Introduction to Social Computing and Its Computation Techniques

Irwin King, Baichuan Li, and Tom Chao Zhou
{king, bcli, czhou}@cse.cuhk.edu.hk

Department of Computer Science and Engineering
The Chinese University of Hong Kong
Interdependence is and ought to be as much the ideal of man as self-sufficiency.

Man is a social being.

Mahatma Gandhi
A Brief History of the World

- Early Middle Ages
- Medieval Age
- Late Middle Ages
- Renaissance
- High Middle Ages
- The Reformation
- Enlightenment
- Age of Liberalism
- Age of Revolution
- World At War and Interwar Years
- The Modern World
A Brief History of the World

- **Industrial Revolution**
- **Information Age**
- **Internet Age**
- **WWW Age**

- **ENIAC**
- **The MITS Altair**
- **Apple II**
- **Time Magazine Person of the Year**
- **Birth of WWW**
- **Birth of Web 2.0**

- **Birth of Internet**
- **IBM Desktop PC**
- **Apple Macintosh**
- **Birth of XML**

Top 10 Populations by Countries

as of July 2009

<table>
<thead>
<tr>
<th>Country</th>
<th>Population (Millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>1,335</td>
</tr>
<tr>
<td>India</td>
<td>1,177</td>
</tr>
<tr>
<td>United States</td>
<td>308</td>
</tr>
<tr>
<td>Indonesia</td>
<td>231</td>
</tr>
<tr>
<td>Brazil</td>
<td>192</td>
</tr>
<tr>
<td>Pakistan</td>
<td>168</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>162</td>
</tr>
<tr>
<td>Nigeria</td>
<td>154</td>
</tr>
<tr>
<td>Russia</td>
<td>141</td>
</tr>
<tr>
<td>Japan</td>
<td>127</td>
</tr>
</tbody>
</table>
Top 10 Populations by Countries

Facebook as of March 2012

- China: 1,335 million
- India: 1,177 million
- Facebook: 900 million
- United States: 308 million
- Indonesia: 231 million
- Brazil: 192 million
- Pakistan: 168 million
- Bangladesh: 162 million
- Nigeria: 154 million
- Russia: 141 million
- Japan: 127 million

Introduction to Social Computing, Irwin King, Baichuan Li, and Tom Chao Zhou, IJCNN2012, June 10, 2012, Brisbane, Australia
Facebook’s Growth Stats

Statistics
901 million monthly active users at the end of March 2012.
Approximately 80% of our monthly active users are outside the U.S. and Canada.
526 million daily active users on average in March 2012.
488 million monthly active users who used Facebook mobile products in March 2012,
and more than 500 million mobile monthly active users as of April 20, 2012.
During March 2012, on average 398 million users were active with Facebook on at
least six out of the last seven days.

<table>
<thead>
<tr>
<th>#</th>
<th>Country</th>
<th>Users</th>
<th>Change</th>
<th>(± %)</th>
<th>Pen.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>United States</td>
<td>156 830 580</td>
<td>-517 760</td>
<td>-0.33%</td>
<td>50.55%</td>
</tr>
<tr>
<td>2.</td>
<td>Brazil</td>
<td>48 041 640</td>
<td>+1 030 580</td>
<td>+2.19%</td>
<td>23.89%</td>
</tr>
<tr>
<td>3.</td>
<td>India</td>
<td>46 307 580</td>
<td>+481 960</td>
<td>+1.05%</td>
<td>3.95%</td>
</tr>
<tr>
<td>4.</td>
<td>Indonesia</td>
<td>42 596 260</td>
<td>+324 220</td>
<td>+0.77%</td>
<td>17.53%</td>
</tr>
<tr>
<td>5.</td>
<td>Mexico</td>
<td>33 587 760</td>
<td>+413 920</td>
<td>+1.25%</td>
<td>29.86%</td>
</tr>
<tr>
<td>6.</td>
<td>United Kingdom</td>
<td>31 106 860</td>
<td>+161 760</td>
<td>+0.52%</td>
<td>49.89%</td>
</tr>
<tr>
<td>7.</td>
<td>Turkey</td>
<td>30 651 580</td>
<td>-26 720</td>
<td>-0.09%</td>
<td>39.40%</td>
</tr>
<tr>
<td>8.</td>
<td>Philippines</td>
<td>27 107 600</td>
<td>+19 280</td>
<td>+0.07%</td>
<td>27.13%</td>
</tr>
<tr>
<td>9.</td>
<td>France</td>
<td>24 435 760</td>
<td>+88 120</td>
<td>+0.36%</td>
<td>37.73%</td>
</tr>
<tr>
<td>10.</td>
<td>Germany</td>
<td>23 687 880</td>
<td>+135 200</td>
<td>+0.57%</td>
<td>28.79%</td>
</tr>
<tr>
<td>Alexa as of August 2011</td>
<td>China</td>
<td>USA</td>
<td>Japan</td>
<td>India</td>
<td>Brazil</td>
</tr>
<tr>
<td>------------------------</td>
<td>-------</td>
<td>--------</td>
<td>--------</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>1</td>
<td>Baidu</td>
<td>Google</td>
<td>Yahoo.jp</td>
<td>Google.in</td>
<td>Google.br</td>
</tr>
<tr>
<td>2</td>
<td>QQ</td>
<td>Facebook</td>
<td>Google.jp</td>
<td>Google</td>
<td>Google</td>
</tr>
<tr>
<td>3</td>
<td>Sina</td>
<td>Yahoo!</td>
<td>FC2</td>
<td>Facebook</td>
<td>Facebook</td>
</tr>
<tr>
<td>4</td>
<td>Taobao</td>
<td>YouTube</td>
<td>YouTube</td>
<td>YouTube</td>
<td>YouTube</td>
</tr>
<tr>
<td>5</td>
<td>Google.hk</td>
<td>Amazon</td>
<td>Google</td>
<td>Yahoo!</td>
<td>Universo Online</td>
</tr>
<tr>
<td>6</td>
<td>163</td>
<td>Wikipedia</td>
<td>Ameblo.jp</td>
<td>Blogger</td>
<td>Windows Live</td>
</tr>
<tr>
<td>7</td>
<td>Weibo</td>
<td>Blogger</td>
<td>rakuten</td>
<td>Wikipedia</td>
<td>Globo</td>
</tr>
<tr>
<td>8</td>
<td>Google</td>
<td>Twitter</td>
<td>livdoor</td>
<td>LinkedIn</td>
<td>Orkut.com.br</td>
</tr>
<tr>
<td>9</td>
<td>ifeng</td>
<td>eBay</td>
<td>Facebook</td>
<td>Twitter</td>
<td>Yahoo!</td>
</tr>
<tr>
<td>10</td>
<td>Yahoo</td>
<td>Craigslist</td>
<td>Wikipedia</td>
<td>Rediff</td>
<td>Orkut.com</td>
</tr>
</tbody>
</table>
Twitter in Spotlight

New York plane crash: Twitter breaks the news, again
Twitter has once again led the media and the blogosphere in breaking news.

By Claudine Beaumont
11:29AM GMT 16 Jan 2009

Twitter lead the media and the blogosphere in breaking news about US Airways flight 1549 crashing in New York’s Hudson river.
Twitter Gainers

<table>
<thead>
<tr>
<th>#</th>
<th>Screen name</th>
<th>Following</th>
<th>Followers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Lady Gaga (@ladygaga)</td>
<td>138 640</td>
<td>25 455 849</td>
</tr>
<tr>
<td>2.</td>
<td>Justin Bieber (@justinbieber)</td>
<td>122 725</td>
<td>23 051 871</td>
</tr>
<tr>
<td>3.</td>
<td>Katy Perry (@katyperry)</td>
<td>98</td>
<td>20 967 819</td>
</tr>
<tr>
<td>4.</td>
<td>Rihanna (@rihana)</td>
<td>815</td>
<td>20 332 267</td>
</tr>
<tr>
<td>5.</td>
<td>Britney Spears (@britneyspears)</td>
<td>415 313</td>
<td>17 495 465</td>
</tr>
<tr>
<td>6.</td>
<td>Shakira (@shakira)</td>
<td>66</td>
<td>16 442 764</td>
</tr>
<tr>
<td>7.</td>
<td>Barack Obama (@BarackObama)</td>
<td>677 280</td>
<td>16 391 776</td>
</tr>
<tr>
<td>8.</td>
<td>Taylor Swift (@taylorswift13)</td>
<td>78</td>
<td>14 920 243</td>
</tr>
<tr>
<td>10.</td>
<td>YouTube (@YouTube)</td>
<td>422</td>
<td>13 531 122</td>
</tr>
</tbody>
</table>
Pinup Interests
The Brave New Words

- blogger
- wiki
- AVATAR
- unfriend
- tweet
- blogsphere
- defriend
- tag cloud
- mash-up
- twitterati
- sexting
- hashtags
- Folksonomy

Introduction to Social Computing, Irwin King, Baichuan Li, and Tom Chao Zhou, IJCNN2012, June 10, 2012, Brisbane, Australia
Web 2.0

- Web as a medium vs. Web as a platform
- Read-Only Web vs. Read-and-Write Web
- Static vs. Dynamic
- Restrictive vs. Freedom & Empowerment
- Technology-centric vs. User-centric
- Limited vs. Rich User Experience
- Individualistic vs. Group/Collective Behavior
- Consumer vs. Producer
- Transactional vs. Relational
- Top-down vs. Bottom-up
- People-to-Machine vs. People-to-People
- Search & browse vs. Publish & Subscribe
- Closed application vs. Service-oriented Services
- Functionality vs. Utility
- Data vs. Value
Social Networks

Society:
Nodes: individuals
Links: social relationship (family/work/friendship/etc.)

S. Milgram and John Guare: Six Degree of Separation.
Social networks: Many individuals with diverse social interactions between them.
Milgram’s Experiment
Social Networks

- The Earth is developing an electronic nervous system, a network with diverse nodes and links.

Communication networks: many non-identical components with diverse connections between them.
The Flow of Information
Organizational Chart

Manuel

Charles
  Carol  Harold  Wynn

Donna
  Kathy  Nancy  Susan  Tanya

Stuart
  Bob  Fred  Sharon
Social Network Chart

Authority vs. Importance

![Social Network Chart Image]

<table>
<thead>
<tr>
<th>Authority Score</th>
<th>Name</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00</td>
<td>Nancy</td>
<td>secretary</td>
</tr>
<tr>
<td>0.66</td>
<td>Donna</td>
<td>supervisor</td>
</tr>
<tr>
<td>0.57</td>
<td>Manuel</td>
<td>manager</td>
</tr>
<tr>
<td>0.19</td>
<td>Stuart</td>
<td>supervisor</td>
</tr>
<tr>
<td>0.17</td>
<td>Charles</td>
<td>supervisor</td>
</tr>
<tr>
<td>0.08</td>
<td>Kathy</td>
<td>secretary</td>
</tr>
<tr>
<td>0.02</td>
<td>Fred</td>
<td>auditor</td>
</tr>
<tr>
<td>0.00</td>
<td>Bob</td>
<td>auditor</td>
</tr>
<tr>
<td></td>
<td>Carol</td>
<td>auditor</td>
</tr>
<tr>
<td></td>
<td>Harold</td>
<td>auditor</td>
</tr>
<tr>
<td></td>
<td>Wynn</td>
<td>auditor</td>
</tr>
<tr>
<td></td>
<td>Susan</td>
<td>secretary</td>
</tr>
</tbody>
</table>
Social Analytics/Informatics

Introduction

The notion of social informatics relates to the interaction between society and ICT (information-communication technologies). In its broad sense it covers:

1. the social consequences of ICT at micro (e.g. social aspects of ICT applications at personal and organisational level) as well as at macro level (e.g. information society studies);
2. the application of ICT in the area of social sciences and social/public sector;
3. the use of ICT as a tool for studying social phenomena (within social science methodology).

Graphical presentation is here>>

News

07.12.09  Information Society Free Virtual Library
02.12.09  Job offer: Professor in Social Informatics
01.12.09  Call for papers to "New technologies and data collection in social sciences"
09.11.09  Call for Papers "IASSIST 2010"
27.10.09  Job offer: Associate Professor Position - Department of Social Informatics

Archive

Associations

- The European Survey Research Association
- Council of American Survey Research Organizations (CASRO)
- Marketing Research Association
- International Communications

Blogs

- Social Informatics by Michael Tyworth
- Social Informatics - a knob by Per Arne Godelord
- Pixelcharmer Field Notes: Social Informatics
- Journal of Social Informatics Blog
- Social Informatic - International Blog

more

Contact: Slovenian: FDV

Search

Login

e-mail

New user  Lost password

Social Informatics

SOCIAL INFORMATICS  STUDY PROGRAMS  RESEARCH CENTRES  BIBLIOGRAPHY
Politics
• Social marketing

• Who are the brokers?

• Who can exert the most influence on buying/selling?

• How much should one advertise?

Influence Ripples

1 1000+ links
Bloggers who exert a larger “sphere of influence” have a broad ripple effect.

2 500+ links
Bloggers at the lower ranking levels also influence, but their ripples are smaller. Bloggers with smaller “influence ripples” tend to be higher in volume.

3 200+ links

4 100+ links

Note: links represent # of other blogs/sites referring to recipient.
Public Health

- People’s behavior can be monitored
- What is on people’s mind translates to search queries
- Google predicts flu trends...
Twitter Pop Culture

- **Twisdom: Twitter Wisdom**

- **A Philosopher Ponders Life in 140 Characters or Less**
  - “I don’t know the key to success, but the key to failure is trying to please everybody.” Bill Cosby
  - Do what you know in your soul is right!

- It is a miserable state of mind to have few things to desire, and many things to fear. – Francis Bacon

- **The Longest Poem In the World—the awesome twitter poem!** 956,644 verses this morning and ~4,000 a day!
The YouTube Generation
The Age of FaceBook

Introduction to Social Computing, Irwin King, Baichuan Li, and Tom Chao Zhou, IJCNN2012, June 10, 2012, Brisbane, Australia
Social Networking Sites

• Example of Social Networking Sites: FaceBook, MySpace, Blogger, QQ, etc.
Social Search

- Social Search Engine
- Leveraging your social networks for searching
Social Media

Introduction to Social Computing, Irwin King, Baichuan Li, and Tom Chao Zhou, IJCNN2012, June 10, 2012, Brisbane, Australia
Social News/Mash Up

Introduction to Social Computing, Irwin King, Baichuan Li, and Tom Chao Zhou, IJCNN2012, June 10, 2012, Brisbane, Australia
Social Knowledge Sharing

Wikipedia

English
The Free Encyclopedia
2,268,000+ articles

Deutsch
Die freie Enzyklopädie
718,000+ articles

Français
L’encyclopédie libre
631,000+ articles

Polski
Wolna encyklopedia
477,000+ articles

Nederlands
De vrije encyclopedie
414,000+ artikelen

Português
A enciclopédia livre
364,000+ artigos

Español
La enciclopedia libre
339,000+ artículos

Svenska
Den fria encyklopedin
277,000+ artiklar

Knol
Share what you know
Write and post a knol (nōl) — a unit of knowledge.
Search
searchable through popular search engines

Create
easy to write and manage

Control
each knol is owned by you, the author

Introduction to Social Computing, Irwin King, Baichuan Li, and Tom Chao Zhou, IJCNN2012, June 10, 2012, Brisbane, Australia
Social/Human Computation
Chinese CAPTCHA

Ling-Jyh Chen, Institute of Information Science, Academia Sinica, Taipei, Taiwan
Human Computation
Social Bookmarking

• What is a tag?
  • Descriptive metadata
  • A keyword or term associated with or assigned to a piece of information
  • User defined, created and shared
  • Many web users do it every day, with very little conscious awareness that they are “cataloging”

• What gets tagged?
  • Pictures, blog posts, video clips, catalog entries, just about anything...
Social Bookmarking

• Share one’s tags

• Make the individual browsing experience a social one
Social Bookmarking in del.icio.us
Social Bookmarking in StumbleUpon

StumbleUpon allows users to discover and rate web pages, photos, and videos. It chooses which web page to display based on the user’s ratings of previous pages, ratings by his/her friends, and by the ratings of users with similar interests.
Tagging is Everywhere
Social Recommendations

Genius Recommendations for Apps

There are tens of thousands of apps in the App Store, with more added every day. A new feature of iPod touch makes finding cool new apps even easier. It's Genius for apps, and it works just like Genius for your music. Tap the Genius icon and get recommendations for apps that you might like based on apps you and others have downloaded.

Genius Mixes

Now the Genius feature is even more powerful. Introducing Genius Mixes. All you do is sync iPod touch to iTunes, and Genius automatically searches your library to find songs that sound great together. Then it creates multiple mixes you'll love. These mixes are like channels programmed entirely with your music.

Genius Playlists

Say you're listening to a song you really like and want to hear other tracks that go great with it. The Genius feature finds other songs on your iPod touch that sound great with the one you were listening to and makes a Genius playlist for you. Listen to the playlist right away, save it for later, or even refresh it and give it another go. Count on Genius to create a mix you wouldn't have thought of yourself.
Web 2.0 Revolution

- **Glocalization** - think globally and act locally!
- **Weblication** - Web is the application!
- **Three C’s**
  - Connectivity
  - Collaboration
  - Communities
Social Relations

crew  teams  squad  organizations  cohorts  communities  populations  markets  partners  groups

binary  cardinal  integer  real

presence  identity  social role  reputation  expertise  trust  ownership  accountability  knowledge
Emerging Issues

- **Theory** and models

- **Search, mining, ranking and recommending** of existing information, e.g., spatial (relations) and temporal (time) domains

- Dealing with **partial** and **incomplete** information, e.g., collaborative filtering, ranking, tagging, etc.

- **Scalability** and algorithmic issues

- **Security** and **privacy** issues

- **Monetization** of social interactions
Topics

- Introduction
- Matrix factorization models
- Social network analysis
  - Link analysis
  - Community detection
- Community question answering
Q & A