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Data Retrieval Scheduling For Unsynchronized Channel in Wireless Broadcast System

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Abstract-Wireless data broadcast is a disseminating data into large number of mobile clients. In many information services, the users may query multiple data items at a time. The environment under consideration is asymmetric in that the information server has much more bandwidth available, as compared to the clients. To maximize the number of downloads given a deadline. It defines a problem called largest number data retrieval (LNDR). To prove the decision problem of LNDR is a NP hard, and to investigate approximation algorithm for it. It also define another problem called minimum cost data retrieval (MCDR), which aims at downloading a set of requested data items with the least response time and energy consumption. Data scheduling problem over unsynchronized channel at server side. In proposed system LNDR and MCDR in push based and pull based broadcast system are used. The proposed approximation algorithms efficiently schedule the data retrieval process of downloading multiple data from multiple channels. Push based and pull based broadcast model are used in unsynchronized channel. When the time needed for channel switching can be ignored, a Maximum Matching optimal algorithm is exhibited for LNDR which requires only polynomial time. The switching time cannot be neglected, finally to provide simulation results to demonstrate the practical efficiency of the proposed algorithms.

Index Terms- Push based broadcast, pull based broadcast, unsynchronized channel, wireless broadcast system

I. INTRODUCTION

Wireless data broadcast has been a popular data dissemination method in the mobile computing environment. In a typical wireless data broadcast system, a base station will broadcast information over one or multiple broadcast channels repeatedly. Clients will listen to the channels, wait for the requested data and download them when they arrive. Wireless data broadcast is especially suitable for public information, such as weather, traffic, and stock quote, because of its scalability and flexibility. Two major performance concerns for a wireless data broadcast system are the response time and the energy efficiency. Response time is the time interval between the moments a client tunes in a broadcast system with a request of one or more data items to the moment all requested data are downloaded. It is obvious that shorter response time is more desirable. On the other hand, in wireless communication environments, most clients are mobile devices operating on batteries. The smaller the amount of energy consumed during retrieving data is, the longer the battery life of a mobile device will be. Therefore, saving energy is another important issue for designing wireless data broadcast system.

To facilitate energy conservation, a mobile device typically supports two operation modes: active mode and doze mode. The device normally operates in the active mode; it can switch to the doze mode to save energy when the system becomes idle. For example, a typical wireless PC card, Orinoco, consumes 60 mW during the doze mode and 805-1,400 mW during the active mode. In the literature, two performance metrics, namely, access latency and tuning time, have been used to measure access efficiency and energy conservation, respectively. Wireless transmission is error-prone. Data might be corrupted or lost due to many factors like signal interference, etc. The client access algorithm for the exponential index under unreliable broadcast is described. We also provide a performance analysis of the exponential index in terms of the access latency and tuning time under unreliable wireless broadcast environments. Extensive experiments are conducted to compare the exponential index with two state-of-the-art air indexing schemes, i.e., the distributed tree and the flexible index under various link error probabilities. Simulation results show that the proposed exponential index substantially outperforms the existing indexing schemes. In particular, it is more resilient to link errors and achieves more performance advantages from index caching. The results demonstrate its great flexibility in trading access latency with tuning time.

The focus of our research is to discuss how to schedule the retrieving process of a set of requested data, given their time offset and resided channels, using a client with multiple antennae. Our target is to minimize the access latency and number of channels switching's for the client. In other words, by the employing protocols proposed in this paper, a client should be able to download a set of requested data using multiple retrieving processes in parallel, with short response time and minimum energy consumption. We name this problem as Parallel Data Retrieval Scheduling with MIMO Antennae. In this paper, we present the communication model, formally define the PADRS-MIMO problem, and construct two greedy heuristics named Least Switch Data Retrieval Protocol and Best First Data Retrieval Protocol.

II. LITERATURE SURVEY

Besides single-channel model, there are a lot of researches for scheduling data items over multiple channels. In designed a broadcast system that has multiple channels and multi-level caches. In developed a dynamic programming algorithm to allocate data items over multiple channels, assuming no data item is replicated among different channels.

In push-based broadcast, the broadcast schedule is fixed, which may result in a long response time for some frequent request. In view of this, pull-based broadcast was investigated as an alternative. In several heuristic algorithms, such as first come first served most requests first and longest wait first were proposed.

Although there have been many works done on data scheduling at the server side, there have been few works done on data retrieval scheduling from the client's point of view. Several heuristic algorithms for downloading multiple data items from parallel channels. But they did not provide any theoretical analysis on either the data retrieval scheduling or their proposed algorithms. They also assumed the data set is partitioned over multiple channels without replications, which further restricts the applications of their works. As pointed out popular data items should be broadcasted more frequently than unpopular ones. No algorithm designed for pull-based data scheduling at the server side over multiple unsynchronized channels. Wireless data broadcast is an efficient technique of disseminating data simultaneously to a large number of mobile clients. In many information services, the users may query multiple data items at a time. In this paper, we study the data retrieval scheduling problem from the client's point of view. We formally define the Largest Number Data Retrieval (LNDR) problem with the objective of downloading the largest number of requested data items in a given time duration, and the Minimum Cost Data Retrieval problem which aims at downloading a set of data items with the minimum energy consumption. When the time needed for channel switching can be ignored.

A Maximum Matching optimal algorithm is exhibited for LNDR which requires only polynomial time; when the switching time cannot be neglected, LNDR is proven to be NP−hard and a greedy algorithm with constant approximation ratio is developed. We also prove that the MCDR problem is NP−hard to be approximated within to any nontrivial factor and a parameterized heuristic is devised to solve MCDR non-optimally. In recent years, fast development of wireless communication technology such as OFDM makes efficiently broadcasting data through multiple channels possible. How to allocate the data onto multiple channels to minimize the expected response time has become a hot research topic and lots of scheduling algorithms are proposed.

III. METHODOLOGY

3.1 EXISTING METHODOLOGY

The single-channel model is a lot of researches scheduling data items over multiple channels. In designed a broadcast system that has multiple channels and multi-level caches. The dynamic programming algorithm to allocate data items over multiple channels, assuming number of data item is replicated among different channels. Push-based broadcast, the broadcast schedule is fixed, which may result in a long response time for some frequent request. Heuristic algorithms are used first come first served; most requests first and longest wait first.FCFS (First Come First Server) algorithm the mobile client can only access a single channel at any particular time. So a client cannot download data from two or more channels. These methods allow the data dissemination processes that come first in the data queue.MRF (Most Request First) algorithm the mobile client can access two or more channels at any particular time. So a client cannot download data in the arrival time. The data broadcast is done who continuously send the request to the server.LWF (Longest Wait First) is the data send to server and process will be waiting stages, after that packet will be send to server. Heuristic algorithms for downloading multiple data items from parallel channels. But they did not provide any theoretical analysis on either the data retrieval scheduling or their proposed algorithms. It also assumed the data set is partitioned over multiple channels without replications, which further restricts the applications of their works

3.2 PROPOSED SYSTEM

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3.2.1 PUSH BASED BROADCAST

Push-based system is the server will broadcast the set of data items to the clients periodically according to a fixed schedule. The channels have uniform bandwidth ba and the data items have uniform size si. All channels are partitioned into distributed time slots, each of size si/ba. The time slot is the smallest unit to download data. Clients will retrieve all the necessary indices before downloading data, which is not related to the data retrieval scheduling. To avoid downloading incomplete data, two data items being broadcasted at time t and t1 md0 via different channels cannot be both downloaded during time. When all the channels share a global time, say the channels are synchronized.

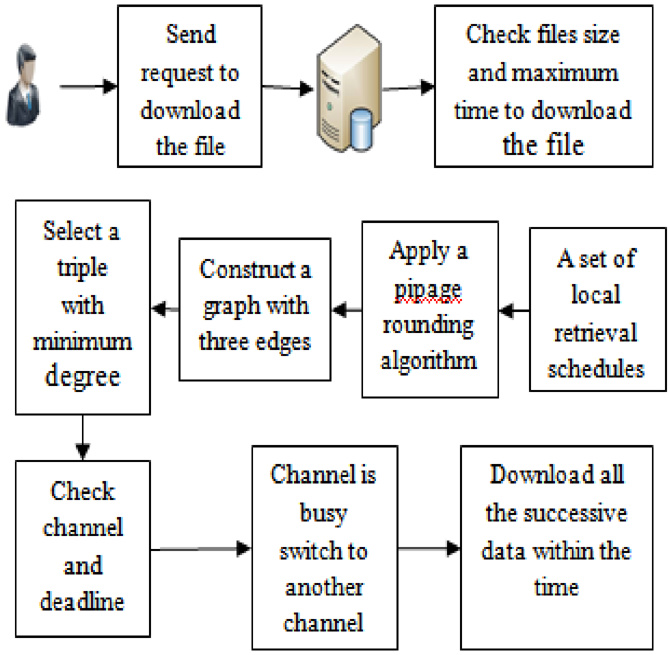

Fig 3.2 Proposed Method

The client have three types of working models: doze mode, active mode and channel switching mode. The energy consumed per time slot in the active mode is much higher than that in the doze mode. The clients will change the modes whenever possible to reduce the energy consumption. When switching among different channels, the clients have to change their radio frequencies and synchronize their clocks. Therefore, the energy consumption is also related to the number of channel switching's.

3.2.2 PULL BASED BROADCAST

Pull-based system is the clients will send requests to the server and the server will provide timely broadcast according to the requests received. The down-link channels the clients will send requests to the server through an up-link channel, and the server will decide the broadcast schedule based on the requests received. In a pull-based system, clients do not know the index information for a requested data item until it has been scheduled at the server side. The rest of model assumptions for pull-based broadcast are the same to that for push-based broadcast and hence omitted for saving space.

3.3 MODULES DESCRIPTION

1. LNDR in Push Based System
2. LNDR in Pull Based System
3. MCDR in Push Based System
4. MCDR in Pull Based System

3.3.1 LNDR IN PUSH BASED SYSTEM

LNDR push based system select all the schedules variables are equal to 1 and arbitrarily choose one data item if it appears in multiple schedules, which forms a valid retrieval schedule for the whole time duration. This kind of situations, it can add weights to data items and the objective is to download a subset of requested data items with maximum weight. Besides weighted model, in some applications, the data items may have non-uniform sizes and channels may have non-uniform bandwidths. That is, a data item may require multiple time slots to download. LNDR push based system using approximation algorithm. Approximation algorithm is a set of broadcast schedule with requested data item and time duration between t1 and t2.

Broadcast channel can partition the whole time duration into disjoint intervals such that the number of valid schedules in each interval is bounded. For each time interval to construct the set of all local retrieval schedules and first time slot obligated for possible channel switching. Approximation algorithm to apply pipage rounding algorithm (PRA) and choose retrieval schedules for time interval. Pipage rounding algorithm to select schedules for those time intervals.

3.3.2 LNDR IN PULL BASED SYSTEM

Pull-based broadcast is different from push-based broadcast in that data items are scheduled at the server side in real time. After submitting a request, a client at any particular time t may only get the broadcast schedule for the next one or several time slots. Assuming a client can get the broadcast schedule for the next r time slots, it show that a greedy data retrieval strategy can provide a 1/1+ (2/r) factor approximation solution. LNDR Pull-based broadcast system using greedy algorithm. Greedy algorithm is a set of broadcast channel, request data and deadline to be calculated. Approximation ratio to LNDR in pull-based broadcast, where a client only knows the broadcast schedule for the next r time slot. The idea of this approach is also appropriate for LNDR in push-based broadcast. The current time (t) is completed in the given deadline to be download large number of data.

3.3.3 MCDR IN PUSH BASED SYSTEM

The broadcast system is push based, the data items are uniform in size and the channels are uniform in bandwidth. The heuristic proposed in this section can only be applied when the broadcast schedule is known (the system is push-based). While in the pull-based broadcast, since it only know the broadcast schedule for the next several time slots.MCDR in push based system using heuristic algorithm. Heuristic is a set of triples selected and t is the earliest possible time that all the requested data items can be downloaded. Each time heuristic searches for a channel broadcasting a significant number of data items during a short time interval before deadline. Heuristic can be applied for downloading non-uniform size data items from non-uniform bandwidth channels.

3.3.4 MCDR IN PULL BASED SYSTEM

The objective of MCDR is to reduce the response time and energy consumption. The index information is assumed to be obtained before data retrieving; it combines the benefits of both channel scheduling to reduce the energy consumption in channel switching and data item scheduling to reduce the response time and the energy consumption in the doze mode.MCDR in pull based system using greedy heuristic algorithm. Greedy heuristic broadcast schedule searching the channel during the time interval and if channel exist to download data items in the given deadline.

Greedy heuristic algorithm minimum time to retrieve the large number of data items.

IV. CONCLUSIONS

The server sends the information to the clients periodically and different users may be listening to the different number of broadcast channels, present an algorithm to coordinate broadcasts over different channels. The data retrieval scheduling over multiple channels. LNDR in push-based broadcast is the MM can download the maximum number of data items when the channels are synchronized. Two optimization problems occurs in the MCDR and LNDR, are defined and a series of theoretical results, such as NP–hardness, approximate and in-approximate. The simulation results show that the proposed approximation algorithms efficiently schedule the data retrieval process of downloading multiple data from multiple channels. It also demonstrates the data allocation scheduling at the server side by simulations with various parameters. The pull based and pull based data scheduling at the server side over multiple unsynchronized channels. Data scheduling problem over for unsynchronized channels from the server's point of view. Finally provide simulation results to demonstrate the practical efficiency of the proposed algorithm.

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