintended network and also the results shows that, CBRP features a higher overhead than DSR owing to its periodic greeting messages whereas AODV's end-to-end packet delay is that the shortest in comparison to DSR and CBRP [9].Examples of routing protocols for heterogeneous MANETs are megahertz (Multi class) that could be a position motor-assisted routing protocol for power varied MANETs. Megahertz routing utilizes the additional powerful nodes as backbone nodes. The routing space is split into several tiny, equal-sized cells and a B-node is maintained in every cell. Most of the routing activities (packet forwarding) are among B-nodes therefore, there's reduction in routing hop count and makes the routing additional economical and reliable, since B-nodes have giant transmission vary, and are additional reliable. Then, a replacement waterproof protocol, i.e hybrid waterproof (HMAC), is intended to work with the routing layer. Supported the cell structure and HMAC, megahertz achieves higher performance [4]. Hierarchical optimized link state routing (HOLSR) could be a routing protocol for large-scale heterogeneous networks and is outlined as a network of movable nodes that are characterized by completely different communication capabilities like multiple radio interfaces. It planned to boost the quantifiability of OLSR and helps in reduction of routing management overhead in giant heterogeneous unintended networks [5]. In [3] author used Device-Energy-Load Aware Relaying framework(DELAR) that focuses on energy conservation in heterogeneous MANETs consisting of powerful nodes and traditional nodes . It achieves energy conservation from power-aware routing, transmission programming and power management. Our approach makes use of loose coupling relationship between nodes in cluster that is healthier than previous existing approaches.

3. Problem Statement

Most of the existing protocols are limited to homogenous networks and perform ineffectively in power heterogeneous networks. A cross-layer-designed device–energy–load aware relaying (DELAR) framework that achieves energy conservation from multiple facets, including power-aware routing, transmission scheduling, and power control, is proposed. DELAR mainly focuses on addressing the issue of energy conservation in heterogeneous MANETs.

To improve the network performance and to address the issues of high-power nodes, we propose a Geographic-based routing protocol. GBRPH consists of two core components. The first component is used to tackle the unidirectional link and to construct the hierarchical structure. The second component is the routing, including the route discovery and route maintenance. It relies on geographic information or multi-radio multi-channels and can be deployed on general mobile devices, including laptops, personal digital assistants.

4. Project Description

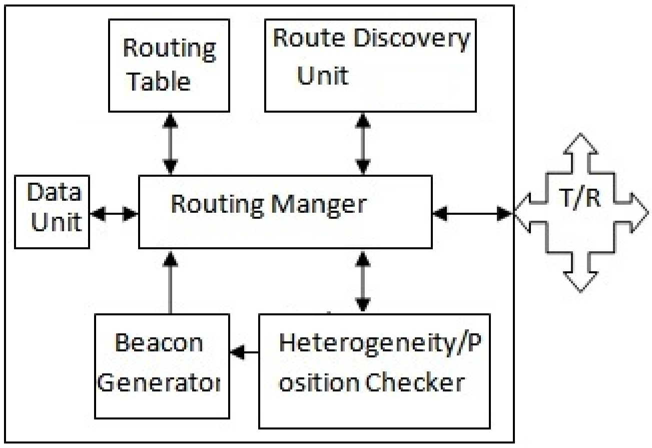

Figure 1: Block Diagram of GBRPH

4.1 Query Generation

a) In general, the node which is has the data to destination and without route then the node needs to find the route to destination.
b) In such a case, node will broadcast the query to all neighbor nodes.
c) The query packer which contains the different field to check the detail of needs.
d) There are the some main fields, which is given as bellow

Source adrs, Destination adrs, seq number, current node adrs, coverage area of current node adrs, GPS value.

4.2 Route Discovery Unit

a) If the source has no route to the destination, then source initiates the route discovery in an on-demand fashion.
b) After generating RREQ, node looks up its own neighbor table to find if it has any closer neighbor node toward the destination node.
c) If a closer neighbor node is available, the RREQ packet is forwarded to that node.
d) If no closer neighbor node is the RREQ packet is flooded to all neighbor nodes.

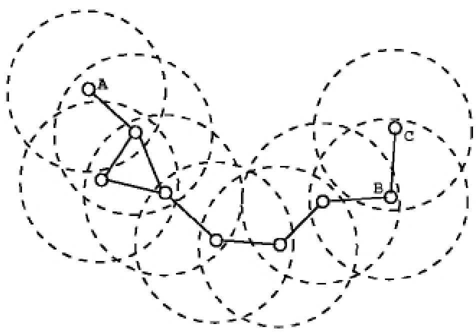

Figure 2: Route Discovery

4.3 Beacon Message Generation

First of all, node A, Figure (3), sends packet to the neighboring nodes. The receiving node checks whether the packet came from B-NODE or not. If it confirms the packet to have come from B-NODE, it generates a "Hello Message." It waits for a reply for a certain time. If reply comes, path is established.

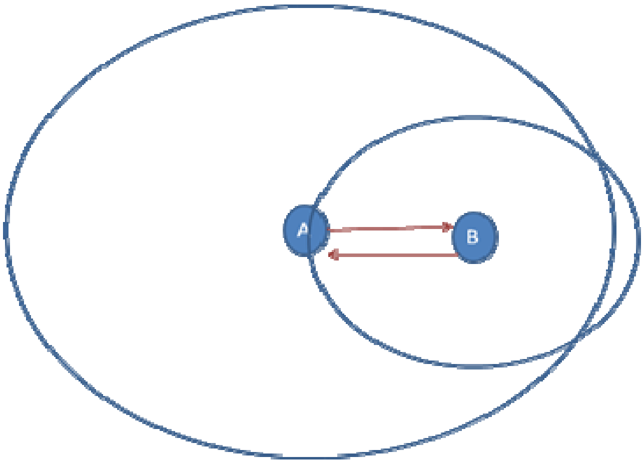

Figure 3: Beacon Message Generation

4.4 Heterogenity and Position Checker

The heterogenity to establish path is calculated based on the Euclidean distance between the two nodes. If the calculated distance is less than the tranmission range of the sender node, bi-directional link can be established and the route request will be accepted else a new path is chosen by discarding the route request.

4.5 Clustering

Initially all nodes will send Hello Message If any node received B-NODE packet it will give CMP (Cluster Member Packet).Then B-NODE will give CHP (Cluster Head Packet) as confirmation. If more than two B-NODES messages are received means it will find which is the shortest distance and it will join in the particular Cluster. If no B-NODE packet is received it will become as an Independent Node (Loose Clustering).

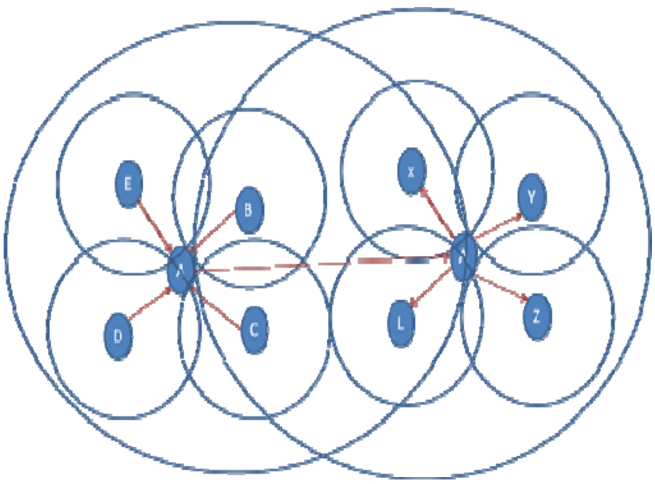

Figure 4: Clustering

5. Algorithm

Two types of nodes we are considering

1) B-NODE (High amount of coverage area and high battery power)
2) G-NODE (Normal Nodes)

Cluster Formation Phase:

1) Initially all nodes will send Hello Message
2) If any node received B-NODE packet it will give CMP (Cluster Member Packet)
3) Then B-NODE will give CHP (Cluster Head Packet) as confirmation
4) If more than two B-NODES messages are received means it will find which is the shortest distance and it will join in the particular Cluster
5) If no B-NODE packet is received it will become as an Independent Node (Loose Clustering)

Path Establishment:

1)If node wants to transmit the data, it will check whether any path is available or not in routing table
2)If available transmit the data
3)If not find path
   a. Send RREQ (Route request)
   b. Intermediate nodes will check that request as well as Heterogeneity based on geographic values
      i. Calculate the Euclidean distance between two nodes
      ii. If the distance is less than transmission range means Bi-directional link, accept the RREQ.
      iii. Else discard the RREQ and choose another path.

6. Results & Analysis

Network performance refers to the service quality of a communications product as seen by the customer. There are many different ways to measure the performance of a network, as each network is different in nature and design.

6.1 Packet delivery function

PDF is the term used to measure the network performance. PDF defines the how much packet delivered correctly over total number of packet sent. Figure (5) shows the packet delivery fraction of the network with three different protocols. Here we can observe that AODV showing very low performance because it is a homogeneous protocol. Whereas remaining two protocols showing performance which is almost 100%.

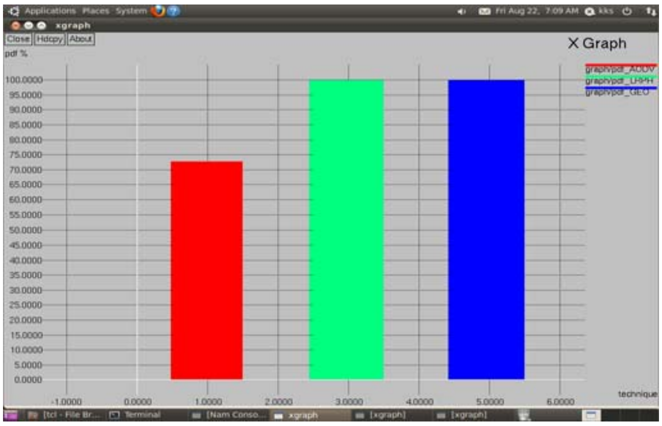

Figure 5: Packet Delivery Fraction

6.2 Packet delay

End-to-end delay refers to the time taken for a packet to be transmitted across a network from source to destination. Figure (6) shows the packet delay fraction of the network with three different protocols. Here we can observe that AODV showing very high delay because it is a homogeneous protocol. Whereas remaining two protocols showing better performance.

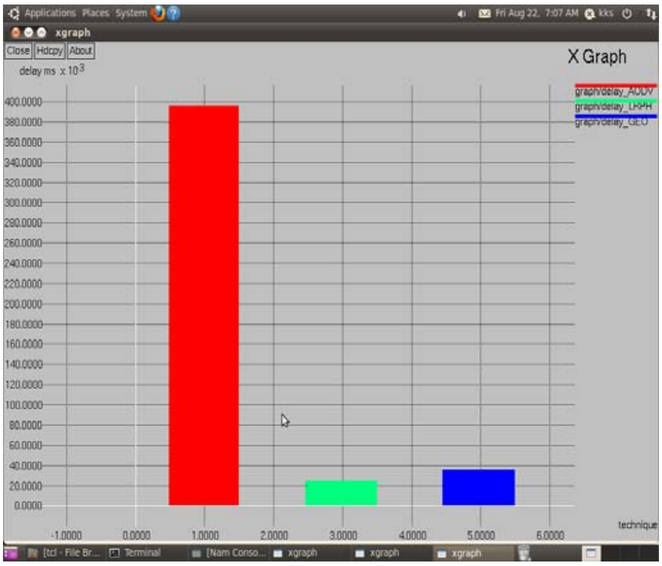

Figure 6: Packet Delay

6.3 Overhead

Overhead is the one important concept to analyze network performance. Overhead is defined as number of routing and control packet is requiring transferring the data. Figure (7) shows the overhead of the network with three different protocols. Here we can observe that AODV showing very high overhead because it is a homogeneous protocol. Whereas remaining two protocols showing better performance. In that GEO based protocol showing very overhead even when compared with LRPH.

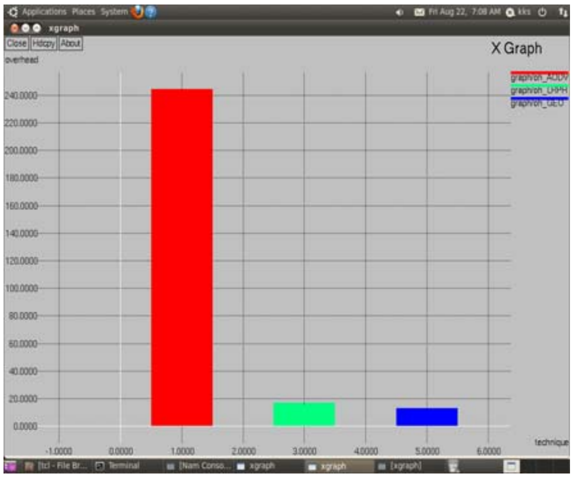

Figure 7: Overhead

7. Conclusion

In this paper we mainly concentrated on the reduction of delay, route hops, overhead and how to improve throughput but we not considered about energy consumption. Further simulations have to be carried out to improve the network performance with respect to energy parameter also.

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