P2P CONTENT-BASED FILE SHARING IN MANETS THAT UTILIZES SOCIAL NETWORKS

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Abstract—Current peer-to-peer (P2P) file sharing methods in mobile ad hoc networks (MANETs) can be classified into two groups: flooding-based, advertisement-based. These two methods can easily have high overhead and low scalability. They are mainly developed for connected MANETs, in which end-to-end connectivity among nodes is ensured. But they fail to adapt the opportunistic nature of disconnected MANETs and also fail to consider the social interests (i.e., contents) of mobile nodes, which can be exploited to improve the file searching efficiency.

In this paper, we propose a P2P content-based file sharing system called Social network-based P2P cOntent-based file sharing in disconnected mObile ad hoc Networks (SPOON). The system uses an interest extraction algorithm to derive a node's interests from its files for content-based file searching. For efficient file searching, SPOON groups common-interest nodes that frequently meet with each other as communities. It takes advantage of node mobility by designating stable nodes, which have the most frequent contact with community members, as community coordinators for intracommunity searching, and highly mobile nodes that visit other communities frequently as community ambassadors for intercommunity searching. An interest-oriented file searching scheme is proposed for high file searching efficiency.

Keywords— *MANETs, content-based file sharing, social networks*

I. INTRODUCTION

In the past few years, personal mobile devices such as laptops, PDAs, and Smartphones have been more and more popular. Indeed, the number of Smartphone users increased by 118 million across the world in 2007 [2], and is expected to reach around 2.5 billion by 2015. The incredibly rapid growth of mobile users is leading to a promising future, in which they can freely share files between each other whenever and wherever. The number of mobile searching users (through Smartphones, tablets, etc.) is estimated to reach 2.85 billion in 2015. Currently, mobile users interact with each other and share files via an infrastructure formed by geographically distributed base stations. However, users may find themselves in an area without wired services (e.g., mountain areas and rural areas). Moreover, users may hope to reduce the cost on the expensive infrastructure network data.

In a peer to peer (P2P) network, the "peers" are computer systems which are connected to each other via the Internet. Files can be shared directly between systems on the network without the need of a central server. In other words, each computer on a P2P network becomes a file server as well as a client. The P2P file sharing model makes large-scale networks a blessing instead of a curse. Wired P2P file sharing systems (e.g., Bit Torrent) have already become a popular and successful paradigm for file sharing among millions of users. The successful deployment of P2P file sharing systems and the aforementioned impediments to file sharing in MANETs (Stands for "Mobile Ad Hoc Network." A MANET is a type of ad hoc network that can change locations and configure itself on the fly. Because MANETs are mobile, they use wireless connections to connect to various networks) make the P2P file sharing over MANETs (P2P MANETs in short) a promising complement to current infrastructure model to realize pervasive file sharing for mobile users.

As the mobile digital devices are carried by people that usually belong to certain social relationships, in this project, we focus on the P2P file sharing in MANET community consisting of mobile users with social network properties. In such a file sharing system, nodes meet and exchange requests and files in the format of text, short videos, and voice clips in different interest categories. A typical scenario is a course material (e.g., course slides, review sheets, assignments) sharing system in a school campus. Such a scenario ensures for the most that nodes sharing the same interests (i.e., math), carry corresponding files (i.e., math files), and meet regularly (i.e., attending math classes).

In MANETs consisting of digital devices, nodes are constantly moving, forming disconnected MANETs with opportunistic node encountering. Such transient network connections have posed a challenge for the development of P2P MANETs. Traditional methods supporting P2P MANETs are either flooding-based [3], [4], or advertisement-based [5], [6]. The former method relies on flooding for file searching. However, they lead to high overhead in broadcast. In the latter methods, nodes advertise their available files, build content tables, and forward files according to these tables. But they have low search efficiency because of expired routes in the content tables caused by transient network connections. Also, advertising can lead to high overhead. Recently, social networks are exploited to facilitate content dissemination/publishing in MANETs based on which we are going to propose a P2P file sharing system that utilizes social networks.

II. EXISTING SYSTEM:

The flooding-based method, 7 Degree of Separation (7DS) [3] is one of the first approaches to port P2P technology to mobile environment. It exploits the mobility of nodes within a geographic area to disseminate web content among neighbours. Passive Distributed Indexing (PDI) [4] is a general-purpose distributed file searching algorithm. It uses local broadcasting for content searching and sets up content indexes on nodes along the reply path to guide subsequent searching.

Geography-based Content Location Protocol (GCLP) [5] is an advertisement-Based Method for efficient content discovery in location-aware ad hoc networks. It disseminates contents and requests in crossed directions to ensure their encountering. Peer-to-Peer Swarm Intelligence (P2PSI) [6] combines both advertisement (push) and discovery (pull) processes.

A. Disadvantages Of Existing System

• The flooding-based methods generate high overhead because of the high amount of duplicated messages. These overhead induces the high congestion due to a high volume of traffic, which is a significant problem in MANETs.

• Advertisement-based method also leads to high overhead, and it has low search efficiency because of expired routes caused by transient network connections.

• Flooding-based method and advertisement-based method are fit for the relative stable MANETs. However, in more disconnected MANETs, the two kinds of method are failed due to the large overhead

III. PROPOSED SYSTEM

To implement Peer-to-Peer file sharing system in MANETs called **SPOON** that groups number of nodes based on its interest as a community for efficient file searching and retrieval using the following algorithms

1. Interest extraction algorithm
2. Community construction algorithm
3. Node role assignment algorithm
4. Interest-Oriented File Searching and Retrieval.

1. *Interest Extraction Algorithm*

Without loss of generality, we assume that node contents can be classified to different interest categories. It was found that users usually have a few file categories that they query for files

frequently in a file sharing system. Specifically, for the majority of users, 80 percent of their shared files fall into only 20 percent of total file categories. Like other file sharing systems we consider that a node's stored files can reflect its file interests. Thus, SPOON derives the interests of a node from its files.

2. *Community Construction Algorithm*
Social network theory reveals that people with the same interest tend to meet frequently [9]. By exploiting this property, SPOON classifies nodes with common interests and frequent contacts into a community to facilitate interest-based file searching. Nodes with multiple interests belong to multiple communities. The community construction can easily be conducted in a centralized manner by collecting node interests and contact frequencies from all nodes to a central node.

3. *Node Role Assignment Algorithm*
We take advantage of different types of node mobility for file sharing. We define community coordinator and ambassador nodes in the view of a social network. A community coordinator is an important and popular node in the community i.e. a node highly interactive with all nodes in the community. It keeps indexes of all files in its community. A node that is often found communicating with other communities is selected as ambassador. Each community has one ambassador for each known foreign community, which serves as the bridge to the community.

4. *Interest-Oriented File Searching and Retrieval*
In social networks, people usually have a few file interests and their file visit pattern generally follows a certain distribution. Also, people with the same interest tend to contact each other frequently [9]. Thus, interests can be a good guidance for file searching. Considering the relation among individuals' common interests, and their contact frequencies, we can route file requests to file holders based on nodes' frequencies of meeting different interests.

Then the interest-oriented file searching scheme has two steps: intracommunity and intercommunity searching. A node first searches files in its home community. If the coordinator finds that the home community cannot satisfy a request, it launches the intercommunity searching and forwards the request to an ambassador that will travel to the foreign community that matches the request's interest.
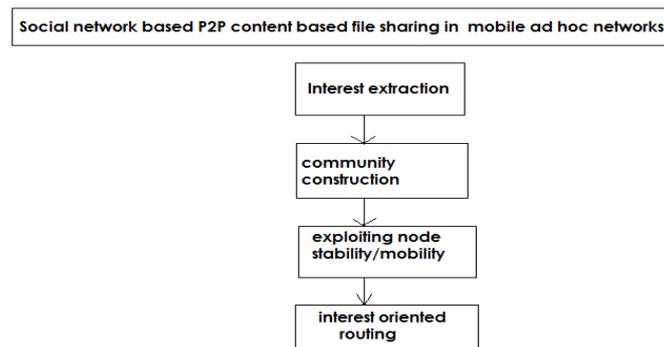

Fig 3.1 overall design of SPOON

Example:

Consider a community whose interest is football if a user in that community requests for a file related to football, first It looks for that file in adjacent nodes, if not found the request is sent to the coordinator which looks for the requested file in the entire community and the file is sent to the requester if found. If not found even in the community then the request is sent to the ambassador which forwards the request to the coordinator of the other community. If the requested file is found in other community it is forwarded to the requester otherwise file not found message is sent. This is depicted in the figure 3.2
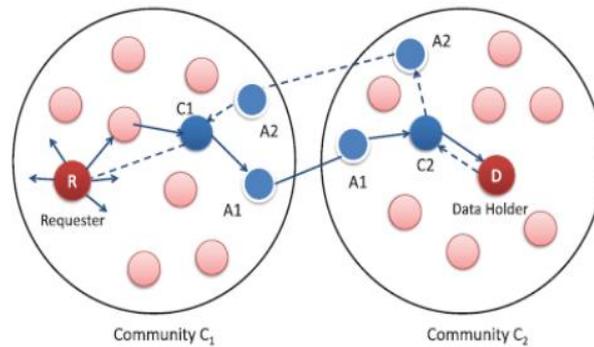
Fig 3.2 System architecture (R: Node requesting file, D: Node holding the requested file, C1, C2: Community co-coordinator, A1, A2: Ambassador)

A. *Advantages Of Proposed System*

1.   The proposed system considers both node interest and contact frequency for efficient file sharing.
2.   The proposed system improves the efficiency of file sharing in terms of

- Speed
- Cost
- Hit rate
- Average delay

IV. CONCLUSION

In this paper, we propose a social network-based P2P cOntent file sharing system in disconnected mObile ad hoc Networks. SPOON considers both node interest and contact frequency for efficient file sharing. We introduce four main components of SPOON: Interest extraction identifies nodes' interests; Community construction builds common-interest nodes with frequent contacts into communities. The node role assignment component exploits nodes with tight connection with community members for intracommunity file searching and highly mobile nodes that visit external communities frequently for intercommunity file searching; the interest-oriented file searching scheme selects forwarding nodes for queries based on interest similarities.

V. FUTURE SCOPE

 In future, we will explore how to determine appropriate thresholds in SPOON, how they affect the file sharing efficiency, and how to adapt SPOON to larger and more disconnected networks.

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