

Beyond WIMP

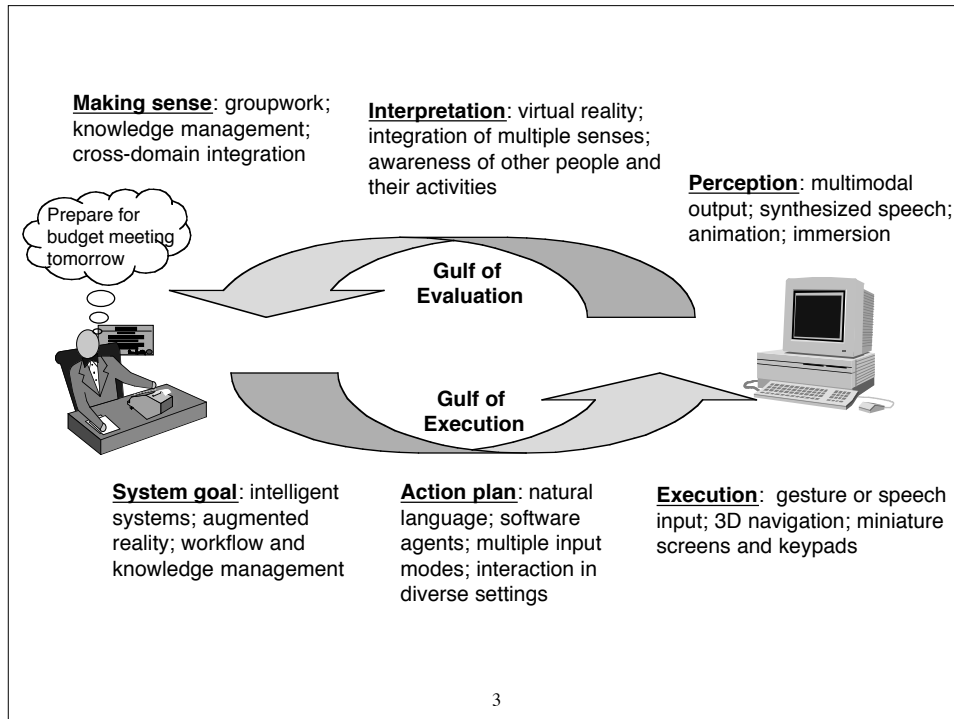
- General level of user sophistication is rising
 - many regular users of multiple applications, Web, email
- Pervasive network makes it possible to collaborate
 - no longer single individual in front of a computer
- Information overload creates strong requirements
 - need more help in finding, organizing, analyzing
- Speed, flexibility of PCs growing rapidly
 - (though network delays pull back in opposite direction)
 - permits complex visualizations, high bandwidth I/O
 - but also technologies based on embedded microchips...

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From Mac to Anti-Mac

Macintosh GUI	The new look
Metaphors	Reality
Direct manipulation	Delegation
See and point	Describe and command
Consistency	Diversity
WYSIWYG	Represent meaning
User control	Shared control
Feedback and dialog	System handles details
Forgiveness	Model user actions
Aesthetic integrity	Graphic variety
Modelessness	Richer cues

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Collaboration

The time-space matrix

	Synchronous	Asynchronous
Co-located	Decision support software Electronic brainstorming Digital whiteboards Voting, real-time comments	Shared file system Group intranet Version control Knowledge management Workflow systems
Remote	Video/audio conferencing Text chat, messaging Shared editors MUDs and MOOs Virtual meeting rooms	Email, listservs Newsgroups Web forums MUDs and MOOs Document annotations

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Computer-supported Cooperative Work (CSCW)

- How to promote awareness of collaboration efforts
 - radar views useful for synchronous; how to translate to equivalent when work is asynchronous
 - supporting the right amount of awareness for a task
- Limitations of computer-mediated communication
 - nonverbal communication cues reduced or absent
 - relative “virtuality” decreases effects of status and other socially-generated distinctions
 - when is anonymity likely to be helpful? hurtful?
- Collecting, organizing, and reusing information: knowledge management
 - BUT, who does the work, who gets the benefit?

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Ubiquitous Computing

- Mobile devices bring new set of UI requirements
 - miniaturization, physical robustness, interoperability
 - effective UIs for a range of small physical devices
 - high bandwidth connections may not be available
 - increased chance of two or more tasks in parallel, i.e. because no longer in traditional work environment
- Augmented reality pushes computing into world
 - any old object may now have computational powers
 - BUT will people expect this? Know how to interact?
 - leveraging existing affordances— roomware that you simply drag around to configure an ad hoc network

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Intelligent Systems

Natural language, multimodal interfaces

- Upside of natural language is obvious—downside?
- Many challenges to supporting natural language
 - providing for *common ground*, accounting for the inherent ambiguity, getting around the tedium of description
 - (speech recognition itself is a separate issue)
- Multimodal interfaces may increase accuracy
 - this is what we do all the time, speech, face, & gesture
 - so it seems natural to point while specifying an action

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Intelligent Systems

Software agents

- Dealing with information overload, especially finding and dealing with information on the Web
 - custom agents on the lookout for good buys, perhaps even negotiating with other agents to enact a purchase
 - automating tedium of collection, comparison, etc.
 - socially-mediated agents, recommendation systems
- BUT, what will be the user-agent relationship...
 - what information do they gather, what is it used for
 - is the stored information viewable, editable, by whom?
 - who builds and evolves the SW agent's behavior?

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Intelligent Systems

Software agents

- Caution: it doesn't take much to fool people...
 - Weizenbaum's ELIZA system (though modern chat-bots seem designed to amuse more than deceive)
 - work on social computing shows that people react to computer "conversation" as if it was human
- Think through the broad social implications
 - what happens if people respond in a naturally social way, as if the software agent was a person?
 - are there times when you would or would not want such a reaction to occur?
 - what can you do to make this more or less likely?

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Virtual Reality

- 3D simulation of a concrete populated world
 - user navigates, interacts directly with objects of interest
- Assumes novel input and output techniques
 - e.g., haptic feedback (pressure), gestures, eye gaze
- Veridicality versus magic that extends real world
 - where, how much, how to convey magic to users?
- How much immersion, i.e., drawn into simulation
 - high engagement, but may induce nausea, disorientation
 - gear needed for full immersion awkward, fatiguing
 - desktop VR often a good compromise (e.g., VRML)

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