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Opportunistic Routing with Congestion Diversity in Wireless Multi-hop Networks

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***Abstract*: Opportunistic routing is a promising example that has been proposed now a day in a wireless ad hoc network. The opportunistic routing has become very popular and as increased the performance of wireless network. It has helped the broadcast characteristics of wireless medium to improve network performance. One of the basic functions of opportunistic routing is to overhear the sent packet and to coordinate among the relaying nodes. In opportunistic routing there is a candidate set which is a potential group of nodes that is selected as the next-hop forwarders so that the packets will be forwarded to the sink node. . Any of the candidates of a node that have received the transmitted packet may forward it. The decision of choosing the next forwarder is made by coordination between candidates that have successfully received the transmitted packet. Opportunistic variants in a shortest path routing which may have heavy traffic scenarios will result in severe congestion in the network. While the opportunistic variants of backpressure ensure a bounded expected delay they are known to exhibit poor delay performance at low to medium traffic conditions in the network. The expected delay encountered by the packets in the network under ORCD is compared against known existing routing policies via simulations where substantial improvements are observed. In Existing system, it fails for the case of sleeping scheduling cycle because the recovery path may be consisting of sleeping nodes. we are extending the opportunistic routing with considerations of sleeping cycle scheduling of nodes.**

***Keywords*: Opportunistic Routing (OR), nodes and system modules.**

1. Introduction

We consider the problem of routing packets in a multi-hop network which includes multiple sources of traffic and wireless links while ensuring bounded usual delay. Each packet that is transmitted over the network can be overheard by a random set of receiver nodes among which the next relay is selected opportunistically. The main challenge in the design of minimum-delay routing policies is that, balancing the trade-off between routing the packets along the shortest paths in the network to the destination and distributing traffic according to the maximum backpressure. Opportunistic Routing (OR) is a new promising paradigm that has been proposed for wireless networks. OR has gained a lot of attention from the research communities for its ability to increase the performance of wireless networks. . In OR, a candidate set is a potential group of nodes that is selected as the next-hop forwarders. Hence, each node in OR can use different potential paths to send packets toward the destination. Opportunistic variants in a shortest path routing which may have heavy traffic scenarios will result in severe congestion in the network. While the opportunistic variants of backpressure ensure a bounded expected delay they are known to exhibit poor delay performance at low to medium traffic conditions in the network. Any of the candidates of a node that have received the transmitted packet may forward it. The decision of choosing the next forwarder is made by coordination between candidates that have successfully received the transmitted packet. In OR, by using a dynamic relay node to forward the packet, the transmission reliability and network throughput can be increased. The expected delay encountered by the packets in the network under ORCD is compared against known existing routing policies via simulations where substantial improvements are observed. In Existing system, it fails for the case of sleeping scheduling cycle because the recovery path may be consisting of sleeping nodes. we are extending the opportunistic routing with considerations of sleeping cycle scheduling of nodes.

2. Existing system

This paper considers the problem of routing packets across a multi-hop network consisting of multiple sources of traffic and wireless links with stochastic reliability while ensuring bounded expected delay. Each packet transmission can be over-heard by a random subset of receiver nodes among which the next relay/router is selected opportunistically. Due to high congestion packets are not transmitted due to the sleep cycle scheduling feasibility of transmission is inconsistent.

3. Proposed work

The challenge in the design of minimum-delay routing policies was balancing the trade- off between routing the packets along the shortest paths to the destination and controlling the congestion and distributing traffic uniformly across the network. Simple opportunistic variants of shortest path routing under heavy traffic scenarios may result in severe congestion and unbounded delay. While the opportunistic variants of backpressure, which ensure a bounded expected delay, are known to exhibit extremely poor delay performance at low to medium traffic conditions. So we choose opportunistic routing for having the most efficient routing mechanism for the delivery of packets. Combining important aspects of shortest path routing with those of backpressure routing, this paper provides an opportunistic routing policy with congestion diversity (ORCD). ORCD uses a measure of draining time to opportunistically identify and route packets along the paths with an expected low overall congestion. Furthermore, the expected delay encountered by the packets in the network under ORCD is compared against known existing routing policies via simulations and substantial improvements are observed. Finally, the paper proposes practical implementations and discusses criticality of various assumptions in the analysis. In Existing system, it fails for the case of sleeping scheduling cycle because the recovery path may be consisting of sleeping nodes. we are extending the opportunistic routing with considerations of sleeping cycle scheduling of nodes.

4. Literature survey

- Michele Zorzi,Ramesh R Rao made survey on "Geographic Random forwarding for Adhoc and sensor networks multihop performance "this paper proposes a novel forwarding technique based on geographical location of the nodes idealized scheme discussed and its performance by means of both simulation and analytical techniques.
- M.J Neely and R Urgaonkar made survey on "optimal back pressure Routing for wireless Networks with multi reciver diversity". This paper proposes a simple back pressure routing algorithm it maximizes the through put. Algorithm is implemented in distributed manner using local link error it supports blind transmission mode.
- C.Lott, D Teneketzis made survey on "stochastic routing in Adhoc network" this paper investigates network routing problem result shows index policy is optimal for routing problem. Three distributed algorithms are used for optimal routing policy.
- S.Jain,S R Das made survey on "Exploiting path diversity in the link layer in wireless Adhoc networks" this paper develop an any cast extension of the IEEE 802.11 MAC Layer. The result shows any cast performs significantly better than 802.11 in terms of packet delivery.

5. System modules

A. Time-varying network topology

The possibility of successful transmissions is time-invariant in the network topology. The time-varying network topology and transmission probability is straight forward. We define a new variable referred to as network topology state which determines the quality of all the links of the network.

B. Interference and scheduling

The nodes transmit over orthogonal channels there is no inter-channel interference in the network. This assumption allowed for a clear presentation of the routing problem and illumination in their simplest forms. The generalization to the networks follows directly with inter-channel interference. The price of generalization is shown to be the centralization of the routing/scheduling globally across the network or a constant factor performance loss of the distributed variants works in similar fashion to optimal power control algorithms or scheduling can be used.

C. Prior work

The goal of this paper is to design a routing policy that improves the delay performance over existing routing policies while ensuring throughput optimality. The main challenge in the design of minimum-delay routing policies is balancing the trade-off between two goals of routing packets along the shortest paths to the destination and controlling the traffic congestion and distributing traffic uniformly across the network.

6. Result

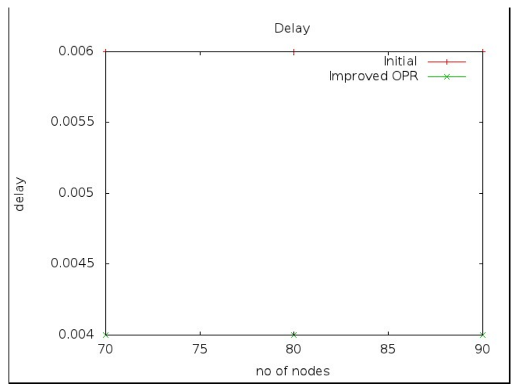

Fig. 1. Using opportunistic routing algorithm we achieve minimum delay of the transmission of packets.

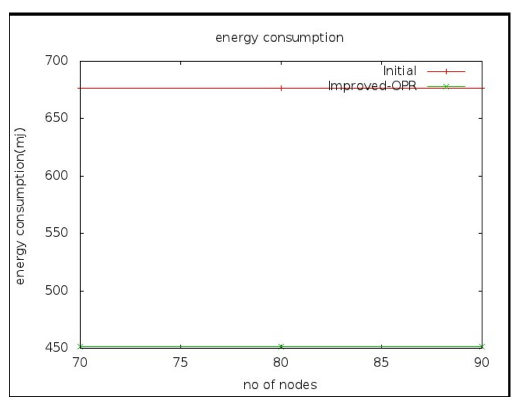

Fig. 2. Using opportunistic routing algorithm energy consumption is decreased compared to initial routing

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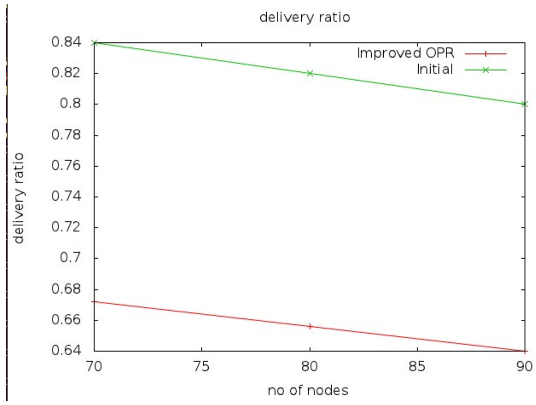

Fig. 3. Using opportunistic routing algorithm delivery ratio is increased compared to initial routing

7. Conclusion and future work

Combining the significant aspects of shortest path routing with those of backpressure routing, we provided an opportunistic routing policy with congestion diversity (ORCD) in which the nodes route packets according to a rank ordering of the nodes based on a congestion cost measure. Furthermore, we considered a single destination scenario. The generalization to the case of multi-destination scenario is believed to be straight forward and is currently a topic of study. Initially the number of nodes are selected for the transmission of packets. these are randomly placed in the network. It is sleep cycle scheduling some of the nodes will be inactive. The source nodes start forwarding the packet and when it encounters a failure node, its stop forwarding so it finds the node recovery in which is the best node is selected for the transmission which is efficient and the re –routing of the packet happen and packet will be forwarded destination. Due to this packet delay has been reduced and energy consumption is also reduced and Delivery ratio is also improved.

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