

Current Directions in HCI

CSI 60: User Interfaces
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Videos

Video Browsing by Direct Manipulation. Dragicevic et al. 2008.

Paper Windows: Interaction Techniques for Digital Paper. Holman et al. 2005

Foldable Interactive Displays. Lee and Hudson. In Submission.

ButterflyNet. Yeh et al. 2006.

LucidTouch: A See-Through Mobile Device. Wigdor et al. 2007.

Shift. Vogel and Baudisch. 2007.

Blindsight: Eyes-Free Phone Access. Li et al. 2008.

Context Awareness

Context-Awareness

Widely regarded as the holy grail for next generation mobile applications:

- Location (e.g., video store) heavily shapes the user's likely actions.
- The system can present streamlined choices – “here are your top-10 video suggestions with clickable previews”
- For users this is very convenient
- Also for vendors...



Context aware example

Knowledge of user background and context provide great opportunities for pro-active services:

- “It’s 7pm and you’re in San Francisco, would you like me to find a nearby restaurant?”



Context aware example

Knowledge of user background and context provide great opportunities for pro-active services:

- “It’s 7pm and you’re in San Francisco, there is a table available two blocks away at Aqua restaurant, would you like me to book it?”



Context aware example

Knowledge of user background and context provide great opportunities for pro-active services:

- “It’s 7pm and you’re in San Francisco, there is a table available two blocks away at Aqua restaurant, and they have a special on Salmon in parchment, would you like me to book it?”



Context aware example

How much do you think the restaurant might be willing to pay me to receive that message?



Speech recognition example

Consider now a speech recognizing version of this application:

- “It’s 7pm and you’re in San Francisco, there is a table available two blocks away at Aqua, and they have a special on Salmon in parchment for \$28. Would you like me to book a table, and order the special?”

User: Yes or No



So what is context?

Much of the work on context-awareness considers only “immediate context”:

- Information that can be sensed or is available where the user is, e.g.
 - Time
 - Location
 - Who is the user, who else is there
 - What is the user doing

So what is context?

A deeper notion is all the information that allows a system to **perform an action the user would want**.

In other words to predict a desired outcome from available information. The full scope of that information is:

- **Immediate** context
- **Activity** context (roughly the user's history)
- **Situational** context (what other users do under similar circumstances).

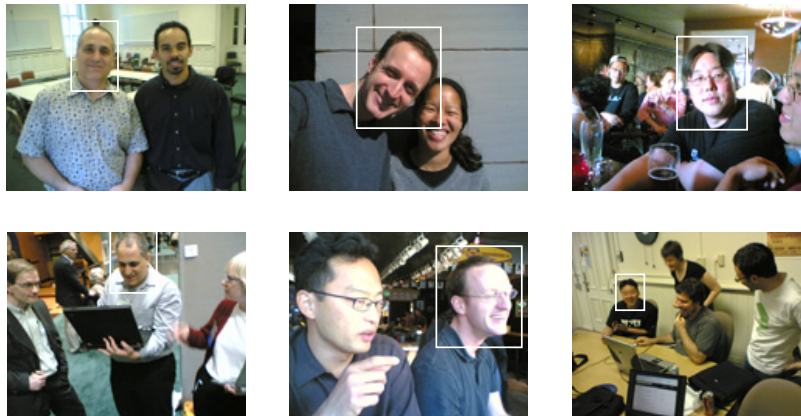
So what is context?

- **Immediate context** is what an observer might see in the situation, but without interpreting it.
- **Activity context** is the history of what that person (or people) have done in similar situations.
- **Situational context** is the set of things that most people (but strangers) might do in that situation.

Perceptual Interfaces

- Perceptual interfaces make high-level interpretations of sensor data:
 - Computer Vision
 - Speech recognition
 - Bluetooth, location sensing

Face recognition



Face Recognition

- Face recognition is very useful on phones because:
 - It allows you to index the people in your photographs for later retrieval.
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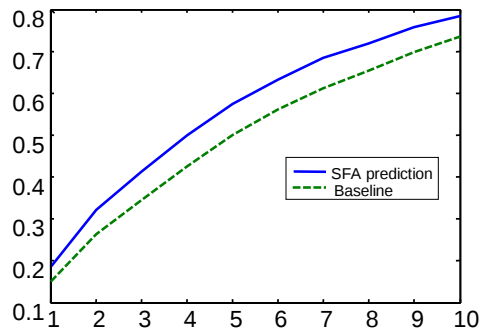
Context-aware Face Recognition

- Context data (time, place, contact list) improves face recognition significantly, in fact:

Recognition method	Accuracy:
• Image analysis alone	30%
• Context analysis alone	55%
• Context+Content analysis	67%

Context-aware Face Recognition

You can also use context data to predict who users will want to share their photos with, apart from those in the photo.



Perceptual Interfaces - Speech

Speech recognition technology has improved steadily in the last ten years, particularly in noisy environments.

Speech was never a good match for office environments.



But the **mobile playing field is completely different.**

Mobile users often **need their eyes and hands free**, and the phone always has a voice channel for telephony.

Speech on cell phones

Restricted speech recognition is available on many phones.

Large-vocabulary recognition just appeared on cell phones last year (Samsung P207). Its a huge step. It enables the next generation of mobile speech-based apps:

- Message dictation
- Web search
- Address/business lookup
- Natural command forms (no need to learn them)...



Speech in developing regions

Speech is an even more important tool in developing regions. Literacy is low, and iconic (GUI) interfaces can be hard to use.

Unfortunately, IT cannot help most of these people because they lack even more basic skills – fluency in a widely-spoken language like English or Mandarin.

Speech-based phones are ideal for this.



What about the home?

What about health care?

Takeaways

Takeaways: Why UI is Important

Major part of work for “real” programs

- Approximately 50%

You will work on “real” software

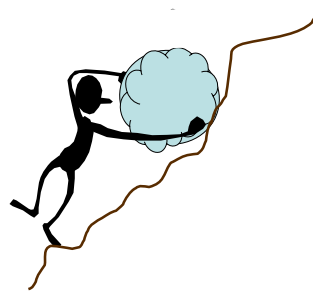
- Intended for people other than yourself

Bad user interfaces cost

- Money (5%↑ satisfaction → up to 85%↑ profits)
- Lives

User interfaces hard to get right

- People are unpredictable



Takeaways: Iterative Design

