

# Connecting People through Physical Resources in an Office Environment

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## ABSTRACT

With the rising popularity of social networks, people's locations are being used for providing rich mobile social services. We present a mobile social service in our office environment called Find & Connect. We use WiFi to record a user's position and allow users to efficiently find, reserve and manage office resources, like meeting rooms and desks, and easily connect to other colleagues through scheduled interactions like having a meeting and/or unscheduled yet implicit interactions like ephemeral encounters. We then describe how we manage office resources and connect with people, followed by a user study that we conducted in our office.

**Author Keywords** Workplace management, ephemeral social network, mobile social network, resource, proximity.

**ACM Classification Keywords** H.5.2 [Information Interfaces and Presentation]: User Interfaces – Evaluation/methodology, H.5.3 [Information Interfaces and Presentation]: Group and Organizational Interfaces – Computer supported cooperative work.

**General Terms** Design, Human Factors, Experimentation, Measurement.

## INTRODUCTION

Current location-based social networking applications such as Geolife [5], Brightkite [3], and Foursquare, mainly focus on outdoor environments using GPS for positioning [1]. However, little work exists on indoor location-based social networks. Inspired by Jyri Engestrom that “social networks consist of people who are connected by a shared object” [2], we present an indoor location-based social network called Find & Connect for office environments. Find & Connect uses a person's location and office resources such as meeting rooms where employees meet and connect with each other, to facilitate social networking. Employee locations are tracked using WiFi to efficiently find, reserve and manage office resources like meeting rooms to easily connect with others through scheduled interactions like having a meeting and/or unscheduled yet implicit interactions like ephemeral encounters.

## OFFICE RESOURCES AS SOCIAL OBJECTS

Each resource in Find & Connect has an associated position. For resources that are static (eg. meeting rooms), we record the centre and the length and width of the room according to the floor map. For resources that are dynamic (ie. people), we record the position as follows. We record the WiFi signal strengths of the user's phone to the nearest WiFi access points, and then compare the signal strength to a positioning model that has recorded all the signal strengths from all locations around the floors in the building (called a site survey). The approximate location is then calculated and converted into an (x, y) coordinate on the floor map. It took approximately 3 days to do the site survey for our company building with 6 floors and employing 2 people.

## Managing Office Resources

The resources that are managed are meeting rooms. Often, meeting rooms are booked in our meeting room booking system but are never occupied, hence preventing others to use the room and having to find another room. By integrating the user's position with the room reservation system, we can determine the room's availability and occupancy. When the reserved meeting is about to start in 5 minutes, Find & Connect will check the meeting organizer's location and if the organizer is not in the meeting room or nearby, Find & Connect will push a notification message to the organizer to ask if the meeting room is still required, otherwise, it will be cancelled and the room resource will be released (“Cancel Meeting”). Users can also find where meetings and meeting rooms are on a map, along with their daily schedule.

## Connecting to People

To provide social capabilities around the office resources, we record the people that have used those resources. In the context of meetings, after the meeting has ended, all meeting attendees in the room will receive electronic business cards from each other. In this way, people know exactly who they have met and do not need to search for those people in the company directory, because they get that information right after the meeting. If user A wants to know how she knows user B who is nearby, A can use the “View Everyone (Nearby)” function, then use “Meeting History” to obtain the information of meetings both A and B have attended, or meetings both B and one of A's friends

have attended. This allows users to add new friends based on other information such as encounter history, similar interests and instant messages which greatly help users become friends and forms the ephemeral social network.

We also provide mobile Q & A in which a user can send a question to a group of people, all people, or only those people nearby. The motivation behind mobile Q&A is that very often, there are questions that are context specific which you do not want to send as a broadcast message such as “What is the lunch special for today?” This could be sent to your friends but maybe none are at lunch. We can send this question to people that are in the cafeteria and are having lunch, then they can answer it. This is a mobile version of community Q&A systems where the Q & A is directly targeted, relevant, and in real-time.

Finally, to encourage users to add others, we provide friend recommendations where we use not just similar profile, shared content, context (eg. in the same meeting), and common friends (like other recommendation algorithms use), but we also add encounter information, messages and mobile Q&A. This is accessed from the “Recommend friends” option in our application. More details of the friend recommendation system can be found in [4].

## DEPLOYMENT AND RESULTS

We deployed Find & Connect in our office from May 24 to July 25, 2010 with a total of 113 users. We show results for the usage, physical proximity and social networking of our application.

### Usage

We discover that most of the users from the Find & Connect trial used the Find features more than the Connect features. Overall, most of the users used the Meeting, Map and Profile features, for booking meeting rooms and finding where rooms and people are, more so than the connection and social networking features.

### Social Networking

In Figure 1, the number of requests for connecting people using View Profile, Make Friend and Find Encounter is shown. Users are interested in viewing other people’s profiles before making friends with them. (Note: “Make Friend” requests here include adding a new friend, accepting or rejecting a friend request). Find & Connect also helps people to remember the person they met before through the “Find Encounter” request. Therefore, users will never forget who they have met in meetings or through encounters.

### Physical Proximity and Social Networking

We next examine if encounters affects social networking. That is, if people encounter others more, then they will have a greater number of friends. Table 1 shows that people that have meetings have more social networking with a higher average number of people encountered, average number of friends encountered and average number of friends.

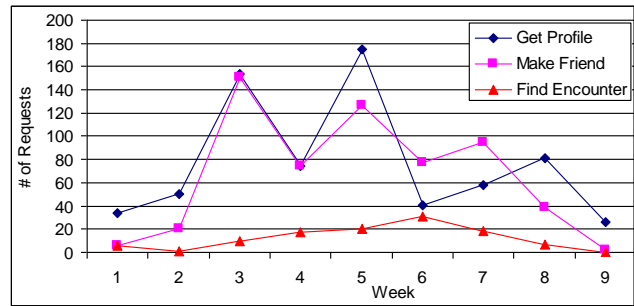


Figure 1. The number of requests related to connecting using Get Profile, Make Friend, and Find Encounter.

	All people	People that had meetings
Average # of people encountered	107.45	140.75
Average # of friends encountered	21.52	28.29
Average # of friends	4.94	5.39

Table 1. Effect of encounters and meetings on friendship.

## CONCLUSION

We presented a mobile location-based system called Find & Connect for connecting people around office resources using location and ephemeral social networks. We explain how the office resources can be used as social objects for social networking. Results show that Find & Connect is useful for meeting management and for connecting with people easily at any time. Future work will involve performing a detailed statistical analysis of the encounters and identifying ephemeral social networks.

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