

## Why Spontaneous Interaction?

- How systems interoperate
  - Modems recognize each other
  - Telecom systems
  - JINI
- But now we have ubiquitous devices
  - Dynamic, large scale, mobile, embedded in world
- Web: a non-ubicom spontaneous system
  - Base level of agreement, then spontaneous
  - amazon.com -- not books.exe
- How to get a similar effect for Ubiomp?

## What are the Goals for Spontaneous Interaction?

- Pairwise or more complex interaction?
  - Like a remote control or a cascaded service invocation?
- For Human or For Programs?
  - Search for devices or automatic record and activate?
- Pairwise but with complex actions?
  - How can a newly discovered output device operate on a source of output?

## Kinds of Association

- Explicit Association – eg. laser pointer Matthias
  - If possible, use it
  - User in control
- Implicit Association – eg. co-location Siegmund
  - Useful when interaction is initiated by smart objects
  - Last choice at the user's side
  - How accurately can we predict actions of the users?
  - Sensors in the environment can be used to predict human behaviour more accurately
  - Predicting is questionable, provide choices, user must be able to overwrite systems choices
  - Problem: privacy
- Assisted Explicit Association – eg. Lobby of game
  - User must be in control
- Hybrid approaches
  - Explicit with Unintrusive mechanisms?
  - Implicit with personalization
    - Profiles; History of interactions, locations etc.

## Human-in-loop vs Autonomic Spontaneity

- Need control over the characteristics and policies of the spontaneity process, but not necessarily the spontaneity itself.
- Sometimes Autonomic is forced due to the context (Impossible for human in loop)
- Sometimes Autonomic is unacceptable (Privacy: Printing/Displaying secrets)
- Who initiates the interaction? (human vs. device/infrastructure)
  - If you bypass the user, make sure you know where the “Semantic Rubicon” was crossed
  - If overrides are allowed, who decides the “default” behavior?
- We need scenarios (better than “choose a printer”) that illustrate the pitfalls of spontaneity.

## Other issues in Association

- Casual Interaction
  - Opportunistic - you wanted
  - Spontaneously - you discover
  - What the system forces on you
    - When should this be allowed if all?
  - Spontaneous fallback!
- Predictable spontaneity?  
How do you predict in a new environment? Exploriation?

## Interoperation: what hardware and software will be enough?

- Java?
- laser/photocell + IP networking?
- Bluetooth?
- RFID & SMS?
- Data exchange?

## Other issues in Interoperation

- Role of Time in Spontaneity
  - Time critical
    - motorbikes on the move
  - Security vs Latency => Authentication vs Spontaneity
    - strong password cumbersome
    - levels of security? physical object-based?
  - Privacy vs Latency
    - Tracking allows The System to be faster, but less private
- System aids to Interoperation
  - Adaptation in Interoperation
  - Composition as Extension
- Impact of Spontaneous Interaction on technology
  - energy drain of presences detection