Ubiquitous and Mobile Computing
CS 403x: Using Proximity and Homophily to Connect Conference Attendees in a Mobile Social Network

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Problem

- “Main objective” of a conference is to meet people that are in your research area
- Can be difficult to find these people in the short time frame of the conference
- Even more difficult to make connections with them
  - Business cards are still required, which is “tedious and requires physical interaction”
- Determine how to use proximity and homophily to connect attendees at a conference
Vision: Find & Connect

- Mobile web application
- Location-based social network for conference attendees
- Provides friend suggestions based on proximity and research interest similarity
- Allows users to manage profile with research interests, sessions attended, and other information
- Lists conference session information
- Displays notifications for user
Related Work

- Homophily Principle
- Physical Proximity
- Location-based Services
Homophily Principle

- In a network of people, humans tend to connect with similar people, and be friends with them
  - Characteristics, interests, beliefs, surrounding context (same school or conference)
- Medium to long-range
  - Facebook users’ probability of friendship is inversely proportional to their distance
- Short Range
  - Distance makes much less of a difference
Physical Proximity

- Phone GPS has been used before to detect people’s offline behaviors
- GPS has accuracy problems, especially inside
- RFID positioning systems are able to measure fairly accurately inside
Location-based Services

- Commercial: HomeExplorer, Foursquare, etc
- Research: Intel’s PlaceLab, MIT’s iFind
- Conference proximity analysis
  - Face-to-face contact at a scientific conference and a museum exhibition
  - Office environment
  - Live Social Semantics - physical and online interaction
- Above research doesn’t help users enhance social network
Methodology

- Combine the conference program with indoor location and proximity sensing
- Conduct pre-survey about motivation for adding contacts on online social networks
- Deploy Find & Connect at a conference (UbiComp)
- Use social network analysis to identify properties and metrics, along with data mining and surveying to understand user behavior
Schedule for the Conference

- **Ceremony: Opening**
  
  **Time:** 08:30 - 09:00
  
  **Location:** Zhulou - 1st floor

- **Keynote: Ubicomp keynote address - Jan Chipchase, Executive Creative Director of Global Insights at frog**
  
  **Time:** 09:00 - 10:00
  
  **Location:** Zhulou - 1st floor

- **Session 1: Being Human**
  
  **Time:** 10:30 - 12:00
  
  **Location:** Zhulou - 1st floor
Methodology: RFID

- Determined location of users with RFID
- Users carried RFID badges
- Conference fitted with indoor RFID positioning system
- Proximity between two users could be determined
  - Used as a factor in friend recommendations
- Determined conference sessions attended automatically based on location
Methodology: Contact Suggestions

- View conference attendees by proximity
  - Categorized into “Nearby, Farther, and All” lists
  - Can narrow by selecting specific research interests
- View attendees of a specific session
- View custom recommendations for individual user generated using EncounterMeet+ algorithm
  - EncounterMeet+ uses similarity and proximity data
Find Nearby People
Methodology: Adding a Contact

- Profile displayed
- Commonality, including research interests, encounters, sessions attended, and common contacts, shown in ‘In Common’ tab
- Contact Request
  - Can send custom message with request
  - Presented survey asking for reason for contact request
Adding a Contact

Add Adrian David Cheok as contact

Send a message

Hi your CoDine demo was cool!

Add as contact

I know Adrian David Cheok because we have:
- Encountered before
- Common contacts
- Common research interests
- Common sessions attended
- Known each other in real life
- Known each other online
- Added each other as phone contact

Other: Met at the demo session

Cancel
Personal Profile Page

People
Adrian David Cheok

Profile

Title

Company
Keio-NUS CUTE Center, National University of Singapore

Encounters (1)
Last: A-438 [ 2011-09-18 08:54:39.0 ]

Sessions attended (2)
- Tutorial 2: Building and Deploying Mobile Systems for Activity Recognition
- Workshop 4: The First International Workshop on Mobile Location-Based Service (MLBS)

Contacts (15)
- Fangxi Yin
Notifications

- Alvin Chin
  - Locate Me
  - Share Location

- Notices
  - Contacts Added (4)
  - Recommendations (10)
  - Public Notices (4)

- Sunny Wang added you as contact
- Michele Dominici added you as contact
- Bin Xu added you as contact
- Simon Gunkel added you as contact

- Hyoseok Yoon
  - View Profile

- Hi it's nice to see nokia connect n find again in ubicomp. I've used in uic10
Analysis/Results

- 241 participants (57% of 421 registered guests)
- Users spent an average of 11min. 44sec. in app per visit, with 16 page switches
- 11.66% of app use was Find Nearby page
- 40% of 571 contact requests were approved
- Authors had higher participation
- Average separation of participants is 4
- Average separation based on encounters is 3
- Only 2% of contact recommendations generated were converted to contact requests
Analysis: Contact Request Motivation

- Asked users primary motivation for adding someone in social network
- Similar data collected when contact added in Find & Connect
- Previous encounters were rated highly in both data sets
- Knowing each other in real life was strong in both, but significantly stronger in the survey results
- Common research interests and common sessions attended were significant in the Find & Connect results
Analysis

![Graph showing frequency of different number of contacts]

- Frequency
- Number of contacts
Conclusion

- Users made fewer contacts than researchers expected
- Proximity and homophily strongly influenced connections
- Very low rate for adding contacts based on contact recommendations
  - Potentially due to difficulty accessing the recommendations list
References