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Opportunistic Search in Disconnected Mobile Adhoc Network

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ABSTRACT

To design social network based P2P content based file sharing system in disconnected Mobile Adhoc Networks in privacy preserving manner for efficient file searching based on interest casting. As the mobile digital devices are carried by people that usually belong to certain social relationships, this project focus on the P2P file sharing in a disconnected 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 in different interest categories. Interest of each node is dynamic and can vary drastically depending on the query search by time. Since time factor may affect the basic interest of a node as prolonged searching for a particular interested thing is liked by user. This interest extraction scheme is dynamic and the communities it belongs differ based on the social contact the particular node is having. Query parsing and search strategies in keyword search enables lightweight efficient search towards community Nodes. The sharing among different community peoples is performed by without revealing the sender and receiver identity.
Keywords: Adhoc networks, p2p content based file, privacy, secure multiparty computation

I. INTRODUCTION

The P2P file sharing model makes large-scale networks a blessing instead of a curse, in which nodes share files directly with each other without a centralized server. The successful deployment of P2P file sharing systems and the aforementioned impediments to file sharing in MANETs make the P2P file sharing over MANETs a promising complement to current. Infrastructure model to realize pervasive file sharing for mobile users. In such a file sharing system, nodes meet and exchange requests and files in the format of text, images in different interest categories. Mobile social networking applications have been recently introduced in the market [3], [4], [5], as well as in the academic community [6], [7], [8], [9], [10]. As mentioned above, mobile social networks enable novel, location-based services, such as friend proximity detection. In the context of mobile social networks, the term friend is used to refer to a person (potentially, a stranger) with whom a user might be interested in getting in touch with, where the notion of friendship used for detection depends on the specific application scenario.

Peer-to-Peer (P2P) file sharing methods in mobile ad hoc networks (MANETs) can be classified into three groups: flooding-based, advertisement-based and social contact-based. The first two groups of 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. The third group of methods adapt to the opportunistic nature of disconnected MANETs but fail to consider the social interests of mobile nodes, which can be exploited to improve the file searching efficiency. Mobile Nodes Exchange all data publicly and there is no privacy for data as well as Meta information which is vulnerable in MANETS.

II. METHODS AND MATERIAL

A. Background

Privacy-Preserving Distributed Profile Matching in Proximity-based Mobile Social Networks, a set of privacypreserving profile matching schemes for proximity-based mobile social networks [7]. In Find, an initiating user can find from a group of users the one whose profile best matches with his/her; to limit the risk of privacy exposure, only necessary and minimal information about the private attributes of the participating users is exchanged. This system leads to some disadvantages such as, it is secure only under the

HBC model and this system is only suitable for network size less than 10.

People Net: Engineering a Wireless Virtual Social Network, People Net, with its bazaar concept and peer-to-peer query propagation, provides a simple and efficient mechanism for seeking information [10]. But it has serious limitations which lead to increased energy consumption due to increased mobile-to-mobile communication and high communication overhead.

People Tones: A System for the Detection and Notification of Buddy Proximity on Mobile Phones, the design of People Tones, a buddy proximity application for mobile phones, contributes (i) an algorithm for detecting proximity, (ii) techniques for reducing sensor noise and power consumption**,** (iii) a method for generating peripheral cues [9]. Empirical measurements demonstrate the precision and recall characteristics of our proximity algorithm. The construction of People Tones presents challenges like imprecise sensors, clumsy actuators and limited battery life.

E-Small Talker is a distributed mobile communications system that facilitates social networking in physical proximity [7]. It automatically discovers and suggests topics such as common interests for more significant conversations. This build on Bluetooth Service Discovery Protocol (SDP) to exchange potential topics by customizing service attributes to publish non service-related information without establishing a connection. This design assumes that users are willing to share personal information at some level with strangers without their awareness. The current implementation works best when there are only two users in physical proximity. Proximity-based mobile social networking (PMSN) refers to the social interaction among physically proximate mobile users directly through the Bluetooth/WiFi interfaces on their smartphones or other mobile devices [1]. Profile matching means two users comparing their personal profiles and is often the first step towards effective PMSN. It, however, conflicts with users' growing privacy concerns about disclosing their personal profiles to complete strangers before deciding to interact with them. This paper tackles this open challenge by designing a suite of novel fine-grained private matching protocols. Our protocols enable two users to perform profile matching without disclosing any information about their profiles beyond the comparison result.

B. System Model

The architecture diagram shows a overall overview of the scope of the project. Some of the nodes are added into the network and their interest is extracted from their profile. Based on their interest, a community (cluster/group) is formed, and each node will be place in their respective community based on interest. A node cannot be in more than one community. The coordinator and ambassador for each community is elected. Based on the size of the community, number of coordinators and ambassadors may vary. The queries parsed by each node will be directed to the community coordinator. The coordinator will look for the matching terms in their own community and if it is not found, the query will be passed to next related community through ambassador. The privacy can be preserved, since both the sender and receiver does not reveal their identity because all the queries will be handled mainly by community coordinator.

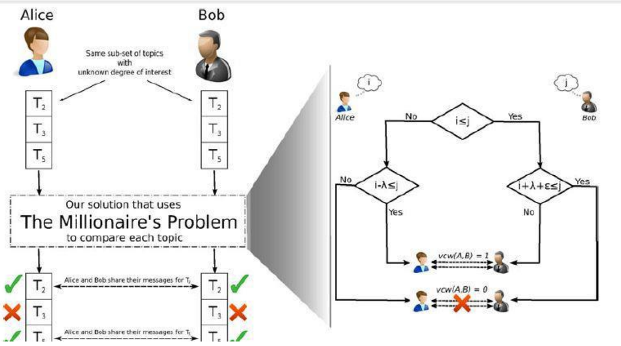


Figure 1: System Model

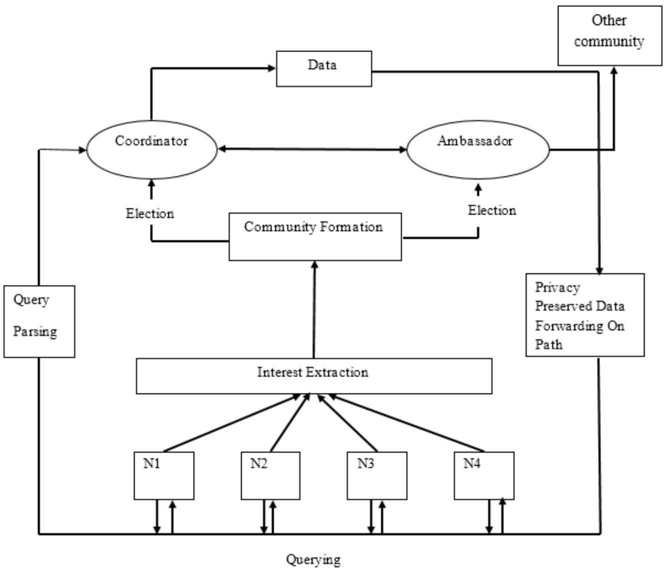


Figure 2: System Architecture

III. RESULTS AND DISCUSSION

A privacy-preserving friend proximity detection scheme based on a protocol for solving the Yao's "Millionaire's Problem", and introduces three interest-casting protocols achieving different tradeoffs between privacy and accuracy of the information forwarding process. The system uses an interest extraction algorithm to derive a node's interests from its files for content-based file searching in a privacy preserved manner. For efficient file searching, the system group's common-interest nodes that frequently meet with each other as communities. It takes advantage of node mobility by designating stable nodes, which has the most frequent contact with community members, as community coordinators for intra-community searching, and highly-mobile nodes that visit other communities frequently as community ambassadors for inter-community searching. An interest-oriented file searching scheme is proposed for high file searching efficiency. Additional strategies for file prefetching, querying-completion and loop-prevention, and node churn consideration are discussed to further enhance the file searching efficiency.

Interest Extraction and community formation

The system derives a node's interests from its files. The interest facilitates queries in content-based file sharing and other components of the system. Collective of nodes that share common interests and meet frequently is grouped as a community in which a node having high probability to find interested files in its community. The probability of similar interested nodes meeting together and sharing is high. If this fails the node can rely on nodes that frequently travel to other communities for file searching. The system builds the community for efficient file searching.

Interest Extraction algorithm

Input: Files for each user(F)
DomainName(D)
1 Get D1,D2...Dn from Profile
2 Get F1,F2,...Fn
3 Set i=1
4 if(F>=0)
Set F1,F2
5 if D contains F1,F2 then true
6 If F contains F1,f2
7 Set D1 as Domain Name in Node
8 Domain Name Set D1 in Node
9 files will be displayed
10 Interest is to be extracted
11 stop

Node Role Assignment

The system defines community coordinator and ambassador nodes in the social network. A community coordinator is an important and popular node in the community, who keeps indexes of all files in its community. There may be more than one coordinator for a community, which depends on the community size. The coordinator is elected by criteria's such as, (i) one must have high memory, (ii) one must have good processing capability, (iii) one must be able to handle more requests and responses.

Each community has one ambassador for each known foreign community, which serves as the bridge to the other communities. The coordinator in a community maintains the foreign communities and corresponding ambassadors in order to map queries to ambassadors for inter-community searching.

The ambassador is elected by following criteria's such as, (i) one must have high mobility, (ii) one who have the tendency to move freely and frequently. The number of ambassadors and coordinators can be adjusted based on the network size and workload in order to avoid overloading these nodes.

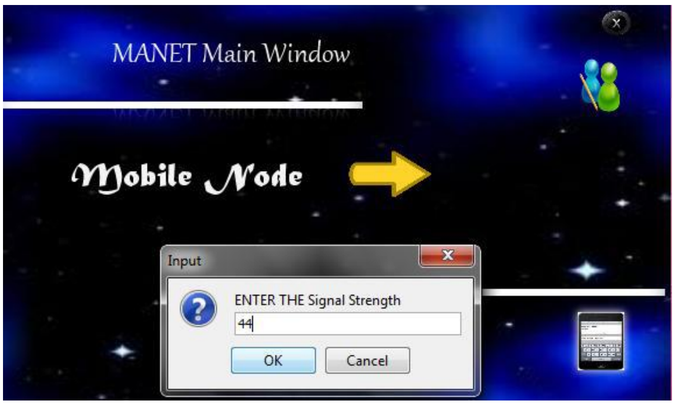


Figure 3: Adding node

Privacy Preserved Querying and rendering the data

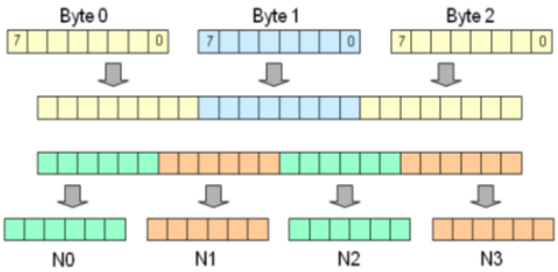
The interest-oriented file searching scheme has two steps: Intra-community and Inter-community searching. A node first searches files in its home community. If the coordinator finds that the home community cannot satisfy a request, it launches the inter-community searching and forwards the request to an ambassador that will travel to the foreign community that matches the request's interest. A request is deleted when its TTL (Time To Live) expires.

During the search, a node sends a message to another node using the interest-oriented routing algorithm (IRA), in which a message is always forwarded to the community that is likely to hold or to meet the queried keywords. The retrieved file is routed along the search path or through IRA if the route expires. The queries parsed by each node will be directed to the community coordinator. The coordinator will look for the matching terms in their own community and if it is not found, the query will be passed to next related community through ambassador. The privacy can be preserved, since both the sender and receiver does not reveals their identity because all the queries will be handled mainly by community coordinator. The BASE64 encryption scheme is used in this work.

Figure 4: Searching

BASE64

1. Each group of 3 bytes is encoded as 4 bytes, each containing only 6 bits of data.
2. These are sent as 7-bit ASCII.
3. Those 6 bits gives us decimal numbers in the range 0-63, by assigning a character to each decimal value (64 of them), encoding can be done for any number in the range 0-63 by just one single character.
4. Base 64 requires 64 symbols, just as decimal (base 10) requires 10 symbols and hexadecimal (base 16), requires 16 symbols.



0	A	16	Q	32	g	48	w
1	B	17	R	33	h	49	x
2	C	18	S	34	I	50	y
3	D	19	T	35	j	51	z
4	E	20	U	36	k	52	0
5	F	21	V	37	l	53	1
6	G	22	W	38	m	54	2
7	H	23	X	39	n	55	3
8	I	24	Y	40	o	56	4
9	J	25	Z	41	p	57	5
10	K	26	a	42	q	58	6
11	L	27	b	43	r	59	7
12	M	28	c	44	s	60	8
13	N	29	d	45	t	61	9
14	O	30	e	46	u	62	+
15	P	31	f	47	v	63	/

Figure 5: Base64 table

Take 3 bytes and encode to 4 bytes:

3 bytes to encode: 10101111 11001010 1 1101010
24 bit stream: 101011111100101011101010
Four 6-bit values: 101011 111100 101011 101010
decimal value 43 60 43 42
Base64 character r 8 r q

Then use the table to send the ASCII codes for each BASE64 Character

For example

4 bytes to encode: 10101111 11001010 11101010 00100011
32-bitstream: 10101111110010101110101000100011
Six 6-bit values: 101011 111100 101011 101010 001000 110000
decimal value: 43 60 43 42 08 48
Base64 characters: r 8 r q I w
Add padding: r 8 r q I w = =

In this case four zeros are added, then two padding characters.

IV. CONCLUSION

This work describes a way to transfer and share the files, in a disconnected mobile adhoc networks. A simple procedure to share files based on the nodes request. The community is formed based on the nodes interest and the files are shared with help of coordinator and ambassador, who belongs to the same community. The files are shared among different community peoples, without revealing the sender and receiver identity. The whole process is done by java framework, and the simulation not yet achieved. In the above work, the concept of file sharing is implemented only on *.txt file format. The future study will be developing the concept, to share all types of files and multimedia contents like, audio, video etc... The current work cannot able to handle more delay in query parsing. This problem will be resolved in the future work. This work should be focused more on increasing the coverage area of the network structure.

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