21W.789: COMMUNICATING WITH MOBILE TECHNOLOGY

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ED BARRETT

Spring 2012: Class 1

Mobile Computing is Everywhere

An Internet-connected computer in 3 billion pockets…

Why study mobile computing?

- Changing lives of many
  - Micro-coordination
  - Farm Prices
  - Microfinance
  - Live Media Sharing
  - Constant Access to Information
- Mobile Application Explosion
  - ~1,000,000 apps in iPhone, Android, Windows Mobile app stores

What's unique about mobile?

- Media Capture
  - Ability to share your world with others
  - Document life for yourself, anywhere
- Sensing
  - Location, accelerometer, compass, body sensing
  - Get content you want, fast
  - Sense and track personal health
- Social Connectivity
  - Device tied to a person, almost always with them
  - Voice, text, email, chat, media sharing…
- Ubiquitous access to Internet, data "everywhere"

What that means for design…

- Concepts can take advantage of context and contacts
  - Location, status updates, photos, etc. all afford radically new experiences with those we care about
- Concepts must work in daily life
  - Not a task to do at a computer screen
  - Interactions must flow with the rest of life
  - Concepts must be evaluated in daily use over long periods of time to judge their usefulness

Much more than just writing the code

Observation

Ideation

Design

Build

Test
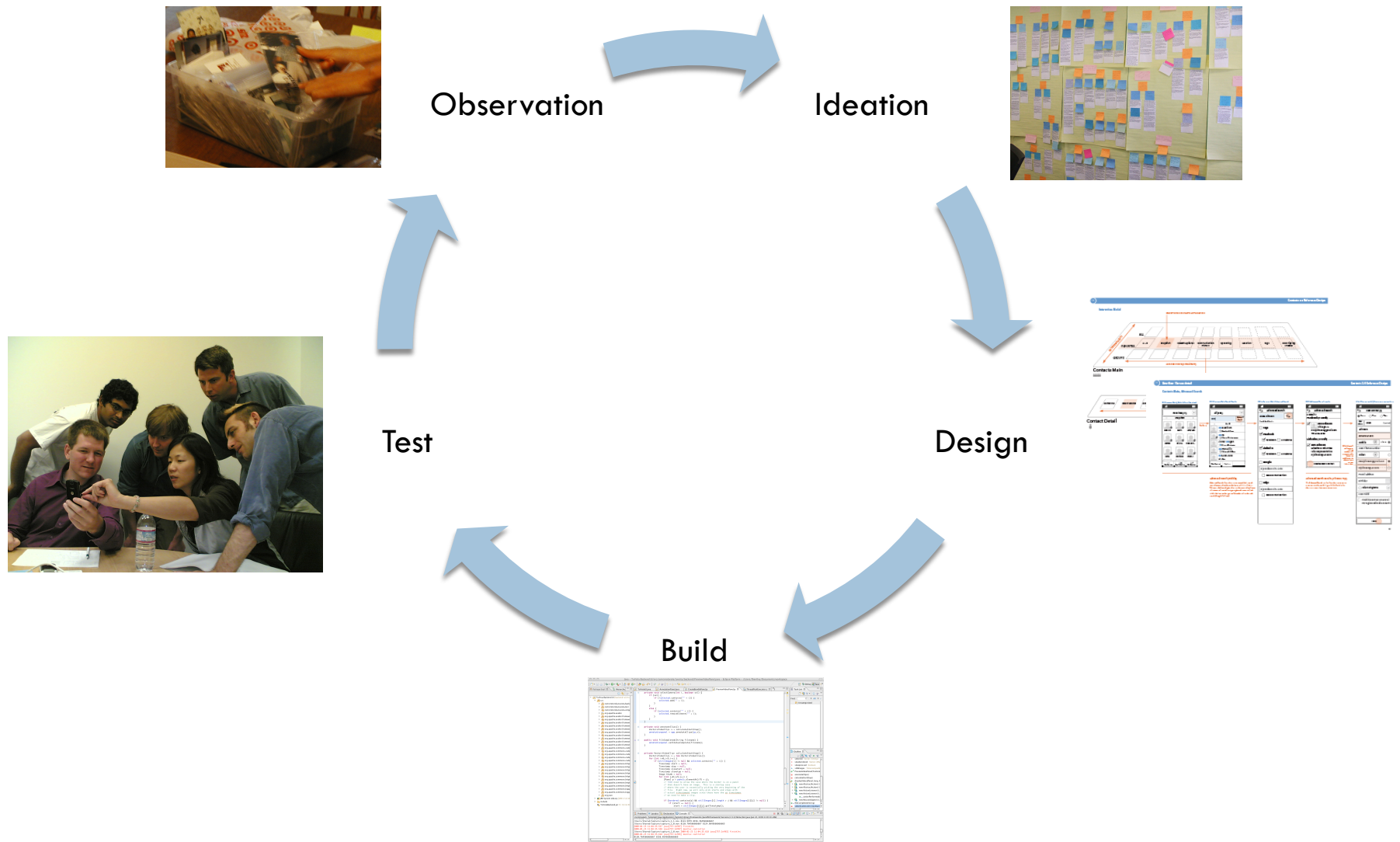
Human-Computer Interaction (HCI)

- The field at the intersection of Computer Science, Psychology, Design, and Anthropology

- Understanding and defining how people interact with digital systems

- Large (~3000 person) research community

- Driving the design/interaction of most digital products on the market today

Experience Design

- Goal is to enable people to do things that were not possible before (i.e. have new experiences)

- More than just designing and implementing an interface to solve a task

- What people do with it, how they appropriate it to their lives is what really interests us

Inspiration for design

- Learning from people

- In-situ observations of related practices

- Grounding new designs in real-world behavior

Coherent Design

- Design is a process from the beginning

- Ensure interaction flows for a user

- Especially important on a small-screen mobile device!

Building and Testing are Iterative

- ☐ Increasing fidelity with quick tests along the way

- ☐ From paper to working in the world

- ☐ Catch mistakes early when it's easy to change

Relative Cost To Repair Defect

from Managing Software Requirements (Leffingwell et al)
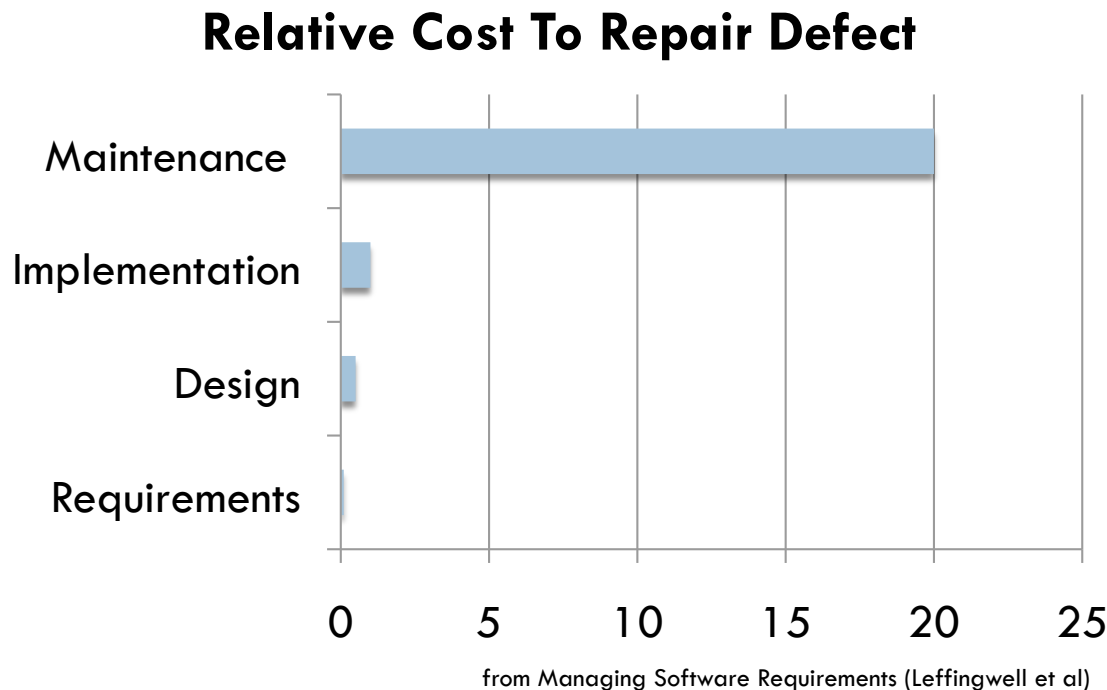
What is the class about?

- Investigating the interaction between people and mobile computing devices

- Creating compelling mobile applications and services to improve daily life

- Group project-based class
  - Design, build, and document a novel mobile application
  - Final conference-style paper

- Other small assignments along the way
  - Location exploration, network characterization

- Classes split into lecture and studio/sharing/review time
  - Attendance and participation required!

Semester Project

- Choose a domain area and form a team (TONIGHT!)
- Perform a field study investigating current practices in that domain (this week!)
- Analyze data and develop concepts based in data (next class)
- Propose project (after next class)

- Later weeks will involve design, implementation, and field evaluation of your concept.

The Syllabus

Date	Topic	Reading (before class!)	In Class Group Activity	Assignment (due next class)	
2/7	**Mobile Applications Overview/Generative Research Methods** Overview of research areas in mobile computing. Discussion of the domains and structures of mobile applications. Discussion of how mobile technology is changing communication patterns. Overview of methods used to create new concepts based in field observations.	None	Share interests, begin to form project gorups	Mobile observation study (10%)	
2/14	**Qualitative Data Analysis / Android Fundamentals:** Performing analysis of user data to generate concept ideas. Fundamentals of programming on Android devices. Differences from desktop Java. Small overview of iPhone programming. Outline for proposals.	Contextual Design	Affinity analysis of observation study, informal report on observations	Proposal (15%), HelloWorld on device (5%)	
2/28	**Proposal Presentations:** Students present proposals for semester projects.	Applying UCD to Mobile Application Development			
3/6	**Mobile Design / Paper Prototyping:** Going from requirements to an interaction model down to the design of screens. Rapid prototyping and evaluation. Discovering usability problems early.	Prototyping For Tiny Fingers References: [1] [2] [3] [4] [5]	3-4 screens prototyped	Complete paper prototype (10%)	
3/13	**Usability / Mobile Location / Networking:** Usability testing of paper prototypes. Novel applications of location in social, media tagging, and public safety applications. Mobile location technology including GPS/CellID/Wifi localization. Networking capabilities of mobile devices. Best practices in writing mobile networking code.		Testing of paper prototypes. Discuss anticipated technological hurdles	Location and networking assignments (10%, due 3/20)	
3/20	**Mobile Persuasion / Urban Computing:** Mobile applications that encourage positivie behavior changes (exercise, diet, social, etc.). Systems that combine physical interaction in the world with mobile technology.	UbiFit Garden, Persuasive Games		Prepare poster/demo on current project state (15%, due 4/3)	
4/3	**Poster/Demo session:** Share current progress on project with the class.		Present posters and demos.		
4/10	**Field Evaluation:** Methods for evaluating mobile computing concepts through everyday use. Diary studies, logging, understanding long-term use.	Serendipitous Family Stories			
4/24	**Large Scale Research / Distribution / Instrumentation:** Launching research projects in app stores. Business models for mobile services. Instrumenting applications to collect analytics data..	None		Continue working on final project.	
5/1	**Final Project Triage:** Get help with any remaining issues for final projects. Possible guest lecture.	None	Share latest progress.	Continue working on final project (25%)	
5/8, 5/15	**Final Presentations**	None	None	Final written report due Friday, May 18, noon in Ed Barrett's office (14N-336).	

Teaching Staff

- Frank Bentley (bentley)
  - Principal Staff Research Scientist at Motorola Mobility Research in Chicago
  - 10 years creating new mobile experiences based on data from ethnographic field studies
  - 6th year teaching this class

- Ed Barrett (ebarrett)
  - Senior Lecturer in Writing and Humanistic Studies
  - Background in web, non-linear narrative, poetry, usability, social media
  - Also teaches 21w.785 Web class

- Steven Schirra (schirra)
  - TA
  - Graduate Researcher in Comparative Media Studies

Devices

- Develop on your own devices. A very small number of Droid 1s may also be available.

- Class will focus mostly on non-platform specific topics, some examples will be given for Android and iPhone

- Assignments require data access – no textbook, so this is really the only cost for the class. T-Mobile/Cricket/Boost have good pay-as-you-go data plans.

Today's Class

- Case Study of Process: StoryPlace.me

- Mobile ecosystem background

- Active research domains

- Break to find others interested in similar domains

- Field methods for generative research (assignment for next week)

Our group has studied:

- in-family communication (2002)
- photo sharing (2003 & 2007)
- music use (2005)
- location sharing (2006)
- social television (2007-2009)
- trips to sporting events (2008)
- intergenerational distance communication (2010)

Case Study: StoryPlace.me

- Initial study to investigate communication between generations across distance (Spring 2010)

- Serendipitous Family Stories prototype and field trial (location-based video sharing) (Fall 2010)

- StoryPlace.me public beta (broader concept of location-based video) (Summer 2011)
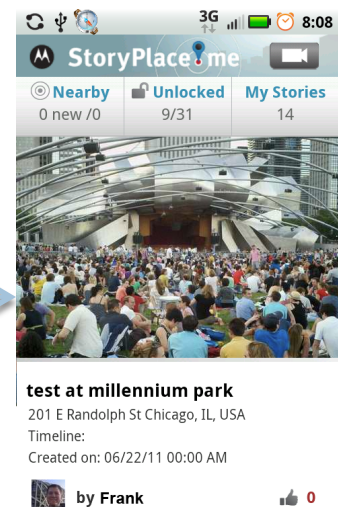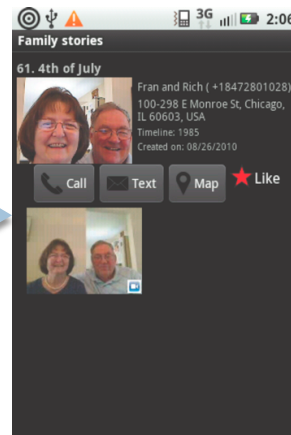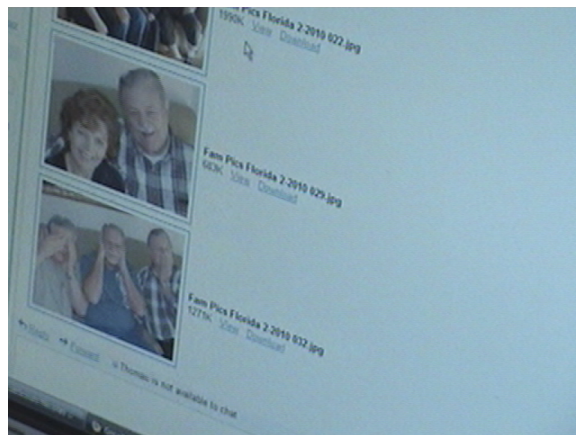
Elder Communication Study

- Understand aging at a distance, communication needs

- Develop knowledge in this area for Motorola – prepare for future product needs

- Identify potential high-impact products/services in this space
  - Validate them through rapid prototyping/field evaluation

Motivation

- **Aging Population**
  - 2030, 20% of Americans over 65
  - 2009, 20% of Europeans were retired
  - 2009, 22% of Japanese over 65

- **Distributed Population**
  - 43% of Americans live > 1 hour from parents
  - Growth of retirement destinations in FL, AZ, NV

Age Distribution, 2000

Female
Male
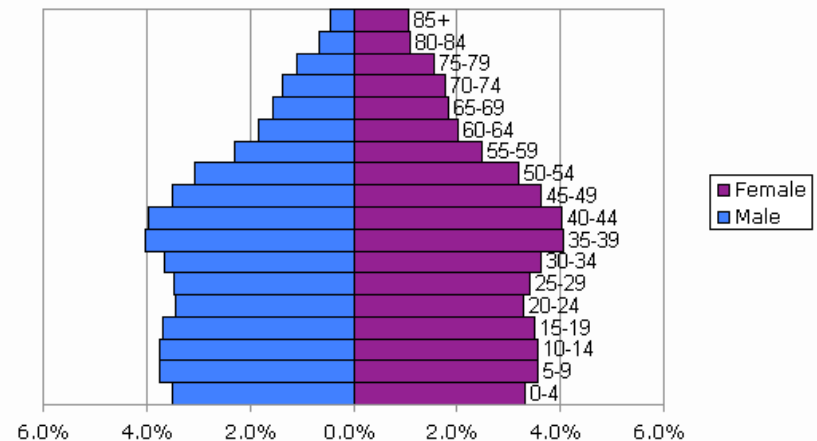
The Villages

8,000 to 80,000 in 8 years

Recruiting

- 5 pairs of participants
  - Parents > 60 in Central FL
  - Adult Children in Chicago area
  - ~1000 miles
- Recruited through email to the Chicagoland Club in one community and through a professional recruiting agency
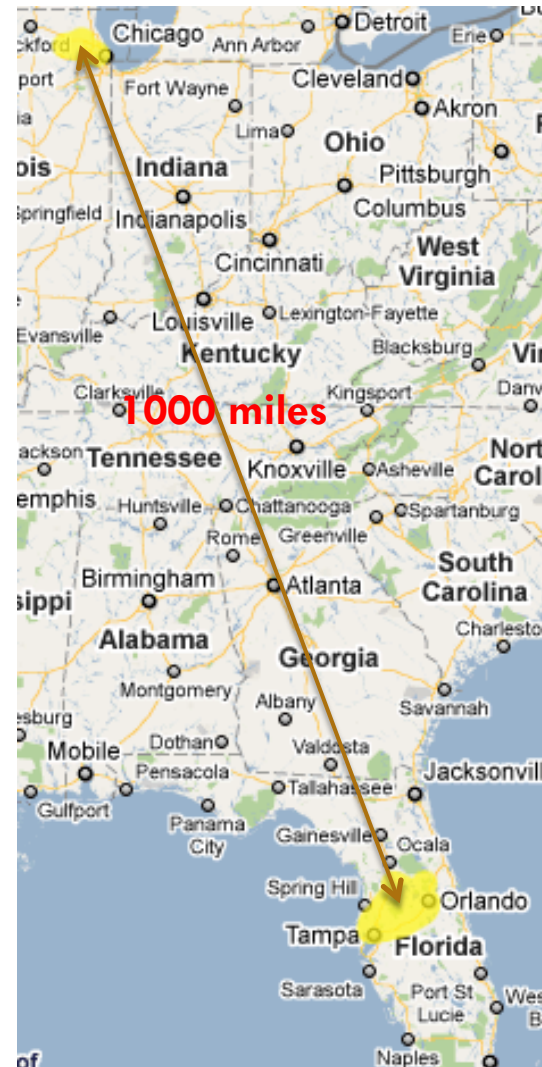
Study Design

- **Initial Interview**
  - Home Tours
  - Questions about recent communication

- **Communication logging**
  - 3 weeks
  - Any communication or remembrance of other participant
  - Photographs of places communication occurred, physical artifacts of communication

- **Final Interview**
  - Questions from logs
  - More general questions about communication / reflection

Concept of Family is Important / Affirming Roles

Ideal Family State

☐ Photos from weddings, graduations, whole family together prominently displayed

Getting the whole family together

☐ EC4-FL: "[EC4-IL] came over to my other daughter's house and spent some time with us. … And then the next day we all went over to [3rd daughter's house] because [she] had Christmas. … And we all had a great time. A lot of fun."

Doing things together

☐ EC1-FL: "And I just go off with the girls. Just the three of us go to lunch or something. That's kind of nice too. We did a little shopping together. I really like doing that."

☐ EC2-FL: "She likes to fish and I like to fish. She likes to work out and I like to work out. When she was here in January, we went to the gym together."

Family History

☐ EC2-IL: "My grandfather used to dance there, when he was in the army or whatever. And so I noted, and I put 'Where Pops used to dance' as the memo [subject line]."
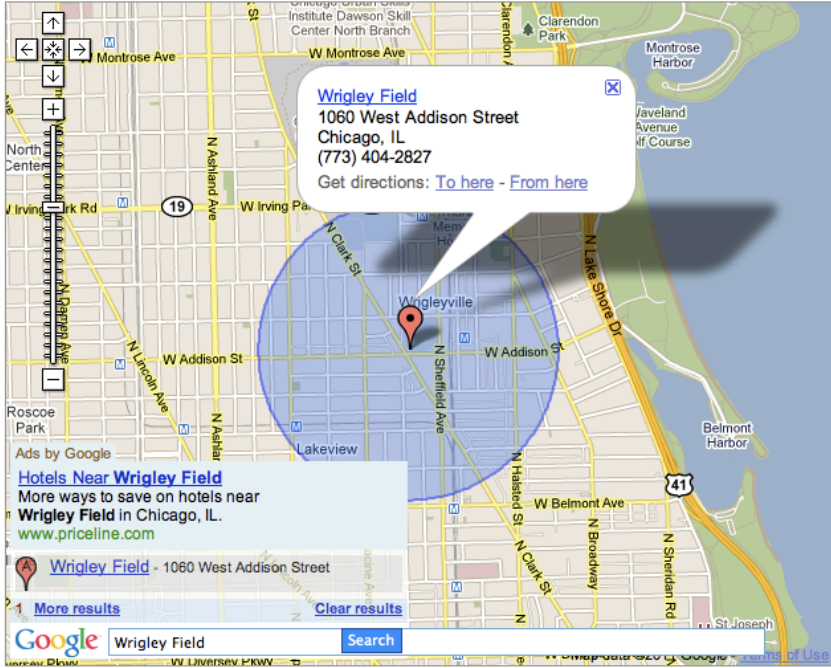
Easy and Comfortable Communication Fits Best Into Daily Life

Communicate From Everywhere

□ EC2-IL: "I talk to them everywhere. Walking out of work, on the train, at the gym, in the car, when I'm at home, on the roof … In South Beach on the beach. I'll call them from inside the tanning bed. Unless I'm under water I'll pretty much use the phone and talk to people."

Distraction From Primary Activity

□ Can get on the wrong train (EC2-IL), get lost (EC1-FL), etc.

Communication From Comfortable Spaces

□ Couches, offices, floors. Spaces to write letters (EC3-IL), etc.

Fixed Communication Spaces

□ EC3-FL: "Where I communicate? You mean where the phone hangs on the wall?"

□ Video Conferencing in fixed spaces

Difficulty in Setting up Communication

□ EC4-IL: "We were both on the phone. Saying here's where you've gotta click mom. Find that spot, that's what it says. 'But I don't see it on here, it's not on here,' she'll say. It's difficult."

□ Forgetting Passwords (EC1-FL)

Learning Stories of Daily Life Creates Togetherness over Distance

Details Build Up Over Time

- EC4-FL: "It made me realize that through communication you stay in contact. And there's like a binding between you. And when you don't communicate, then you lose that. And you know what's going on, and you get to talk to your grandkids even though they're not around. And it builds up your relationship with them."

- EC3-IL: "I just talked to him a little bit. Hey, how you doin'? What's going on? What did you eat? How's the weather? Stuff like that."

Sharing Media Of Daily Life

- EC4-IL: "Because my mom is not here to celebrate things like this, she wants to be a part of it. We want her to be able to see it. … Just so they can share in it and feel like at least they have a part, even though they are far away."

Design Inspiration

Design Implications

- Evoke Family History/Shared Memories
- Communication Should Be Integrated Into Everyday Life
- Communication Technologies Should Recreate Feeling of Being Together

C2 was passing by a theater in Chicago and took a picture and sent it to her mother. "My grandfather used to dance there, when he was in the army or whatever. And so I noted, and I put 'Where Pops used to dance' as the memo [subject line]."

Serendipitous Family Stories Concept

- Parents/Grandparents can record videos about their lives growing up in Chicago
- Stories can be saved to the places where they occurred

- Kids/Grandkids will get notifications on their phones when they happen past one of these places and can "unlock" the videos

The Serendipitous Family Stories System

Web interface to create stories (webcam captured videos, with a location, a radius, and a recipient):

The Serendipitous Family Stories System

Mobile interface to receive stories serendipitously as you go about your day:

- Notifications (and vibrations) when approach a new story

- Another notification when you are within the story radius

- Ability to view any story that you've already found ("unlocked")

- "Compass" giving you heading and direction to closest new story
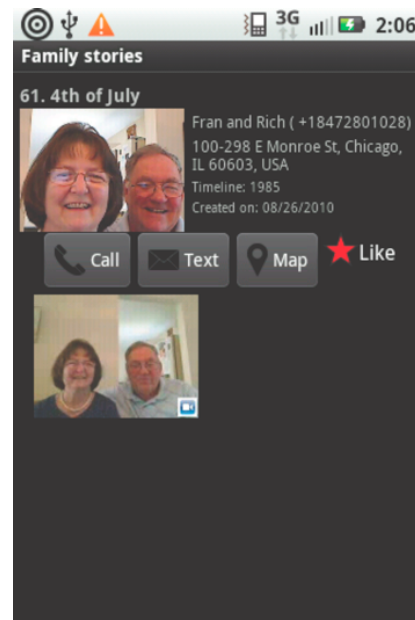
our evaluation philosophy

- Get new concepts in the field as early as possible
  - Weeks after having idea!
  - Working functional prototype
- Field evaluations serve to:
  - Improve Concept
  - Mitigate Risk (kill unsuccessful concepts)
  - Build understanding of mobile interaction
- Make prototyping and field testing:
  - Cheap (incentives + your time)
  - Fast (~2 week implementation, ~3 week study)
  - Informative (interviews, home tours, diary logs, voicemails, photos, etc.)

SFS Field Study

10 parents and grandparents in Florida (55+)

10 adult children and grandchildren in Chicago (20s-40s)

- Met with older adults in their homes
  - Created 5-10 stories for their child/grandchild
  - Voicemail diaries during study
  - Final interview at end

- Met with children/grandchildren
  - Installed Serendipitous Family Stories app on their phones
  - Used app for 4 weeks in daily life
  - Voicemail diaries during study
  - Final interview at the end

Content of stories

What did people talk about?

- Family outings (boat rides, musicals, concerts, dinners)

- Holiday events (department store windows, festivals)

- Neighborhood events growing up (sports, picnics, movies, music)

- Dating (places where met husband/wife, amusement parks, meeting the parents)

- Work (old offices, colleagues)

Place Type	Number of Videos	Event Type	Number of Videos
Home	14	Sports	11
Retail	10	Trip/Museum	11
Restaurant/Bar	10	Live Performance	9
Park/Zoo	7	Holiday/Birthday	7
Theater	7	Professional Life Events	6
Amusement Park/Racetrack	6	Wedding/Engagement	5
Church	6	Accident	4
Stadium	5	Shopping	4
School	5	Moving	4
Street/Alley	5	Eating	4
River/Lake	5	Date	4
Work	4	Party	3
Hotel	4	Boat Ride	3
Recording Studio	3	Getting a Car	2
Museum	3	Crime	2
Car/Bus	2	Prom	2
		Dancing	2
		Cooking	1

Finding Stories

83% of stories were found during the four weeks of the study

- Serendipitous discovery of stories was seen by participants as "a cute little treat" (C3) and an experience "that will make you feel happy or bring a smile to your face" (P6)

- Surprise: "I was surprised. I was not intentionally going to the location to see the story but it was a surprise for me ... and then this thing was right there!" (C2)

- Intentional Trips: "I went over to the Daley Center because that's where he did a lot of his court cases." (C7)

- But sometimes annoying: Continually getting a notification on the subway, with no way to get to the place of the story.

Videos Found Per Day of Study
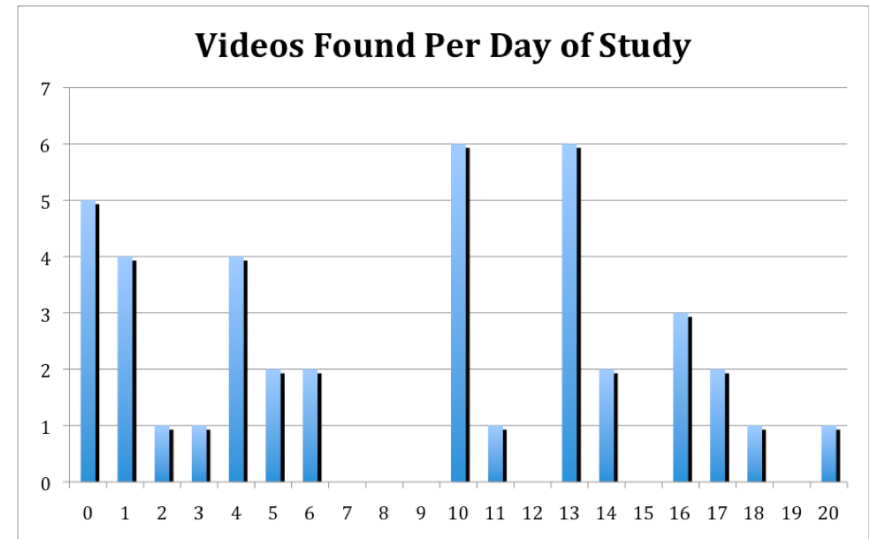
Strong Memories and Emotions

Experiencing media "together" and the strong emotions that come with remembering the past

- She called "to say that I made her cry that she was so touched by the stories. And she thought they were funny, the first ones I told her about." (P6)

- "After that [watching the two new stories] I called both my mom and my brother and I laughed about the situation cause it was pretty funny what they said." (C10)

Ramping Communication

Liking/Texting -> Phone Calls -> In-person Sharing

Overall increase in communication reported

- C6: I "did end up texting my mother and telling her how sweet it was. Brought back a lot of memories, which was nice. And she called me back and we actually laughed about it."

- P4: "This has really brought us closer together because we've been more communicative."

- P5 called the intergenerational communication that the system created "a minor miracle" since her daughter did not previously show an interest in family history.

Extending Storytelling to Family and Friends

Watching stories becomes a whole-family event

- "My husband was watching it with me, we were in the car. So we were in the car and he was watching it with me and was laughing. I don't remember word for word what we were talking about and **then my kids starting asking us questions about it, I know that. He wanted to see the video and they got all involved in it too**."

- C7 "watched them all one day when I was on the way home and **then I watched them again with [my wife]**. Showed them to her cause she wanted to see them and wanted to see what her dad had said."

- C4: "Oh yeah, **I showed everyone at Thanksgiving**. Which was nice because it was Thanksgiving and everybody was together. My mom started talking about the stories then and it was great!"

- C5 "**was hanging out with my cousin**. And I was telling him about this app ... And I was like, look! **Look! It's mom and dad and they recorded stories** and they geolocated them. So I showed him the stories and he was like woah, that's cool."

Number of Views For a Video
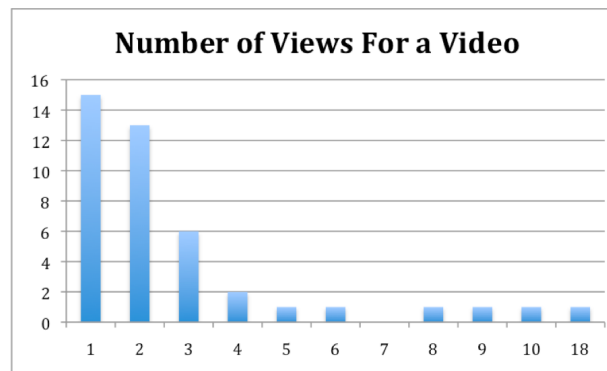
Engaging with the city through family history

Changed perspectives on everyday places: Learning about how the city has changed, or a different view from a loved one

- "Just **being other places that other people were is neat.**" (C4)

- "It was a story about her being on the dance show and how they took video and used to go on boat rides. **I had never heard of Ray Reiner,** but I guess everybody else has because when I talked about it with people from my office they all said that oh yes, Ray Reiner is very popular. … **[My aunt and I] just talked about who Ray Reiner was** and how he was kind of like a Dick Clark." (C3)

- "**I had no idea there was even an amusement park there.**" (C4)

- Seeing a visual of the city that was unknown…

"It was interesting to hear about [father's] office in that building and how when the lights went off the whole city lit up, otherwise you couldn't see anything. It was very dark up there. That was an interesting story." (C7)

Photo by Henriette Cramer

Seeing the family in new ways

Learning about the lives of others

- **"I didn't know that they didn't have a car.** She never had a car growing up. So everything they did they took a bus or the train and things like that." (C4)

- "She got a big kick out of the things that I did tell her though! And **I guess she never knew her grandmother was human.**" (P4)

- "Yes, she said that she never realized that I worked at [department store]. And she said that she also didn't realize that I was pregnant when I worked there. She was so surprised to hear that. So she says, 'Were you married!?' … **And said that she didn't realize that I was a Jr Executive with [department store]. She thought I was just always just a little sales clerk.**" (P3)

- **"I didn't know he was so into the architecture of things. I talked to him about it.** I talked to [my wife] about it too." (C7)

summary

Location-based asynchronous video communication:

- Fits connection with relatives into everyday activities

- Bridges space and creates new opportunities for "being together" with relatives

- Encourages communication

- Creates deeper understanding of the lives of family members and the importance of everyday places in the city

Moving to StoryPlace.me

- Recognized we had a concept that worked for people, created compelling interactions in the city
- Needed a more robust, designed solution for public deployment (user management, access control, mobile content creation, etc.)
- Interested in how system would be used "in the wild"

new opportunities:

☐ **Professional Location Based Content**

  ☐ Participants loved getting history of locations they passed by in SFS trial

  ☐ We partnered with WTTW, City of Chicago, WNET (NYC), and others to offer professionally produced clips about city landmarks

☐ **Sharing with anyone**

  ☐ Participants in the SFS trial wanted to share with spouses, friends, family, public, etc.

  ☐ Created access control per story (and collections)

Following content in StoryPlace.me

- Did not want users to be bombarded with content (ads/etc.) as they walked about the city
- Notified for:
  - Stories explicitly shared from friends
  - Stories from friends' collections that you have explicitly followed
  - Stories from public collections that you have explicitly followed
- Can view other collections nearby in the mobile app and decide to follow them

Deployment

- Currently available in Android Market

- Anyone can use web interface (e.g. parents/ grandparents without smartphones)

- ~700 users with no active publicity

- Studying the places where content is created, sharing patterns, growth networks in users, etc.

StoryPlace.me: Summary

- Creating mobile user experiences is unique

- Involves interactions with the city, sensing, media, and contacts

- Most successful concepts are:
  - Inspired from real-world observations
  - Tested in real-world settings

Next Topics

- Current Mobile Ecosystem (web vs. mobile app)
- Current Mobile Research Topic Areas

Current State of Mobile Computing

- Three main platforms
  - Android, iPhone, Windows Phone
- Each platform has its own marketplace and own language/APIs for developing native applications
- Mobile websites can cater to all phone types, but for the most part cannot access the parts of the device that make it truly unique (location, sensors, camera, phone book, file system, etc.)

- This class will focus on native applications for mobile

Mobile Ecosystem

Web

- No installation
- Limited interaction with phone platform
- Rendering issues on different handsets
- Some reach to almost every device
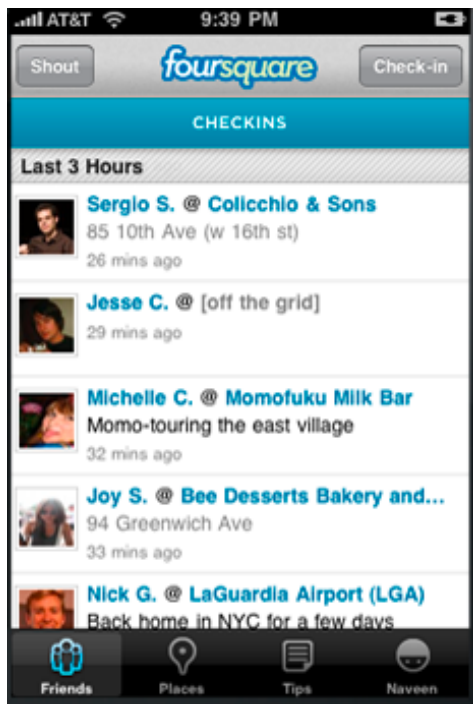- No discoverability (e.g. market to find new apps)

Native

- Written for a particular OS
- Deepest interaction with phone platform, sensors
- Supports complex interactions, animations, data cacheing, etc.
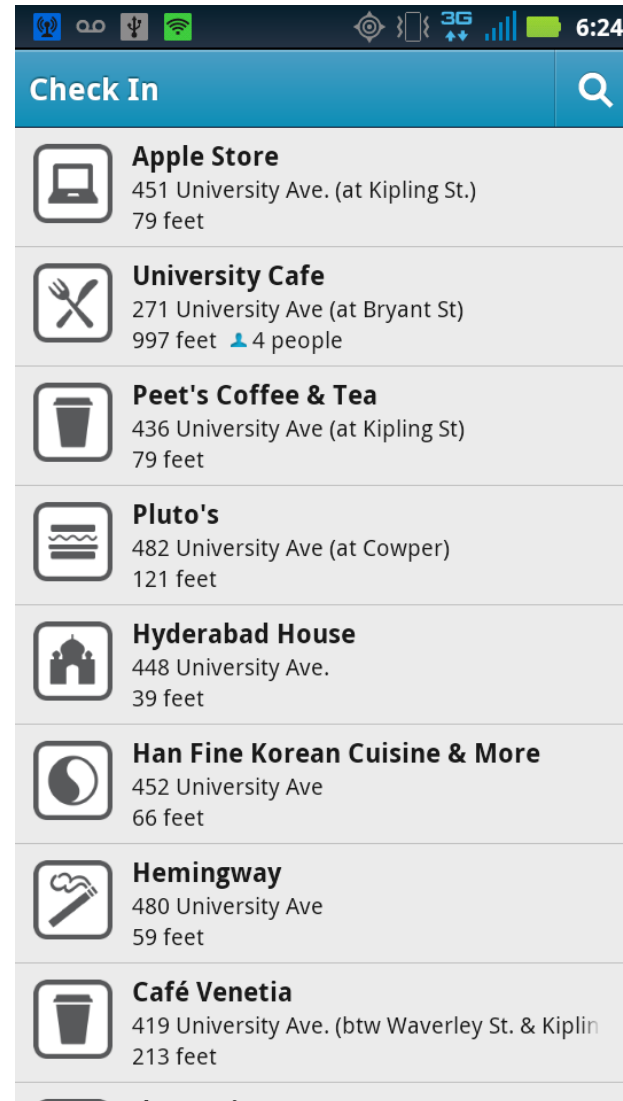- Background Processes
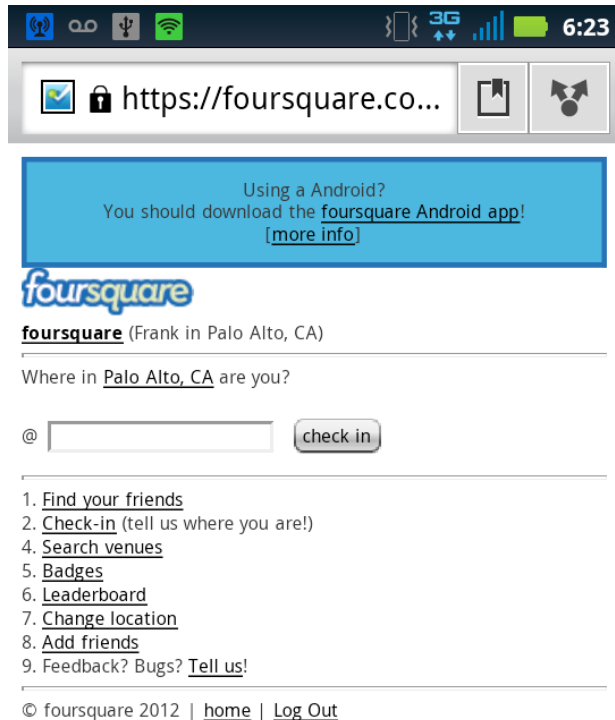- Popular marketplaces to release applications

Mobile Web Applications
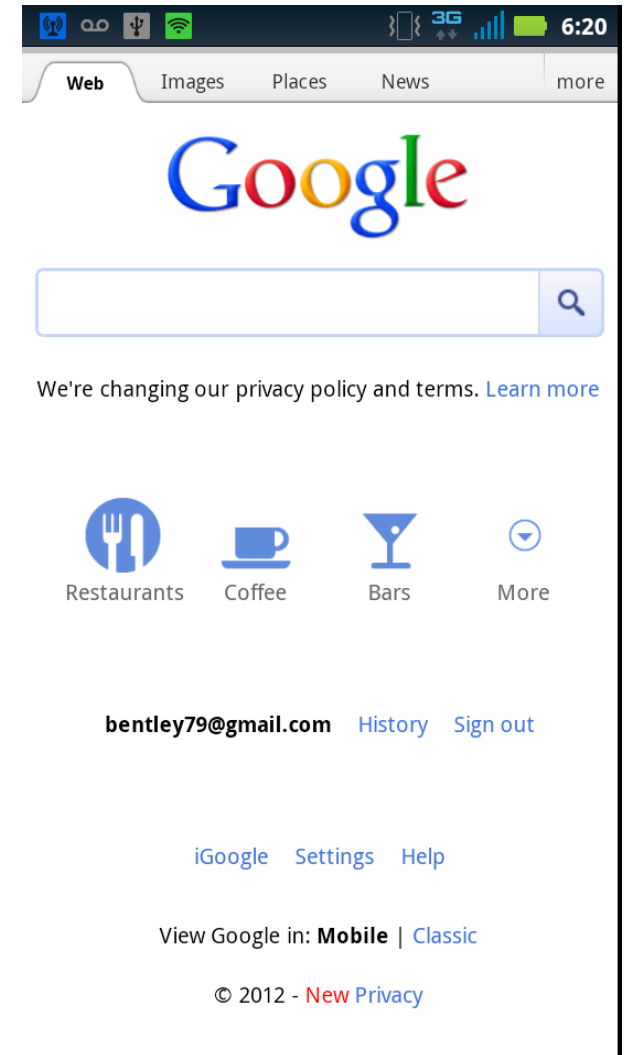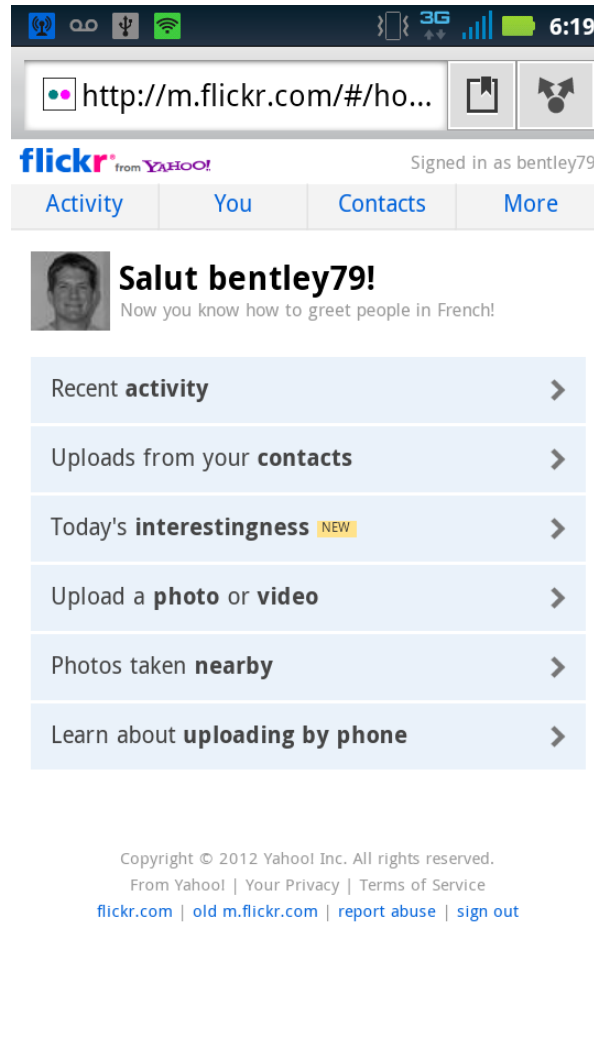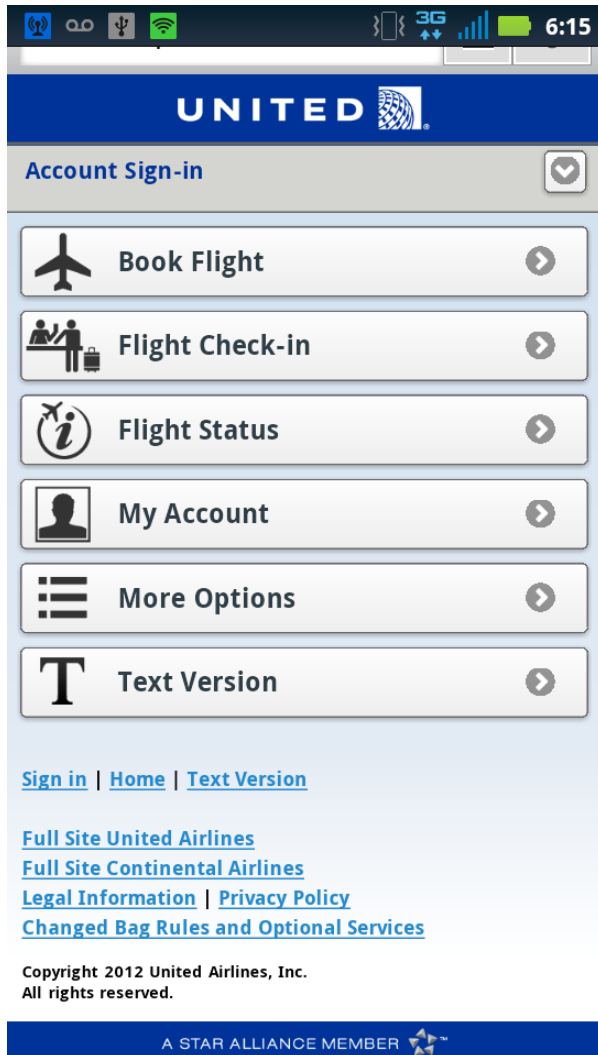
Native Applications
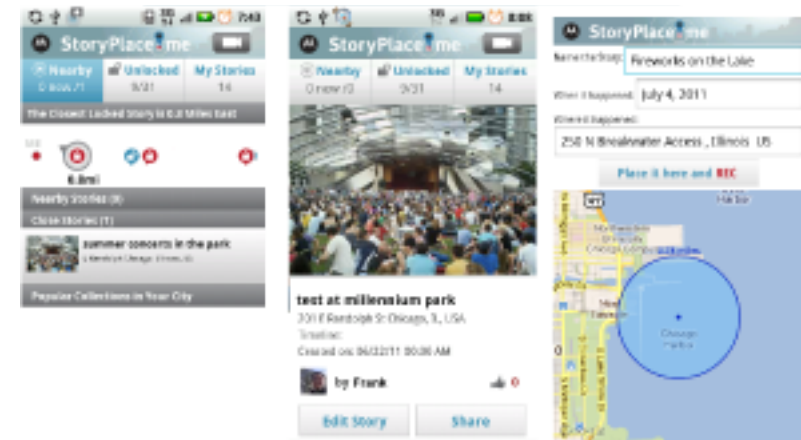
Web vs. Native: foursquare

Path to consumer

- Web:
  - Go to a URL (but they must know/find that URL)
  - Instant and updatable totally from server side
- Native:
  - Platform App Store (Apple, Google, Microsoft)
  - Updates can be placed in app stores / users notified on some schedule, but not instantly

This class:

- Focus on Native Applications
  - Richer experiences
  - Integration with on-device sensing / location / camera
  - Background processes
  - Easy discovery in mobile markets

Current Mobile Research Areas

- Location-Based Mobile Computing

- Persuasive Applications

- Urban Computing

- Mobile Social Computing

- Extending Experiences

- Personal Networks/Wearables

- Companion Devices

- Enterprise

Location-Aware Computing

- How can location help make any mobile task more efficient?
  - Finding restaurants
  - Getting movie tickets
  - Knowing which bus to take
  - Tagging photos
  - Finding friends
  - Know where to sell their crops
  - Mobile tour guide/games

REXplorer

Mobile Persuasion

How can mobile phones convince people to…

- Eat healthy food
- Work out
- Use less energy
- Help their friends and family
- Volunteer
- Be religious
- Save the planet

Figure 1. UbiFit Garden's glanceable display. a) at the beginning of the week—small butterflies indicate recent goal attainments; the absence of flowers means no activity this week; b) a garden with workout variety; c) the display on a mobile phone—the large butterfly indicates this week's goal was met.

Urban Computing

- Urban games (e.g. pacmanhattan)
- Interacting with city history (e.g. StoryPlace.me)
- Check-in/Location Sharing (e.g. Foursquare)
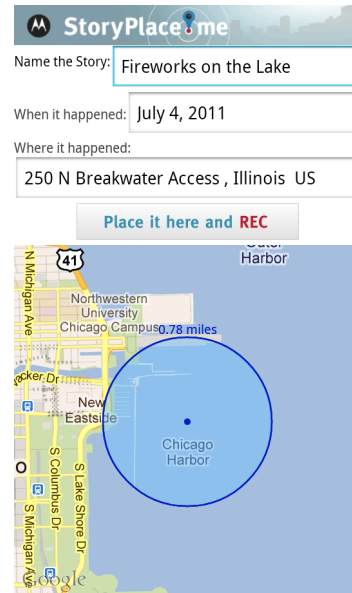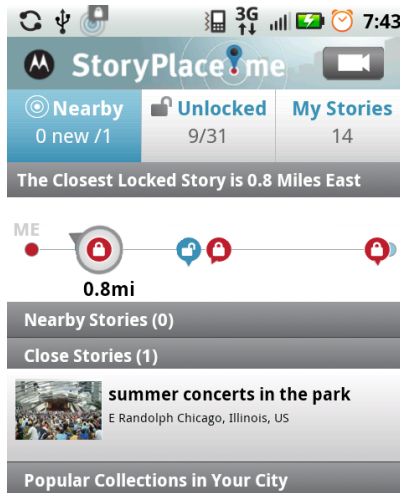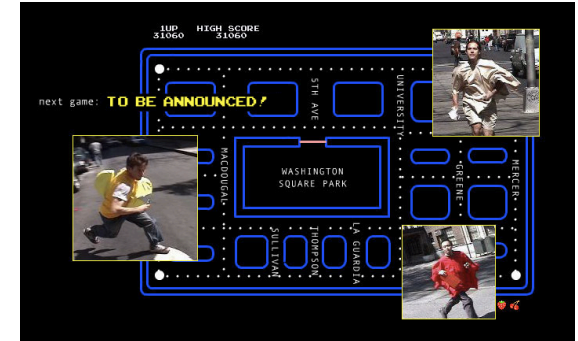
Social Computing

☐ How can phones link in data from online communities?

- ☐ Status in contacts app
- ☐ Micro-coordination (helping plan and meet up)
- ☐ See photos from friends
- ☐ Syncing online calendars
- ☐ Selling goods/services
- ☐ Managing group finances / microfinance
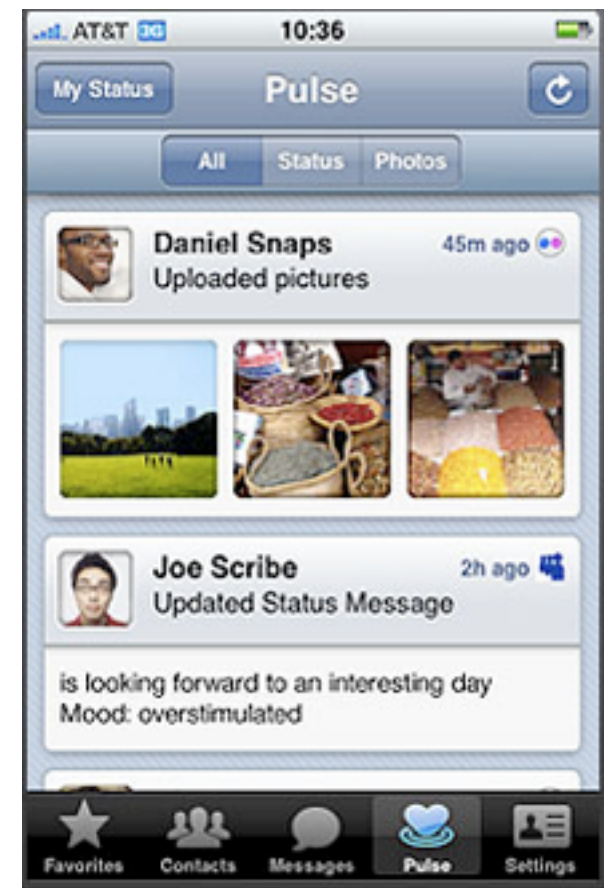
Yahoo! OneConnect

Extending Experiences

- How can an experience on a phone augment an in-person experience?
  - Sports – replays/stats on phone
  - Concerts/Festivals – see other people's photos/videos in real time
  - Working out – virtual workouts with others

Partner is jogging faster

Jogging at same speed

Partner is jogging slower
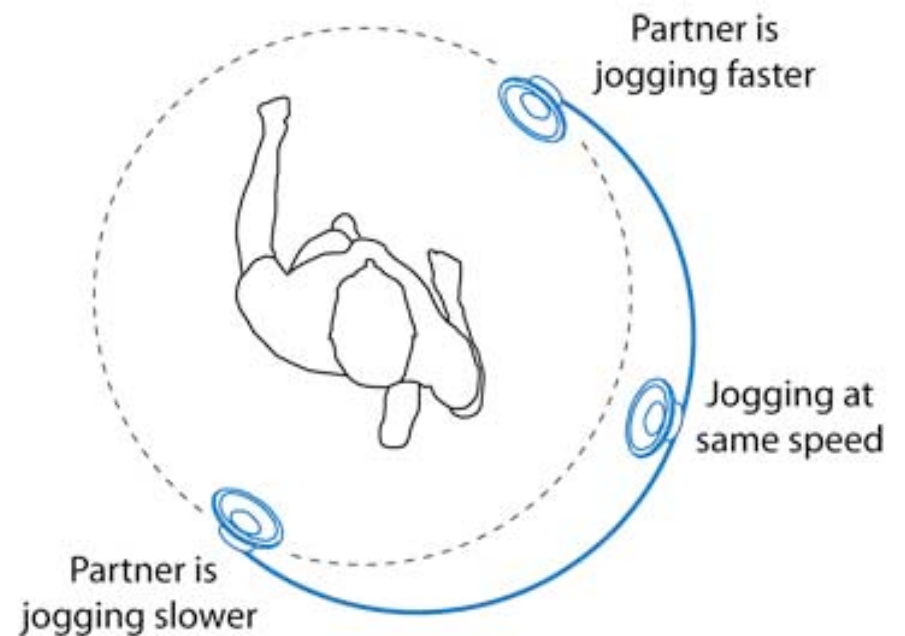
Jogging the Distance

Personal Networks/Wearables

- What can you do when you combine a phone with other sensors/actuators?
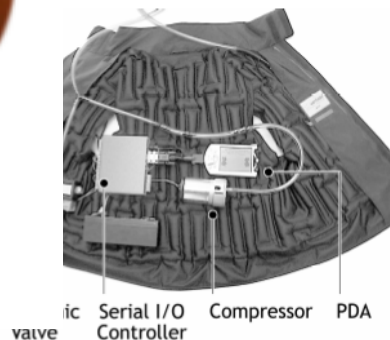 - Step Counters
  - Pollution Sensors
  - Actuated Hugs

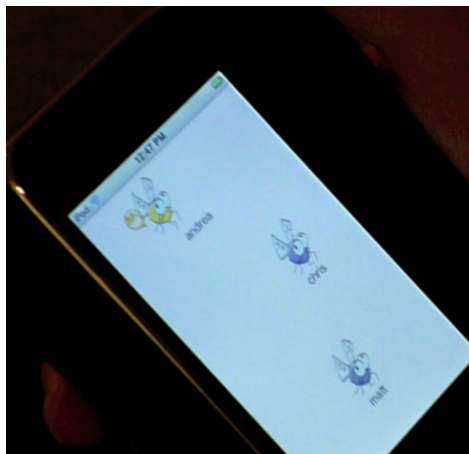Houston (Intel Research)

inAir (CMU)

Hug Over a Distance (Melbourne)

MOTOACTV Android Watch (Motorola)

Companion Devices

☐ How can mobile devices be used to complement other screens (TV/Computer/Games)?

  ▪ Displaying "private" information

  ▪ Interactions off-screen to not disturb others

  ▪ Different content for different people

BackTalk (Media Lab)

DIRECTV iPhone app

Enterprise

- How can mobile devices be used in a work context?
  - Routing people more efficiently
  - Getting additional information about products from web / checking inventory
  - Automatic check-in based on Bluetooth ID

RFID Reader

QR Code for Wikipedia

Getting inspired by real data

- Best concept ideas come from observations of real people doing real activities
- Can see what does not work for them today
- Can understand what's the most important/fun/relevant in what they do today

- At Motorola, start all work from domain area before thinking of particular concepts
- More after the break...

Pick a topic area and explore…

- My group at Motorola has studied:
  - in-family communication (2002)
  - photo sharing (2003 & 2007)
  - music use (2005)
  - location sharing (2006)
  - social television (2007-2009)
  - trips to sporting events (2008)
  - intergenerational distance communication (2010)

Now…

- Introduce yourselves, discuss topics of interest
- Topic ideas (don't feel limited!): Music, Photography, Video Sharing, Experience Sharing, Urban Computing, Mobile Persuasion, Health and Wellness, Fitness, Shopping, Alarm Clocks, Travel, Location Sharing, Social Computing, …

- Short break – talk to others interested in similar topics!

- Intro to ethnographic-style field methods…

Inspiration for Design

- Design of a new application/service should be grounded in daily realities

- Should work with how people think about each other, their environments, and the world

- Need to get out into the world to learn this…

Studying Mobile Interactions

- Interactions happen in the world
- Interactions are generally private and not directly observable
- Interactions are short and spread throughout the day

- You can't just invite someone to a lab and ask them to show you what they usually do

Rapid UCD Process

1. ethnographic-style investigations in a new space of interest

2. concept generation and prioritization

3. initial prototype implementation (days or weeks)

4. field test of new system

5. iterate

6. product decision

7. work with marketing, design, engineering, and sales teams to create product version

Can stop work at any time if value is not shown

Steps to initial ethnographic-style research

- Define research questions
  - What do you need to know to create your new service / application?
  - Focus on understanding current practices
- Choose appropriate methods to answer them
  - Observation, interviews, home tours, diary logging, etc.
- Recruit users
  - Generally 7-10 is sufficient, stop when you see repeat data
- Conduct Study
- Analyze Data
- Design!

Example Research Questions

Intergenerational Communication Over Distance

- How do participants communicate with remote family/closer relations? What tools do they use?

- What are the barriers to remote communication? What challenges do people face in maintaining or engaging in remote communication?

- What communication tensions and obligations exist surrounding remote communicate for the elderly?

- What are differences between communication at a distance and communication when remote relatives visit?

- What artifacts in the home serve to promote remembrance of and communication with distant family?

Use of Location in Phone Calls

- During communications with others, what location and activity information is provided?

- Under what circumstances is this activity and location information disclosed?

- Why do people disclose location and activity information?

- How are disclosures of activity and location similar? Different?

Music Usage

- What breakdowns exist in today's music experience in both independent and co-located situations?

- What contextual (from the past and the present) metadata can be used to address the breakdowns in today's music experience as identified in previous question?

- How can this contextual information be used to enhance today's music experience?

Methods: Observation

- Watch how users interact with a space/object/each other

- Good for observing many people, findings patterns

- Good when interaction times/locations are predictable

- But only get what, not why

- Used by students for grocery store behaviors, wayfinding in public spaces, booking travel

Methods: Home Tours

- Visit a home or work setting and see particular places of interaction

- Good for tasks which are very context dependent / rely on physical objects

- Used in Elder Communication study, music study (CDs), photo study (photos on display, use of computers, etc.)

Methods: Diary Logging

- Have participants keep a log (paper, voicemail, voicenotes, etc.) when they do particular things of interest

- Get data at time event happens. MUCH more reliable than recall some time later

- Used in almost all of our studies: Elder Communication, Location Sharing, etc.

Methods: Interviews

- Interviews complement direct observation
- Should focus on understanding current practice
  - Ask specifically about the last time they did something that you are interested in, and the time before that…
- NOT future concepts, "how would you like …," etc.
- Generally semi-structured with probes that follow up in interesting areas of use

- Used in every study we've done

What to watch for...

- What do people enjoy…what part of a task makes them smile?

- Where do they get hung up/frustrated?

- What is currently easy/hard for them to do?

- How does their environment appear to play into their use?

- Write down all of these observations on index cards/post-its

Examples: Music Usage

- Home tours, Interviews, Contextual Inquiry

- 12 participants

- Explored how they searched for, selected, played, and acquired music

- Findings: Satisficing, Ruts + Kicks, More like this

- Designs: Metadata Knob, Playtree, Music Presence
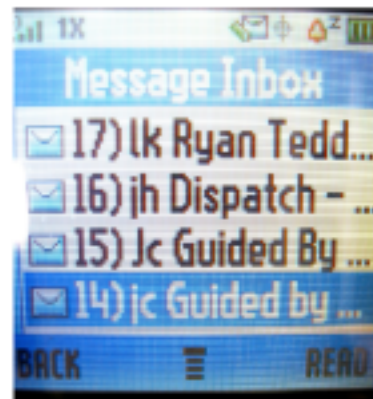
Examples: Location Sharing

- 5 participants
- Recorded phone calls for 1 week
- Interviews + Statistical data analysis of calls

- Findings: People already share basic location context, transition times mostly unknown, confirmation of context confirms availability
- Designs: Motion Presence, Contacts 3.0/MotoBLUR
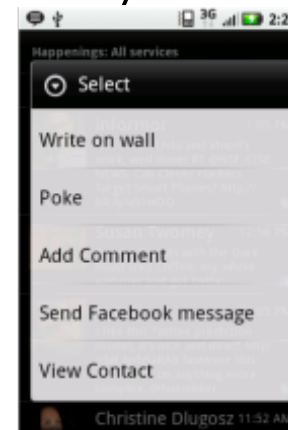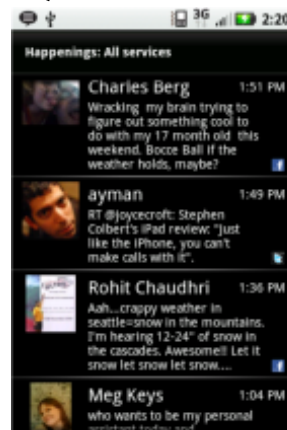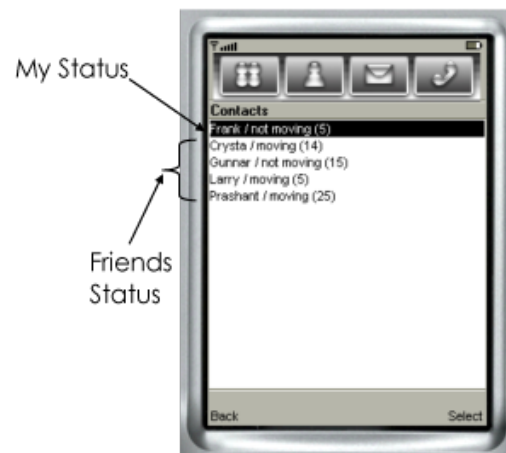
How to ask questions…

- Don't ask people what they usually do, how they would use/like a particular application/feature, or what they would do in a given situation

- Do ask about specific instances of use ("the last time" or "the time before that" work nicely)

- Do ask questions you have after observing someone, but wait until they are done with what they are doing

- Follow up when you want more information…keep them talking

Assignment: Generative Research

- Goal: To develop understanding of area of interest – inspire design ideas for new applications

- Process: Come up with a few research questions. Observe people performing activities in your area of interest. If possible ask questions about their use that help you understand answers to questions.

- Write exact quotes or observations on post-it notes – a single idea to a note

- Try to capture ~75 notes

Examples of notes from Music Study:

P1: "Some of my CDs remind me of a time I had and I like to put it on and remember that time I had with it. Fall always gets me in the mood to play music I always listen to. Me and my sisters sitting on the porch and talking in our Nike sweatshirts. We used to play this song over and over when we went to her house"

P2: "I often don't like listening to the old stuff because…it sometimes takes me back to somewhere I don't want to be…"

P6: "She made this CD of music that related to them, she had this basket of CDs at the wedding and everyone took one and the bubbles…"

P1: Has CDs in a stack with no cases – sorts like playing cards

For next class...

- Bring in raw data on ~75 notecards or post-its, each quote or observation on a card
  - Do not start any analysis
  - Do not think of concepts/applications yet

- In class next week:
  - We'll be performing an affinity analysis based on your observations to help inspire new ideas, solutions based in real world problems
  - From analysis, we'll create design ideas for your semester project
  - Do not think of specific applications/services until next class

Questions?

- Let's talk now…
- Additional questions, please email us (sooner better than later!)
- Course website: http://web.mit.edu/21w.789/www/
  - Assignment for next week is posted!

- Ed available during the week
- Frank lives in Chicago:
  - Available throughout week electronically (email, skype by appt)
  - In-person tomorrow morning or next Tuesday afternoon (by appt)

- Frank – bentley@mit
- Ed – ebarrett@mit
- Steven – schirra@mit