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Research paper

Optimized Leasing on Mobile Devices using Dynamic Programming

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Abstract

Now a day's all advanced mobiles uses mobile data to retrieve content from remote server through user requested queries. The request processed on the mobile devices reduces the available battery power to a significant extent. The processing of user queries at remote server gets very low response during the huge query transmission due to communication delay. In a network used mobile station scenario, the service provider is deployed by the mid network nodes with leasing capability. Leasing is the process of borrowing some resources to the mid network from the service provider. The processing cost in the mid network is low. The user queries should be processed before identifying the intended content from the remote server. The computation power used for leasing improves the response time by reducing the use of battery power on mobile devices. The low leasing cost reduces the traffic in the remote server. The response time taken to download the content from the mid network has been experimentally analyzed.

Keywords:

1. Introduction

The content from the remote servers are retrieved through user generated queries generated. The user queries should be processed before identifying the intended content. When the request is processed, the limited battery resources on mobile devices may get weakened quickly. To reduce the battery usage, the computation power can be leased to improve response times. The decision of processing the borrowed computation power must be made accountable. This is used to do research in the trade-off between the usage of battery power, leasing of mid-network, latency processing and transmission. The dynamic programming framework creates a solution for the problem processed done at each intermediate node thereby reducing the communication lags and processing costs.

2. Existing System

The traditional model for data content distribution is a centralized one, where the service provider creates a server and every user extracts files from it. In these architectures, limited resources are being challenged by users for power processing of a single server. Major challenges that face a P2P network in the real time include selection of peer systems, searching and routing data. The response time of the user query is minimized by reducing the time taken for actual file transfer. In Temporal Correlation, it is not possible to prevent the network traffic in the current system and develop statistical analysis for detecting the traffic anomalies. The wireless link that exists between the mobile device and base station often has reduced bandwidth and involves huge capital expenditures. The upstream latency incurred from transmission seems to be higher when enormous query data is sent through the network.

Because of this, there is a undefined trade off that exists between the battery usage and latency. There is a possibility of a significant number of systems enabling distributed processing that spans over multiple intermediate nodes. A query delivery network offering low cost, share their resources to increase the available mobile content is the prior responsibility of any publisher having mobile server. The latency time, use of battery resources and cost related to leasing have a bonded relationship between them.

2.1. Drawbacks

- Available resources belong to application server only.
- Before content fetching, the query must be processed at remote server or mobile device which increases latency and processing.
- Mid network nodes computation reduces battery and response time but deciding of processing at which node is problematic.
- Decision making, which is requesting power from intermediate nodes, is not possible.
- Over use of battery decreases costs related to leasing and latency thereby limiting the mobile's lifetime.
- Lifetime of the device is made possible by reducing the cost related to latency and battery usage thereby increasing leasing costs

3. Proposed System

The proposed network assisted computing reduces the burden of processing, which reduces the battery usage thereby extending the lifetime of the mobile devices. Starting from the intermediate

nodes, the leased processing power reduces the communication lag by reducing the size of message sent, rather than sending an enormous request message over blocked links on the way to Application Server. The leasing server offers user query processing capability before they reach the application server. The intermediate node is deployed by processing data queries if they have the content to respond. Some methods like transparent caching respond to data queries using the intermediate paradigms concerned with leasing. The main objective of optimal processing policies is to minimize the processing power and lack of communication and cost related to processing and leasing.

3.1. Advantages of Proposed System

- End users don't participate in the distribution process and, thus, scalability issue doesn't rise.
- Allows leased processing power via mid-network nodes.
- Decision making in optimal manner.
- Quality of service can be improved.
- Use of scheduling techniques reduces latency and battery use by considering leasing costs.
- If the requested processing is managed at the mobile station, there is possibility that the battery power could get used up.
- If the requested processing is managed at the application server, the communication loss could be large due to less bandwidth of the wireless access link and significant query size.

The day today's capability of processing power and storage area related to mobile consumer devices has been constantly increasing. As a result, a new range of new applications provide best quality for the end users. A group of these applications, called mobile augmented reality provide content delivery in reply to the queries generated by the user to improve the user's experience related to the environment. Similar paradigms such as Text to speech conversion and optical character recognition are based on mobile device applications. Consider an interesting scenario as when a person uses a mobile camera to click a picture or video of an object in a building, or an animal in the dense forest. The image captures is then processed and sent to an Application Server containing a image database over the network. The query image extracted is then compared with the entry in the database and the resultant information, location and title is then streamed back to the user. Currently, this type of service is provided by existing commercial products. The query image processing involves processes namely recognizing pattern, extracting background and feature, matching feature, which when processed often reduces the lifetime of the mobile battery device. Similarly, running a text to speech conversion or OCR using mobile devices reduces the mobile lifetime.

As an alternative, the processing is done while the raw data is sent to the Application Server. This results in increase of bandwidth demand over the network requested by several users using an application and generating deadlock by competing for spectrum for voice and data traffic generated by users in the wireless medium. The first connected wireless link between the mobile and the base station results in reduced bandwidth and huge capital and operation expenses. Due to unwanted use of mobile data applications, several wireless carriers have resulted in increased data traffic over mobile networks. Backhaul links carrying traffic from the edges to the core employing copper, fiber or wireless links incur huge cost for the carriers and battery loss for the mobile device. As an enormous query data is involved in transmission through the network, the transmission latency would be larger. Today as the mobile devices have high resolution image and video capabilities, the query data continues to grow resulting in loss of battery power processing.

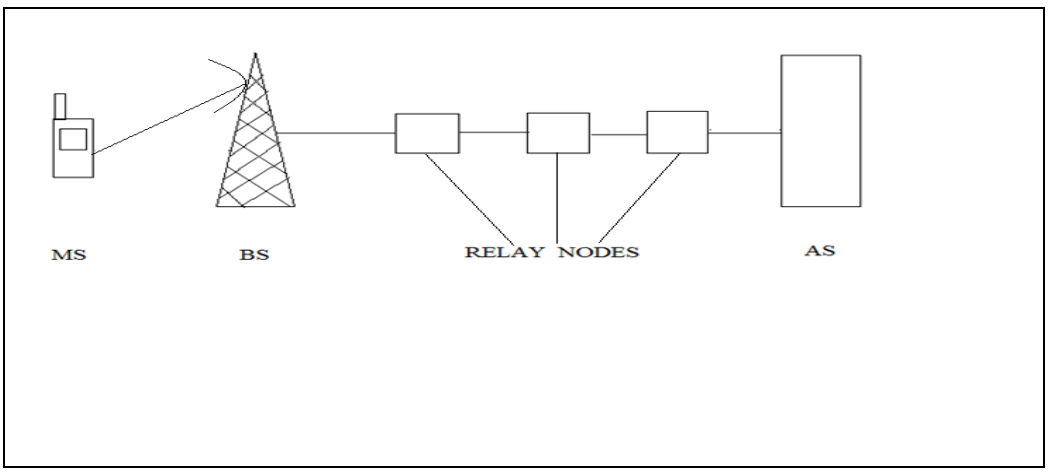
- The request from the user is initiated at the mobile station which acts as the source. The request is transmitted upstream through a base station and a continuous stream of relay nodes (wired or wireless) to the application server (destination).The proposed system considers systems with leasing servers that are deployed offering processing capability user queries providing processing capability before application server is reached. The servers are placed in a secured place where queries that are uploaded are processed without the data reaching the servers.
- Content Centric Networking (CCN) creates architecture by placing interested queries uploaded using internet data that is processed using name-based address. The intermediate node is deployed by processing data queries if they have the content to respond. Some methods like transparent caching respond to data queries using the intermediate paradigms concerned with leasing.

3.2. Mobile User Request

In this module, the mobile user sends a query regarding what he needs in like text document, image and so on. The request query made by the mobile user must be processed in order to get the request or delivery of what it is being requested for.

3.3. Base Station Allotment

In this module, the data or query request of the mobile user, that is being sent to the base station must be processed or send to application server for processing. In the base station, the user request queries are being allotted to the mid nodes so that processing is being carried out. The numbers of servers are dependent on available resources in the network. The web content performance problem is reduced by creating a base station, that provide availability and increasing content.



3.4. Mid Node Processing

The objective of network connected mobile computing is to use power processed at intermediate nodes. The power processed by leasing from the middle of the network nodes reduces the latency and extends the battery life of a mobile device. The signal energy is attenuated from the sender by the relay nodes are then retransmitted to the receiver. The information about download stats, like: download speed; round trip time; download bytes and server availability is sent by each user. CDNs or relay nodes contain duplicated data copies, located at different places.

3.5. Application Server

The module represents application servers collaborated to increase the availability of content. When transmission using two-hop method is used, there is a possibility that two time slots may be consumed. The transmission of messages to the relay nodes from the mobile station are sent to the application server during the second time slot. In order to send the content further, each relay server duplicates the external content and shares its own resources. The application servers sends the available contents to the relay nodes to provide faster mid-network processing with the possibility for the users to extract a peer list of specialized content. Thus the request query submitted by the mobile user gets processed in a very short latency and the request is being given to the user with low cost and short period of time.

3.6. Data Delivery

In this module the request query given by the mobile user is processed by the mid node server and issued to the user. The processing is carried out using he load balancing mechanism, where the request query separated as blocks are mapped into different multi hops. Due to this, a centralized entity is created in the base station to make allotment to the relay nodes. The information about the needed request query and download request are sent periodically and processing is carried out at the relay nodes and processed result is given to the mobile requester.

4. Conclusion

The use of mobile applications has been on a steady rise recently. When we consider the multimedia applications, many applications need the power needed for computation. The loss in battery power and huge use of bandwidth for communication prevent the use of the applications used recently. The power consumed by battery and the lack of communication can be rectified by leasing the processed power form the mid- network nodes. The proposed dynamic programming system reduces the processing burden without compromising the service latency.

5. Future Enhancements

In case of high security requirement, it is necessary that additional costs are needed for handling mid- network processing. For example, if the process involves transcoding, the packets are dropped using fully encrypted data, making the process ease to use and provide security. However, if the data remains encrypted during query processing, then partitioning the data query would be less. It would be useful to consider the process that allow for query processing on data encryption, even if transcoding the encrypted media is considered as an interesting area of research.

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