ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

Hop-by-Hop Communication Substantiation and Source Privacy in Wireless Sensor Networks

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ABSTRACT

Disruption tolerant networks (DTNs) are characterized by low node density, unpredictable node mobility, and lack of global network information. Most of current research efforts in DTNs focus on data forwarding, but only limited work have been done on providing efficient data access to mobile users. We propose a novel approach to support cooperative caching in DTNs, which enables the sharing and coordination of cached data among multiple nodes and reduces data access delay. Our basic idea is to intentionally cache data at a set of network central locations (NCLs), which can be easily accessed by other nodes in the network. An efficient scheme that ensures appropriate NCL selection based on a probabilistic selection metric and coordinates multiple caching nodes to optimize the tradeoff between data accessibility and caching overhead.

INTRODUCTION

Disruption tolerant networks (DTNs) consist of mobile devices that contact each other opportunistically. Due to the low node density and unpredictable node mobility, only intermittent network connectivity exists in DTNs, and the subsequent difficulty of maintaining end-to end communication links makes it necessary to use carry and-forward methods for data transmission. Although forwarding schemes have been proposed in DTNs there is limited research on providing efficient data access to mobile users, despite the importance of data accessibility in many mobile applications. A common technique used to improve data access performance is caching, i.e., to cache data at appropriate network locations based on query history, so that queries in the future can be responded with less delay. Although cooperative caching has been studied for both web-based applications and wireless ad hoc networks to allow sharing and coordination among multiple caching nodes, it is difficult to be realized in DTNs due to the lack of persistent network connectivity. First, the opportunistic network connectivity complicates the estimation of data transmission delay, and furthermore makes it difficult to determine appropriate caching locations for reducing data access delay. This difficulty is also raised by the incomplete information at individual nodes about query history. Second, due to the uncertainty of data transmission, multiple data copies need to be cached at different locations to ensure data accessibility. The difficulty in coordinating multiple caching nodes makes it hard to optimize the tradeoff between data accessibility and caching overhead

OBJECTIVE

Cooperative caching is to allow sharing and coordination among multiple caching nodes it is difficult to be realized in DTNs due to the lack of persistent network connectivity. The network connective complicates the estimation of data transmission delay, and furthermore makes it difficult to determine appropriate caching locations for reducing data access delay.

LITERATURE SURVEY

The primary focus of these mechanisms is to increase the likelihood of finding a path with limited information, so these approaches have only an incidental effect on routing metrics such as maximum or average delivery delay. In this paper, we present rapid, an intentional DTN routing protocol that can optimize a specific routing metric such as worst-case delivery delay or the fraction of packets that are delivered within a deadline. The key insight is to treat DTN routing as a resource allocation problem that translates the routing metric into per-packet utilities which determine how packets should be replicated in the system.

In this paper, we rigorously prove that a finite domain, on which most of the current mobility models are defined, plays an important role in creating the exponential tail of the inter-meeting time. We also prove that by simply removing the boundary in a simple two-dimensional isotropic random walk model, we are able to obtain the empirically observed power-law decay of the inter-meeting time. We then discuss the relationship between the size of the boundary and the relevant timescale of the network scenario under consideration. Our results thus provide guidelines on the mobility modeling with power-law inter-meeting time distribution, new protocols including packet forwarding algorithms, as well as their performance analysis.

We study data transfer opportunities between wireless devices carried by humans. We observe that the distribution of the intercontact time (the time gap separating two contacts between the same pair of devices) may be well approximated by a power law over the range [10 minutes; 1 day]. This observation is confirmed using eight distinct experimental data sets. It is at odds with the exponential decay implied by the most commonly used mobility models. In this paper, we study how this newly uncovered characteristic of human mobility impacts one class of forwarding algorithms previously proposed. We use a simplified model based on the renewal theory to study how the parameters of the distribution impact the performance in terms of the delivery delay of these algorithms. We make recommendations for the design of well-founded opportunistic forwarding algorithms in the context of human carried devices

PROPOSED SYSTEM

There is limited research on providing efficient data access to mobile users, despite the importance of data accessibility in many mobile applications. Cache Data consumes 30 percent less buffer than our scheme, but also leaves a lot of data unmatched that impairs data access performance. We notice that caching overhead in our scheme also includes the transmission and storage cost when queries and data are transmitted between requesters and caching nodes, and realize that such cost is proportional to data access delay during which data are carried by relays.

Method

Authentication

If you are the new user going to consume the service then they have to register first by providing necessary details. After successful completion of sign up process, the user has to login into the application by providing username and exact password. The user has to provide exact username and password which was provided at the time of registration, if login success means it will take up to main page else it will remain in the login page itself.

Intermediate

The design of caching strategy in wireless ad hoc networks benefits from the assumption of existing end-to end paths among mobile nodes, and the path from a requester to the data source remains unchanged during data access in most cases. Such assumption enables any intermediate node on the path to cache the pass-by data. Limited cache space, C caches the more popular data d1 based on query history, and similarly data d2 are cached at node K. In general, any node could cache the pass-by data incidentally. The effectiveness of such an incidental caching strategy is seriously impaired in DTNs, which do not assume any persistent network connectivity.

Network Central Location

The selected NCLs achieve high chances for prompt response to user queries with low overhead in network storage and transmission. A data access scheme to probabilistically coordinate multiple caching nodes for responding to user queries. We furthermore optimize the tradeoff between data accessibility and caching overhead, to minimize the average number of cached data copies in the network. a utility-based cache replacement scheme to dynamically adjust cache locations based on query history, and our scheme achieves good tradeoff between the data accessibility and access delay.

Receiver

Receiver is a node which receives batches from remote sender node and then applies them to receiver caches in the same topology data center. First, sender initiates connection to receiver node through a handshake request. Receiver ensures that protocol versions and marshallers are the same in both sender and receiver hubs. If so, receiver accepts handshake. Then, sender begins sending batches to receiver. Once batch is received, receiver node applies it to corresponding receiver cache. Once batch is applied, receiver answers sender node with acknowledge.

TECHNIQUE USED

Dynamic Programming Algorithm

Dynamic programming algorithms are used for optimization for example, finding the shortest path between two points, or the fastest way to multiply many matrices. A dynamic programming algorithm will examine all possible ways to solve the problem and will pick the best solution. Therefore, we can roughly think of dynamic programming as an intelligent, brute-force method that enables us to go through all possible solutions to pick the best one. If the scope of the problem is such that going through all possible solutions is possible and fast enough, dynamic programming guarantees finding the optimal solution.

A dynamic programming algorithm will look into the entire traffic report, looking into all possible combinations of roads you might take, and will only then tell you which way is the fastest. Of course, you might have to wait for a while until the algorithm finishes, and only then can you start driving.

The path you will take will be the fastest one assuming that nothing changed in the external environment. On the other hand, a greedy algorithm will start you driving immediately and will pick the road that looks the fastest at every intersection.

CONCLUSION

We propose a novel scheme to support cooperative caching in DTNs. Our basic idea is to intentionally cache data at a set of NCLs, which can be easily accessed by other nodes. We ensure appropriate NCL selection based on a probabilistic metric; our approach coordinates caching nodes to optimize the tradeoff between data accessibility and caching overhead. Extensive simulations show that our scheme greatly improves the ratio of queries satisfied and reduces data access delay, when being compared with existing schemes.

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