International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2016): 79.57 | Impact Factor (2017): 7.296

Survey on Spatial Reusability-Aware Routing in Multi-Hop Wireless Networks

Abin Pious[1], Jerin Mathew[2], Sijimol A.S[3]

Abstract: ***In the issue of routing in multi-hope wireless networks, to accomplish high end-to-end throughput, it is critical to find the "best" path from the source hub to the destination hub. A large number of routing protocols have been proposed to find the path with minimum total transmission count/time for delivering a single packet, each protocol is based on different techniques in MUP it is used to optimize local spectrum usage via intelligent channel selection in a multihop wireless network. In multirate anypath routing, each hope uses both set of next node and a selected transmission rate for destination. In this a new concept "Spatial Reusability" is introduced in order to improve the end-to-end throughput in multi-hop wireless network.***

Keywords: MUP, SAAR, SASAR, Multirate anypath routing.

1. Introduction

Wireless communications are a sort of information communication that is performed and conveyed remotely. Because of restricted limit of wireless communication media and lossy remote connections[7] it is critical to precisely choose the path that can maximize the end-to-end throughput, particularly in multi-hop wireless networks. As of late, a substantial number of routing protocol have been proposed for multi-hop wireless networks[4], [6]. No twith standing, a basic issue with existing wireless routing protocols is that limiting the general number of transmissions to convey a single packet from a source hub to a destination hub does not really expand the end-to-end throughput. In this paper, we investigate routing protocols which is used in multihop wireless networks. In MUP (Multi-Radio Unification Protocol), it is used to localize nearby range use by means of intelligent channel determination in a multihop remote system [2]. The objective of MUP is to advance nearby spectrum use by means of insightful direct determination in a multihop wireless network. In multirate anypath routing, each node uses both a set of next node for transmission and a selected transmission rate to reaching the destination [5][3]. The multirate anypath routing can very useful for maximizing the transmission rate. David B Johnson and David M Maltz describe the design and performance of a routing protocol for ad hoc network with the aim of as replacement for uses dynamic source routing of packet relating hosts to facilitate fancy just before communicate [1]. When we using Spatial Reusability-Aware Routing protocols we can maximize the end-to-end throughput. It has two routing protocols and that are spatial reusability-aware single-path routing (SASR) and anypath routing (SAAR) protocols [8]. The rest of the paper is organized as follows. Section 2 describes about literature on Spatial Reusability-Aware Routing in Multi-Hop Wireless Networks Section 3 gives the comparison between different techniques used in multihop wireless network. Section4 describes the conclusion.

2. Literature Review

Due to limited capacity of wireless communication media and lossy wireless links, it is extremely important to carefully select the route that can maximize the end-to-end throughput, especially in multi-hop wireless networks. In recent years, a large number of routing protocols have been proposed for multi-hop wireless network

2.1 Dynamic source routing in ad hoc network

David B Johnson and David M Maltz describes the design and performance of a routing protocol for ad hoc networks with the aim of as a replacement for uses dynamic source routing of packets relating hosts to facilitate fancy just before communicate. Source routing is a routing technique in which the sender of a packet determines the wide-ranging succession of nodes through which to forward the packet; the sender explicitly lists this route in the packet's header, identifying each forwarding "hop" by the address of the next node to which to transmit the packet on its way to the destination host. The protocol presented here is explicitly designed for use in the wireless setting of a personal hoc network. In this, routing is facilitated dynamically, select route from source to destination based on cached information and on the results of a route discovery protocol. Dynamic source routing protocol offers a number of potential advantages over conventional routing protocol and uses no periodic routing advertisement messages. The dynamic routing protocol described here can adapt quick changes such as host movement. In this routing technique, in order to send packet to another host, the sender constructs a source route in the packet's header, providing address of each host in the network. The dynamic source routing protocol performs well over a variety of environmental conditions such as host density and movement rates.

2.2 Multi-Radio Unification Protocol for IEEE 802.11 Wireless Networks

Atul Adya proposed a new method Multi-Radio Unification Protocol. The objective of MUP is to localize nearby range use by means of intelligent channel determination in a multihop remote system. MUP is executed at the link layer, so that network traffic can influence utilization of the various interfaces with no modification to applications to or to the upper layers of the system convention stack, because of this MUP uncovered a single virtual MAC address set up of the various physical MAC tends to utilized by the remote Network Interface Cards. The fundamental usefulness gave by the MUP layer is a method for choosing which NIC to utilize, and accordingly which channel to utilize, when

Licensed Under Creative Commons Attribution CC BY

communicating with a neighboring hub. A naive approach would be basically to pick a channel at random; we allude to this approach as MUP-Random. By making utilization of numerous channels, this approach can possibly lessen conflict and in this way increment the general network capacity. MUP settles on a choice about which channel to use for communication between a couple of nodes in view of neighborhood data about channel quality.

The MUP usage keeps up a table of data about neighboring hubs. We refer to this table as the MUP neighbor table. A hub utilizes this table to monitor which hubs it has spoken with, and which of those hubs are MUP-capable. It additionally stores the per-interface MAC addresses, and in addition the relating channel quality and channel determination data for each neighbor. At the point when a MUP-empowered host first starts correspondence with a neighboring host, it doesn't expect that the neighbor is MUP-capable. Consequently, correspondence is started utilizing the ARP protocol an ARP ask for is communicated over every one of the interfaces. The ARP is utilized as the first step of correspondence between hubs. After the underlying ARP, a MUP-enabled hub likewise starts the MUP disclosure procedure to decide whether the neighbor is MUP-enabled. Note that ARP reactions for in excess of one system interface may have just been gotten, however the presence of various interfaces on a hub does not imply that the hub supports MUP. To decide if the remote hub supports MUP, a MUP "CS" message is sent over every single settled interface. A MUP enabled hub will react with a "CS-ACK" message, where as an inheritance hub won't. Timeouts are utilized to retransmit CS messages if fundamental. After a specific number of failed retransmissions, the neighboring hub is classified as a legacy hub. Sections in the MUP neighbor table are erased if no traffic is traded with that neighbor for a drawn out stretch of time. The disclosure and classification process described above is utilized when the following correspondence is started with that neighbor. The discovery and classification process described above is used when the next communications initiated with that neighbor. When two MUP-capable nodes communicate, they periodically test the nature of all channels accessible to them. Likewise, on an occasional premise, they choose which channel to convey over for whenever period, in light of their gauge of late channel quality.

2.3 Multirate Anypath Routing in Wireless Mesh Networks

Present another directing worldview that sums up entrepreneurial steering in wireless network. In multirate anypath directing, every hub utilizes both an arrangement of next bounces and a chose transmission rate to achieve a goal. Utilizing this rate, a packet is communicated to the nodes in the set and one of them advances the packet on to the destination. The proposed algorithm keeps running in a same running time from general most limited way calculations and is therefore suitable for arrangement in interface state routing protocol.

In classic wireless network routing, every hub advances a packet to a single next node. Accordingly, if the transmission to that next jump falls flat, the node needs to retransmit the packet despite the fact that different neighbors may have caught it. Conversely, in anypath directing, every hub communicates a packet to various next node at the same time. In this way, if the transmission to one neighbor falls flat, an elective neighbor who got the packet can forward it on. This is known as forwarding. At the point when a packet is communicated to the sending set, in excess of one node may get a similar packet. To stay away from pointless copy sending, just a single of these hubs ought to forward the packet on. For this reason, every node in the set has a need in priority they got packet. A node just advances a packet if all higher priority nodes in the set neglected to do as such. Higher priority is relegated to hubs with shorter separations to the goal.

Past work on anypath directing concentrated on a single bite rate. Such a supposition, in any case, impressively underutilizes accessible data resources. A few hyper-links might have the capacity to maintain a higher transmission rate, while others may just work at a lower rate. To date, the issue of how to choose the transmission rate for anypath steering is as yet open. Here they give an answer for this issue and fuse the multirate ability characteristic in IEEE 802.11 systems into anypath routing. For this situation, other than choosing an arrangement of next node to forward packets, a node should likewise choose one among numerous transmission rates. For every destination, a node at that point keeps both a sending set and a transmission rate used to achieve this set. Accordingly, every two hubs will be connected through a work made out of the association of various ways, with every hub transmitting at a selected rate. Consider a multirate any path network consist of nodes where s and d nodes are the source node and destination node respectively. It delineates the situation where node utilize a chose bit rate to forward packets to an set of neighbors. Here define this association of ways between two hubs, with every hub utilizing a conceivably unique bit rate as a multirate anypath. In this, expect a packet is sent from s to d over the multirate any path. Just a single of the accessible ways is crossed relying upon which hubs effectively get the packet at each node. We demonstrate a way perhaps taken by the packet utilizing dashed lines in multihop wireless network. We utilize diverse dash lengths to speak to the different transmission rates utilized by every hub. A shorter dash speaks to a shorter time to send a packet, henceforth a higher transmission rate. Succeeding packets may take totally unique ways with other transmission rates along its way

2.4 Spatial Reusability-Aware Routing in Multi-Hop Wireless Networks

To achieve high end-to-end throughput in Multi-Hop Wireless Networks, it is important to find the “best” path between source and destination node. Although there are many routing protocols available but these protocols do not guarantee to achieve maximum end-to-end throughput. This paper is based on the concept “Spatial Reusability” and uses two new routing protocols namely, spatial reusability-aware single-path routing (SASR) and spatial reusability-aware any-path routing (SAAR) protocols, comparison is done with respect to the existing single-path routing and any-path routing protocols.

Licensed Under Creative Commons Attribution CC BY

Most of the existing routing protocols select path, that reduces the overall transmission counts or transmission time for sending a packet. The existing routing protocol does not bring spatial reusability into account. Almost all the existing protocols were designed based on existing transmission cost minimizing routing metrics, they cannot assure maximum end-to-end throughput. *By* carefully considering spatial reusability of the wireless communication media, we can improve end-to-end throughput in multi hop wireless networks.

3. Comparative Analysis

This section illustrates comparative analysis of various techniques used for multihop routing with its advantages and limitations. The comparative study is shown in the following table1.

Table: Comparative Analysis

Techniques	Advantages	Limitations
Dynamic source routing in ad hoc wireless networks	• protocol uses no periodic routing advertisement messages • reducing network bandwidth overhead • adapt quickly to changes	• does not concern security adherent in wireless networks or packet routing,
Multi-Radio Unification Protocol	• Minimize hardware modification • Avoid making changes to the higher layer protocols	• Less channel quality
Multirate AnyPath Routing	• Same complexity as Dijkstra's algorithm • Easy to implement	• When a node is disconnected, it can affect the result
Spatial Reusability-Aware Routing in Multi-Hop Wireless Networks	• Spatial Reusability • Improved end-to-end throughput • Increased overall transmission count	• No inter-flow spatial reusability

4. Acknowledgment

I would like to express my profound gratitude and deep regard to my Project Guide Assistant Professor.Sijimol A.S, for her exemplary counsel, valuable feedback and constant help throughout the duration of the project. Her suggestions were of immense help throughout my project work.

5. Conclusion

As this complete paper describe different approaches on wireless network routing, but none of the approaches are seems to be perfect. From the survey, it can be observed that each routing protocols have advantages and disadvantage.

References

[1] D. B. Johnson and D. A. Maltz, "Dynamic source routing in ad hoc wireless networks," Mobile Computing, vol. 353, pp. 153–181, 1996.

[2] A. Adya, P. Bahl, J. Padhye, A. Wolman, and L. Zhou, "A multiradio unification protocol for ieee 802.11 wireless networks," in BROADNETS, 2004.

[3] S. Chachulski, M. Jennings, S. Katti, and D. Katabi, "Trading structure for randomness in wireless opportunistic routing," in SIGCOMM, 2007.

[4] Y. Lin, B. Li, and B. Liang, "Codeor: Opportunistic routing in wireless mesh networks with segmented network coding," in ICNP, 2008.

[5] R. P. Laufer, H. Dubois-Ferri`ere, and L. Kleinrock, "Multirate anypath routing in wireless mesh networks," in INFOCOM, 2009.

[6] H. Rahul, H. Hassanieh, and D. Katabi, "Sourcesync: a distributed wireless architecture for exploiting sender diversity," in SIGCOMM, 2010.

[7] S.Zhao,L.Fu,X.Wang,andQ.Zhang,"Fundamentalrelation ship between node density and delay in wireless ad hoc networks with unreliable links," in MOBICOM, 2011.

[8] Tong Meng, Fan Wu, Zheng Yang, Guihai Chen and Athanasios V. Vasilakos," Spatial Reusability-Aware Routing in Multi-Hop Wireless Networks" in IEEE 2015.

Author Profile

Abin Pious, B.Tech Student, Department of Computer Science and Engineering MBCCET, Peermade, Kerala, India

Jerin Mathew, B.Tech Student, Department of Computer Science and Engineering MBCCET, Peermade, Kerala, India

Sijimol A.S, Assistant Professor, Department of Computer Science and Engineering MBCCET, Peermade, Kerala, India

Licensed Under Creative Commons Attribution CC BY