Ubiquitous Computing & “Natural” Interaction

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Myth of the Paperless Office

Reality of Ubicomp: many computers per person!

Computers at many levels of scale

PARCTAB
(inch)

PARCPAD / mPAD
(foot)

Liveboard
(yard)

What makes ubicomp design different (harder)?

Key differences

- Multiple form factors (inch/foot/yard)
- Network connectivity
- “Context” awareness
- Interface modalities

Naïve “computerization” does not work!
Styles of design within ubicomp

- Mobile
- Ambient
- Augmented
- Tangible
- Multi-device / Device Ensembles
- Pen Computing
- Speech Interfaces
How to approach Ubicomp design

- User centered design especially important
- The design of everyday things approach
- The coming age of calm technology
- Embodied virtuality

More on Embodied Virtuality

Virtual Reality

Embodied Virtuality (ubiquitous computing)

Examples dealing with Ubicomp design issues: calm computing

Examples dealing with Ubicomp design issues: pen.

Examples dealing with Ubicomp design issues: wall

Design considerations vary depending on scale

**Inch**
- Every pixel counts
- Detail + Overview
- Context Aware

**Foot**
- Action at point of input
- Error handling and disambiguation
- Reduce requirement for recognition

**Yard**
- Fluid interaction
- Freeform input
- Reduce requirement for recognition

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Additional Ubicomp design considerations

- Context (e.g., location in the real world)
- Spatial or temporal multiplexed input
- Capture and access
- Privacy
Eye to the Future: Millimeter (<<inch) Sensors / Computing

Smart Dust

Source: Pister, Kris, et. al. Smart Dust. UC Berkeley.
Midterm
Privacy

• Dourish