From the Intelligent Room to Ambient Intelligence

Context
- Current trend: computing capabilities added to devices:
  - first: car radios, telephones, cameras,
  - and now: tickets, clothing, furniture, walls, doors...
- Convergence of the physical and digital worlds
- Concept of Ambient Intelligence:
  - ubiquitous computing,
  - ubiquitous communication,
  - intelligent user interfaces.

Objectives
- Build an experimental room as a testbed for research into intelligent buildings
- Feature numerous sensors and actuators linked via a dedicated network infrastructure
- People involved:
  - technologists, who can deploy new devices and new interaction methods in the IRoom,
  - sociologists, who can study user behavior in “ambient” environments.

Scientific issues and topics
- Need to know the context of use
- Heterogeneous population of users and devices
- Need for an easy-to-use environment
- Proactive and intelligent behavior

Research Agenda
- Unified middleware to leverage all devices in the experimental room
- Open the facility to users/projects from various disciplines
- Create a semantic description of the room (ontology-based)
- Add automatic reasoning

Project status, first results
- Basic experimental room with a large flat screen, video projector, X10-controlled lights, loudspeakers.
- UPnP as a universal abstraction layer.
- Reconfigurable Wizard of Oz platform, allowing a person hidden in a cabinet to control the system as if it implemented a functional application and study user behavior.
- First study of people’s usage of input modalities. Preliminary results:
  - speech seems to be a favorite modality in an ambient context,
  - system output modalities influence user input modalities.

Experiment
- Study input modalities used by people w.r.t. output modalities used by the system
- Setting: intelligent room where the following output modalities are available: Touch screen, Speech, Remote control
- Modality chosen when the system uses...

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<thead>
<tr>
<th>Text</th>
<th>Graphics</th>
<th>Speech</th>
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<td>10%</td>
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<td>27%</td>
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Wizard of Oz workstation.