Available Online at www.ijcsmc.com

International Journal of Computer Science and Mobile Computing

A Monthly Journal of Computer Science and Information Technology

ISSN 2320–088X

IJCSMC, Vol. 3, Issue. 7, July 2014, pg.528 – 530

RESEARCH ARTICLE

Data Broadcasting Approximation Algorithms for Wireless Networks

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Abstract: In this paper, an algorithm for efficient network-wide broadcast (NWB) in mobile ad hoc networks (MANETs) is proposed. The algorithm is performed in an asynchronous and distributed manner by each network node. The algorithm requires only limited topology knowledge, and therefore, is suitable for reactive MANET routing protocols. Simulations show that the proposed algorithm is on average 3-4 times as efficient as brute force flooding. Further, simulations show that the proposed algorithm compares favorably over a wide range of network sizes, with a greedy algorithm using global topology knowledge, in terms of minimizing packet transmissions. The application of the algorithm to route discovery in on-demand routing protocols is discussed in detail. Proofs of the algorithm's reliability and of the intractability of solving for a minimum sized transmitter set to perform NWB are also given.

1. Introduction

Wide broadcasting could be a necessary development in wireless networks, during which a message needs to be transmitted from its resource to all or any the more nodes within the network. There could also be totally different communication to be broadcasted from multiple sources. some network protocols have confidence broadcasting, for instance, in sequence transmission, improving the source or package, or finding the direction in multi-hop wireless networks strict that sort applications of multi-hop wireless networks contains not a hit discharge and unleash operations forces message, and exclusive of interruption entity detection victimization sensors, the propose of low-latency broadcasting method is needed to satisfy thorough end-to-end intermission provides for higher-level applications. Imposition is associate innovative qualified downside in wireless networks. Once 2 or additional nodes broadcast a communication to a wide-ranging neighbor at the equivalent time, the regular node won\'t acknowledge any of this communication. In such a case, we are saying that crash has occurred at the regular node. Invasion cluster could also be continuous higher than the published vary, during which case a node might not collect a communication from its supply if it’s among the interruption vary of special node causation a message. The planning of low-latency broadcasting system is critical to satisfy powerful end-to-end impediment requests for higher-level applications. Once 2 or additional nodes broadcast a communication to a daily neighbor at the equivalent time, the regular node won't collect a number of this communication. Busy vary could also be constant larger than the published vary, during which case a node might not collect a communication from its receiver.

The algorithms for ONE-TO-ALL and ALL-TO-ALL broadcasting problems. In one-to-all broadcast, a source that forwards a message to all other remaining nodes in the network. In all-to-all transmission each participating node forwards its individual communication messages to all supplementary nodes .constant the one-to-all broadcasting problem is known to be NP-complete. For in cooperation problems, we increase the strength of the algorithms, which develop the preceding consequences. For ONE-

TO-ALL transmit problem, we convenient a simple algorithm that achieves a solution, thereby recovering the assurance. Our algorithm is based on following two ideas that lead to the development:

1) Dispensation the nodes acquisitively in no growing order of the quantity of receivers.

2) Allowing nodes to broadcast more than once.

ALL-TO-ALL BROADCAST problem and current two algorithms (called CDA and ICDA) with guarantees of 20 and 34, correspondingly, thereby recovering the guarantee of 27. Our enhanced product is due to well-organized development technique to collect data and then perform pipelined broadcasting. In ICDA, all nodes are scheduled to contribute in transmissions as before time as feasible. Constant although its hypothetical bound is weaker than that of CDA, untried results prove that it afford improved presentation.

2. Scope

Approximation algorithms are algorithms used to find approximate solutions to optimization problems. Main aim of the project is to find out the approximate algorithms for broadcasting problem. Broadcasting like one to all and all to all broadcasting algorithm have the major impact like interference, redundancy, bandwidth contention and collision problems. To overcome these problems, this project will help to perform the collision free broadcasting.

3. Overall Description

This section provides a high level description of the system including its definition, primary goal, objectives, context, and capabilities.

4. Definition

In communication protocol design of wireless networks Broadcasting is the fundamental operation and plays an important role. In multi-hop wireless networks, interference at a node due to simultaneous transmissions from its neighbors' makes it important to design a minimum-latency broadcast algorithm. For the one-to-all broadcast problem we are presenting a simple 12-approximation algorithm and it improves all previously known guarantees for this problem. While considering the all-to-all broadcast problem where each node sends its own message to all other nodes, to this all-to-all broadcasting problem, we are presenting 2 algorithms with approximation ratios of 20 and 34 and these will improve the results.

5. Goal

One of the earliest broadcast mechanisms is flooding where "EVERY NODE IN THE NETWORK TRANSMITS A MESSAGE TO ITS NEIGHBORS AFTER RECEIVING IT". Although flooding is extremely simple and easy to implement, that flooding can be very costly and can lead to serious redundancy, bandwidth contention, and collision: a situation known as "BROADCAST STORM". Since then, a large amount of research has been directed toward designing broadcast protocols which are collision free and which reduce redundancy by reducing the number of transmissions. In this paper, we revisit the data broadcast problem and present improved algorithms that guarantee collision free delivery and achieve low latency.

6. Objectives

The objectives of the system are to make the dense network to distributed network.

Network Creation:

In this module, we are going to create a network in which the broadcast to be perform. In this module client can send request to server and can get the request from the server. And can receive the files. In this module server get the entire request from clients and response to the clients by generating the server. . Every user should know about their neighbor details so that they can share their information in the network. Like Client name, Ip Address, Port No etc. With this information client can communicate with other clients in the network and share their data.

Approximation algorithms (one to all):

This algorithm takes the input and a source node s. If a node u is parent node of the node w then u is responsible for transmitting the message to w without any collision. In this module first we send the message to primary nodes. Second we send the message to all other nodes. It leads to guarantee that receiver node will receive the message collision free by overcoming broadcast problem. For sending the message from server to primary and primary to secondary it takes three parameters. They are receiving time, transmitting time and total number of transmission. Once if the server sends the message to the primary then there is no need for transmission from the server.

Approximation algorithms (all to all):

In all to all broadcast, every node in the network will transmits the message to every other node in the network. We present 20 approximation algorithm based on collect and distribute algorithm (CDA). Here we first send the message to the root node from all the nodes in a network via upward transmission and then we distribute the message to all the nodes in the network on the basis of flooding technique. At the time of sending the message from each node to root node all other nodes are in the idle mode. It leads to resolve the interference problem. Likewise every node in the network send the message to root node. After collecting the message from every node in the network it distribute the message to the other nodes in the network.

Approximation algorithms (all to all):

In all to all broadcast, every node in the network will transmits the message to every other node in the network. We present 20 approximation algorithm based on Interleaved collect and distribute algorithm (ICDA). Here we first send the message to the root node from all the nodes in a network via upward transmission. At the time of sending the message from each node to root node all other nodes are in the idle mode. In that time that sending node also sends to child node via downward transmission. So there is no need send the message to the child node after receiving the message from the node. It reduces the broadcasting time of the network. Then we distribute the message to all the nodes in the network on the basis of flooding technique.

Conclusion

This study proposes two efficient one-to-all broadcast protocols, one for packet radio networks and another for MANETS. The two protocols can significantly reduce redundant rebroadcasts, and thus avoid contention and collision. The novel protocols are particularly effective under conditions of high node density. Additionally, an all-to-all broadcast protocol is proposed based on protocol 1, and can prevent the broadcasting packets from queuing in the high degree nodes. Simulations results show that the two novel one-to-all broadcast protocols can not only significantly reduce the rebroadcast ratio, but can also reduce broadcasting latency. When broadcasting latency and rebroadcast ratio are considered, the two novel one-to-all broadcast protocols perform better than the flooding and TB protocols. As for the all-to-all broadcast protocols, the novel AA2 protocol finishes an all-to-all broadcast faster than alternative protocols. The novel one-to-all and all-to-all broadcast protocols developed herein are more efficient than previous works because we focus not only on avoiding collisions but also on reducing redundant rebroadcasts and broadcasting latency. We studied the problem of efficient collision free broadcasting in ad hoc networks. We showed that minimum latency collision-free broadcasting in ad hoc networks is NP-hard. We presented simple, efficient and distributed collision-free broadcast algorithms which have provably good approximation bounds for both latency and the number of retransmissions. Specifically, for single message broadcast, for networks with bounded node transmission ranges, the latency of our algorithm is within a factor of $O(1)$ from the optimal value. For multiple messages, for networks with uniform transmission ranges, our algorithms have a latency which is within a factor of $O(1)$ from the optimal. For networks with bounded node transmission ranges, the number of retransmissions for all our algorithms is within a factor of $O(1)$ from the optimal. We studied the performance of our algorithms experimentally and showed that our algorithms perform much better in practice than what is analytically guaranteed. An interesting future work is to extend our current algorithms to networks with dynamic topologies. Creating and maintaining a broadcast tree in dynamic topologies is inefficient. Existing deterministic, collision-free broadcasting approaches involve pre-computing the schedule of all the nodes independent of the network topology in the beginning. However, in general, such schemes do not guarantee good latency and retransmission bounds. Randomized schemes which do not rely on complete topology information but locally guarantee collision-free transmissions with high probability seem more attractive for dynamic topologies. Another research issue for the future is extending our work to support multicast operations.

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