

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

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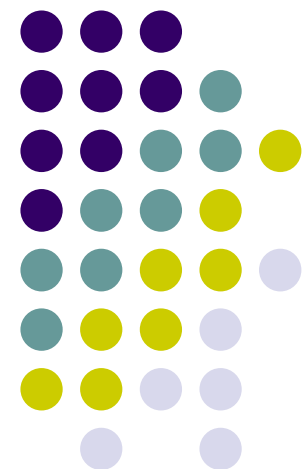
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# Problem

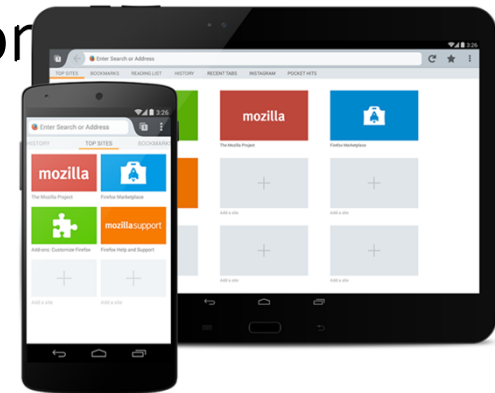


- “Main objective” of a conference is to meet people that are in your research area
- Can be difficult to find these people in the short time frame of the conference
- Even more difficult to make connections with them
  - Business cards are still required, which is “tedious and requires physical interaction”
- 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



The image displays two screenshots of a mobile application interface for a conference schedule. Both screenshots show the 'Program' tab selected, with a top navigation bar containing 'People', 'Program', and 'Me' (with an envelope icon). The status bar at the top of each screen indicates 'No SIM', signal strength, Wi-Fi, and the time '9:48'. Below the navigation bar is a date selector with buttons for '9.17', '9.18', '9.19', '9.20', and '9.21'. The left screenshot shows the following events:

- 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

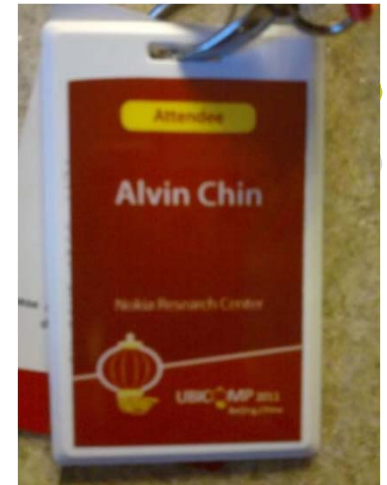
The right screenshot shows the details for the keynote event on 9.19:

- Keynote: Ubicomp keynote address - Jan Chipchase, Executive Creative Director of Global Insights at frog**
- Attendees** (with a person icon)
- Time**: 09:00 - 10:00
- Location**: Zhulou - 1st floor
- Chair**

Both screenshots feature a bottom navigation bar with icons for back, forward, refresh, book, and share.

# 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

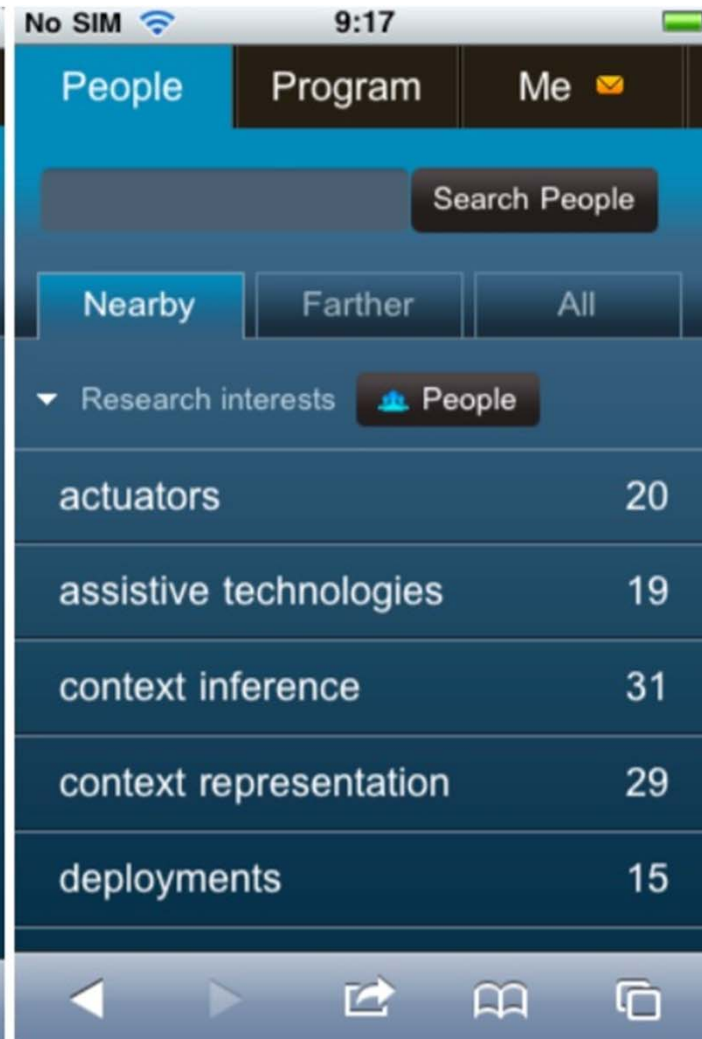
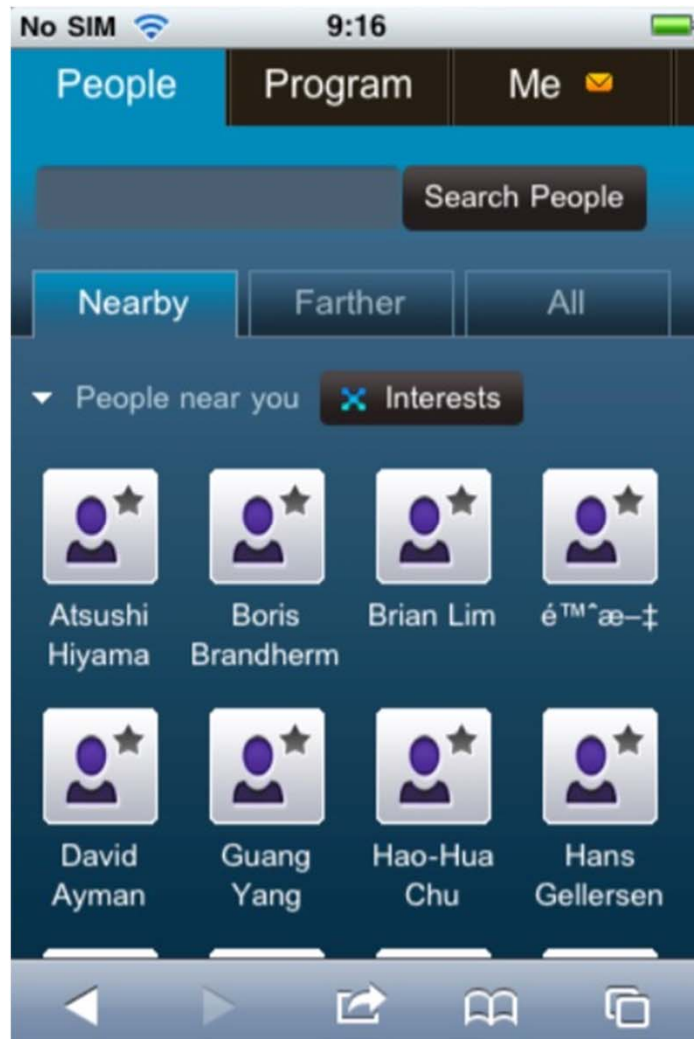


# Methodology: Contact Suggestions



- 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

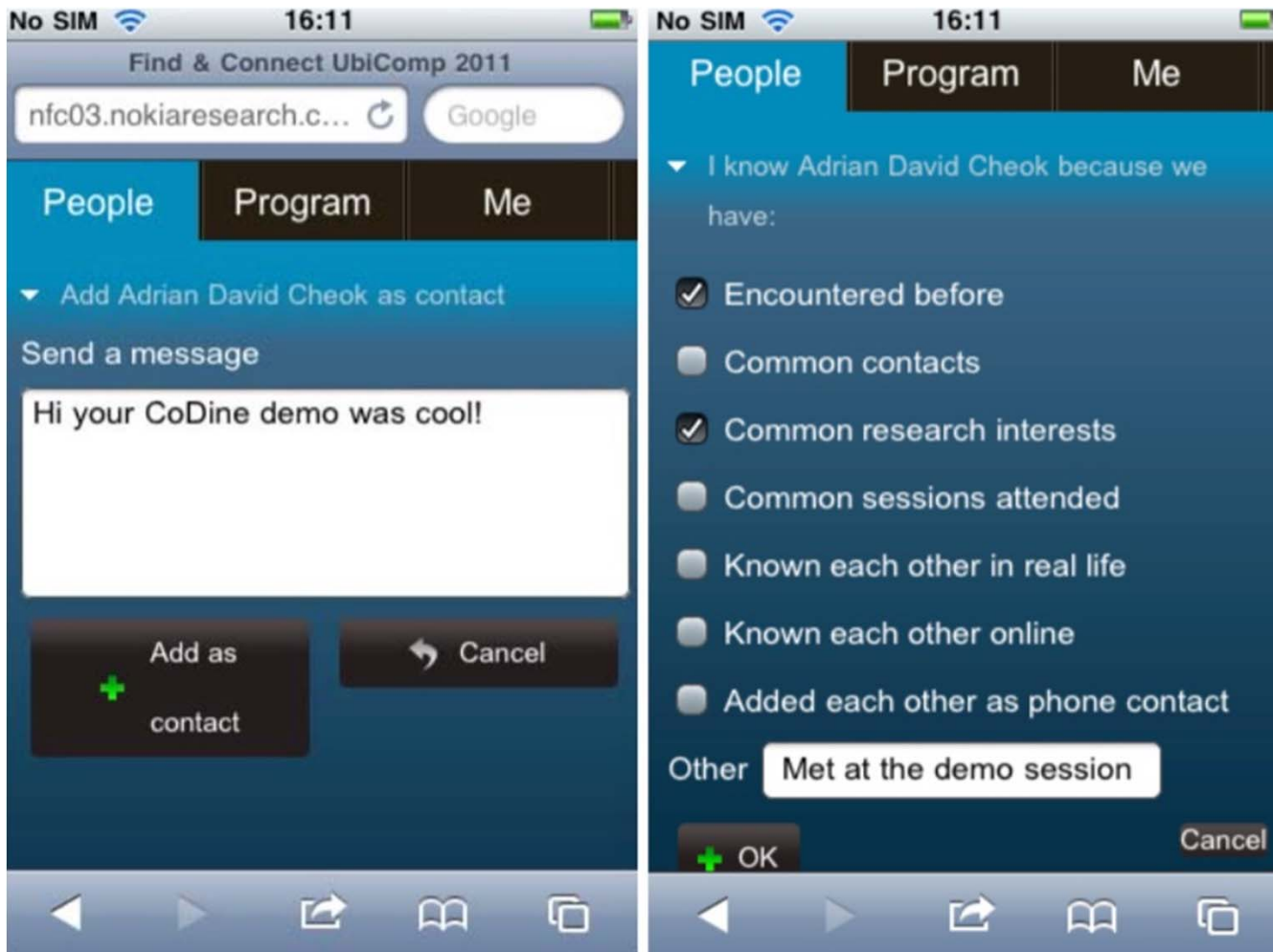
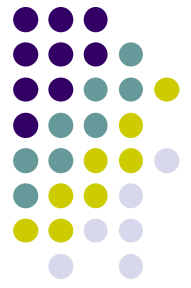


# Methodology: Adding a Contact

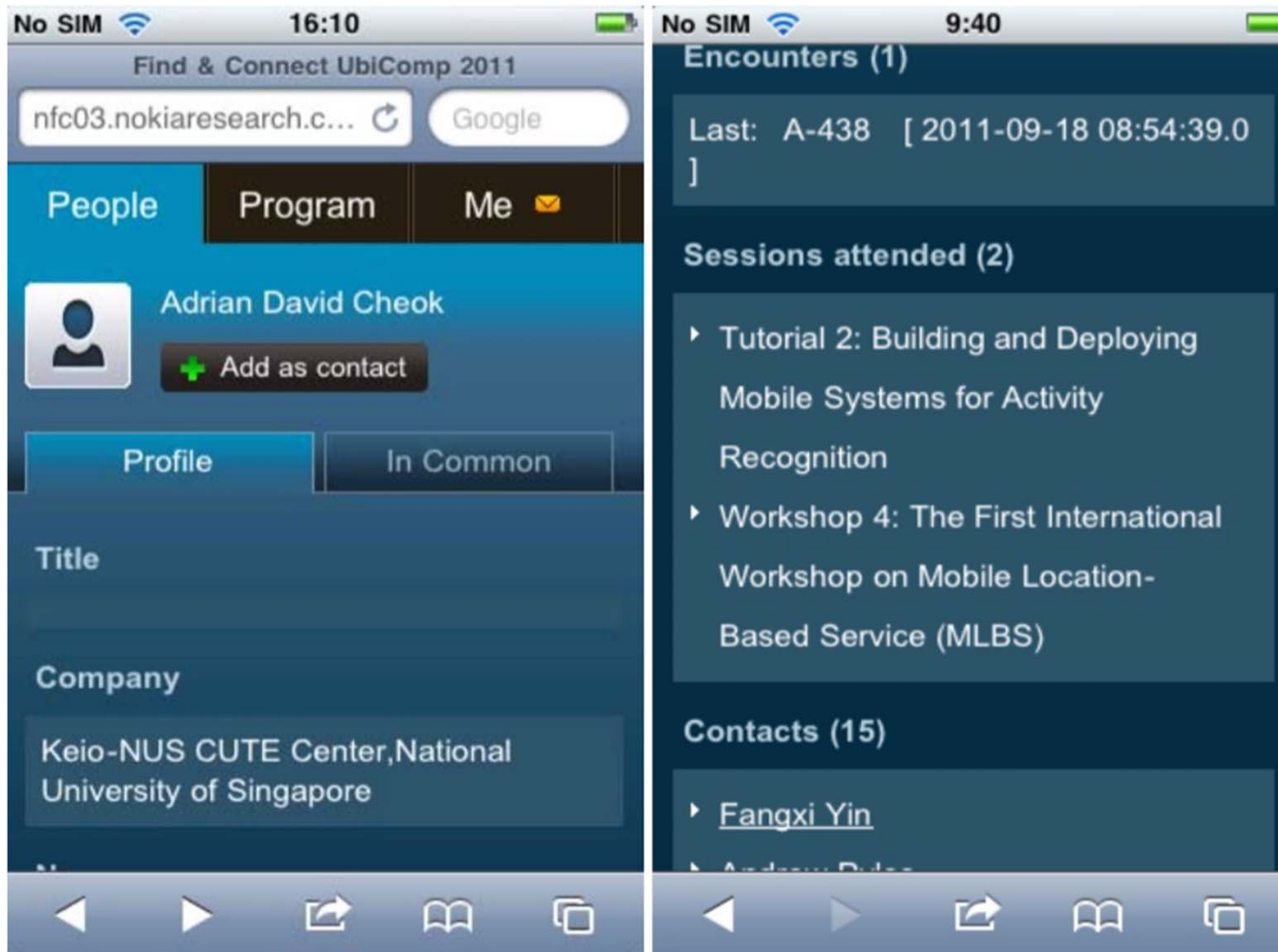


- Profile displayed
- Commonality, including research interests, encounters, sessions attended, and common contacts, shown in 'In Common' tab
- Contact Request
  - Can send custom message with request
  - Presented survey asking for reason for contact request

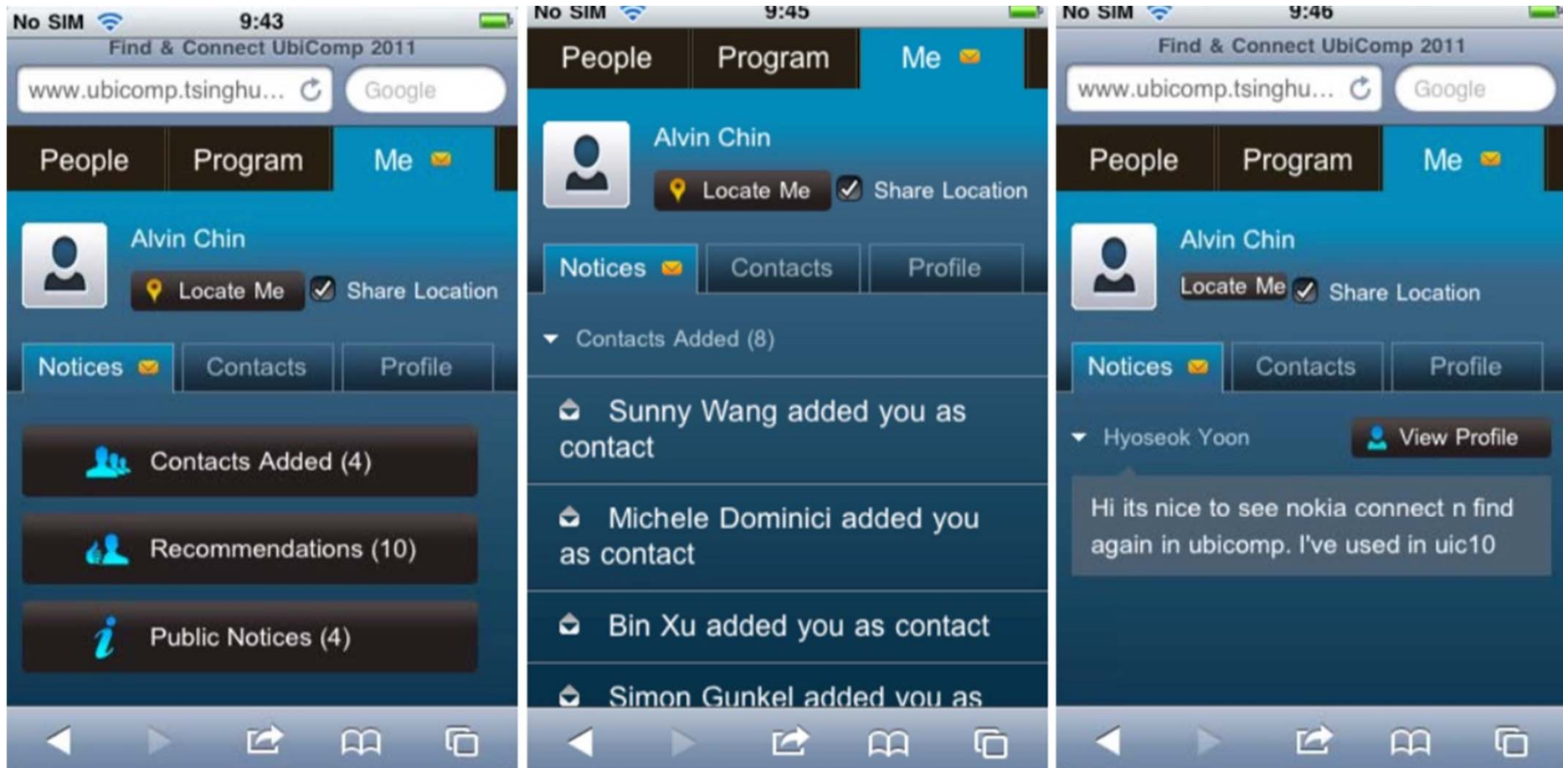
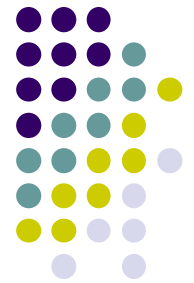
# Adding a Contact



# Personal Profile Page



# Notifications





# Analysis/Results



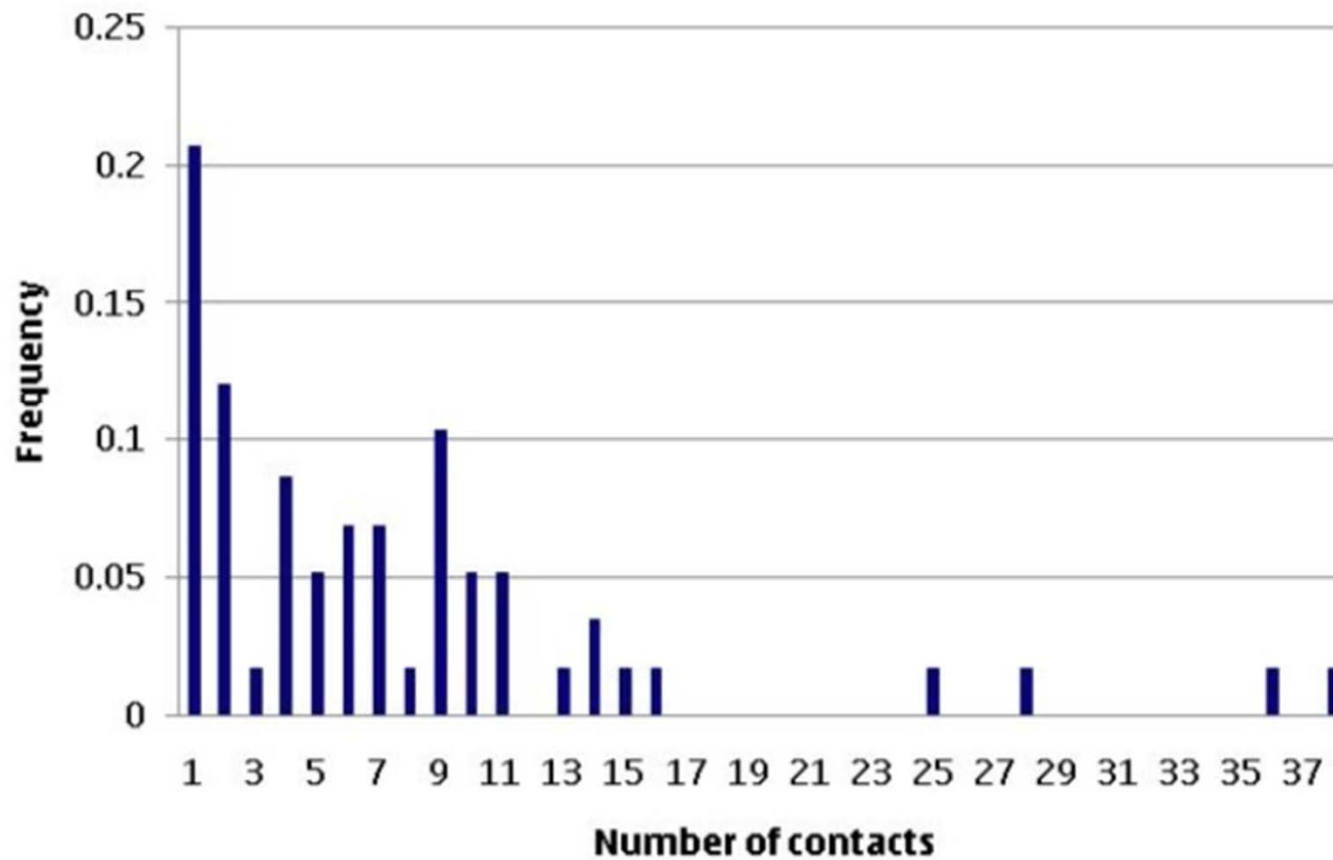
- 241 participants (57% of 421 registered guests)
- Users spent an average of 11min. 44sec. in app per visit, with 16 page switches
- 11.66% of app use was Find Nearby page
- 40% of 571 contact requests were approved
- Authors had higher participation
- Average separation of participants is 4
- Average 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





# 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

- A. Chin, B. Xu, F. Yin, X. Wang, W. Wang, X. Fan, D. Hong, and Y. Wang, “Using Proximity and Homophily to Connect Conference Attendees in a Mobile Social Network,” 2012 32nd International Conference on Distributed Computing Systems Workshops, 2012.