

Killer Applications for Pervasive Computing

A Human-centered View

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Killer Applications

- Vision: a pervasive computing environment that assists *social/group* activities
- Buddy Search
 - Find buddies: know their location, status, ...
 - Communicate with buddies
- Expert Search
 - Find experts: doctors, lawyers, tennis coaches, etc.
 - Get introduced

Scenarios

- What?
 - Social activities
- Where?
 - City center, gyms, hospitals, office buildings, ...
- How?
 - Using a mobile device

Top 20 Sites of Pages Views

Sep. 2008

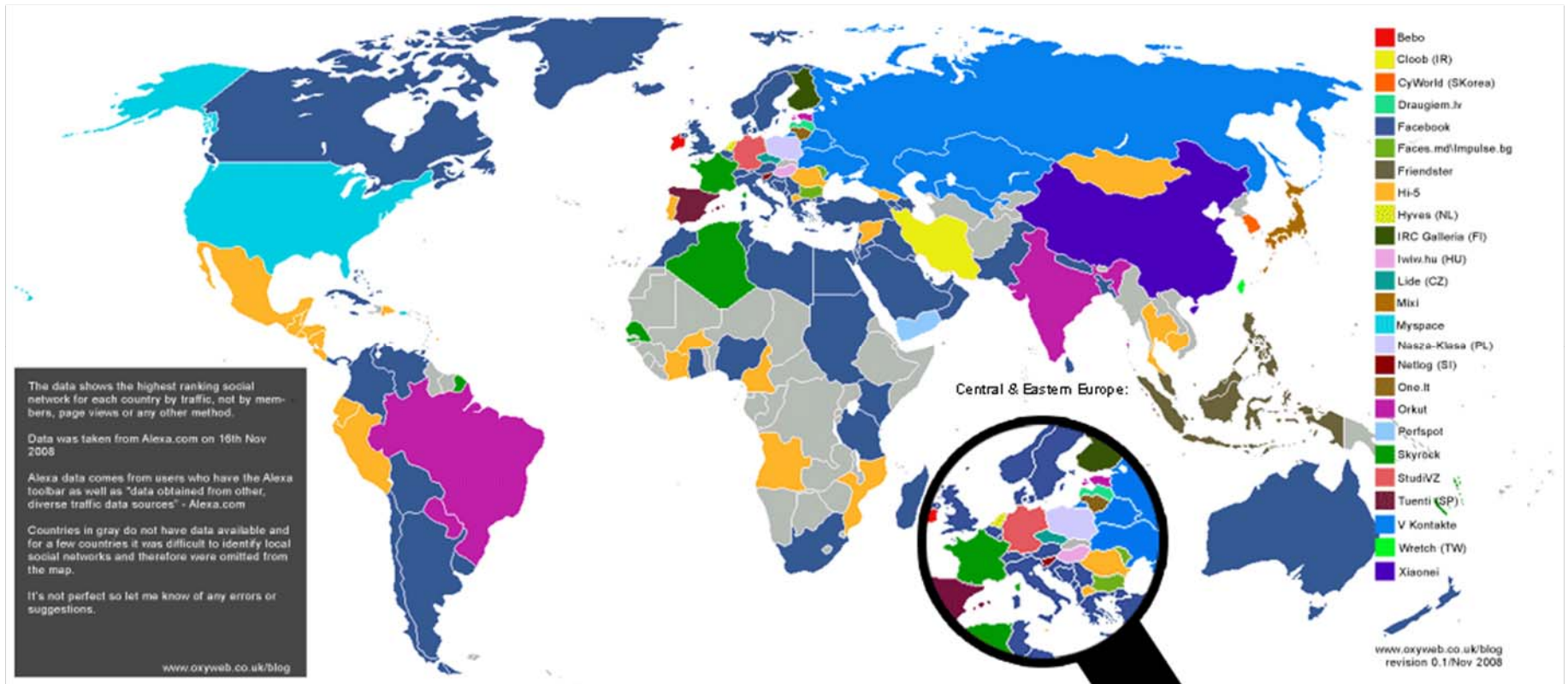
		Total Pages Viewed (MM)
1	MYSPACE.COM	40,340
2	YAHOO.COM	36,347
3	GOOGLE.COM	17,885
4	FACEBOOK.COM	14,312
5	AOL.COM	12,311
6	YOUTUBE.COM	11,001
7	CRAIGSLIST.ORG	9,967
8	LIVE.COM	8,617
9	MSN.COM	7,582
10	EBAY.COM	6,099
11	COMCAST.NET	5,279
12	GO.COM	2,202
13	POGO.COM	1,665
14	MYYEARBOOK.COM	1,530
15	ESPN.COM	1,453
16	ATT.NET	1,337
17	NEOPETS.COM	1,268
18	BANKOFAMERICA.COM	1,177
19	AMAZON.COM	1,172
20	PHOTOBUCKET.COM	968

Source: comScore September 2008. Total Internet : Total Audience 469,433

Facts about Social Networks

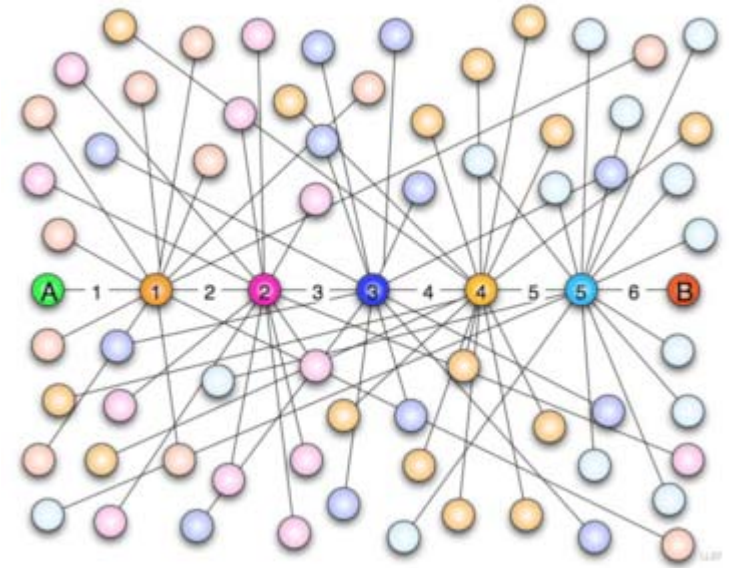
- Various applications
 - Photo (Flickr), Video (YouTube), General (MySpace, MSN Live), Colleague/employer (LinkedIn), etc.
- Fast growing, huge numbers
 - MySpace 2004~2006, 67M users
 - MySpace: 110M active users/month, 50M mails/day, 8M uploaded images/day
 - Facebook: 6th trafficked site in US, 60+M active users, 14M uploaded images/day, 24K apps
- Mobile access (ABI research)
 - 46% of SNS users visited a social network via a mobile phone
 - Among them, ~70% visited MySpace, 67% visited Facebook

Social Networks around the World - By Popularity



Six Degrees of Separation

- Travers and Milgram, 1969¹
- 6-degrees of Kevin Bacon
- Microsoft IM study²
 - Average distance: **6.6**
 - 240M people, 30B conversation
 - Communication graph with 180M edges
 - Tend to communicate more with people having similar age, language, and location
- <http://renlifang.msra.cn/>



1. J. Travers and S. Milgram. *An experimental study of the small world problem*. *Sociometry*, 32(4), 1969.
2. Jure Leskovec, Eric Horvitz. *Planetary-Scale Views on a Large Instant-Messaging Network*. In *World Wide Web (WWW)*, 2008.

Enabling Technologies

- Networking & middlewares
 - WiFi, GSM/GPRS/3G, ad-hoc, Mesh, ...
 - IM, SMS, Email, ...
 - P2P
- Location & activity sensing
 - Mobile phones, RFID, WiFi, etc.
- Data storage & services
 - YouTube, Flickr, Gmail, ...
 - Cloud computing: Amazon EC2 & S³, Google GFS & BigTable, EMC Cloud, etc.
- Data mining & information retrieval
 - Identify patterns, make predictions/recommendations

Interesting Research Issues

- Community patterns
 - E.g., find important persons, identify community pattern, find fraudsters on eBay, find spammers,
- Study human behavior
 - Activity sensing for individuals
 - Community behavior
 - Predict and reason individual/group activities
- Security & privacy issues