Analysis of Some popular Mobile Social Network Systems

Chang Tong
Helsinki University of Technology
tchang@cc.hut.fi

Abstract

With the rapid development of mobile devices and wireless technologies, a large number of mobile social network systems have emerged in the last few years. The migration of social networks from web-based applications onto mobile platforms not only increases the connectivity of people, but also promotes the convenience of people's life. Integrated with location-based information services, mobile social networks can help users search for a friend or a friend of a friend nearby, or glean some location-related information. This paper studies some current popular mobile social network systems,namely, Dogeball, Twitter, and Jaiku, analyzes their services, architectures, technologies used to provide location-based information, interaction methods, and other issues. Mobile social network systems have many advantages over traditional web-based social network systems, but they also face some challenges, such as business issues, privacy protection, and correct use.

KEYWORDS: mobile social network systems, Dogeball, Twitter, Jaiku

1 Introduction

A mobile social network [5, 14, 12] is a virtual community for individuals of similar interests to connect with one another using mobile devices, such as mobile phones and PDAs. Initially, social networks were based on the Internet, and many people used it as a way to communicate with their family members, co-workers, friends, and strangers too. Later, as a result of the widespread use of mobile phones, the advent of more mature mobile platforms, and the development of location-based services, social networks migrated from web-based applications onto mobile platforms. The functionalities of the current mobile social network systems can be very sophisticated and comprehensive. Users of a mobile social network system can create their own profiles, make friends, search for a company nearby, and share photos and blogs all by using their mobile phones. Mobile social networks are also ideal channels for users to seek some location-specific and time-specific information, since this kind of information is often not available on the Internet or elsewhere. [8]

Many mobile social network systems exist nowadays.Dodgeball, Jambo Networks, Plazes, Myspace, playtxt, Friendster, GoPets, Jaiku are just some of the most popular ones. The majority of the users of mobile social networks are people aged 20-35, who have a lot of friends, go out a lot, and are very social. [11] Although the number of mobile social network users is not very great at present, people believe that mobile social network will become much more popular in the near future.

In the resent few years, some papers have investigated mobile social network related technologies, or have made case studies of a certain mobile social network system, mostly, Dodgeball.[11, 16, 10]However, there is no paper having made a systematical analysis and comparison of mobile social network systems. This paper will try to analyze and compare some of the most popular mobile social network systems according to some chosen criteria.

The rest of the paper is organized as follows. In the second section, the criteria which are chosen to analyze mobile social network systems are presented. Then some popular mobile social network systems, that is, Dodgeball, Twitter, and Jaiku, are analyzed according to the chosen criteria. The benefits and challenges of mobile social networks are discussed in the next section. And finally, some conclusions will be drawn about the development of mobile social network.

2 Methods

In this paper, I will analyze and compare three mobile social network systems, that is, Dodgeball, Twitter, and Jaiku. I choose these three systems because they are some of the most popular mobile social network systems nowadays, and there are some differences between them.

This paper will study these mobile social network systems according to the following criteria: (i) what kinds of services they provide, (ii) what their architectures are like, (iii) whether they are hybrid systems or mobile systems by design, (iv) what technologies they use to provide user's location information, (v) what methods users can use to interact with servers. A hybrid system means a system which is first developed as web-based, and migrates or extends to mobile platforms later. I choose these criteria because they are important factors of mobile social network systems, and investigating they can help us understand both the similarities and differences of different systems.

In addition, issues like business, privacy, and correct use of these systems will be discussed, as they are also critical to the success of a mobile social network system.

3 Study of mobile social network systems

A few small companies have begun to exploit the growing demand for mobile social networks, and a large number of mobile social network systems have been developed and put into market. Dodgeball, Twitter, and Jaiku are just some examples of the most popular systems nowadays.

In this section, I will study these three systems according to the following five criteria: services, architecture, purely mobile or hybrid, location awareness, and interaction method.

3.1 Services

3.1.1 Dodgeball

Dodgeball [10] is a New York City-based system that merges Location Based Services(LBS) with social networks to help people to connect with people around them. The Dodgeball company was founded in 2000, and was acquired by Google in 2005. Dodgeball service is now available in 22 American cities and has more than 15000 users.[1]

The aim of Dodgeball is to help users meet with friends when they are in the downtown area of the city. A user can join Dodgeball by filling out a profile, posting his/her photographs on the Dodgeball website (http://www.dodgeball.com), and listing his/her friends and their cell phone numbers.[16]

Dodgeball primarily provides two kinds of services, [9] which are described briefly as follows.

- The first service is location notification. After a registered user "checks-in" by sending a text message containing his/her current location information to Dodgeball inbox, his/her friends or friends of friends who are within ten street block radius will receive a text message indicating his/her location and check-in time. If the receiver is graphically near to the user, they can meet face to face if they want to. On the other hand, a user will be notified by a text message if a friend, friend of a friend, or "crush" of him/her has checked in within 10 street blocks. A "crush" is someone the user is anxious to meet. Users specify their "crush"s by viewing profiles of other members and designating ones they'd like to meet.

- The second service is "shout", a user can broadcast messages to all the people in his network.

A major characteristic of Dodgeball is: the dense the urban environment, the more valuable the service becomes. Thus, the ideal environment for using Dodgeball is where there are a large number of potential meeting spots and thousands of potential people. [16]

3.1.2 Twitter

Twitter is a "social-networking and micro-blogging" service developed in San Francisco and lunched in October 2006. Twitter describes itself as "a service for friends, family, and coÍCworkers to communicate and stay connected through the exchange of quick, frequent answers to one simple question: What are you doing?" [2]

To join Twitter, a user can register for an account by filling out a profile, posting his/her photo on Twitter website (http://twitter.com/), and filling in his/her mailbox address. Twitter will check the user's contacts from the user's mail box and search if some of them are already Twitter users, so that the user can specify to follow their updates. The user can also invite other contacts to Twitter. Twitter does not require users to use mobile phones to post or view updates, although it encourages users to do so. If a user wants to use Twitter service via mobile phone, he/she needs to post his/her mobile phone number to Twitter server and then verify the number by sending a SMS message which contains an authentication code to Twitter.

The primary service provided by Twitter is "micro-blogging". Twitter allows users to send "updates" (also called "tweets"; text no longer than 140 characters) to the Twitter server, via SMS message, instant messaging, or twitter's web site. Updates are instantly displayed on the user's profile page and delivered to other users who are in the user's network and have signed up to receive the user's updates. The sender can specify which people in his/her network can receive his/her updates (delivering updates to everyone is the default). Users can receive updates via the Twitter website, instant messaging, SMS, RSS, email or through a third-party application which uses Twitter's API. If a user utilizes mobile phone to access Twitter, he/she can post an update to Twitter by sending a text message to a Twitter number which is different in different regions of the world, e.g. 40404 in the U.S., 21212 in Canada or the long code: +44 7624 801423 in U.K.

Users can also specify the properties of their accounts. If they want to stop following their contacts's updates, they can send a text message "off" to Twitter any time, and star following again by sending a message "on" to Twitter later. They can even set quiet times on Twitter so that they are not interrupted, e.g. at night. And if users don't want everyone in the world to be able to see their updates, they can make them private and visible only to people approved.

3.1.3 Jaiku

Jaiku is a competing system to Twitter. It was founded in February 2006 in Finland. It was launched in July 2006 and purchased by Google in October, 2007.

Jaiku [3] is a social networking, micro-blogging and lifestreaming application for web and mobile phones. The services provided by Jaiku is quite similar to its competitor Twitter, as the main service of Jaiku is also "micro-blogging". It enables users to update their activity, availability, and location onto their Jaiku pages and view the updates of their contacts. The posts in Jaiku have a smaller size (100 characters) than those in Twitter, but Jaiku is more similar to a real blog site as posts get their own pages where comments can be added.

One of the main differences between Jaiku and Twitter is Lifestream, an internet feed that shares users online activities utilizing other programs such as flickr for photos, last.fm for

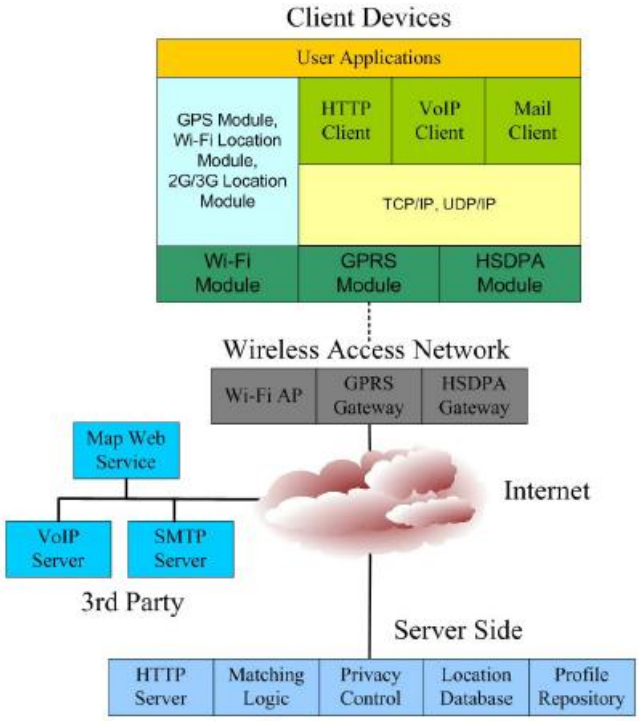

Figure 1: System architecture for mobile social network services in the context of social services

music, and location by mobile phone.

First, Jaiku was only compatible with Nokia S60 platform mobile devices through its Jaiku Mobile client software, later it became also compatible with other mobile platforms, such as iPhone. Jaiku Widge is a third-party software developed using Jaiku's API, and it can be used on most of the mobile phones. "Jaiku widget - Read your friends Jaikus as well as public Jaikus and update your own Jaiku whitout paying the SMS fee!" [4]

3.2 Architecture

The common architecture for mobile social network systems is client-server architecture. The server consists of a number of components including http server, databases, profile repository and application logic. The clients are the web interface and (or) the applications running on users' mobile phones. [7]

[6] has proposed a general architecture for building mobile social network services, which is presented in Fig. 1. It consists of four main components: (i) the Client Device, (ii) the Wireless Access Network, (iii) the Internet and its hosts, and (iv) the Server Side. There are five modules at the Server Side: Web Server, Location Database, Profile Repository, Matching Logic, and Privacy Control.

The architectures of Dodgeball, Twitter, and Jaiku are similar to but simpler than the general architecture described above. They all use Client/Server architecture, but their clients are a little different. The clients of them all include the web interface, however, Dodgeball and Twitter do not require application softwares being installed on users' mobile phones, since users only need to sending SMS messages and do not need any extra software. On the other hand, for supporting mobile phone use, Jaiku has "Jaiku Mobile" for Nokia S60 handsets and "Jaiku widge" for other Java phones. [3]

Another difference between these three systems is that Twitter and Jaiku have API available to allow outside developers to develop third-party softwares. Jaiku API has been used to develop a bunch of third-party applications in the categories of IM connectivity, web applications, desktop applications, mobile applications, blog applications, and virtual world applications. For example, IMified's Jaiku widget enables posting to Jaiku from AIM, MSN, GTalk/Jabber, and Yahoo. The Jaiku+Twitter widget enables posting to both services at once. And Jaiku Moblet is a mojax moblet to directly interface with Jaiku through the Jaiku API via mobile phones. [3]

3.3 Purely mobile or hybrid

Here, we are going to take a look at whether Dodgeball, Twitter, and Jaiku are purely mobile systems or hybrid systems. A purely mobile system is a system that is mobile by design and supports mobile use at the beginning. While A hybrid system means a system which is first developed as web-based, and migrates or extends to mobile platforms later. While social networkings were initially only accessible through websites, with the development of the mobile platform, hybrid online/mobile communities have emerged with users participating both through a website and by using their mobile devices,e.g. mobile phones, PDAs.[16]

Dodgeball, Twitter, and Jaiku were all hybrid systems, because they were first only web-base, and supported social networking in mobile environment later. And currently, they allow users to access the service through both the Web and mobile phones.

3.4 Location awareness

Locations is a very strong and valuable information for building and retaining social interaction. Location awareness is the biggest difference between web-based and mobile social network systems, and it is critical to the success of a social network system. A user's location can be obtained by using a lot of different methods, such as Bluetooth, GPS (Global Positioning System), and cellular network assisted location technology.

When a Dogeball user "checks-in", he/she sends a text message which includes his/her current location, like "@NYU Library" to nyc@dodgeball.com. When Dogeball server receives this message, the server knows that the user is currently at the library of New York University. Dogeball server uses a different in-box for each city, for example, nyc@dodgeball.com for New York City, and sf@dodgeball.com for San Francisco. So after the user checks in, the server first look at which in-box the message is to figure out what city the user is in. Then the server converts the user's location to latitude and longitude by searching a database which contains GPS coordinates for many of the most popular places in the city, such as restaurants, museums, theaters, and sports arenas. Then the Dodgeball server

computes the location and finds out if someone in the user's network is currently in ten blocks radium. [10]

For Twitter and Jaiku users, if they include their current location in the updates they post to the server, their location will be known by people who read the updates.

Dogeball, Twitter, and Jaiku are not really location aware systems, because they get user's location information only through user's notification, and if a Dodgeball user does not "checks-in" and a Twitter/Jaiku user does not tell his/her location in his/her "micro-blogging", the system knows nothing about user's location. And for Dodgeball, if the user's check-in location name is not in the location database, e.g. the location is not popular enough, the Dodgeball will encounter a problem to convert the location to GPS coordinates and search for nearby users.

3.5 interaction method

For both Dodgeball and Twitter, SMS message is the only method for user to interact with server. While Jaiku provides two ways for user to to send or read updates, that is, through SMS message or Jaiku's own client software. This use of client software has both advantages and disadvantages. As almost all the mobile phones and cellular networks support SMS message, both Dodgeball and Twitter can overlay easily on almost any existing cellular infrastructure and are compatible to almost all the mobile phones. Jaiku's client software may make the posting and viewing of updates easier and more pleasant, but it also make Jaiku has a limitation on compatible mobile platforms. First, Jaiku was only compatible with Nokia S60 platform mobile devices through its Jaiku Mobile client software,and later in order to be compatible with other mobile platforms, some third-party software had to be used.

This also influences practicality. People often use mobile devices on the spur of the movement, for example, betwwen pressing work engagements or while in transit. Mobile social networking systems therefore must be simple to use and quick to operate, or people will choose another form of communication, such as making a phone call. As for Dodgeball and Twitter, all the interaction is done through SMS messages, which people probably use all the time anyway, so there's not much to learn. And Jaiku software needs some work to get familiar with it, but it seems not difficult to learn. In fact, Dodgeball is not so good at practicality for people who travel from city to city a lot. It requires the user to manually type in and send a text message which includes his current location to the Dodgeball server. If a user does not send this kind of "check-in" message to server, the server has no idea about where the user is at. So in fact Dodgeball is not totally location aware, however, this characteristic can protect user's privacy better as user can decide whether to disclose his location and when to disclose his location. The other issue is that the "check-in" message must be sent to different in-boxes when the user is in different cities, this causes some inconvenience as user needs to remember many sending addresses.

3.6 Comparisons

From the above discussion, I find that the three mobile social networking systems, Dodgeball, Twitter, and Jaiku have more similarities than differences. The comparisons among them in services, architecture, purely mobile or hybrid, location awareness, and interaction method are listed in Table 1.

4 Analysis of mobile social network

In this section, first, the advantages of mobile social networking systems over web-based social networking systems is presented, then some possible improvements and challenges of mobile social network systems are proposed.

4.1 Advantages over web-based systems

Social network technologies claim to map virtual connections between people. The web site built upon social networks may be fun and interesting to browse but users may lose interest quickly if there is no direct way to correlate the virtual social network with the social network in real world.

Although web-based social networks make the communication among people more convenient and easier, it is criticized to increase the isolation of people as it decreases the face-to-face meeting between people. They are not really social because they require users to be in front of a computer to connect with friends and make new acquaintance. And at most of the time, users of a web-based social network only communicate with each other through network, and do not meet face to face. In the contrast, mobile social network can promote the face-to-face meeting between friends and even strangers. By using their mobile phones, users of a mobile social network can search for nearby friend or like-minded people, and meet face to face anywhere, anytime. Users can use desktops, laptops, PDAs, mobile phones to access to network continually in their work and social lives. And the mobile social networks can be functional in everyday social settings, such as in a bar, on a bus, at a conference, and so on. So if you are at the cafe, you can tell your friends that instantly, Or if you just watched a particularly good movie, you could micro-blog about that. The ease of mobile social networking is that you can do it on your phone in a few moments. Hence we can say that Compared with web-based social networks, mobile social networks correlate with the real-world social network much better.

4.2 Improvements on Services

The services provided by the current mobile social network systems are still quite simple. Dodgeball provides primarily two kinds of services, location notification and message broadcast. Twitter and Jaiku's core services are both "micro-blogging". The potential of mobile social networking still needs more exploration. In the future, some other interesting services may be possible, such as sticky shadow, and efficient information search. And the location-based technologies can be truly applied in mobile social networking systems.

Systems	Services	Architecture	Purely mobile or hybrid	Location awareness	Interaction method
Dodgeball	location notification, message broadcast	S/C, no API available	hybrid	user notification	SMS
Twitter	micro-blogging	S/C, API available	hybrid	user notification	SMS
Jaiku	micro-blogging	S/C, API available	hybrid	user notification	SMS, client software

Table 1: Comparison of mobile social networkings

Sticky shadow [7] is a location-based messages that are left in a geographical place for specific people or groups of people. A sticky shadow can be configured to expire after a specific time, to be available in only a specific area and to be viewed only be selected recipients. When the intended recipients enter the space, the application on their mobile phones notifies them of sticky shadow. Sticky shadow may be used for multiple purposes, such as touring a visitor in a big park, telling story about a specific place, life bookmarks (set a "pick up milk" sticky shadow outside a grocery store), personal restaurant reviews for friends, scavenger hunts and games, and so on. However, a possible problem of sticky shadow is that to provide this service, the server must track the user's location all the time, and this may leak user's location information.

Mobile social networking can also be used for efficient information search. People often seek answers to questions by asking other people even they have other sources of information, such as libraries and Internet. Social networking is effective because some location-specific, community-specific, and time-specific information can not be gain anywhere else. By utilizing mobile phones, social networking information seeking is even more efficient. Consider the following situation: a user goes shopping, and finds that some goods are on sale, so he/she wants to publish this news because he/she thought that some other people may also be interested in it. If there is only wired web-based social networking, the user can only publish this news after going home and having the access to the computer. But if there is mobile social networking available, he/she can publish the real-time news instantly. So the information in mobile social networking is more time-efficient than web-based social networking.

An experimental mobile social network called PeopleNet [13] is an example of systems developed for efficient information search in a distributed manner. This network takes advantage of the fact that mobile devices are becoming more sophisticated and often support multiple network interfaces, e.g. a mobile phone, not only provides access to the cellular network, but also support short-range peer-to-peer connectivity such as Bluetooth. It propagates queries to users in specific geographic locations, called bazaars. Within each bazaar, the query is further propagated between neighboring nodes via peer-to-peer connectivity until it finds a matching query.

Another possible improvement is in the message through which users access the service. Currently, The kind of message is too limited. For Dodgeball, Twitter, and Jaiku, users can only send or read SMS messages to or from server. In the future, the content of the message should include text, audio, vedio or any combination of them.

It is an obvious trend that future mobile social network systems will become truly location awareness. GPS,Wi-fi, blutooth, and cellular network assisted location technologies can all be used to get user's location information. In fact, a mobile service accessed from a mobile device such as a mobile phone, is ąőlocation basedąŕ because the location of a mobile device is always known to the subscriberąŕs mobile operator.

4.3 Challenges

There are also many challenges existing for mobile social network systems, and the biggest ones may be business, privacy, and correct use. These three challenges are described in detail as follows.

4.3.1 Business

Currently, almost all the mobile social networks are free to use, including Dodgeball, Twitter, and Jaiku. Users only need to pay for the SMS messages they send and(or) received according to their cellular phone services. This amount of money is paid to users' wireless communication provider, not the mobile social networking company. So how do these companies make money? One way is to share the profit with wireless communication provider, as the service increases the amount of messages sent and received. Twitter tells its users "Depending on how you pay for text messages on your cellular phone service, you may be charged for each text message you receive or send via Twitter. Twitter actually pays for each message that they send out and receive as well, and have yet to make revenues outside of a few Google ads on their website". [2]

One of the founders of Dodgeball said "Technology is easy. Business is difficult.". And in fact, Dodgeball is planning to start charing its users some time later, but I am afraid that it will lose some of its users then.

4.3.2 Privacy

Mobile social networking systems must give users sufficient control of their personal data, especially their location information. [9]

The servers of some social network systems should not track the user's current location, as employing a tracking system would enable attackers to glean a user's location without the user's knowledge. [15]

It is good that Twitter and Jaiku allow user to set their micro-blog private or public. if a user does not want everyone in the world to be able to see his/her updates, he/she can make them private or visible only to people approved. However, it is all or nothing: all the user's posts will be either public or private. It would be better if there can be options that would let user make some posts public and others private.

And for users of mobile social networking systems, it is important to know how to protect their own privacy and security issues. They should be careful of updates which they are willing to share with the public when the updates have their location or activity information.

4.3.3 Correct Use

Fans of mobile social networking say it is a good way to keep in touch with busy friends. But some users are starting to feel 'too' connected, as they receive check-in messages or micro-blog updates too often. The continuous messages and higher mobile phone bills are quite annoying. Most reviews of Twitter and Jaiku are split between people who consider micro-blogging to be a breakthrough form of communication and people who think itąs an annoying distraction.

Following are some basic tips to help users get the most out of mobile social networking without being overwhelmed, or overwhelming others.

- Consider your audience. Remember who will read your updates and make sure it is something of value to them.
- Check in or update regularly but not too often.
- Turn off message sending from mobile social networking system if you start to feel like you are getting too many check-in or update messages.

5 Conclusion

With the rapid development of mobile devices and wireless technologies, a large number of mobile social network systems have emerged in the last few years. This paper analyzes some of the most popular mobile social network systems at present, that is Dodgeball, Twitter, and Jaiku, according to following criteria: services, architecture, location awareness, purely mobile or hybrid, and interaction method. After analysis, we found that the current mobile social networking systems are quite similar and have minor differences. Although mobile social networking has advantages over traditional web-based social networking, their services are still very simple and straightforward. Some new services may be provided in the future and the systems may become truly location awareness. Business, privacy, and correct use are three main challenges of mobile social networking, and need more exploration.

References

[1] http://www.dodgeball.com/.

[2] http://twitter.com/.

[3] http://jaiku.com/.

[4] http://www.widsets.com/widget/3450.

[5] Calabrese Francesco and Kloeckl Kristian and Ratti Carlo and Bilandzic Mark and Foth Marcus and Button Angela and Klaebe Helen and Forlano Laura and White Sean and Morozov Petia and Feiner Steven and Girardin Fabien and Blat Josep and Nova Nicolas and Pieniazek M.P. and Tieben Rob and van Boerdonk Koen and Klooster Sietske and van den Hoven Elise and Serrano J. Martin and Serrat Joan and Michelis Daniel and Kabisch Eric. Urban Computing and Mobile Devices. *Pervasive Computing, IEEE*, 6:52–57, July 2007.

[6] Chang Yao-Jen and Liu Hung-Huan and Chou Li-Der and Chen Yen-Wen and Shin Haw-Yun. A General Architecture of Mobile Social Network Services. In *2007 International Conference on Convergence Information Technology*, pages 151–156, November 2007.

[7] Daniel Melinger and Karen Bonna and Michael Sharon and Mohit SantRam. Socialight: A Mobile Social Networking System.

[8] Hirokazu Tomiyasu and Takuya Maekawa and Takahiro Hara and Shojiro Nishio. Profile-based Query Routing in a Mobile Social Network. In *The 7th International Conference on Mobile Data Management*, pages 105–105, May 2006.

[9] Ian Smith. Social-mobile applications. *Computer*, 38:84–85, April 2005.

[10] JAY DIXIT. The Artfuląland MobileąlDodger. *IEEE Spectrum*, pages 59–60, March 2005.

[11] Lee Humphreys. Mobile Social Networks and Social Practice: A Case Study of Dodgeball. *Journal of Computer-Mediated Communication*, 13, January 2007.

[12] Marta C. Gonzĺćlez and Pedro G. Lind and Hans J. Herrmann. System of Mobile Agents to Model Social Networks. *The American Physical Society*, March 2006.

[13] Mehul Motani and Vikram Srinivasan. PeopleNet: Engineering A Wireless Virtual Social Network. In *International Conference on Mobile Computing and Networking*, pages 243–257, August 2005.

[14] Mimi Sheller. Mobile publics: beyond the network perspective. *Environment and Planning D: Society and Space*, 4:39–52, February 2004.

[15] Nathan Eagle and Alex Pentland. Social Serendipity: Mobilizing Social Software. *Pervasive Computing, IEEE*, 4:25–38, January 2005.

[16] Ziv Nina D. and Mulloth Bala. An Exploration on Mobile Social Networking: Dodgeball as a Case in Point. In *The International Conference on Mobile Business*, pages 21–21, June 2006.