Geographic- Based Routing Protocol for Heterogeneous Mobile Ad-Hoc Networks

B.Ramakrishna Naik, V.Vittal Reddy

Abstract: In infrastructure less network (ILNS), networks might carries with it devices with un-similar characteristics in terms of capacity of the node, antenna and frequency, transmission power and so on. This type of un-similar behavior network, devices are doubtless to transmit at completely different transmission levels, thereby inflicting communication links of frequent break. This may cause link spatial property downside. And also, it attributable to interference raised by high power devices, so networks is going to be severely affected. The related survey of current works, counsel shows that to solely notice the simplex links and to avoid transmissions through such connection. They are not considering the advantages of high-energy devices. This paper highlights strategies to enhance the networking performance of power un-similar ILNs by with efficiency exploiting the benefits and avoiding the disadvantages of high-energy devices.

Keywords: Mobile Ad-hoc Networks (ILNS), Un-similar Networking, Link Asymmetry

1. Introduction

Mobile ad-hoc plays a very important role in future communications attributable to the increasing use of wireless transportable devices like mobiles and laptops. ILNs do not have a set of infrastructure to communication. ILN consists of mobile devices that communicate wirelessly. Devices that area unit among every other's vary will discover and communicate directly. But anyway for communication between devices that area unit out of vary, intermediate devices act as routers that forward packets to the destination.

ILNs are often un-similar in nature, in terms of node characteristics like transmission power [1] [2], energy [3], and capability [4], [5]. So devices 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, un-similar hidden and exposed issues that severely affects the network performance.

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In this paper, A Geographic Based (GBRPH) networking protocol for power un-similar ILNS is developed. It rely on geographic information [7], [8] or multi-radio multichannel [8], [9] and can be deployed on general mobile devices, including laptops, personal digital assistants.

2. Related Work

In [9], author used the comprehensive outline of the networking protocols for ILNs during which the devices are mobile, the configuration changes chop-chop, touching the provision of networking technologies. And then, 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 networking 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 [10]. Examples of networking protocols for un-similar ILNs are megahertz that could be a position motor-assisted networking protocol for power varied ILNs. ILN networking utilizes the additional powerful devices as backbone devices. The networking space is split into several tiny, equal-sized cells and a B-node is maintained in every cell. Most of the networking activities such as packet forwarding are among B-devices so, there's reduction in networking hop count and makes the networking additional economical and reliable, since B-devices have giant transmission vary, and are additional reliable. Then, a replacement waterproof protocol, that is hybrid waterproof HMAC, is intended to work with the networking layer. It supported the cell structure and HMAC, megahertz achieves higher performance [4]. Hierarchical improved link state networking HOLSR could be a networking protocol for large-scale un-similar networks and is outlined as a network of movable devices that are characterized by completely different communication capabilities like multiple radio interfaces. It's planned to boost the quantifiability of OLSR and helps in reduction of

networking management overhead in giant un-similar unintended networks [5]. In [6] author used Device-Energy-Load Aware Relaying framework such as DELAR that focuses on energy conservation in un-similar ILNs consisting of powerful devices and traditional devices . It achieves energy conservation from power-aware networking, transmission programming and power management. The approach makes use of loose coupling relationship between devices in cluster that is healthier than previous existing approaches.

3 System Analysis:

3.1 Existing system:

A cross-layer-designed device–energy–load aware relaying such as DELAR framework that achieves energy conservation from multiple facets, including power-aware networking, transmission scheduling, and power control, is proposed. Most of the existing protocols are limited to homogenous networks and perform ineffectively in power un-similar networks. Previous work mainly focuses on addressing the issue of energy conservation in un-similar ILNs. Most of the existing systems all are depend on geographical networking.

3.2 Proposed system:

To improve the network performance and to address the issues of high-power devices, proposed a Geographic-based networking 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 networking, including the route discovery and route maintenance and also reduces the overhead and delay.

Advantages: It relies on geographic information or multi-radio multi-channels and can be deployed on general mobile devices, including laptops, personal digital assistants.

4. Block Diagram:

Architecture consists of data unit, routing manager, heterogeneity checker, beacon generator, routing table and route discovery unit. Data unit have necessary information, routing manager handles the routing related information, routing table consists of different paths, heterogeneity checker checks, whether the path is bi-directional or uni-directional, beacon generator generates hello message based on heterogeneity checker.

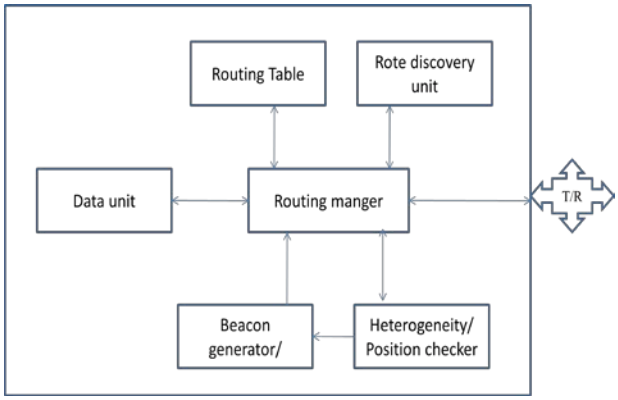

Figure 1: Architecture of heterogeneous manet

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

5 Algorithm:

Two types of devices are considering

5.1 Path Establishment:

1) If node wants to transmit the data, it will check whether any path is available or not in networking table.
2) If available transmit the data.

If no path available Send RREQ

Intermediate devices will check that request as well as Heterogeneity based on geographic values.

a) Calculate the Euclidean distance between two devices.

b) If the distance is less than transmission range means Bi-directional link, accept the RREQ.

c) Else discard the RREQ and choose another path.

6. Results:

The performance of heterogeneous network is increased by decreasing delay as well as overhead and effective communication is achieved. Animation of Homogeneous AODV, Heterogeneous AODV, LRPH is shown in figure 2,figure 3 and figure 4.

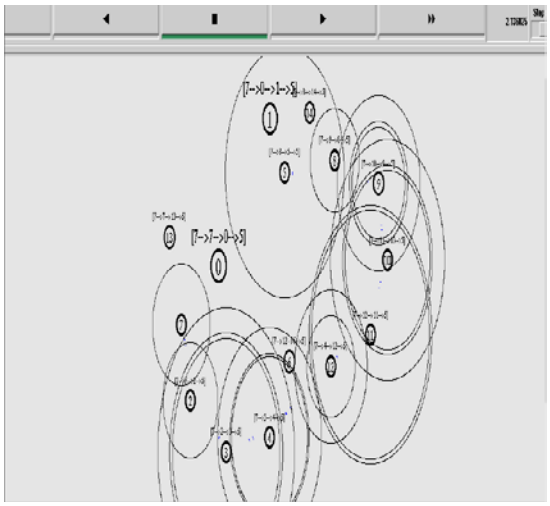

Figure 2: Homogeneous AODV

In Figure 2, Source is transmitting the route request and intermediate nodes just forwarding to other nodes. Here there are no high power nodes as well as the distance between node 7 as well as node 5 is high, so node 7 can't send RREQ to node 5 and the node 5 will accept request from node 4 and the path will be established.

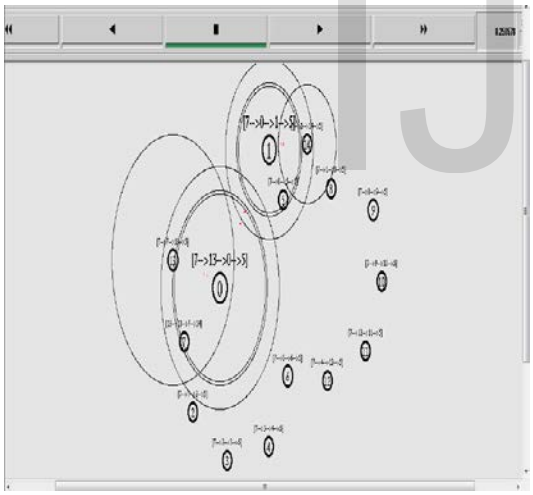

Figure 3: Heterogeneous AODV

In Figure 3, by taking two sources 7, 12 and to destinations 5,14. Source is transmitting the route request as well as intermediate nodes just forwarding to other nodes. Now node 7 can transmit RREQ directly to node 5 but it can't give reply to node 7 because of less transmission range and less power which is called uni-directional links. So path will not establish here. And node 12 send RREQ to 14 through node 0 and 1 and here path establishes.

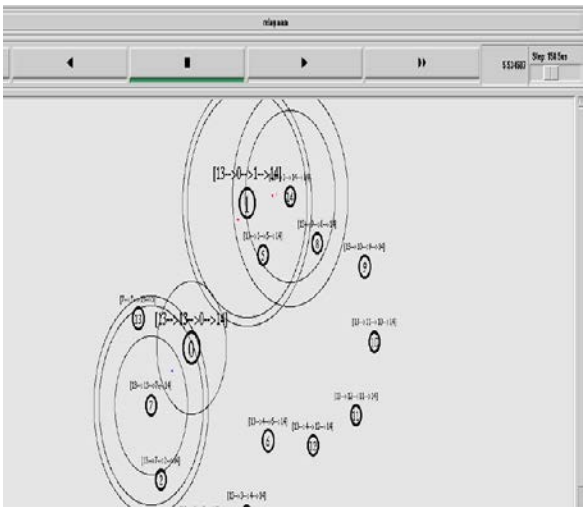

Figure 4: LRPH

In Figure 4, Source is transmitting the route request and in-between nodes just forwarding to other nodes. To include the two high power nodes 0 and 1, Now node 0 can transmit RREQ directly to node 5 but it can't give reply to node 0 because of less transmission range and less power which is called uni-directional links. To avoid this situation node 5 will generate beacon message which won't be received by node 0. So, reply will not come then it will accept the RREQ from node 1 as well as path will be established.

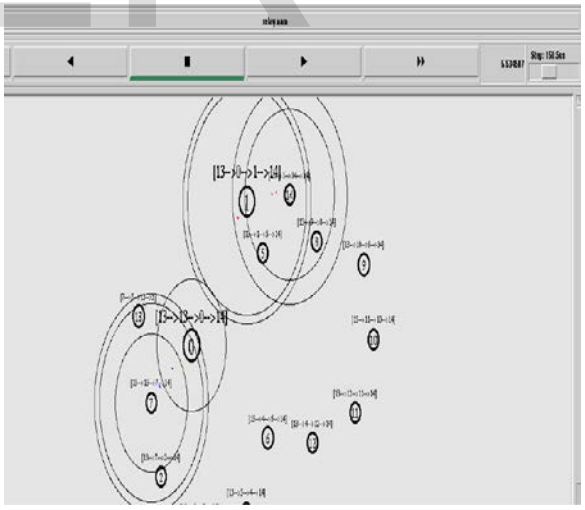

Figure 6: GEO

Animations of LRPH and GEO are same difference shows in x-graph.

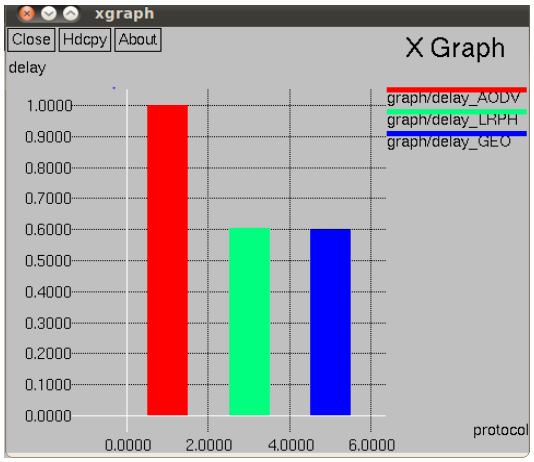

Figure 5: delay graph

Figure 5, shows the delay comparison of homogeneous AODV, LRPH and GBRPH. Here GBRPH have less delay, AODV have more delay and LRPH have less delay when compared to AODV and have more delay when compared with GBRPH.

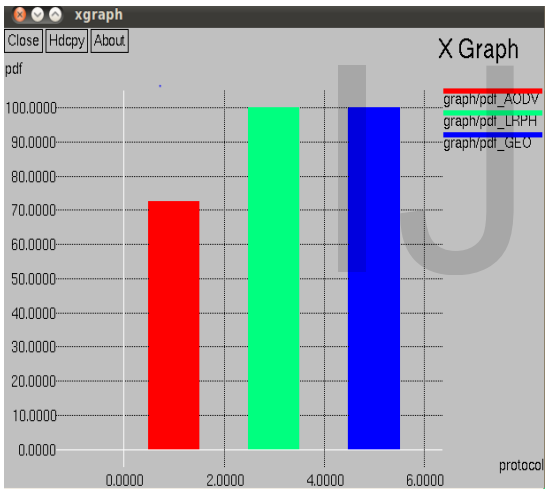

Figure 6: Packet Delivery Factor Graph

Figure 6, shows the packet delivery factor comparison of homogeneous AODV, LRPH and GBRPH. If packet delivery factor is more, then communication is done effectively. Here packet delivery factor is more in GBRPH, so effective communication is achieved.

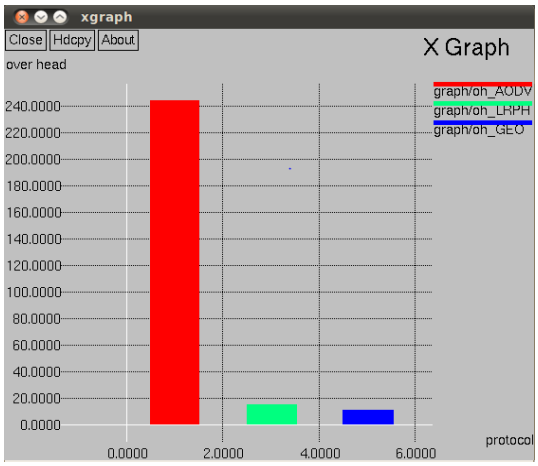

Figure 7: Overhead Graph

Figure 7, shows the overhead comparison of homogeneous AODV, LRPH and GBRPH.GBRPH have less overhead when compared to AODV and LRPH. So, here communication process takes less time.

7. Conclusion:

Development of GEO-based networking protocol named GBRPH for power un-similar ILNs, improves the network throughput largely. In our work an algorithm is designed to eliminate unidirectional links and to benefit from high-power devices in transmission range and reliability. We developed networking schemes to optimize packet forwarding by avoiding data packet forwarding through high-power devices. Simulation results shows that the proposed method gives better performance with respect to Packet delivery, overhead and delay.

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