Content Sharing Systems in Mobile Social Networks

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I. Introduction

II. System Design

In this section, we present our design for the system. We first overview the basic concept of Bluetooth scatternet. Then we propose our protocol design on scatternet building up to implement the social relationship. We talk about the dynamic scenario in the system.

A. Bluetooth scatternet

When two Bluetooth devices come across, they will set up a *piconet* if they want to communicate with each other. In a piconet, the device sponsoring the connection takes the role of *master* while the other one becomes its *slave*. The max number of active slave devices in a piconet is limited to 7. Besides, the communication is performed only between master device and slave devices. Time-Division Duplex (TDD) is used for bi-directional communication.

A Bluetooth device can take part in different piconets meanwhile. The BT devices timesharing among different piconets are called "*bridging node*". Several piconets connecting though some bridge nodes form a *scatternet*. Bridging devices can act as different roles in different piconets. In particular, a device can be a master of one piconet while a slave in another piconet. Although Bluetooth Specification has described the concept of scatternet, the methods for the foramtion and optimization of scatternet are not indicated. Furthermore, based on the particular request of our application on the performance of scatternet and the behavior of the bluetooth nodes, we propose an original approach to form our scatternet.

B. Bluetooth scatternet design

To form the Bluetooth scattenet to distribute the video, we propose a new method based on social network. users will take into consider their social relationship with new discovered Bluetooth devices when their want to build connection between them. It is naturally that someone is willing to share his data source to strangers while others will select their friends in real society as the only ones having the right to get their data. In this system, we divide the users to three categories. The users in the first category will distribute their data only to their friends. The users in the second category are willing to provide their data to the users sharing the same attribute with them. At last, the users are so generous that they can distribute their data to all other users.

Based on the social relationship we have built, an original method to build up a scatternet is developed. The scatternet is built as a tree for several reasons. First, in the particular scenario, there is a server which provides the origin data source to the users. Second, when a new user joins the system, it is probably that he will connect with his friends, in the way that the friend he select to connect acts as the parent while the new user acts as a child. Such structure works like a tree.

The system takes into consider the dynamic mobility of node in system. The users join or leave off the system at an unpredictable time. The nodes in the system keep on discovery new Bluetooth device and monitor current connection. it's discovered by others. The Bluetooth devices who discover new devices should check whether they would like to connect to them. A node would like to connect to a newcomer satisfying one of 3 conditions:

It is necessary to check whether a node has the privilege to set a connection to and get the resource from another node. We define three scenarios in which a connection is allowed to be set based on the attribution and the preference of the node. The privilege is authorized if and only if the social relationship between the two node satisfies one of the conditions:

(1)one node is a friend of the other node;

(2)one node share the same attribution with the other node while the other node is willing to distribute his data to others with the same attribution;

(3)one node is a stranger of the other node, but the other node is willing to share his data to strangers.

In our design, the preference of a node is stored by a service record. If node A tends to connect to node B, node A searches the service record of node B first, and gets the preference of node B. Then node A judge whether his attribute matches the preference of node B, e.g. they satisfy one of the three conditions above.

We will describe the procedure for a new to join in the system. When a new Bluetooth user move to the range of the system, he first discoveries other users. After that, he can get the preferences and the attributions of them. He makes sense which users he has the privilege to get the resource from by check the social relationship between them and the preference of other users. After that, the new user can get a list of the users he can connect to. Since friends is the strongest social relationship comparing to attribution sharer and stranger, while stranger is the weakest one, we can get a priority sequence from highest to lowest as: friends, attribution sharer, stranger. When the new user chooses users to connect from the list, he will choose the one with the highest priority. Then a connection socket is sent and a connect is built to send data to the new user.