Friend U : A Tag-Based Mobile Social Networking Platform

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Abstract.

Most web 2.0 social network applications focus on matching and interactions between people who sit near by computer devices. For outdoor activities, especially for the location-based activities, users can not know whether a friend is nearby or not through such services. To build relationships instantly between people who are nearby, this paper proposes a location-based mobile social network application, called FriendU, and shares the experiences of design and implementing the FriendU system.

Keyword: Social Network Services, Location-Based Services, Mobile Web 2.0.

1. Introduction

With the growth of web 2.0 applications, people are connected by social network services/systems (SNS) based on their interests or personal profiles. There are several famous social service web sites around the world. For example, Facebook is a social utility that connects people with friends and others who work, study and live around them [1]. MySpace is a popular social networking website offering an interactive, user-submitted network of friends, personal profiles, blogs, groups, photos, music and videos for teenagers and adults internationally [2]. For special interest groups, MyChurch provides free social networking for Christian churches [3]. NurseLinkup offers a social networking site for nurses [4]. PoliceLink brings members of law enforcement community together to promote officer safety, and provide resources and services to advance careers [5].

Most of these social networking applications try to connect virtual world people who sit nearby a computer or hand-held device. Users of such systems do not know how far the real world geographic distances their friends are [6][7]. However, in our daily life, we sometimes need to know is there any friend or expert nearby or not, even know the precise geographic location of them. For example, it would be helpful if you can reach the doctor nearby once you try to relieve a victim. It would also be great if you can find someone nearby who has the same interests with you when you are on the boring business trip abroad.

It is the purpose of this paper to propose a mobile social network application, called FriendU, for outdoor users and activities. Based on the tag-based social network technology, the FriendU system is implemented by integrating several cutting-edge components, including tag-based social networking system, Geographic Information System (GIS) modules, Google Map, and Google Android platform [8] [9]. Users can use FriendU to improve the mobility for

off-the-shelf social networking sites.

2. Related Works

The FriendU system integrates several existing components to fulfill the mobility requirement for the outdoor users and activities. Here are background knowledge for these components.

2.1 Global Information and Positioning System

FriendU system is not a new GIS system but reuses the existing GIS and Global Posiitoning System (GPS) modules to get and display the geographic location information for each user. For budget issue, in our FriendU implementation, we choose the PaPaGo!SDK to be the GIS platform to get the GPS location of each Client Agent and use the Google Map module to display the result of user queries [10]. We also design an adapter in FriendU Client Agent for replacing the PaPaGo!SDK in the future. FriendU users can also implement their own adapter for GIS integration.

2.2 Tag-Based Social Networking System

There are several tag-based web 2.0 social networking sites, such as Twitter which is a social networking and microblogging service utilising instant messaging, SMS or a web interface [11]. Users can tag themselves by identifying their personal profiles and interests in those systems. Another user can subscribe or submit queries for his interests. The SNS system will reply him answers which consist of several users in the same interests. SNS servers treat the tag as parts of personal profiles, and return the answers by calculating the relationship and weighting of each tag string. There are several famous string searching or matching algorithms can be used to implement the tag searching and answering functions. For example, the Boyer–Moore string search algorithm is a particularly efficient string searching algorithm, and it has been the standard benchmark for the practical string search literature [12].

Again, the FriendU system is not trying to propose a new tag string searching or matching algorithm, but tries to integrate tag-based social networking systems to enhance the mobility and location-based functions.

3. The FriendU System

The FriendU system is composed of client agents on the hand-held devices and the server side components. Figure 1 shows the GUI snapshots of submitting a query of interest from a mobile device, and getting the answers back from the server. The answers are consisted of object identifications as well as the location information of each object. Client Agents will display the results on the Google Map based on the location information.

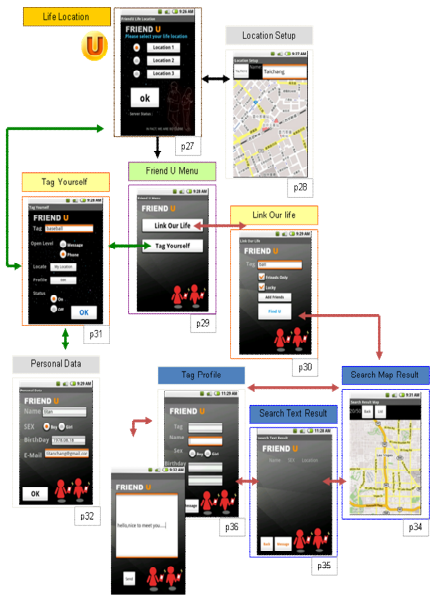

Figure 1. Snapshots of the FriendU System

3.1 FriendU System Architecture

To provide the mobility and location services to existing web 2.0 social network services, the FriendU system is proposed to be device and platform independent. Figure 2 illustrates the system components of the FriendU system. The whole system is integrated with the Client Agent, tag-based social networking modules, OpenID module, and the Location Manager.

Figures 3 articulates the components of the FriendU Client Agent. The Client Agent is responsible for interaction between FriendU server, the GPS adapter, and Google Map module. The GPS module is responsible for getting the geographic location information of FriendU client agents. Once getting the location information update from the GPS module, the Client Agent will update it to the Location Manager in the server side. On the other hand, the Google Map module focuses on the display of the location on the map for each answer object. Client Agents will trigger the Google Map module to update the location of answer objects.

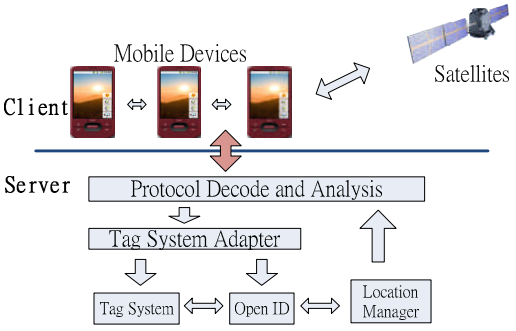

Figure 2. The FriendU System Architecture

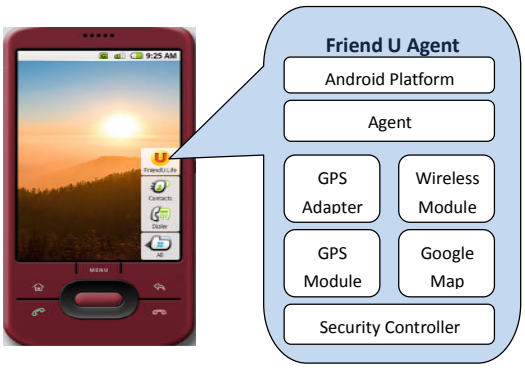

Figure 3. The FriendU Client Components

3.2 Implementation Issues

Device and tag system independent is one of the key features of the FriendU system. That is the reason why the FriendU system is implemented on Google Android platform by Java language. There are also some experiences regarding to system implementation are shared in the following sub-sections.

3.2.1. OpenID v.s. Personal Profile

OpenID is currently the emerging standard for web 2.0 social networking systems to identify users and personal profiles [13]. FriendU system proposes a tag system adapter to integrate both tab system and OpenID module. FriendU application developers can replace the tag system to any other SNS applications which support OpenID.

It would be a trade-off to use OpendID as the format of personal profiles of FriendU users. From our experiences, if you put all user profiles, including personal identification and interest, into the OpenID, it will decrease the system performance due to mass OpenID transmission and exchange between FriendU server and Client Agents. If you separates specific interest tags from OpenID, FriendU application developers will need to implement their own tag

matching or searching functions by their own. It would be an important issue while implementing the FriendU system to decide the content of the OpenID.

3.2.2 FriendU Communication Protocol

To transmit the location information and tag strings between Client Agents and the FriendU server, the FriendU system communication protocol is designed over TCP/IP UDP. Any request from mobile devices will be packed into a FriendU packet to the server side. There are three type of packet format in order to check the correctness of the packets. Table 1 shows the normal packet definition. All requests will be packed in this format. Table 2 shows success answer packet definition (ACK). If the end device receives the right packet, it will send back this information. Table 3 shows fail answer packet definition (NACK). Of course, if it fails to pass check, it will send back some error information to ask the packet again.

Packet Field	Description
Header	2 bytes 0xAA + 0xBB
Command	1 byte,
Phone Number Length	Phone Number Length
Phone Number	Phone Number
Parameter	According to Command
End	2 bytes 0xAA + 0xCC
Checksum	1 byte

Table 1：Normal Packet Definition

Packet Field	Description
Header	2 bytes
	0xAA + 0xDD
Command	1 byte
Phone Number Length	Phone Number Length
Phone Number	Phone Number
Checksum	1 byte

Table 2：Success Answer Packet Definition

Packet Field	Description
Header	2 bytes 0xAA + 0xEE
Command	1 byte
Phone Number Length	Phone Number Length
Phone Number	Phone Number
Error Code	Error Code Number
Checksum	1 byte

Table 3：Fail Answer Packet Definition

3.3.3. Tag Context

A tag context is the content of personal data including the identification, profile, and interest information. Although the OpenID is used to be the interface and context format for personal identification and profiles, the tag context will vary for different FriendU applications. To meet the requirements of mobile web 2.0 application, FriendU separates the tag context into three parts, and they are UserData, Pre-Assorted Tag, and Control Command. The UserData is the most important part got form user. It includs the basic personal information, definition of tag, function permission and so on. The Pre-Assorted Tag is designed to offer better matching service for further FriendU applications. The Control Command is designed for FriendU application developers to have specific code implementation. It will provide the flexibility for future

enhancement of the FriendU system.

3.3.4. The Selection of Mobile Devices

The FriendU Client Agents only work on the mobile devices equipped with Internet and GPS capability, such as GPRS, 3G, WLAN, GPS and the likes. From our experience, it consumes large energy while 3G and GPS modules are enabled together in mobile devices. Battery consumption of mobile devices will be a critical issue while promoting or implementing the FriendU applications.

3.3.5 Privacy Issue

There will be many security concerns while implementing a mobile social networking service. In our FriendU system, a Security Controller is suggested to guard the user privacy [14]. Currently, we use the simplest way to implement the Security Controller is to maintain a “white name list” and a “black name list” to accept or reject the request to build the connection from strangers. In the future, FriendU application developers can implement their own filters to guarantee the user security.

4. FriendU Applications

In previous works, there are surveys on introducing tour or scenic spot with mobile devices. Based on the dynamic update of user location information, FriendU system can introduce new mobile applications for outdoor users and activities [15]. Here are some potential FriendU applications.

Case A: Amusement

The initial idea for the design of FriendU is for amusement. When you want to play baseball but can’t team up, or you can’t find partners go to movies together, you can use FriendU to search or match people around you and make connection between you and them. You can easily enjoy leisure entertainment with people of the same interest face to face.

Case B: Knowledge+

Similar to Yahoo Taiwan Knowledge+ functions, you can get help by people who is nearby you. When you have some problems and need consultants, you can type keyword (for example, program design) in FriendU. You may find experts willing to help you instantly. In the future, we look forward to using “Trust Number” to allure more people to become seeds of experts of FriendU Knowledge+ [16].

Case C: Conversation Setup

It is embarrassed that people don’t know how to have an enjoyable conversation with people who are not familiar. Users can use FriendU to know which topics are suitable for the first conversation. FriendU can suggest the suitable topics for conversation setup.

5. Conclusion and Future Works

The design, implementation, and potential applications of FriendU system is proposed to meet the potential requirements of mobile social networking services. With the design the FriendU adapters, FriendU developers can also replace the sub-systems based their demands. Even they can enhance the functionalities currently proposed by FriendU easily.

Due to the speed of mobility, the performance to identify users of the same interest is not good currently. We plan to tune the system

performance well and launch the FriendU service to the Internet soon in the near future.

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