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Efficient File Search in Delay Tolerant Networks with Social Content and Contact Awareness

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Abstract: In this paper analysis a DTNs backup network for infrastructure intensive areas or a low-cost communication structure in severe environments. This paper focus on distributed peer-to-peer file search in a delay tolerant network (DTN) formed by mobile devices, the holders of which exhibit certain social network properties. However, due to sparse node distribution and continuous node mobility, DTNs are featured by frequent network partition and intermittent connections. DTN Packet forwarding is often realized in a store-carry-forward manner in DTN routing algorithms, which means that a message is carried by current holder until meeting another forwarder. Furthermore, due to the distributed network structure, it is almost impossible to maintain global file distribution information in DTNs. In this existing we design three components in Contact and Content model: community creation, neighbor table construction and update and content and contact based file search. Common-interest communities benefit file searching from two aspects: (1) it increases the probability that a node finds its interested files in its own community since common-interest nodes tend to meet more frequently and (2) it can enable a request to learn the destination community directly. The neighbor table provides organized information regarding how to find the requested file efficiently and the propose system implement a advanced techniques that can further enhance file searching efficiency, thought at additional costs.

Keywords—DTN, store-carry forward, packet forwarding.

I. INTRODUCTION

The wide usage of portable digital devices and smart phones has stimulated significant researches (e.g., laptops) on distributed file search in mobile environments. In this paper, we envision DTNs as a backup network for infrastructure intensive areas or a low-cost communication structure in severe environments, e.g., mountain/rural areas and battle field. For example, even with no network connection, students can acquire course materials from other students' mobile devices and drivers can acquire weather and traffic conditions from passing by vehicles. Besides, people or vehicles moving in mountain areas can help forward data, e.g., emails, between villages at a very low cost, i.e., without the need of infrastructures. Thus, in this paper, we focus on distributed peer-to-peer file search in a delay tolerant network (DTN) formed by mobile devices, the holders of which exhibit certain social network properties. However, due to sparse node distribution and continuous node mobility, DTNs are featured by frequent network partition and intermittent connections. As a result, packet forwarding is often realized in a store-carry-forward manner in DTN routing algorithms which means that a message is carried by current holder until meeting another forwarder. Furthermore, due to the distributed network structure, it is almost impossible to maintain global file distribution information in DTNs. This means that a file request often does not know which nodes contain the requested file when it is generated. These characteristics lead to significant challenges on efficient file searching in DTNs.

II. RELATED WORK

Region Based Random Deployment for Improved Content Searching in Mobile Disconnected Networks[1] describes the problem of content searching in mobile disconnected networks has been well studied in previous research articles and the authors discussed many approaches towards the problem of content search in mobile disconnected networks. Still the approaches suffer with the problem of latency and poor searching quality. To overcome the issue of content search in MDN, the author proposes a region based random deployment approach to improve the search quality.

The propose method splits the entire network region into different region and maintains Meta data about the content search. Also, the method monitors the query and computes content popularity from the search query

The Age Of Impatience: Optimal Replication Schemes For Opportunistic Networks [2] describes about the multimedia content dissemination in mobile settings requires significant bandwidth. Centralized infrastructure is often either inadequate or overly expensive to fill the demand. Here, an alternative P2P content dissemination scheme for mobile devices (e.g., smart-phones) is studied, which leverages local dedicated caches on these devices to opportunistically fulfill user requests. In this model, the allocation of content in the global distributed cache comprising the union of all local caches, determines the pattern of demand fulfillment.

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Wireless Ad Hoc Podcasting [3] describes the podcasting has become a very popular and successful Internet service in a short time. This success illustrates the interest for participatory broadcasting, in its actual form however, podcasting is only available with fixed infrastructure support to retrieve publicized episodes. The paper is aimed at releasing this limitation and present herein this podcasting system architecture together with a prototype implementation based on opportunistic wireless networking that allows authors to extend podcasting to ad hoc domains.

Providing Content-Based Service In Disruption-Tolerant Networks [4] describes about the The Content-based service [4], which dynamically routes and delivers events from sources to interested users, is extremely important to network services. However, existing content-based protocols for static networks will incur unaffordable maintenance costs if they are applied directly to the highly mobile environment that is featured in disruption-tolerant networks (DTNs). A unique publish/subscribe scheme is proposed that utilizes the long-term social network properties, which are observed in many DTNs, to facilitate content-based services in DTNs. The authors distributively construct communities based on the neighboring relationships from nodes' encounter histories.

The Small World File-Sharing Communities [5] describes Web caches, content distribution networks, peer-to-peer file sharing networks, distributed file systems, and data grids all have in common that they involve a community of users who use shared data. In each case, overall system performance can be improved significantly by first identifying and then exploiting the structure of community's data access patterns. The authors proposed a novel perspective for analyzing data access workloads that considers the implicit relationships that form among users based on the data they access.

III. METHODOLOGY

When a node receives a request, if it is the file holder, it returns the file. Otherwise, if the node is located in the destination community, it conducts intra-community searching. If it is not in the destination community, it conducts intercommunity searching, which forwards the request gradually to the destination community. When the request arrives at the destination community, the intra-community search is launched. Note that the definition of community ensures that the requested file, if exists in the system, is highly possible to be held by nodes in the destination community.

In intra-community searching, requests are forwarded within the destination community to find the file holder. In each forwarding, the request is forwarded to a neighbor node that has more intra-community connections toward the node having the highest similarity with the requested file. Such a method is designed for two reasons. First, the node having a high similarity with a request has high probability of containing the requested file. Second, an interest can usually be further classified into sub-interests, and people in a sub-interest group have a higher probability of meeting with each other than with other members in the interest community. For example, lab members majoring in computer systems tend to meet more often. Thus, if the high similarity node fails to satisfy the request, its frequently met nodes may contain the requested file. Therefore, the similarity works as an indication of the probability of satisfying the request.

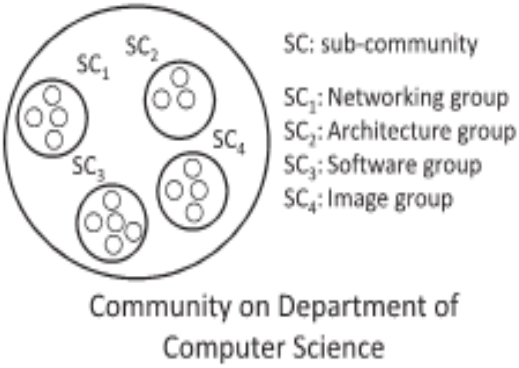

Fig 3.1 Community Searching

In file retrieval process, Upon receiving a request, the file holder first forwards the file back along the route the request traversed, which is inserted into the request during the file searching. If the route is broken, the intra-community and inter-community searching algorithms are used to send the file back to the requester according to the IDs of the requester and its community. In current design, we only consider the scenario that there is only one matched file for a request. We can continue searching after a successful hit to find multiple matched files.

In inter-community searching, In inter-community searching, node Na first checks its neighbor table to see whether there is a neighbor from the destination community (Cd), and takes it as the next relay node if one exists. If more than one exist, Na chooses the one with the highest Fi1Cd by referring to the CCT in its neighbor table since that node has more connections with the destination community.

Advance-file searching describes three components introduced above can realize efficient file searching. However, they suffer from two drawbacks considering sparse node distribution in DTNs. First, interest-based community structure may have a loose structure, which limits the efficiency of the intra-community search. Second, a request may be generated in an area that is far away from the file holder, which means that it may not be forwarded towards the correct direction in the beginning. We then propose advanced techniques to solve the two problems and further improve the efficiency of file searching.

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In contact-based sub communities Specifically, each node first collects its meeting frequencies with same-community members. After nodes have collected their stable contact frequencies with same-community members, i.e., after the initial period, they begin to construct sub-communities. Each sub-community has a coordinator known by all sub-community members that is responsible for membership management. It is the node in the sub-community that can meet the most nodes in the sub-community. We define a node's average contact frequency with a group of nodes as the sum of its contact frequencies with these nodes divided by node number.

The contact-based sub-communities help enhance the efficiency of intra-community file searching. In the intra-community searching algorithm introduced .The node with higher Fi1Cd (i.e., with more connections with the destination community) is selected as the carrier for the request. However, such a node may not have a high probability of meeting the file holder. It may frequently meet nodes in its sub-community but cannot meets nodes out of its sub-community with a high frequency. Consequently, a request may be trapped in the sub-community, which would degrade the file searching efficiency.

IV. PROPOSED ARCHITECTURE

Upon receiving a request, the file holder first forwards the file back along the route the request traversed, which is inserted into the request during the file searching. If the route is broken, the intra-community and inter-community searching algorithms are used to send the file back to the requester according to the IDs of the requester and its community. In current design, we only consider the scenario that there is only one matched file for a request. We can continue searching

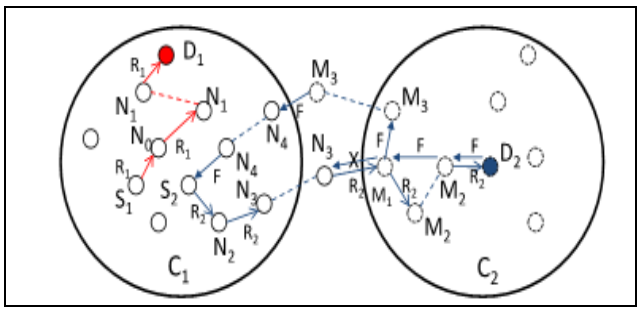

Fig 4.1 Distribution DTNs

The three components introduced above can realize efficient file searching. However, they suffer from two drawbacks considering sparse node distribution in DTNs. First, interest- based community structure may have a loose structure, which limits the efficiency of the intra-community search. Second, a request may be generated in an area that is far away from the file holder, which means that it may not be forwarded towards the correct direction in the beginning.

V. RESULTS

The following Table describes experimental result for number of video file search process in existing and proposed hit rate analysis. The table contains number of search video file, existing and proposed probability distribution rate details are shown in below table.

TABLE I: EXPERIMENTAL RESULTS

S.NO	Number of Video file Search	Existing System Probability Distribution Rate	Proposing System Probability Distribution Rate
1	25	0.265	0.313
2	50	0.278	0.285
3	75	0.312	0.321
4	100	0.345	0.349
5	125	0.387	0.392
6	250	0.394	0.98
7	275	0.404	0.408
8	300	0.431	0.437

The following table describes experimental result for number of video file search process in existing and proposed average delay of video file analysis. The table contains number of search video file share, existing and proposed average video file share details are shown.

Table 4.2: Video Analysis

S.NO.	No. of Video file Share	Existing System AVG	Proposing System AVG
1	125	60.30	61.13
2	150	63.52	64.04
3	175	70.27	73.31
4	200	74.35	76.46
5	225	78.66	80.31
6	350	82.75	83.71
7	375	86.39	89.77
8	400	92.07	93.11

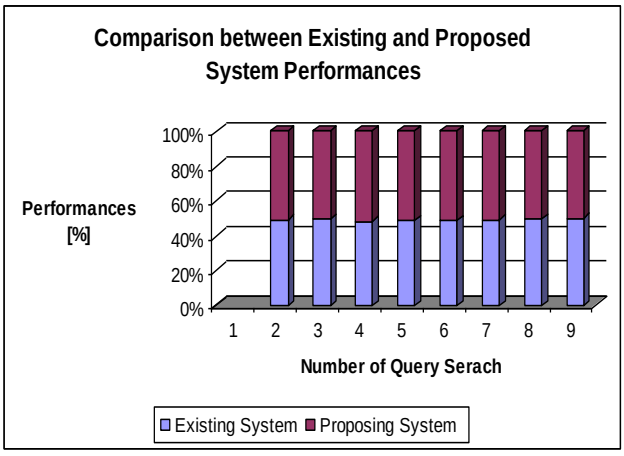

Fig 4.2 Comparison Chart

As the above chart describes the performances of existing system and proposed system. As the number of

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search query increases, the performance in searching the query also increases. The proposed system can handle any number of search queries and extracts the desired results in less time.

VI. CONCLUSION

The new system eliminates the difficulties in the existing system. It is developed in a user-friendly manner. The aim of the thesis is to generate data templates with minimum input. The system is very fast and any transaction can be viewed or retaken at any level. Error messages are given at each level of input of individual stages. This software is very particular in developing web templates. More number of customized templates can be designed. In addition, tags can also be created. Any node with .Net framework installed can execute the application.

The difficulty in distributing the content in the server is eliminated by using this application. It reduces the server bandwidth to consistent amount. The end users need not wait for server in downloading the video file since the P2P application gets the video from available client nodes.

VII. FUTURE WORK

It is believed that almost all the system objectives that have been planned at the commencement of the software development have been net with and the implementation process of the project is completed. A trial run of the system has been made and is giving good results the procedures for processing is simple and regular order.The processes of organizing strategies have been a new experience, which was found use full in later phases of the research work is completed. Efforts had been taken to make the system user friendly and as simple as possible. However at some points some features may have been failed to notice out which might be considered for further modification of the application**.**

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