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Throughput Maximization Using Spatial Reusability in Multi-Hop Wireless

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ABSTRACT: Proposed system spatial reusability aware, the difficulty of routing in multi-hop wireless networks, to achieve high end-to-end throughput, it is adamantine to discover the optimal path from the source node to the destination node.However a large number of routing protocols has been implemented to find the path with minimum transmission time for sending a single packet, such transmission time reduces protocols cannot be guaranteed to derive high end-to-end throughput. Spatial reusability aware routing in multi hop wireless network is present by considering spatial reusability of the wireless communication media. Spatial reusability-aware single-path routes and any path routing protocols, and compare them with existing single-path routing and any path routing protocols, respectively. Our appraisal results show that our protocols significantly improve the end-to-end throughput compared with previous protocols. In proposed system security technique is used for key generation and also sink node share i.e. acoustic mode. Specifically, for single-path routing, the median throughput gain is up to 70 percent, and for each source-destination pair, the throughput gain is as high as 6.8x; for anypath routing, the maximum per-flow throughput gain is 80 percent, while the median gain is up to 15 percent.

KEYWORDS- Hop to Hop to communication, Protocol design, Routing, Wireless network, Security, Throughput Maximization.

I. INTRODUCTION

In this paper, spatial reusability aware routing in multi-hop wireless networks. We probe two types of routing protocols, including single-path routing and anypath routing. The task of a single-path routing protocol is to choose a cost minimizing path, along which the packets are taken from the source node to the destination node. Recently, anypath routing (e.g., [2], [4]) show as a novel routing methods exploiting the broadcast nature of wireless communication media to enhance the end-to-end throughput. It collects the power of more relatively weak paths to form a strong path, by welcoming any middle node who overhears the packet to participate in packet forwarding. Most of previous routing protocols, no matter single path routing protocols or anypath routing protocols, rely on path-quality aware routing metrics, such as link transmission count-based metrics (e.g., ETX [6] and EATX [32] and link transmission time-based metrics (e.g., ETT [7] and EATT [13]. They simply choose the (any) path that minimizes the overall transmission counts or transmission time for delivering a packet.

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II. REVIEW OF LITERATURE

1. An Optimization Framework for Opportunistic Multipath Routing in Wireless Mesh Networks.

Refer Points-

This paper proposes an optimization framework for addressing questions of multi-path routing in wireless mesh networks. We have extended existing work by incorporating the broadcast nature of wireless.

2.An Interference-Aware Channel Assignment Scheme for Wireless Mesh Networks.

Refer Points-

In this paper, we discover the problem of finding the largest number of links that can be activated one by one in a Wireless Mesh Network subject to interference, radio and connectivity constraints. Our goal is to activate all such links and we current an interference aware channel assignment algorithm that realizes this goal.

3.Model-Driven Optimization of Opportunistic Routing.

Refer Points-

In this paper, we present the first protocol that can correctly optimize the performance of opportunistic routing in IEEE 802.11 networks. Our framework consists of three key components: 1) a simple, however effective, wireless network model to support optimization; 2) a novel algorithm for optimizing several performance objectives; and 3) an opportunistic routing protocol that effectively maps solutions resulted from our optimization into practical routing configurations.

4.Physical Carrier Sensing and Spatial Reuse in Multirate and Multihop Wireless Ad Hoc Networks.

Refer Points-

In this paper, we discover the impacts of these factors as well as different other crucial factors, such as SINR (signal to interference plus noise ratio), node topology, hidden/exposed terminal problems and both direction handshakes, on finding the optimum carrier sensing range to maximize the throughput through both analysis and simulations.

5.A High-Throughput Routing Metric for Reliable Multicast in Multi-Rate Wireless Mesh Networks.

Refer Points-

In this paper, we have proposed EMTT as a robust metric for derive high-performance multicast routing in multi-rate WMNs. EMTT captures the collected effects of 1) MAC-layer retransmission-based reliability, 2) transmission rate diversity. 3) Wireless broadcast advantage and 4) link quality awareness.

6.Estimation of Link Interference in Static Multi-hop Wireless Networks.

Refer Points-

To enhance, or to even estimate the performance of these networks, one must have some knowledge of which links in the network middle with one another, and to what extent. However, the problem of estimating the interference among links of a multihop wireless network is a challenging one.

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7.CodeOR: Opportunistic Routing in Wireless Mesh Networks with Segmented Network Coding.

Refer Points-

Opportunistic routing significantly enhance unicast throughput in wireless mesh networks by effectively using the wireless broadcast medium. With network coding, opportunistic routing can be implemented in a simple and practical route without resorting to a complicated scheduling protocol.

IIII. SOFTWARE REQUIREMENT SPECIFICATION

Software:-

Operating System : XP, Windows7
Coding language : JDK7.0
Tool : Eclipse Luna

Non-Functional Requirement

1 Performance

There are many different ways to measure the performance of a network, as each network is different in nature and design. Performance measuring in bandwidth, throughput, latency, jitter and error rate etc.

2 Scalability

Scalability is the capability of a system, network, or process to handle a growing amount of work, or its potential to be enlarged in order to accommodate that growth.For example, it can refer to the capability of a system to increase its total output under an increased load when resources (typically hardware) are added.

3 Capacity

Wireless carriers are pushed to increase network capacity to accommodate user demand for high-bandwidth services.

4 Availability

When data is not secure and easily available, information security is affected, i.e., top secret security clearances. Another factor affecting availability is time.

5 Reliability

A **reliable** protocol provides reliability properties with respect to the delivery of data to the intended recipient(s), as opposed to an unreliable protocol, which does not provide notifications to the sender as to the delivery of transmitted data.

6 Security

Network security involves the authorization of access to data in a network, which is controlled by the network administrator.

IV. MATHEMATICAL MODEL

Let us consider S as a set **Spatial reusability aware routing ….**

Let P_{ij} be the link delivery probability from node *i* to node *j*, i.e., if a packet is transmitted from node *i* to node *j*, then with probabilityP_{ij} the packet can be decoded. That is to say, to deliver a packet from node i to node j, node i is expected to do

$$Z_i = \frac{1}{P_{ij} \times P_{ij}}$$

Let T_{data} and Tack denote the transmission time of a data packet and an acknowledgment, respectively. Then, the expected time to deliver a packet from node *i* to node *j* is

$$t_{ij} = Z_i \times T_{data} + Z_i \times P_{ij} \times \text{Tack}$$
$$= \frac{T_{data}}{P_{ij} \times P_{ji}} + \frac{\text{Tack}}{P_{ji}}$$

Let $F_i \subset N$ be the forwarding set of node *i*. Then, to deliver a packet from node i to at least one of the nodes in its forwarding set F_i , the expected number of transmissions needed to be done by node *i* is

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$$t_iF_i = Z_iF_i \times T_{data} = \frac{T_{data}}{1 - \prod_{j \in F_i} (1 - P_{ij})}$$

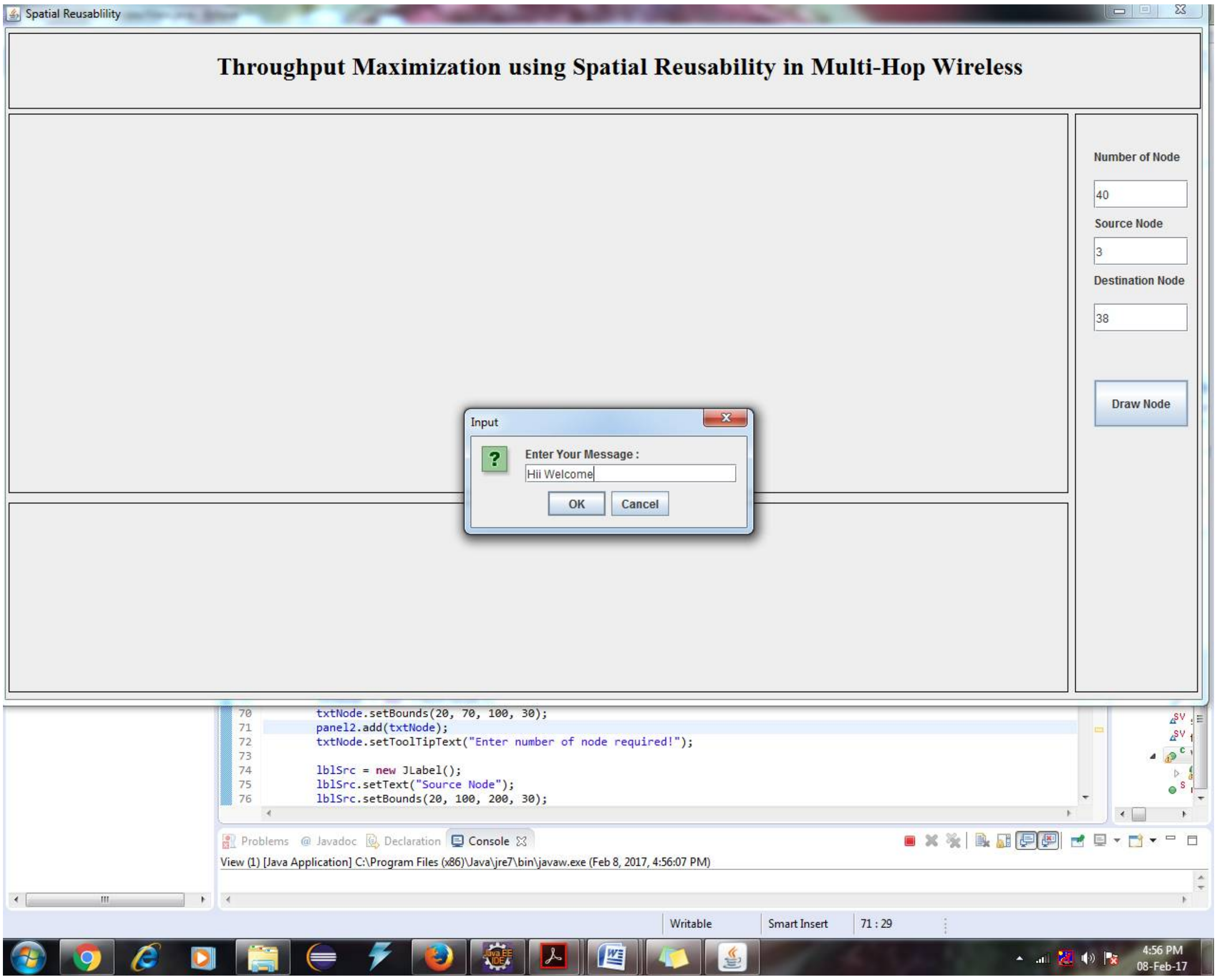
Given a set of non-interfering hyperlinks I, which can work simultaneously without any interference, we can calculate the fused cost of set I as the largest expected hyperlink delivery time in the set:

$$c(I) = \max \{ \bar{t}_{iF_i} \mid (i, F_i) \in I \}$$

Consequently, given a collection I of all the sets of non interfering hyperlinks, the total cost for delivering a packet from the source to the destination is:

$$C_{Src} = \sum_{I \in I} c(I).$$

V. IMPLEMENTATION STATUS



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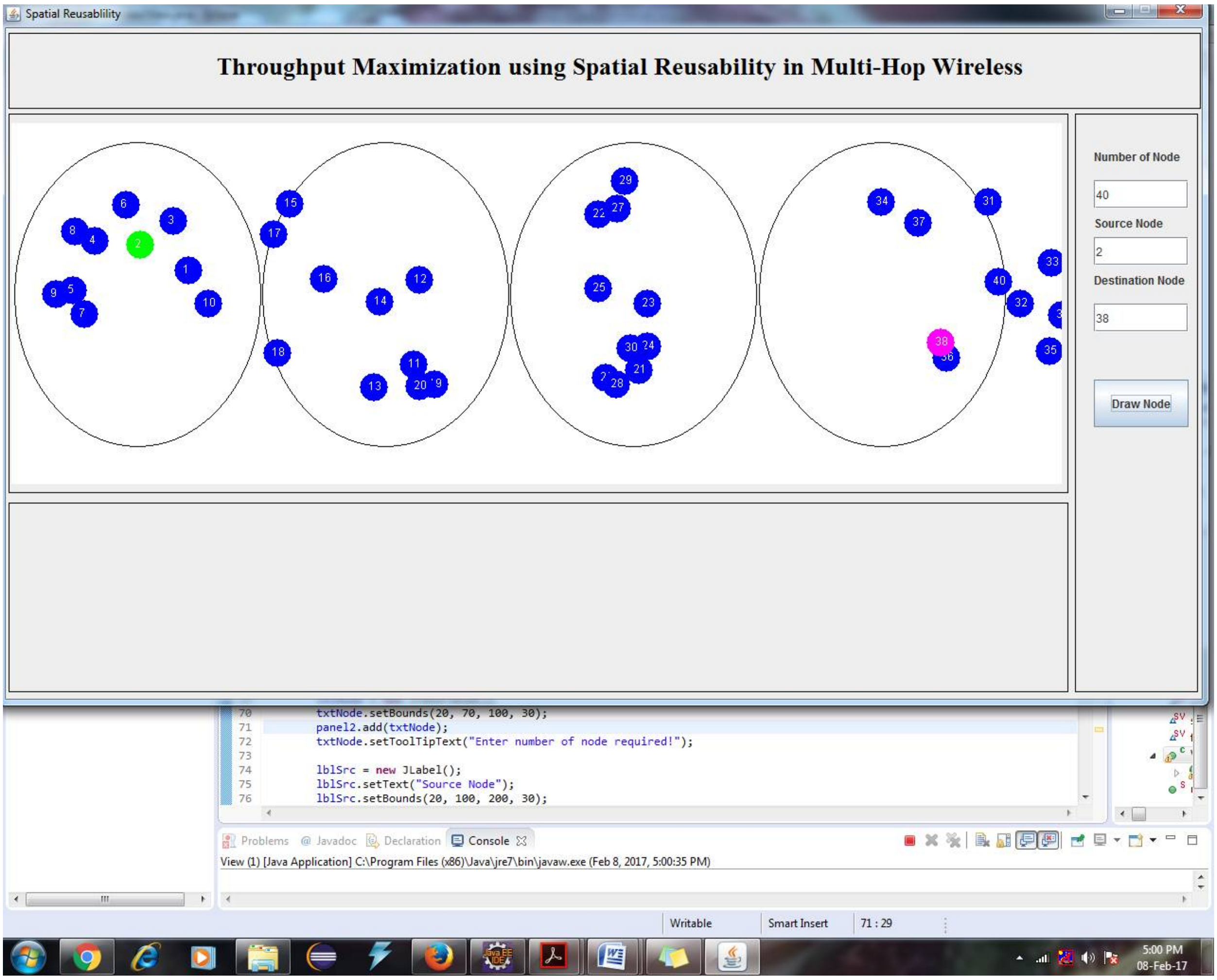

1. **Network Creation**
   Network Creation is first module in this module system perform is that network formation with the help of input like no. of nodes, source node and destination node, message etc.

2. **Shortest Path**
   This is second module system perform find shortest path with help of shortest path
3. **SASR and SAAR**
   In this module find multiple shortest paths.

4. **Throughput**

Performance Measure

We evaluated the performance of our SASR and SAAR algorithms in java. Considering that all the nodes use the same transmission rate, we can compare our algorithms with transmission count-based routing protocols and metrics. To be specific, we compared them with the ETX-based DSR [6] (denoted by DSR-ETX) and the shortest anypath first algorithm. Table 1 lists the parameters in our simulation. Specifically, to uniformly distribute 80 nodes in a 2,000 meter

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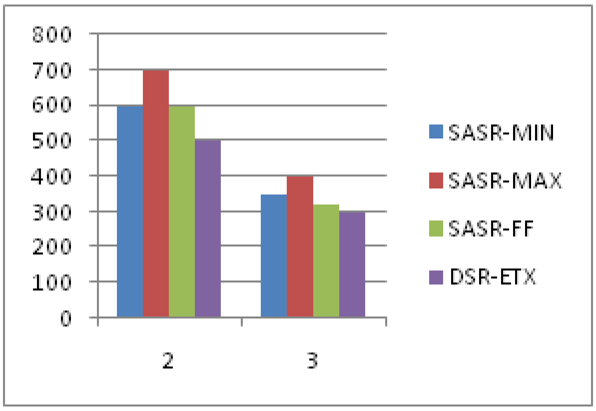
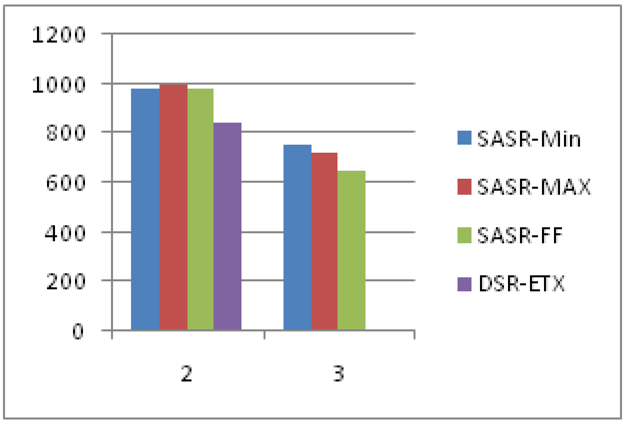
2,000 meter area, and considered two data rates of 802:11, including 11 and 54 Mbps. We used CBR to generate 1; 500-byte packets at high enough rates. In addition, RTS/CTS is turned off in all the simulations.



Number of flows
(a) Data Rate: 28 Mbps



Number of flows
(b) Data Rate: 60 Mbps

Fig. Average throughputs with multiple concurrent flows.

Result Table

Parameter	**Value**
No. of nodes	90
Terrain Area	2000mX2000m
RTS/CTS	OFF
Packet Size	1700 Bytes
802.11 Data Rate	28 Mbps/60 Mbps

Table: Simulation Parameters Setup

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VI. COMPARISON WITH SIMILAR SYSTEM

Existing System

In An ad hoc network wireless sensor nodes dynamically forming a network without the use of any existing network infrastructure administration. Which limit transmission range of wireless network devices, multiple networks "hops" may be needed for one node to exchange data with another across the network. So existing work proposed, a variety of new routing protocols targeted specifically at this environment have been developed, but little performance information on each protocol and no realistic performance comparison between them is available.

Disadvantage of Existing system

1) Energy consumption was bigger challenge to wireless sensor network.
2) In multi hop communication secure data transmission with less cost is ignored.
3) Existing infrastructure is expensive or inconvenient to use, wireless mobile users may still be able to communicate through the formation of an ad hoc network.

VII. PROPOSED SYSTEM

In this paper, the spatial reusability concept novel method is discovering with the spectrum spatial reusability in any path routing. In our paper using several algorithms such as SASR, SAAR and euclidean distance algorithm, and AES for key generation algorithm. Propose SAAR algorithm for participating node selection, cost calculation, and forwarding list determination. We have designed SASR algorithms and SAAR algorithm with different data rates in network simulator. The evaluation results show that our algorithms works improvement to end-to-end throughput compared with existing ones. Specifically, for single-path routing, a throughput gain up to 6.4x with a median of more than 70 percent is achieved in the case of single-flow, and an average gain of more than 20 percent is achieved with multiple flows; for any path routing, a median gain of 14.6 percent and the maximum gain up to 81.6 percent can be realized. Proposed work presents the results of a detailed packet-level simulation comparing four multi-hop wirelesses ad hoc network routing protocols that cover a range.

Advantages of Proposed System

1. Increase overhead deduction in multi-hop wireless networks.

2. Key generation for security during packet transmission.

3. Reduce packet drop attack with trust based active source packet.

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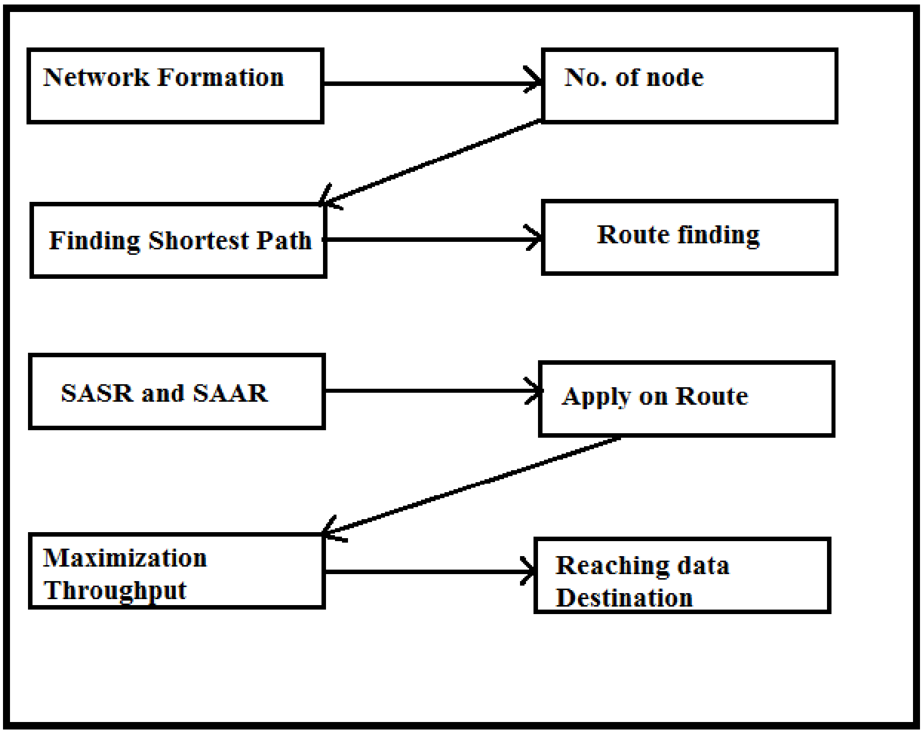

Fig. System Architecture

Efficiency

Consequently, given a collection I of all the sets of non interfering hyperlinks, the total cost for delivering a packet from the source to the destination is:

$$C_{Src} = \sum_{I \in I} c(I).$$

In this system, main aim is that throughput maximization with help of SASR and SAAR algorithm for single path and any path finding and increase throughput.

VIII. CONCLUSION

In this paper, we have reveal that we can significantly increase the end-to-end throughput in multi-hop wireless networks, by alert considering spatial reusability of the wireless communication media. We have presented two kinds of protocols, SASR and SAAR, for spatial reusability-aware single-path routing and anypath routing, respectively. We have also implemented our protocols, and compared them with existing routing protocols with the data rates of 28 and 60 Mbps. Evaluation results show that SASR and SAAR algorithms can derive more significant end-to-end throughput gains under higher data rates. For the case of single-flow, SASR achieves a throughput gain of as high as 6.5 under 60 Mbps, while for SAAR, the maximum gain can reach 70 percent. Furthermore, in multi-flow case, SASR can also increase the per-flow average throughputs by more than 20 percent. Meanwhile, the tremendous throughput gains only require acceptable additional transmission overheads. The extra transmission expenses of route request are less than 10 percent in our evaluation. In 80 percent cases, the overall transmission counts are increased by no more than two with SASR, while for SAAR, most of the increments are below 1.

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