A Design Framework for Pervasive Systems

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Overview

- Aspects of a pervasive system
- Space - Information - Citizen
- Degree of “publicness”
- Public - Social - Private
- How is it helpful?
- Understanding, Design, Evaluation
Motivation

• Current “pervasive” systems are not consistently
• Designed
• Represented
• Compared
Framework

• A set of useful ideas & concepts
• Origins: User - Task - Domain
• Useful in reasoning about pervasive systems
• Two dimensions:
  • Aspects of pervasive systems
  • Degree of publicness
Aspect: Space

• Architectural space + Interaction Space

• Architectural space affects how we move, behave, feel

• Interaction space affects how we use technology and access information
Aspect: Information

- Information spheres are “pools of information”
- Information is organised / categorised in information spheres
- Similar to InfoSpaces, Locales Framework
Aspect: Citizen

• What user/human aspects are relevant?
  • Presence
  • City dweller
  • Rights & responsibilities
• Lots of theories on privacy
• NOT what we want to offer
• Draw on two interesting theories:
  • Control theory
  • Restricted access theory
• Control theory: privacy if and only if one has control over information about oneself

• Recognises that individuals with privacy can grant, as well as deny, others access to private information
Restricted Access Theory

- Describes privacy in terms of limiting access to information about oneself in certain contexts
- Recognises the need for zones that protect privacy
• Concept of barrier is key

• User & technology barriers: Control theory

• Physical space barriers: Restricted access theory
Aspects of pervasive systems

Location (Architectural Space) is contained in Technology (Interaction Space) provides Information (Information Spheres)

Degree of publicness

Private
Social
Public

Bathroom
Bedroom
Private office
Secluded area

Headphones
PDA
Mobile phone
Vibrating device

Bank info
Ideas
Personal info
Plans

Office
Car
Building
Elevator

Television
Smartboard
Smart table
Intercom

Strategies
Team info
Financial info
Phone talk

Park
Street
Beach
Plaza

Video wall
Billboards
Projectors
Loudspeakers

Train timetable
Adverts
Maps
Instructions
Designing with the Framework

- In design, we have a range of artefacts that can create interaction spaces; e.g. wall displays, PDAs etc
- To know what interaction space to create, we take account of the information sphere and the space in which the citizen is currently located
Aspects of pervasive systems

Degree of publicness

Private

Social

Public

Location (Architectural Space)

is contained in

Technology (Interaction Space)

provides

Information (Information Spheres)
Conclusion

- Aspects to think about
  - Architectural Space
  - Interaction Space
  - Information
- These can be categorised as
  - Public - Social - Private