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Multi-Copy Routing Techniques in Mobile Communal Network Using Homing Spread

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ABSTRACT: A Mobile Social Network (MSN) is a special kind of delay tolerant network (DTN) composed of mobile nodes that move around and share information with each other through their carried short-distance wireless communication devices. A main characteristic of MSNs is that mobile nodes in the networks generally visit some locations (namely, community homes) frequently, while visiting other locations less frequently. Here propose a novel zero-knowledge multi-copy routing algorithm, homing spread (HS), for homogeneous MSNs, in which all mobile nodes share all community homes. HS is a distributed and localized algorithm. It mainly lets community homes spread messages with a higher priority. Theoretical analysis shows that HS can spread a given number of message copies in an optimal way when the inter-meeting time between any two nodes and between a node and a community home follows independent and identical exponential distributions, respectively. And also extend HS to the heterogeneous MSNs, where mobile nodes have different community homes. In addition, calculate the expected delivery delay of HS, and conduct extensive simulations. Results show that community homes are important factors in message spreading. By using homes to spread messages faster, HS achieves a better performance than existing zero-knowledge MSN routing algorithms, including Epidemic (with a given number of copies), and Spray & Wait.

KEYWORDS: Mobile Social Network (MSN), Delay Tolerant Network (DTN), Routing, Homing Spread (HS), Security.

I. INTRODUCTION

Basic of Networking

A computer network consists of a collection of computers, printers and other equipment that is connected together so that they can communicate with each other.

Representation of Network

Broadly speaking, there are two types of network configuration, peer-to-peer networks and client/server networks.

Peer-to-peer networks are more commonly implemented where less than ten computers are involved and where strict security is not necessary. All computers have the same status, hence the term 'peer', and they communicate with each other on an equal footing. Files, such as word processing or spreadsheet documents, can be shared across the network and all the computers on the network can share devices, such as printers or scanners, which are connected to any one computer.

Client/server networks are more suitable for larger networks. A central computer, or 'server', acts as the storage location for files and applications shared on the network. Usually the server is a higher than average performance computer. The server also controls the network access of the other computers which are referred to as the 'client' computers.

Components of a Network

A computer network comprises the following components:

- A minimum of at least 2 computers

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- Cables that connect the computers to each other; although wireless communication is becoming more common (see Advice Sheet 20 for more information)
- A network interface device on each computer (this is called a network interface card or NIC)
- A 'Switch' used to switch the data from one point to another. Hubs are outdated and are little used for new installations.
- Network operating system software

Structured Cabling

The two most popular types of structured network cabling are twisted-pair (also known as 10BaseT) and thin coax (also known as 10Base2). 10BaseT cabling looks like ordinary telephone wire, except that it has 8 wires inside instead of 4. Thin coax looks like the copper coaxial cabling that's often used to connect a Video Recorder to a TV.

Hub and Switch

A hub is a device used to connect a PC to the network. The function of a hub is to direct information around the network, facilitating communication between all connected devices. However in new installations switches should be used instead of hubs as they are more effective and provide better performance. A switch, which is often, termed a 'smart hub'. Switches and hubs are technologies or 'boxes' to which computers, printers, and other networking devices are connected. Switches are the more recent technology and the accepted way of building today's networks. With switching, each connection gets "dedicated bandwidth" and can operate at full speed. In contrast, a hub shares bandwidth across multiple connections such that activity from one PC or server can slow down the effective speed of other connections on the hub. Now more affordable than ever, Dual speed 10/100 autosensing switches are recommended for all school networks. Students may want to consider upgrading any hub based networks with switches to improve network performance – i.e. speed of data on the network.

Wireless Networks

The term 'wireless network' refers to two or more computers communicating using standard network rules or protocols, but without the use of cabling to connect the computers together. Instead, the computers use wireless radio signals to send information from one to the other. A wireless local area network (WLAN) consists of two key components: an access point (also called a base station) and a wireless card. Information can be transmitted between these two components as long as they are fairly close together (up to 100 metres indoors or 350 metres outdoors).Suppliers would need to visit the students and conduct a site survey. This will determine the number of base stations you need and the best place(s) to locate them. A site survey will also enable each supplier to provide you with a detailed quote. It is important to contact a number of different suppliers as prices, equipment and opinions may vary. When the term 'wireless network' is used today, it usually refers to a wireless local area network or WLAN. A WLAN can be installed as the sole network in a school or building. However, it can also be used to extend an existing wired network to areas where wiring would be too difficult or too expensive to implement, or to areas located away from the main network or main building. Wireless networks can be configured to provide the same network functionality as wired networks, ranging from simple peer-to-peer configurations to large scale networks accommodating hundreds of users.

What are the advantages and disadvantages of a Wireless LAN?

Wireless LANs have advantages and disadvantages when compared with wired LANs. A wireless LAN will make it simple to add or move workstations, and to install access points to provide connectivity in areas where it is difficult to lay cable. Temporary or semi-permanent buildings that are in range of an access point can be wirelessly connected to a LAN to give these buildings connectivity. Where computer labs are used in students, the computers (laptops) could be put on a mobile cart and wheeled from classroom to classroom, providing they are in range of access points. Wired network points would be needed for each of the access points.

1.6.2 A WLAN has some specific advantages

- It is easier to add or move workstations
- It is easier to provide connectivity in areas where it is difficult to lay cable
- Installation can be fast and easy and can eliminate the need to pull cable
- through walls and ceilings
- Access to the network can be from anywhere in the school within range of an access point

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- Portable or semi-permanent buildings can be connected using a wireless LAN
- Where laptops are used, the 'computer suite' can be moved from classroom to classroom on mobile carts
- While the initial investment required for wireless LAN hardware can be similar to the cost of wired LAN hardware, installation expenses can be significantly lower
- Where a school is located on more than one site (such as on two sides of a road), it is possible with directional antennae, to avoid digging trenches under roads to connect the sites
- In historic buildings where traditional cabling would compromise the façade, a wireless LAN can avoid drilling holes in walls
- Long-term cost benefits can be found in dynamic environments requiring frequent moves and changes
- They allow the possibility of individual pupil allocation of wireless devices that move around the school with the pupil.

WLANs also have some disadvantages

- As the number of computers using the network increases, the data transfer rate to each computer will decrease accordingly
- As standards change, it may be necessary to replace wireless cards and/or access points
- Lower wireless bandwidth means some applications such as video streaming will be more effective on a wired LAN
- Security is more difficult to guarantee, and requires configuration
- Devices will only operate at a limited distance from an access point, with the distance determined by the standard used and buildings and other obstacles between the access point and the user
- A wired LAN is most likely to be required to provide a backbone to the wireless LAN; a wireless LAN should be a supplement to a wired LAN and not a complete solution

II. LITERATURE REVIEW

Literature survey is the most important step in software development process. Before developing the tool it is necessary to determine the time factor, economy and company strength. Once these things are satisfied, then the next step is to determine which operating system and language can be used for developing the tool. Once the programmers start building the tool the programmers need lot of external support. This support can be obtained from senior programmers, from book or from websites. Before building the system the above consideration are taken into account for developing the proposed system.

The major part of the project development sector considers and fully survey all the required needs for developing the project. Before developing the tools and the associated designing it is necessary to determine and survey the time factor, resource requirement, man power, economy, and company strength. Once these things are satisfied and fully surveyed, then the next step is to determine about the software specifications in the respective system such as what type of operating system the project would require, and what are all the necessary software are needed to proceed with the next step such as developing the tools, and the associated operations.

A. BUBBLE Rap: Social-based Forwarding in Delay Tolerant Networks

Huang .L, Wu .J and Xiao .M 2013, to improve our understanding of human mobility in terms of social structures, and to use these structures in the design of forwarding algorithms for Pocket Switched Networks (PSNs). The envision of a future in which a multitude of devices carried by people are dynamically networked. The aim to build PSN a type of Delay Tolerant Networks (DTN) for such environments. A PSN uses contact opportunities to allow humans to communicate without network infrastructure. Taking human mobility traces from the real world, discover that human interaction is heterogeneous both in terms of hubs (popular individuals) and groups or communities. A propose social based forwarding algorithm, BUBBLE, which is shown empirically to improve the forwarding efficiency significantly compared to oblivious forwarding schemes and to PROPHET algorithm. The decentralized approximation for centrality relates to the predictability of human mobility.

B. DTN Routing as a Resource Allocation Problem

Disruption tolerant networks (DTNs) enable transfer of data when mobile nodes are connected only intermittently. More than one DTN routing protocols use a variety of mechanisms, including discovering the meeting probabilities among nodes, packet replication, and network coding. The primary focus of these mechanisms is to increase the

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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. Here 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. To evaluate rapid rigorously through a prototype deployed over a vehicular DTN tested of 40 buses and simulations based on real traces. This is the first paper to report on a routing protocol deployed on a real DTN at this scale. The results suggest that rapid significantly outperforms existing routing protocols for several metrics. The release of an implementation of rapid will enable us to enlist others to deploy rapid on their DTNs, diversifying results to other scenarios.

C. Epidemic Routing for Partially-Connected Ad Hoc Networks

The advent of inexpensive wireless networking solutions has enabled a broad range of exciting new applications. Wireless network adaptors in portable computing devices, such as cellular phones, personal digital assistants, and laptops, can enable ubiquitous access to global information resources. Mobile ad hoc routing protocols allow nodes with wireless adaptors to communicate with one another without any pre-existing network infrastructure. While existing ad hoc routing protocols are robust to rapidly changing network topology, they are unable to deliver packets in the presence of a network partition between source and destination. For a number of compelling application classes, including mobile sensor networks and disaster recovery scenarios, nodes can be spread over wide geographical distances. Such wide dispersion makes it unlikely that a connected path can always be discovered, making it virtually impossible to perform
12 message delivery using current ad hoc routing protocols. Introduce Epidemic Routing, where random pair-wise exchanges of messages among mobile hosts ensure eventual message delivery. The goals of Epidemic Routing are to: i) maximize message delivery rate, ii) minimize message latency, and iii) minimize the total resources consumed in message delivery. Show that Epidemic Routing delivers 100% of messages with reasonable aggregate resource consumption for scenarios where existing ad hoc routing protocols are unable to deliver any messages because no end-to-end routes are available.

D. MaxProp: Routing for Vehicle-Based Disruption- Tolerant Networks

Disruption tolerant networks (DTNs) allow for routing in networks where contemporaneous end-to-end paths are unstable or unlikely. Unstable paths can be the result of several challenges at the link layer. DTNs can be based on moving nodes such as vehicles or pedestrians. Vehicles can provide substantial electrical supplies and transport bulky hardware, which may be inappropriate for use by non-mechanized peers. A number of the proposed routing algorithms for DTNs make few assumptions and are therefore widely applicable. In general, these algorithms are based solely on deciding which messages to forward during a meeting with a given peer and which messages to drop when buffers reach capacity. Here propose MaxProp, a protocol for effective routing of DTN messages. MaxProp is based on prioritizing both the schedule of packets transmitted to other peers and the schedule of packets to be dropped. Evaluations show that MaxProp performs better than protocols that have access to an oracle that knows the schedule of meetings between peers. The evaluations are based on 60 days of traces from a real DTN network we have deployed on 30 buses.

III. PROPOSED SCHEME

Mobile social networks (MSNs) are composed of mobile users that move around and use their carried wireless communication devices to share information via online social network services, such as Face book, Twitter, etc. Recently, the short-distance communication model has also been adopted by encountered mobile users in MSNs to share information, such as multimedia, large-size files, etc., at a low cost. Many routing algorithms that are based on store-carry-and-forward schemes have been proposed to address this issue. The existing algorithms can simply be divided into two categories. Here explicit to overcome delay tolerant a network process, sharing and receiving process like messages, text, video, audio, image via Zero Knowledge Multi Copy Routing Algorithm. The proposed process is Zero Knowledge Multi Copy Routing Algorithm.
The main process to be continued in a proposed process is

- Community homes
- Homing Spread

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- Throw Box (Copy the messages)

Community homes

Community Homes is used to cover all the Nodes with each there individual capacity. Because of each Cluster Head have individual Capacities. The Main usage of Community Homes to lead an important role in that project to share and receiving Messages or else.

Homing Spread

HS consists of three phases: homing, spreading, and fetching. In the homing phase, the source sends copies quickly to homes. Upon reaching the first home, the message holder (which includes the source) dumps all copies into the throw box of the home. In the spreading phase, the homes with multiple copies spread these copies to other homes and mobile nodes. These homes first spread their copies to each node that visits them by splitting the copies between themselves and those visiting nodes. Then, each node that receives copies spreads these copies to other homes and mobile nodes.

Throw Box

Throw box is used to copied all the information and dump all the information into side of the throw box. Each home has a throwbox that can locally store and forward messages. Many real applications can support throwboxes, such as the roadside units in vehicular ad hoc networks, the base stations in delay tolerant networks.

Zero Knowledge Multi Copy Routing Algorithm

Zero-knowledge routing algorithms do not require any prior knowledge on the contact probabilities or social characteristics of nodes. The typical algorithms include Epidemic and Spray&Wait. Epidemic spreads messages to each encountered node through the flooding strategy. To avoid producing too many message copies, Epidemic in the real implementation generally limits the maximum number of copies. Spray&Wait also limits the number of copies. Moreover, it adopts a binary splitting method to spread copies into the network until one message holder encounters the destination. Each node frequently visits a few locations, called community homes or homes, while the other locations, called normal locations, are visited less frequently. Each node might have multiple homes. Many real MSNs follow this unbalanced-visiting characteristic. That each home has a throwbox that can locally store and forward messages. Many real applications can support throwboxes, such as the roadside units in vehicular ad hoc networks, the base stations in delay tolerant networks. Even though there are no real throwboxes in some homes, the nodes that are visiting these homes act as the virtual throwboxes. If a node that acts as a virtual throwbox wants to leave the home, it can handoff its messages to another node in this home. The throwbox in each home has enough cache space to store messages from visited mobile nodes. This is reasonable since a real throwbox is generally equipped with a large cache. If a virtual throwbox has limited cache, multiple nodes that are visiting the home act as the virtual throwboxes at the same time, so that they can also provide a large cache together.

Advantages

- Homing Spread utilizes the home feature and sends the messages quickly.
- Homes to spread messages faster and it achieves a better performance.
- Community homes are important factors in message spreading.
- The throw box is used to copy and dump the information on it.
- In a real time dataset using the real throw box.

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IV. ARCHITECTURAL DESIGN

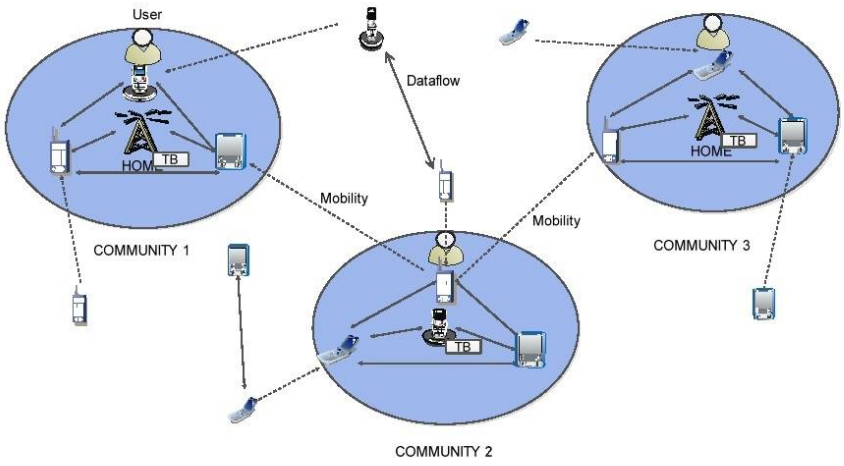

Fig.1 System Architecture

System design is the process of defining the architecture, modules, and data for a system to satisfy specified requirements. One could see it as the application of systems theory to product development. If the broader topic of product development blends the perspective of marketing and design, then design is the act of taking the marketing information and creating the design of the product to be manufactured. System design is therefore the process of defining and developing systems to satisfy specified requirements of the user.
The major part of the project development sector considers and fully survey all the required needs for developing the project. Once these things are satisfied and fully surveyed, then the next step is to determine about the software specifications in the respective system such as what type of operating system the project would require, and what are all the necessary software are needed to proceed with the next step such as developing the tools, and the associated operations. Generally algorithms shows a result for exploring a single thing that is either be a performance, or speed, or accuracy, and so on. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures and behaviors of the system. System architecture can comprise system components, the externally visible properties of those components, the relationships (e.g. the behavior) between them.

V. METHODOLOGY

Following are the most frequently used project management methodologies in the project management practice:

1. Community Network Creation &Access Point Allocation
2. Throw Box Creation and Fetch Copy
3. Homing Spread Access
4. DTN Destination

1) Community Network Creation & Access Point Allocation

Fig.2 Community Network Creation & Access Point Allocation

The community home mainly organizes the nodes. A main characteristic of Mobile Social Network is that mobile nodes in the networks generally visit some locations frequently, while visiting other locations less frequently. The communities home have a home. That home spread the messages via using homing spread. Homing spread (HS), for homogeneous MSNs, in which all mobile nodes share all community homes. HS is a distributed and localized

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algorithm. It mainly lets community homes spread messages with a higher priority. Those homes are called an Access point.

2) Throw Box Creation and Fetch Copy

The throw box can used to dump a message copies from a user. Each community home only create the throw box or simply, home in real traces can support a real throw box, a device that can locally store and forward messages, or can let the nodes that are visiting it act as virtual throw boxes. Such social characteristics can be utilized to guide message deliveries so as to improve the routing performance. The message Holder dumps all copies into the throw box of the home. And throw box is ready to send the messages to other nodes.

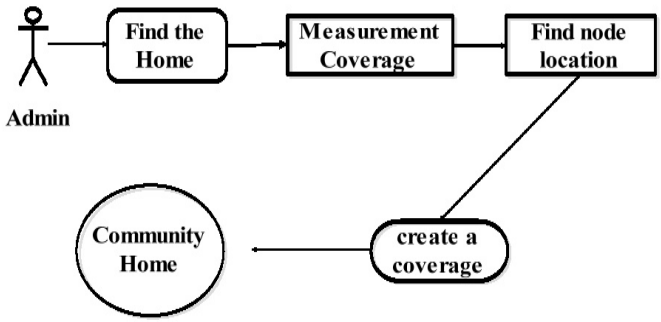


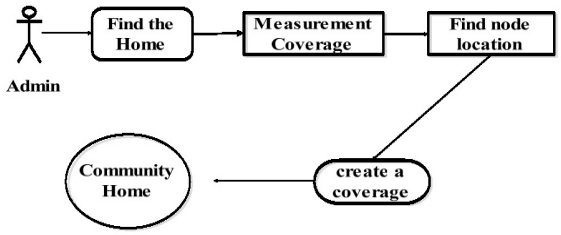
Fig.3 Throw Box Creation and Fetch Copy

3) Homing Spread Access

The homing phase, the source sends copies quickly to homes. Upon reaching the first home, the message holder which includes the source dumps all copies into the throw box of the home. When roaming occurs a message holder meets another node at a normal location before reaching a home, copies are split between the two nodes and both become message holders. HS algorithm to the heterogeneous MSNs, in which mobile nodes might have different community homes. HS can still achieve good message delivery performance in the heterogeneous MSNs.

4) DTN Destination

The Access point or home is ready to access when a message holder first visits a home, it will dump all copies into the home, and then it immediately enters the second phase to receive copies from the home. Reach other node via to fetch the message copies to spread out all corresponding nodes. That home plays an important role in the message spreading process. By using the notion of home, HS achieves a better performance via spreading and reaches the accurate destination without any delay time.



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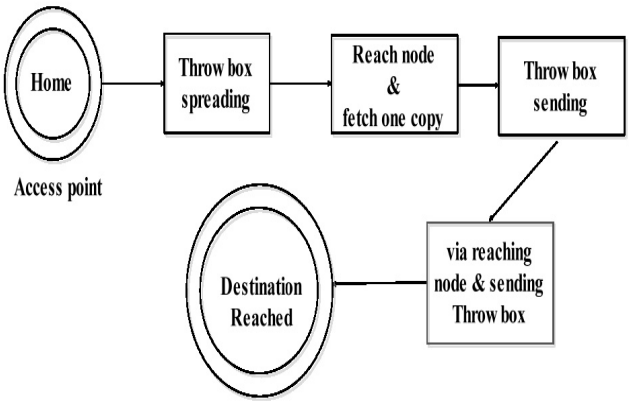

Fig.4 DTN Destination

VI. CONCLUSION

A special type of mobile social network, where the routing space includes some frequently visited homes, and propose a zero-knowledge multi-copy routing algorithm called Homing Spread. HS utilizes the home feature and sets a higher priority for homes to help spread messages quickly. Theoretical analysis and simulation results show that homes play an important role in the message spreading process. By using the notion of home, HS achieves a better performance than existing zero knowledge MSN routing algorithms

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