Location and Presence in Mobile Data Services

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Introductions

Jonathan Grubb

Jonathan designs mobile software applications in hopes of making phones a little more fun and useful. He is currently at Yahoo! designing their new line of downloadable Java applications, which aim to extend Yahoo!'s services beyond the desktop. He previously worked at Vodafone in the Bay Area and in Düsseldorf, Germany, where he designed mobile sites and applications for consumer audiences in the US, Western Europe, Australia, Africa, and Greece. He is also an artist showing regularly in San Francisco galleries.

Shawn Smith

Shawn is an Information Architect at sbi.razorfish. Previously, he managed a User Experience design team at Vodafone, developing various mobile messaging and browsing applications. He was involved with the team that created the first prototype for Vodafone's mobile data services portal (Vodafone live!), and he co-managed the development of Vodafone's interaction design guidelines and styleguide for developers.

Imagine…

- knowing before you call that your friend is driving in traffic

- knowing before you pick up that the call is urgent

- a phone that knows not to ring while you're in a theater, museum or church (and when to make exceptions)

- paintings in a museum that can push information about themselves to your phone

- a subscription-based real estate service that can push maps and directions to nearby open houses to your phone (and houses that can tell you about themselves as you tour)

- a highly localized and personalized weather service that can tell you when it's time to go find shelter

- a social network service (à la Friendster) that can automatically and discretely compare your profile to the people around you and point you to people who have compatible interests

What we'll be talking about tonight

- A very brief history of mobile data services

- The introduction of location-awareness and presence

- The here and now: how some current services are using location-awareness and presence

- The immediate horizon: imagining the next generation of location- and presence-enabled services

- Mogi: A Japanese "item hunt" game as a best-of-breed location-enabled application

- Some social implications of presence in communication

- The role of the User Experience designer: a design philosophy for mobile devices

Some things we won't be talking about

- Privacy

- Hardware (i.e. designing the devices themselves)

- Mobile client support for specific development platforms, languages, etc.

- Mobile UE best practices of the past

A very brief history of mobile data services

First there was SMS

SMS was originally conceived as a way for carriers to push data (software upgrades, promotions, etc.) to customers' handsets

Carriers soon recognized its potential as an alternative mobile-to-mobile communication protocol

Carriers initially marketed SMS toward business professionals, but it was embraced by the youth market.

- Because of technical limitations in carriers' billing systems, SMS was initially free for prepaid customers (mostly young people)

- Paradoxically, the usability barriers inherent in mobile text composition became a selling point for this segment

First there was SMS (continued)

Europe vs. U.S.

- The popularity of prepaid plans was the key market driver for SMS in Europe

- Lack of carrier-interoperability was the key roadblock in the U.S.

- The gap has closed a bit; latest statistics show that US users sent 2 billion SMS messages last month, surpassing the UK for the first time.

SMS messaging spawned a variety of SMS-based data services:

- Ringtones

- Information Alerts

- M-Commerce

And then came…

WAP and the mobile web

- High expectations, major flop – the result of trying to stuff PC applications into mobile devices

E-mail and Instant Messaging

- Introduced mobile presence and pioneered the desktop-mobile link

Games

- Never underestimate the desire to kill time

MMS and picture messaging

- Initially the concept had many critics, but camera phones outsold digital cameras in 2003 by nearly 2-1 (84 million to 50 million units worldwide)

- 1 in 6 handsets has an integrated camera

- Sony recently ceded the low-end camera market to mobile phones

The bottom line

We can't tell in advance what will fly and what will flop

Communication seems to be more successful than content

Users will continually surprise us by reinventing what we produce

(Read this partly as a disclaimer to qualify what we're going to say about location awareness and presence, but mostly as an affirmation of what makes the mobile space so exciting)

Introducing location awareness and presence

Introducing location awareness and presence

Location-awareness and presence are not product or service categories themselves, but aspects or underpinnings of products and services across a number of categories

Location-awareness is a category of technologies for enabling true presence

THE MARKET POTENTIAL

Gartner predicts that the number of American businesses and consumers using location-aware computing will skyrocket from 150,000 in 2002 to 42 million in 2005*

The FCC has mandated that mobile carriers be able to locate anyone making an emergency 911 call to within an accuracy of 50 to 100 meters by December 2005 – a huge technology driver*

*Eric W. Pfeiffer, MIT Technology Review 09.2003

Location-Based Services

Broadly, a location-based service is any service with real-world locative dependencies

More narrowly, location-based services are applications which employ one or more location detection/tracking technologies.

Presence

Presence is simply the ability to know the status of someone. Some examples of status, to illustrate the concept of presence, are:
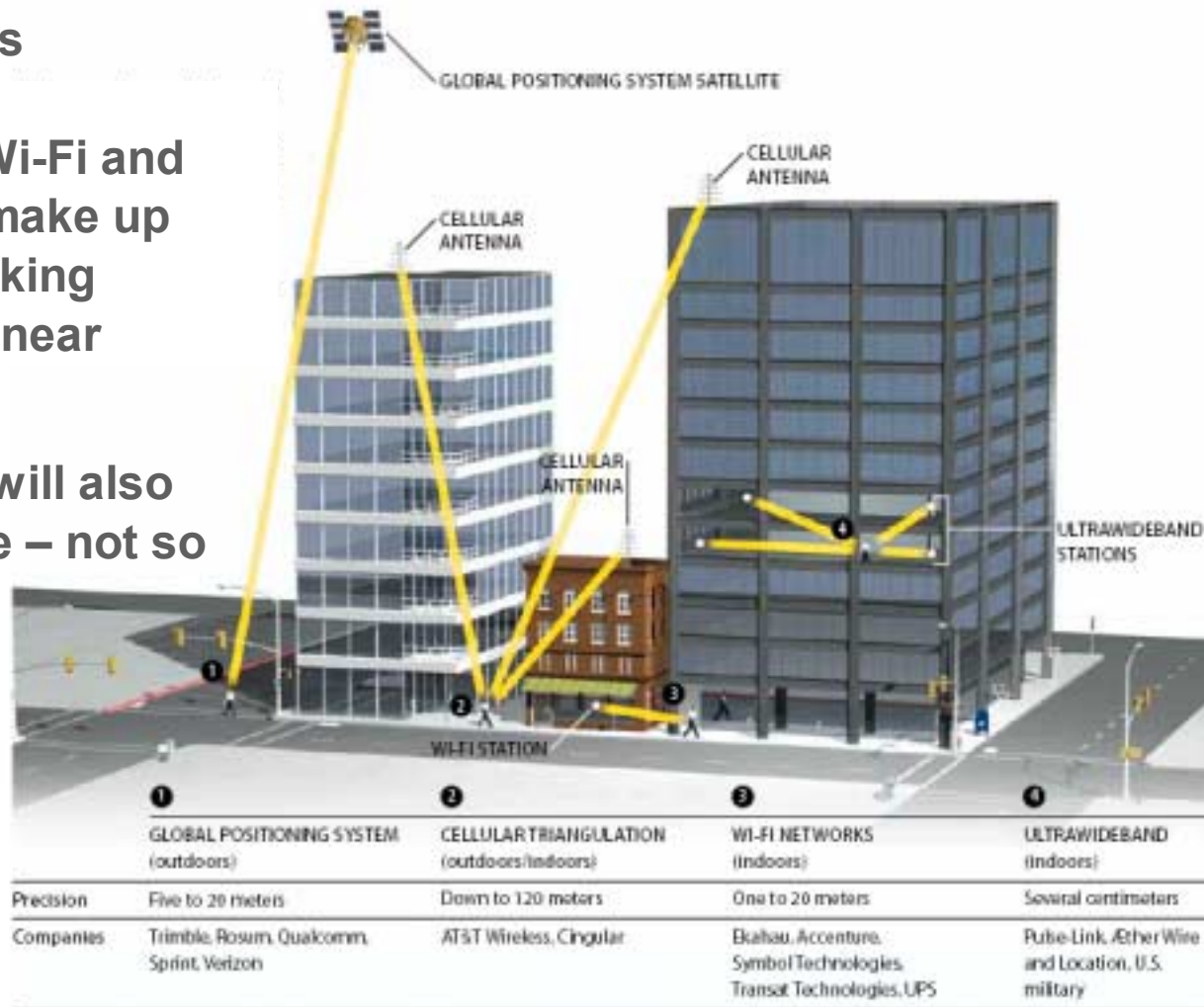
- Available/unavailable, active/idle, typing, etc. (IM status)

- Happy, sad, etc. (mood - emoticons)

- Ringing/busy (basic telephone status)

- At home, at work, I'm mobile

- Phone on/off/out of range

- Moving fast, moving slow, standing still
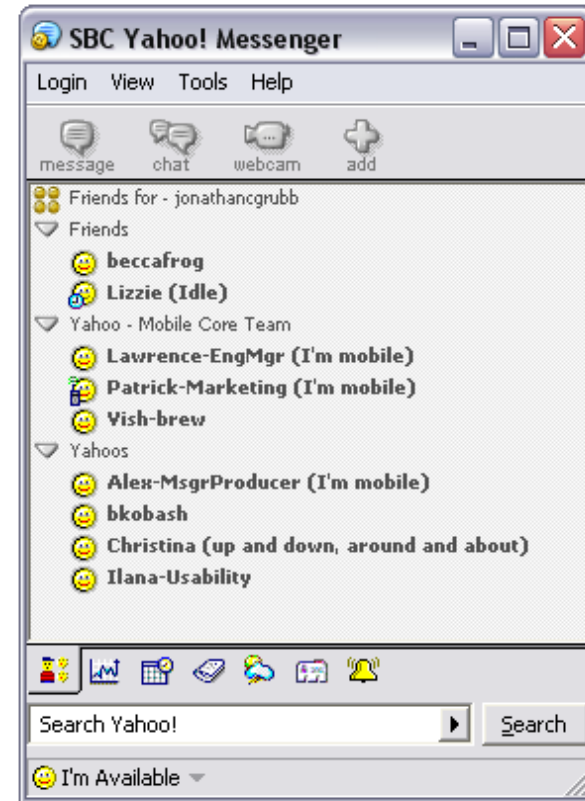
Location Detection Infrastructure

A mix of technologies (including cellular triangulation, GPS, Wi-Fi and ultrawideband) will make up the location and tracking infrastructure of the near future.

RFID and Bluetooth will also come into the picture – not so much for detection and tracking, but for facilitating interaction


| | GLOBAL POSITIONING SYSTEM SATELLITE | CELLULAR ANTENNA | CELLULAR ANTENNA | CELLULAR ANTENNA | ULTRAWIDEBAND STATIONS | WI-FI STATION |

	❶ GLOBAL POSITIONING SYSTEM (outdoors)	❷ CELLULAR TRIANGULATION (outdoors/indoors)	❸ WI-FI NETWORKS (indoors)	❹ ULTRAWIDEBAND (indoors)
Precision	Five to 20 meters	Down to 120 meters	One to 20 meters	Several centimeters
Companies	Trimble, Rosum, Qualcomm, Sprint, Verizon	AT&T Wireless, Cingular	Ekahau, Accenture, Symbol Technologies, Transat Technologies, UPS	Pulse-Link, Æther Wire and Location, U.S. military

Location and Presence examples: Instant Messaging

Desktop Instant Messaging introduced the buddy list, and the buddy list introduced pushed presence

- First there was simply online or offline, then active or idle and user-set status (away, busy, in a meeting), then real-time presence (typing)

- Location-awareness is a natural next step, and carriers have begun to introduce friend-finding and other location features to IM

A UK-based research group has created an IM client called BuddySpace that provides location-based data and other pushed presence information
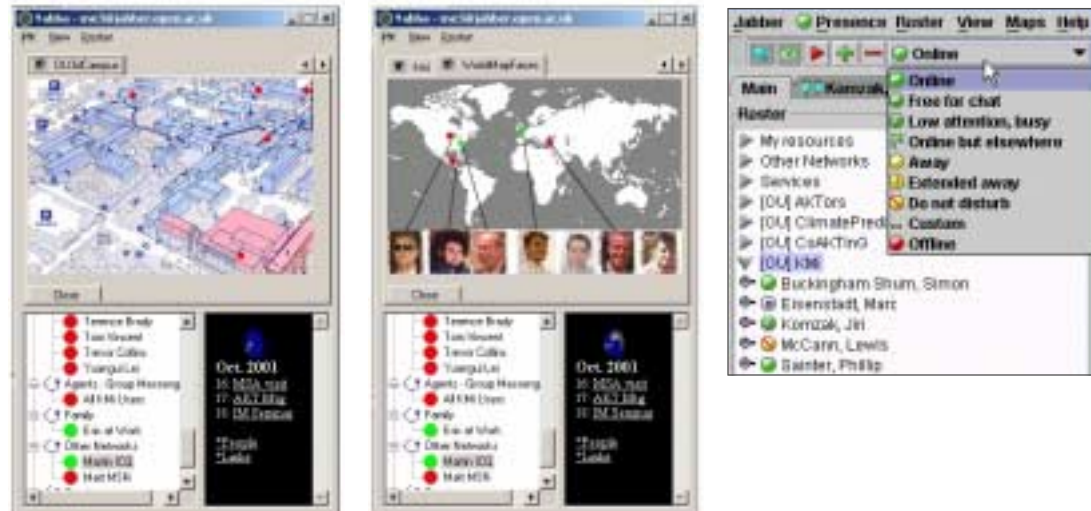
Location and Presence examples: smart environments

Location-aware advertising (basically smart spam) applications make up the most obvious and common examples of existing intelligent environments

"Urban Tapestries", a kind of Epinions for a place, allows residents and visitors to Bloomsbury in central London to write digital notes and link them to various locations (pubs, restaurants, shops, tourist attractions, etc.), for others to access later.

A company called BeyondGuide creates "audio soundscapes" (similar to an audio tour of a museum or tourist site) of history-rich cities like Athens, New York and Washington DC, delivering audio content to mobile phones

Location and Presence example: games

"Mogi" is a Japanese game that represents the best of breed UE design for location and presence

'Item Hunt' game in which players travel Tokyo collecting items and interacting with other players – both human and virtual

Multi-client play: At any given time, each team has players who are mobile and players who are sitting at PCs.

- PC players can see a map of the whole city

- Only mobile players can collect and trade items

- PC players can direct the action, guiding mobile players through the game and managing the activities of the team

Location-enabled gaming: Mogi (continued)

Screenshots from the mobile and PC components of the game

1. 'Radar' showing nearby objects
2. Detailed view of an individual item
3. The PC interface
4. Overhead map of central Tokyo
5. 3D 'fly-over' map

Location-enabled gaming: Mogi (continued)

Some key points:

- Location defines the game; it couldn't exist without locatable mobile devices

- Mobile component exploits the main characteristics of a mobile phone: mobility and communication

- Desktop component leverages the advantages of a PC – larger screen and faster processor

Why Mogi is a good model

Games have been known to introduce new technologies and concepts to the mass-marketplace

Mogi effectively breaks large tasks into chunks and assigns parts to users with the most appropriate devices

It replicates the way we actually use the devices in general

With some modifications, it could easily be re-imagined as a way to dispatch taxis, monitor public transit or a truck fleet, manage emergency services or coordinate troops.

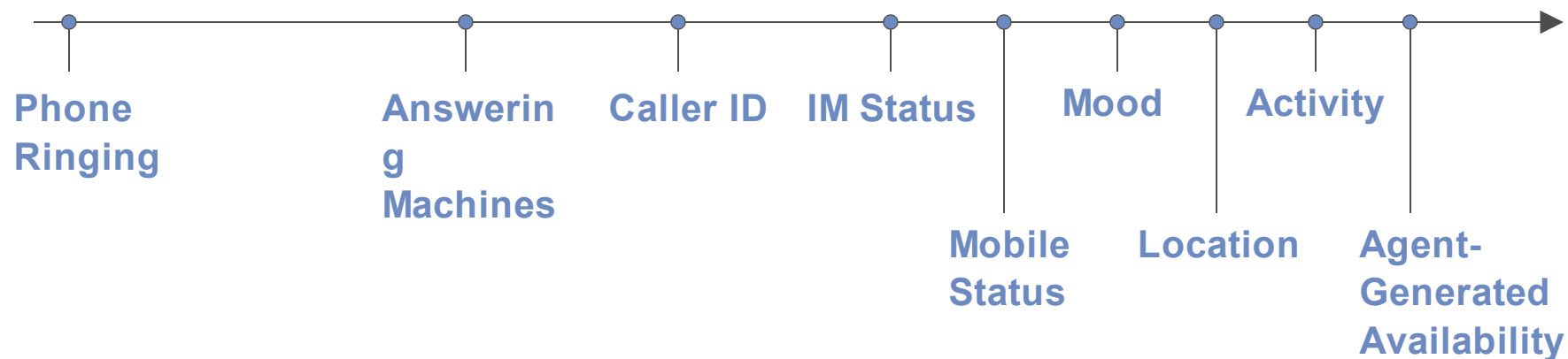# Some social implications of location and presence

Presence everywhere

Presence management will change the way we use all person-to-person communication media and will affect almost every network application.

- Knowing a friend's status and location eliminates the need for a voice call when the entire purpose of the call would be to convey status and location

- Knowing a friend's mood and activity (along with status and location) helps determine which, if any, method of communication is most appropriate

  - If I am calling a friend to chat, I'd like to know he is not busy or in a bad mood

  - If I am calling a coworker with an urgent business question, I would like to be able to convey this to encourage her to answer

- More information about all parties in a communication will enhance the communication itself

The Presence timeline

Presence has been around for a while, and as its accuracy and granularity have evolved, we've come to rely on it more and more – forgetting what it was like before

Phone Ringing

Answering Machines

Caller ID

IM Status

Mobile Status

Mood

Location

Activity

Agent-Generated Availability

Case Study in Presence: Caller ID

Caller ID shows the potential of presence in changing how people communicate

- Enables user to see who is calling and decide how to respond

- Doesn't require extra action by either party (pushed presence)

- Many users can't imagine life without caller ID. It is essential to how they communicate

- Originally built to solve a problem: telcos wanted to charge users for receiving calls, but callers weren't willing to pay unless they knew who was calling

- Easily extensible as new capabilities are added (show caller's photo, show caller's local time, location, mood, urgency of call, etc.)

Designing the next generation of mobile apps

Interpolation: on terminology

As designers, let's use the term "Mobile Device"

"Mobile" speaks to the very nature of the device and its advantages over other devices, whereas "wireless" binds it to its relationship with older technologies

"Device" doesn't denote a particular technology or use, whereas "phone" carries with it many decades of expectations

A new design philosophy for mobile devices

Stop thinking about mobile devices as limited personal computers (the WAP legacy)

Start thinking about them as versatile, connected, multi-modal devices

Finally, location and presence will define the next generation of mobile applications, so it is important not to see these as mere features, enhancements or add-ons.

Rather than thinking about the differences between a PC and a mobile phone, think about the difference between someone with a mobile phone and someone without one

The mobile UE toolkit

In their latest generation, mobile devices combine:

- Audio interface (microphone and speaker)

- Graphical interface

- Physical/tactile interface (keypad)

- Camera

- Signal reception and location-detection (cellular, GPS, WiFi, etc.)

- Connectivity (cellular, Bluetooth, IP)

- Storage

- A variety of built-in applications (PIM, 'office' tools, etc.)

A multi-modal User Experience

As User Experience designers, we will define more and more how the various interfaces and components of a device are leveraged and combined in a given application

Mobile applications should offer users as many communication channels and device modes as possible and provide enough information to help users reach their communication goals effectively

A multi-client User Experience

Like "Mogi" many services will have a User Experience that is not confined to a single device; the key is to leverage the client experiences appropriately in a continuous User Experience

- Designers need to think about which aspects of the User Experience are right for which type of client

- Designers also need to think about creating effective connections and jump points between the specific client experiences

Initiating interaction

With desktop PCs, users initiate interaction, and the PC expects and demands the their full, undivided attention throughout the interaction

With mobile devices, however, the application can initiate the interaction

This, combined with location-awareness and presence, gives UE designers an extremely powerful opportunity to deliver information and functionality best suited to the situation

Designing presence

When it comes to designing presence into applications, designers need to understand the two basic types of presence, and determine the kinds of status that make sense for the application

Machine-generated status (e.g. online, offline, idle, location)

- Accurate, reliable, objective

- User should be able to suspend, change or override in certain cases

User-set status (e.g. busy, bored, invisible)

- Qualitative, controlled completely by the user

Applications shouldn't use presence data to set limits that second-guess the user – only provide information (i.e. even if a user has set her status to "EXTREMELY BUSY", the designer should not remove the ability for someone to call her)

Hypothetical User Scenario: Driving Directions

1. My artist friend sends directions to her new studio from her PC to my phone

2. I glance at the map on my screen, and since I already know how to get to the general neighborhood, I start driving without looking too closely at the accompanying directions

3. When I'm in the neighborhood, I use my phone to access the directions

4. Since I'm on the road, my phone provides the directions via audio, and since my phone has GPS, they start at my current location and bearing

5. When I'm within a couple of blocks, the application gives me the option (via a voice-activated "yes" or "no") to call my friend

Hypothetical User Scenario: Driving Directions

The fact that the User Experience through this driving directions scenario was not fully contained in a single client or a single mode is not a design shortcoming

- Delivery of appropriate functionality to appropriate clients and an effective flow between clients

- Employment of various device modes, using the GUI, audio, keypad and voice input at different points in the process

- Use of location and presence data to focus the User Experience and select the device mode best suited to the user's current status

Conclusion

Location and presence will define the next generation of mobile applications and change the way we communicate with each other

- Presence enables users to pay less attention to the system

- Presence enables designers to tailor the User Experience more than ever before

Mobile and desktop clients each have their advantages, and many services will employ multiple clients in the overall User Experience

With their many features, the latest generation of mobile devices offers designers a robust User Experience "toolkit"

The success of many services will depend on how effectively the User Experience leverages the advantages of different clients as well as the items in the mobile UE toolkit

Thanks!

Now…

"Do you have one of those phones you can talk to people on?"

Sources

- *Mogi: Second Generation Location-Based Gaming* by Justin Hall
  TheFeature.com (http://www.thefeature.com/article?articleid=100501)

- *Mobile Social Presence: Who Knows Who's Where Now?* by Howard Rheingold
  TheFeature.com (http://www.thefeature.com/article?articleid=100442)

- *Smart Places* by Jack Schofield
  The Guardian, March 25, 2004

- *WhereWare* by Eric W. Pfeiffer
  MIT Technology Review, September 2003

- *Be Here Now* by David S. Bennahum
  Wired Magazine, November 2001