基于位置的服务与社会网络
Location-based Services and Social Networks

Xiaofang Zhou and Kexin Xie
周晓方　谢珂心

School of Information Technology and Electrical Engineering
昆士兰大学信息技术与电气工程系

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Outline

- An introduction to
  - Location-based services
  - Social networks
- The fusion of LBS and Social networks
  - The synergy
  - Existing systems and potentials
  - Research opportunities
- Conclusions

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Location-based Services

- Broadly, any information service that makes use of the geographical location of a user

- More specifically, those services related to mobile devices with positioning functionality

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Obtaining Location Information

- Initially via cell IDs, and then triangulation of mobile phone stations
- Increasingly via embedded GPS
- Also possible via bluetooth, WiFi stations, RFID

- Now as part of smart phones and 3G
  - Finally we have the positioning accuracy, digital maps, local processing power, screen size and bandwidth to do something serious

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Examples of LBS

- "What's near me" type of services
  - The nearest business or service (eg, ATM, restaurant)
    - Pull (kNN queries) or Push (mobile advertising)
  - People (gaming, matching)
- Navigation
  - Current location on a map, turn-by-turn navigation
- Emergency responses
- Mobile search
- Tracking and resource planning
- …

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Social Networks

- Social network is a social structure made of individuals (or organizations) called nodes, which are tied (connected) by one or more specific types of interdependency, such as friendship, kinship, financial exchange, dislike, sexual relationships, or relationships of beliefs, knowledge or prestige. - *Wikipedia*
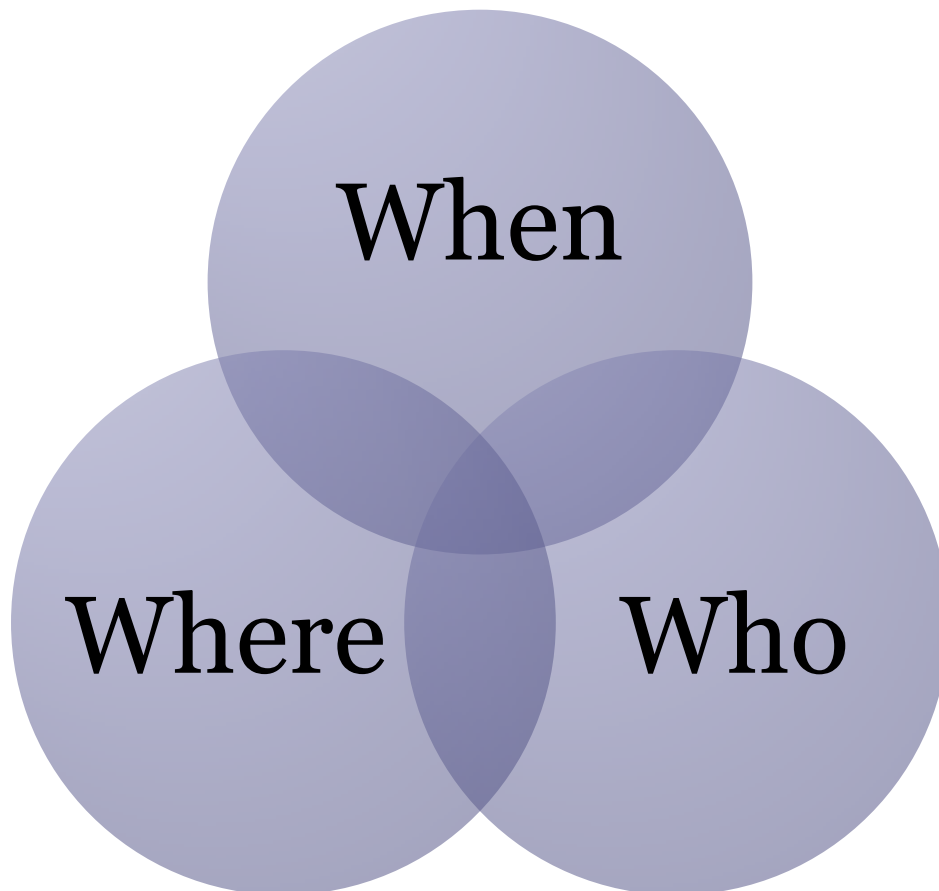
Social Network Analysis

- Social network analysis is a key technique of sociology
  - To apply network theory to study social relationships
    - Interesting social groups, patterns, evolution and other graph properties
    - Typically very complex graphs, large, not-well-defined and often hierarchical
    - Wide range of applications, such as epidemiology, anti-terrorism, Guanxi and other social behaviors

Social Network Services

- Building online communities of people who share interests and/or activities, or who are interested in exploring the interests and activities of others
- Three typical services:
  - Category divisions
  - Means to connect with friend
  - A recommendation system
- Examples: Facebook, Twitter, LinkedIn, Xiaonei…

Three Usefulness Factors of Information Services

When

Where

Who

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The Missing Link

- Location is a link between the digital world and the real world

- Social relationship is a link between a user's explicit request and the unspoken context

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Location-based Social Networks

- Social network as a LBS
  - Additional applications to LBS
    - Location triggered (*Hey, we are having a party near your location, wanna join?*)
- Social network with location flavor
  - Location helps to find potential friends and social communities
  - Shares more information by adding the location dimension (photos, traces, place of interests)

Key Characteristics of LBSN

- Social networking in which geographic services and capabilities such as geocoding and geotagging are used to enable additional social dynamics
  - Allow users to interact relative to location and time
  - Target locally familiar content, and encourage face-to-face interaction of users in or around local places

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Examples of LBSN

- There are many discovery-based LBSN services
  - Loopt
    - To see where their friends are on a map
    - To see local reviews
    - Interoperable and with several privacy settings
  - Whrrl
    - A combination of mapping and blogging
    - For reviewing local businesses and events which are constantly updated and extended by members
- Many LBSN services interoperate/collaborate with other social networking services, and review sites
- Year 2009 sees the entrance of LBSN by big names such as Facebook, Twitter and Google

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Research Opportunities

- Massive user generated data could be very helpful in analysis social and location behaviors
- Relations between social network and their the locations of users
  - Spatial distance vs social distance
  - Location traveling behavior vs social activity behavior
  - Location connections vs social connections

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Some Further Considerations

- Location data: collect, store and making sense
- Content: user generated, customized web
- Spatial, graph and data mining algorithms
- User interfaces and interaction management
- Value: who needs LBSN? And what's the cost?
- Privacy: beyond simple settings

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Monetization

- 3.3B by 2013 (*ABI Research, 2008*)
- Business models
  - Location-based advertisement
  - Subscription fees
  - Currently still mainly from licensing and revenue-sharing with carriers or handset manufacturers
- Many limitations
  - From hardware and software
  - From carrier and handset partnerships
- But all main players in social network services must provide LBS, and there is a huge potential from large LBS user groups

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Conclusions

- There is a natural synergy between location-based services and social network services
- LBNS is truly in its infancy
- Business models and value in its own right still not clear
- Lots of opportunities for data management and data processing research
- And it's the time now!

谢谢！

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