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Routing in Multi-Hop Networks

Pooja Eknath Sakunde
poojasakunde@gmail.com
Dr. D.Y. Patil College of Engineering, Pune, Maharashtra

Latika Desai
Dr. D.Y. Patil College of Engineering, Pune, Maharashtra

ABSTRACT

In a wireless network, there is a single source and a single destination or number of destinations associated with the number of relays. Nodes of wireless networks communicate by sending signals transmits a message through a single source to single destination. Signals are in the encoded form when receives at the node it processes decoded/ encodes with information received from previous nodes. In the wireless network, there is a problem of routing path complex and combinatorial problem transmission from source to destination.

In this system, we investigate the optimal routing problem in signal transmission from source to destination for the multi-hop network. We use the technique of rate less code which is used to accumulate the data with each packet in the transmission. This can decrease the total energy; reduce delays in transmission for transmitting data from the source to the destination. Proposed system enables significant performance through the shortest path routing using Floyd-Warshall algorithm

Keywords: *Accumulative Multi-hop, Energy Accumulation, Minimum Energy, Graph Theory*.

1. INTRODUCTION

In the wireless network the data transmission between the source and destination maintained by the cooperation among the two nodes. In the tradition network which data transmission between source and destination achieved through the intermediate node that can receive the information from immediate nodes and transmits to next node. Sometimes this problem in the data transmission such as delays in routing requires more energy to transmit the data. In the today's era of the network the relays concept widely used is relay channeling. Compared to traditional system in this, nodes use the information of all nodes instead of nearest one. This concept first proposed by van der Meulen. In this system the relay channel considers one relay assisted to information transmitted between source and destination. This has strong control over the data transmission in the routing in good rates. In this system addressed the problem of Accumulative multi-hop network routing in the communication between two nodes.

The communication between two nodes through the single source to single destination which is accumulated with relays gained from the immediate nodes. The accumulation is done by two ways energy accumulation decoded packet after all energy received from the source node. In the data transmission multi-hop data, we mainly focus on decode and forward strategy while transferring the information from single source to destination. The mutual data accumulated until full message decoded. This can become fully aware of rate fewer codes such as fountain raptor code. This increases the reliability and decreases the energy requirement in the transmission. Studied the problem of routing in multi-hop wireless network using the accumulation of optimal mutual information with help of distress optimality.

2. LITERATURE SURVEY

In the second section, we explain our work briefly to set of methodology and overview of routing in multi-hop networks.

A. Background

Yaling Yang Jun Wang introduced the need design and types of the routing protocols. There are two types of routing protocols one is path calculation algorithm and packet forwarding scheme. Path calculation algorithm is used in the different network for path calculation. Data is transmitted through a different path. For this they have used flooding-based route discovery, Dijkstra's algorithm and the Bellman-Ford algorithm. These algorithms proved best for the wireless network. In the other type of protocol source routing and hop by hop routing forwarding scheme is used to send data. Source routing scheme data is straight forward through the headers. Hop by Hop scheme forwards the packet through a node by node to destination [2].

These are the scheme to send the packets but while send forwarding and receiving the data node requires energy to stay active. While transmitting packets nodes gain the energy from received overhead signals and collecting energy from re-transmission. This causes the low energy data broadcast problem and requires extra power. To tackle this problem, one approach proposed named as a cooperative strategy. This approach is used while broadcasting, which can use local data and loosely synchronized [3].

By identifying the order of nodes and determining the power of each node. Jiangzhuo Chen, Lujun Jia et.al addressed the problem of accumulative routing. Data transfer normally the maximum costly activity of a wireless node in relationships of power consumption**.** Various methods have been planned to shrink the energy expenses in the communication process. Address the problem of energy efficient routing and identification of multipath routing based on various metrics [4]. Cooperative relay scheme is for a source to destination communication through the relays. Traditional energy consumption approach is normally used with the fountain code used in relays to accumulate energy [5].There is a problem of energy consumption and data accumulation. Remaining work shows the review of routing methods and transmission in the network.

B. *Review Of Travel Package Recommendation Methods*

João Luís Sobrinho [1] presented the algebraic theory for the routing in wireless network investigated the algebra for the dynamic routing. This used for shortest path routing to generalize the positive length cycles. Strengthen the convergence in routing implied the properties called monotonicity and isotonicity. First property converges in every network and second property converges in optimal path. Intra domain routing protocol used to converge the short and wide paths in any network and inter domain to border gateway. The mathematical term proposed for verification of routing policies.

Yaling Yang and Jun Wang guided to design the routing metrics in a multihop network. First mentioned, that the characteristic is important for the design of metrics. A different network inspires to structure the metrics and to get various aspects of networks. It sometime affects the working to routing protocols. If these metrics not combined with proper protocols may cause the problem in routes and suboptimal paths. The author studied the importance of metric and protocol relationships and provided guidelines [2].Ivana Maric and Roy D. Yates addressed the problem of minimum energy broadcast problem. The nodes collect the energy while transmitting the messages. They studied cooperative strategy for energy accumulation and mainly focused on the synchronized, low power network. That uses the local information to broadcast on the network. To overcome lower energy problem proposed the two way approach first identification of nodes ordering in which message has to be a pass. Other is finding of the power to that order. Among those second problem is solved by using the linear programming and used an algorithm for ordering nodes. Experimented it and the result shows the better performance [3]. Jiangzhuo Chen, Lujun Jia et.al studied and proposed energy efficient routing methodologies. The accumulative relay is one technique introduced from the relay channel focuses on network apply for energy problem in the multi-hop network. In which signal is received from the previous nodes and same are used to decode using maximal ratio combining technique for extra energy saving over traditional routing. The author first studied the minimum energy accumulative routing. For solution shortest path algorithm is used to find a short path from source to destination which results in minimum energy path. Showed this algorithm is bad to accumulated energy and moved to heuristic approach to finding the optimal path. Developed polynomial time heuristic approach to finding the best optimal path and showed 30% energy saving by experimenting it [4].

Andreas F. Molisch and Neelesh B. Mehta et.al studied fountain code technique in a wireless network. N number of relays used to transmit the information form source to destination using fountain codes. The problem of traditional approaches is that it only accumulates the energy in a cooperative manner while fountain codes are efficiently accumulated the information. This reduces the required energy to send the data from source to destination. While sending data analyzed the behavior of source node and relay when they start and stops transmitting the information and decode it. It the optimized and mutual information approach used for reducing energy consumption and time [5]. Stark C. Draper et.al studied the importance of cooperation in the network to improve communication reliability, decrease energy accumulation and reduce delay in communication. They proposed the unicast and multicast resource allotment while the main goal was to reduce the time required to transmit and bandwidth. Proposed approach while transmitting data which node is included in the cycle and resource allocation to them such as bandwidth and time. Linear programming approach is used to decide the transmission order and swap accordingly while transmitting data, shows efficient in solving. Finally compared with traditional approaches show 70% reliability [6].
Zigui Yang and Anders Høst-Madsen investigated energy efficient cooperative multiple relay channel when carrier level synchronization not allowed and use of decode and forward approach. Showed decode and forward scheme is efficient inference free using simple path and power allocation strategy [7].

Rahul Urgaonkarand Michael J. Neely proposed mutual information accumulation and optimal routing in a network using rate fewer codes. These codes give accumulation chance to each node in the network while packet transmission and energy accumulation, this is much useful in gaining the efficiency. Formulate the decision which nodes used in sending and decode data. The problem of minimum latency problem, which causes time problem and the problem of broadcasting to solve this problem they have used the proposed approach with greedy algorithm [8]. Raymond Yim, Neelesh Mehta, studied relay node and their importance in the network to minimize energy consumption in data transmission cycle, uses decode forward strategy. Progressive Accumulative Routing (PAR) algorithm is proposed to find the relays, maintain rank and allocation of power to each node which requires info of their adjacent nodes. Simulated this approach to show effective to obtain [9].A. Salman Avestimehr and Suhas N. Diggavi proposed an approach to first gets the nodes signal strength, broadcast, and superposition that represent characteristics of the network. Then based on that information mapped in quantize and forward scheme. In this approach, nodes quantize the received signal from recent node map to Gaussian code word and forward to next node for decoding. Shows this efficient relay channel Gaussian diamond approach extension to multi hop network [10].

3. CONCLUSION

We have studied the routing in a multi-hop network that can minimize the delay and energy consumption using mutual information. The approaches such as fountain code, rate less code that is used for routing purpose and metrics to formulate the network. Energy and mutual information accumulation using relays can be used to find an optimal path using multigraph techniques and reduce communication delay.

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