Academia Sinica, Taipei, Taiwan

SNHCC: Mobile Social Networks

Introduction: What is Mobile Social Network

**Instructor:**

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The Objective of Our Textbook

- ❑ Point out current research problems in mobile social networks
- ❑ Give examples of mobile social networking applications
- ❑ Study real-life data collected from the field
- ❑ Challenge the definition of mobile social networks

Social Networks in Physical World

❒ Social networks exist way before the Internet era

❒ We build communities, or networks, of colleagues, friends, family, and so on

❒ These communities provide us a sense of belonging

❒ Consequence: six degree of separation (Milgram experiment, 1967)

  ○ You can connect any two people in 6 steps of "a-friend-of-a-friend" relations
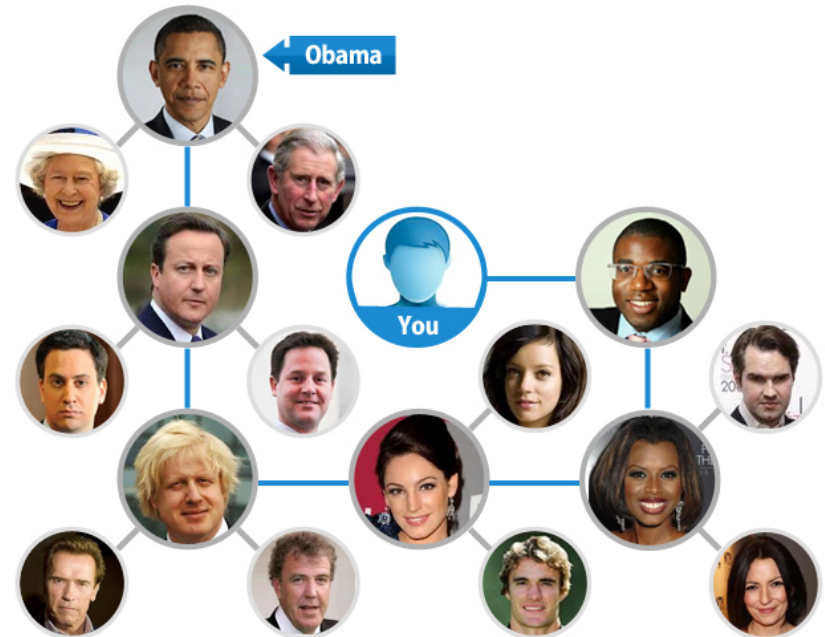
With Internet?

❑ New ways to form virtual communities online
- ○ 1970's: emails, news groups, and bulletin board systems (BBS) ← ASCII
- ○ 1990's: Internet Relay Chat (IRC), instant messengers (ICQ, Microsoft Messenger), and Web-based services (blogs and wikis) ← images and videos
- ○ 2000's: online social networks (such as Facebook, MySpace, and Twitter) ← Allow people to browse others' profiles and become online friends with each other

❑ Online social networks enable us to easily share content and communicate with our friends in virtual world ← many of us are addicted to Facebook!

Modern Mobile Devices

Always-on connectivity (3G/4G/B4G)
More portable
Higher-resolution display
More computing/storage space

Now, it makes sense to run mobile social network clients on mobile devices

Online Social Networks on Mobile Devices

☐ With the tremendous success of iPhone/Android and Facebook, users start to use online social networking apps on mobile devices

☐ Mobile devices are used as tiny computers, e.g.,
  ○ Facebook user look up friends by typing their name ← doesn't sound user-friendly
  ○ Can't be better than using a full-fledge computers

Can We do Better?

☐ Yes! Because modern mobile devices come with a wide array of sensors
- Proximity sensors
- Accelerometers
- Gyroscopes
- Light sensors
- Barometers
- Fingerprint sensors
- Network interfaces
- Cameras
- Microphones

☐ We can make our mobile devices smarter to automatically form virtual communities and even share contents ← Real mobile social networks!

Context Awareness

□ Context refers to the environment a user is in
  ○ Terminology from ubiquitous (or pervasive) computing
  ○ For example, I'm at Academia Sinica, I'm in a class, I'm with the students of SHNC7430

□ Before iPhone/Android, it is hard to capture context
  ○ No one wants to type in the context using the tiny mobile device keyboards (blueberry?)
  ○ Now, and in this class, we will learn how to infer context using sensory data on smartphone

□ Goal: connecting people through common physical context: co-location, co-activity, and co-encounter
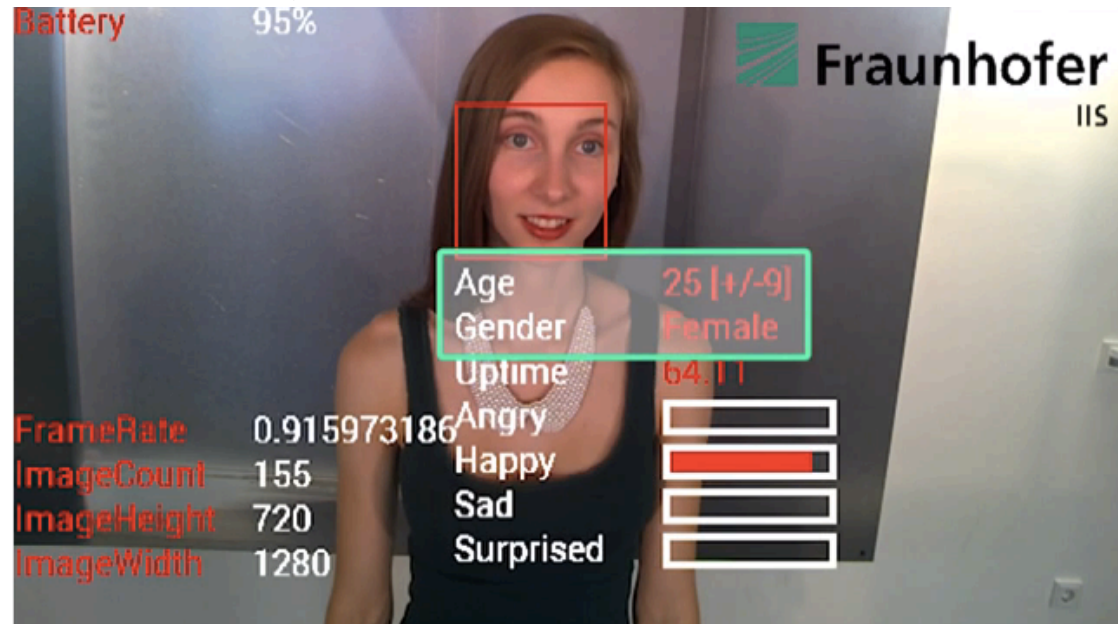
(To Me) Mobile Social Network is

❒ Different from social networks on mobile devices

❒ Use smartphones (and other mobile devices) as an integrated part of your social networks and life style
  ❍ Must be easier to use than the PC-version of social networks!

❒ An interdisciplinary and emerging topic to fuse physical and virtual social networks using mobile

❒ Across the following research areas
  ❍ Content sharing/dissemination
  ❍ Social networks
  ❍ Sensor networks
  ❍ Pervasive computing
  ❍ Embedded systems
  ❍ …

A Real-Life Example

❒ **When you run into someone who you met somewhere, but forget his/her name**

  ❍ Your smartphone may inform you who the person is, based on the sensory and social networking data recorded during previous encounters

  ❍ If fact, your smartphone has exchanged virtual business cards with that person's smartphone in earlier encounters

Shore on Google Glass from Fraunhofer

Feature 1: Duration

Feature	Social Networks on Mobile	Mobile Social Networks
Duration	Continuous	Ephemeral

- Ephemeral: precise start and end times

- Such as: school concerts

- Facebook has timeline, but it's human edited and thus is error-prone

Feature 2: Physical Interaction

Feature	Social Networks on Mobile	Mobile Social Networks
Physical interaction	None	Activity based

- We typically meet people in physical activities/events

- But we often forget to record it afterwards

Feature 3: Proximity and Location

Feature	Social Networks on Mobile	Mobile Social Networks
Proximity and location	Co-location	Nearby, encounter

- Social networks leverage GPS locations

- Mobile social networks use sensors, such as WiFi and NFC, for finer-grained proximity detection

Feature 4: Content Sensing

Feature	Social Networks on Mobile	Mobile Social Networks
Context sensing	Manually	Environment and phone sensing

- Mobile social networks use sensors to infer contexts
- Challenge: high computing and energy overhead
- Possible solution: an context interference middleware

Feature 5: Contact Management

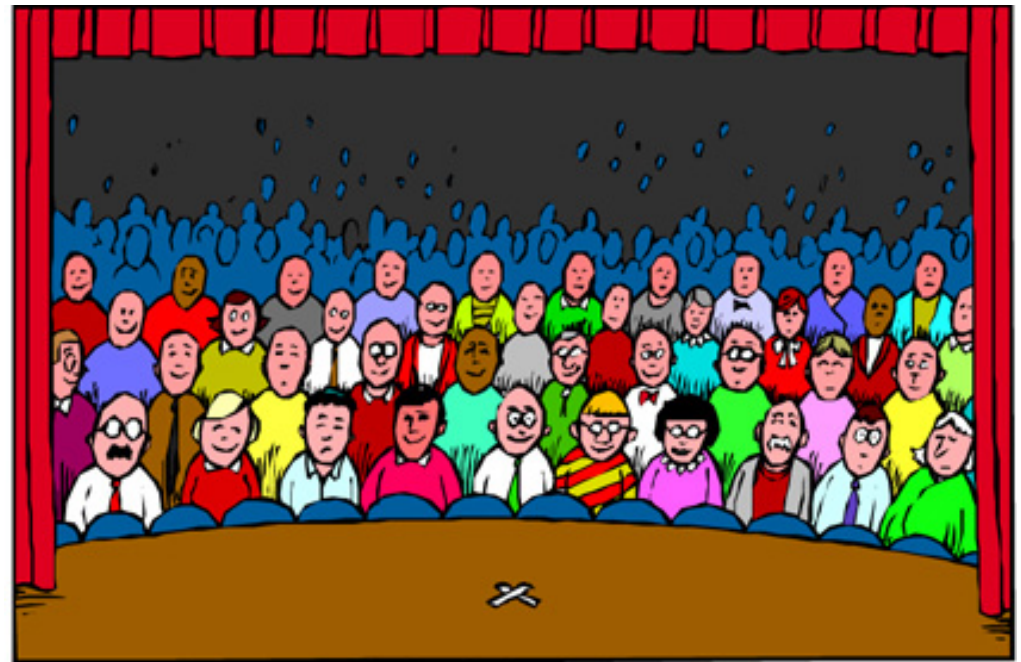| Feature	Social Networks on Mobile	Mobile Social Networks
Contact management	Indirect discovery (explicitly)	Direct discovery (implicitly)

- As in our earlier example, mobile social networks mange the contact without (or with little) human intervention
- E.g., bump or even more aggressive

Feature 6: Content Sharing

Feature	Social Networks on Mobile	Mobile Social Networks
Content sharing	Public	Public; private; group

- Social network users have to manually configure access control list, which is cumbersome, most of the time they will just ignore the privacy concerns
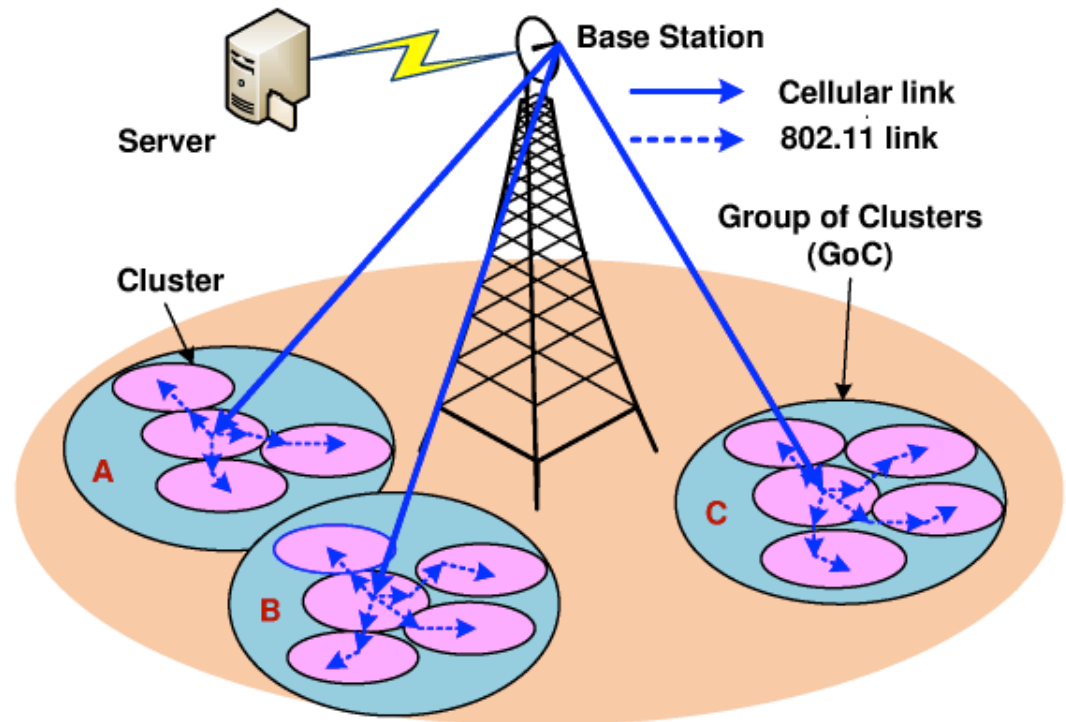- School concert example

Feature 7: Collaboration

Feature	Social Networks on Mobile	Mobile Social Networks
Collaboration	Coordination	Ad hoc

- **Different from social networks, mobile socia networks can be highly distributed**
  - Useful in areas without always-on networks
  - Citizen journalism
  - Real free media!
- Can also be hybrid

Summary of Unique Features of Mobile Social Networks

Feature	Social Networks on Mobile	Mobile Social Networks
Duration	Continuous	Ephemeral
Physical interaction	None	Activity based
Proximity and location	Co-location	Nearby, encounter
Context sensing	Manually	Environment and phone sensing
Contact management	Indirect discovery (explicitly)	Direct discovery (implicitly)
Content sharing	Public	Public; private; group
Collaboration	Coordination	Ad hoc
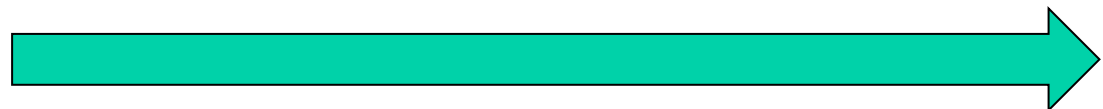
Automated, finger-grained, easier to use, new functionalities and more

Covered Topics

- **Introduction on Mobile Social Networks**
  - Socially Aware Computing: Concepts, Technologies, and Practices
  - Ephemeral Social Networks
- **Mobile Social Network Services** (Prof. Jang)
  - Social Behavior in Mobile Social Networks: Characterizing Links, Roles, and Communities
  - Mobile Social Service Design for Special Context
- **Context-Aware Mobile Computing in Mobile Social Networks** (Prof. King)
  - Exploiting Personal and Community Context in Mobile Social Networks
  - Enhancing Mobile Social Networks with Ambient Intelligence
- **Data Analysis and Privacy in Mobile Social Networks** (Prof. Hu)
  - Data Analysis on Location-Based Social Networks
  - Towards Trustworthy Mobile Social Networking

Questions?

Contact me at chsu@cs.nthu.edu.tw anytime