

Computer/Human Interaction

Lecture 37

Overview:

- Emerging Paradigms: Beyond WIMP
- Collaborative Systems
- Ubiquitous Computing
- Intelligent Interfaces
- Simulation and Virtual Reality

Emerging Paradigms: Beyond WIMP

- General level of user sophistication has risen – regular use of applications, Web, email, etc.
- Pervasive networking makes it possible to collaborate
- Information overload requires more help in finding, organizing, and analyzing information
- Connectivity with non-PC devices increasing

From Mac to Anti-Mac

- Gentner & Nielsen (1996) argue that WIMP is no longer a satisfactory interface.
- Need to transition from a model of simplicity to a model of intelligence
- Examples from Mac design principles (p. 305):
 - Metaphors -> Reality
 - Direct Manipulation -> Delegation
 - See & Point -> Describe & Command

Collaborative Systems

- Time/space matrix of interaction

	Synchronous	Asynchronous
Co-located	Digital whiteboards Decision-support software Electronic brainstorming	Shared file systems Version control Knowledge management Work-flow systems
Remote	Video/audio conferencing Chat, messaging MUDs	Email, listservs Newsgroups Web forums

Computer-supported Cooperative Work (CSCW)

- How to promote awareness of collaborative efforts
 - Overview of workspace and where each collaborator is "looking"
 - How much should be shown; can be distracting
- Limits of computer-mediated communication
 - Loss of "non-verbal" cues, social distinctions
- How is credit/blame tracked? When is anonymity useful/hurtful?

Ubiquitous Computing

- Mark Weiser, seminal paper in Scientific American in 1991
 - No desktop computers
 - Computing integrated seamlessly into daily life
 - Devices interact automatically
- Getting closer every day – PDAs, cell phones, iPods, RFID tags, etc.

Ubiquitous Computing 2

- CACM special issues in December 2002, March 2005 - "Disappearing Computer"
- Human-**Information** Interaction, rather than Human-Computer Interaction; facilitation of Human-Human communication
- Both physical and mental disappearance
 - Miniaturization of devices
 - Think of interactive devices, not a "computer"; e.g., interactive walls or tables

Ubiquitous Computing 3

- Interaction techniques
 - Gesture-based interaction
 - RFID badges for "logging in"
 - Ambient information displays for overview of collaboration activities
- Can extend any object with computational characteristics, but will people expect it and be able to interact? E.g., smart oven
- Social issues: privacy, blurring of work and home

Intelligent Interaction

- Turing test: computer responses are not distinguished as such by a human user
- HCI Goal: collect and organize enough information to enable an accurate prediction of what user wants to see or do
- Should make users' tasks easier and more satisfying

Natural Language Interface

- Advantages are obvious
 - Direct input of task goals vs. mapping to system goals
 - Direct response without perception interpretation
- Disadvantages
 - Less precise
 - Takes more time than command language
 - Inherent ambiguity, context/cultural sensitivity
- Separate from speech recognition

Multi-Modal Interaction

- CACM special issues in March 2003 and January 2004
- Process two or more combined input modes using recognition-based technologies in order to accurately interpret users' intent
- Higher accuracy and efficiency than one mode of interaction alone; similar to human multi-sensory perception combining speech, writing, and gestures

Software Agents

- A way to deal with information overload, especially from the Web
- Customized agents: shopping agents automate tedium of collecting price data, bidding agents eliminate the need to be on-line all the time
- Novices may think system is smarter than it is. E.g. Eliza program (in emacs, M-x doctor)
- Social issues: what information is kept, can it be viewed/edited and by whom, etc.

Simulation and Virtual Reality

- CACM special issues in July 2003 and August 2004
- Users interact directly with objects of interest ala Star Trek holodeck and The Matrix
- Currently requires novel input/output devices to provide ***haptic*** feedback (i.e., based on touch)
- How to combine real and virtual objects
- How to apply to non-entertainment applications

Emerging Paradigms and SBD

- Can explore using scenarios
 - Technology metaphors
 - Claims analysis