

Human Computer Interaction in Pervasive Computing

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Outline

- **Importance of HCI**
- **Research Topics of HCI in PerComp**
- **Project Smart Classroom**
- **Project SEMIC**
- **Conclusion**

What made the history of computer?

PC + GUI made the history

- **Things behind GUI**
 - **Desktop metaphor**
 - **WIMP (Windows, icons, menu, and pointer)**
 - **Direct manipulation and WYSIWYG**
- **Killer application**
 - **Word processing**
 - **Electronic spreadsheet**

What's Computer?

- **Now, computers become pervasive. They are embedded in everyday things.....**
 - **Users do not care about what is inside the box, as long as the box does what they need.**
 - **As far as the customer is concerned, the *interface is the product*.**
 - **The point of interaction or communication between a computer and any other entity**
 - ***Interaction*, is with more importance**

Interface/HCI--Key tech for computer applications

Hardware: Moore's Law

Software: Upgrade every 5 years

Interface: Upgrade every 15-20 years

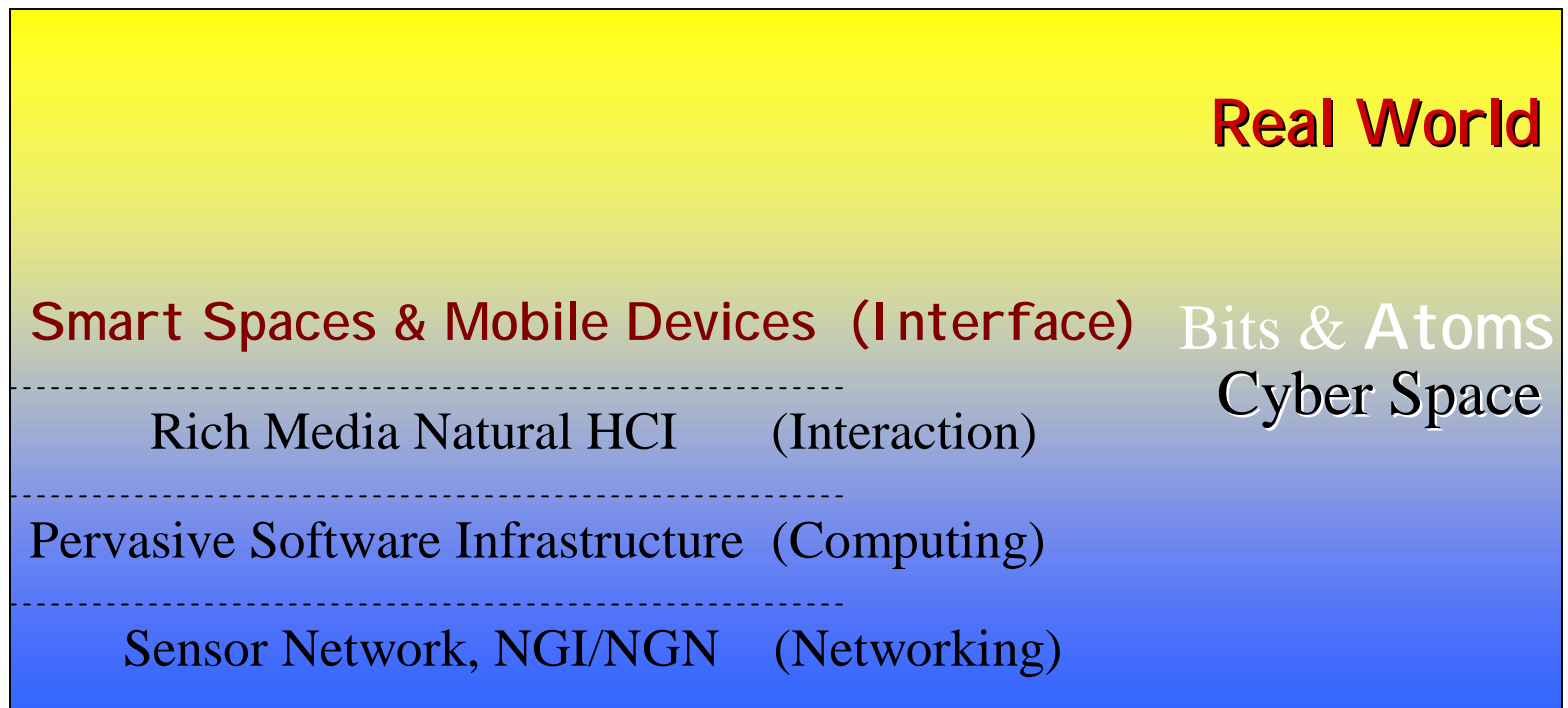
60s-70s: Keyboard, Character Interface

80s-90s: Mouse, Graphic Interface

Future: HCI??

Ideal of Pervasive Computing

Trying to conceive a new way of thinking about computers in the world, one that takes into account the natural human environment and allows the computers themselves to vanish into the background



Smart Space

are work environments with embedded computers, information appliances, and multi-modal sensors allowing people to perform tasks efficiently by offering unprecedented levels of access to information and assistance from computers

Real World

Smart Spaces & Mobile Devices (Interface)

Bits & Atoms
Cyber Space

Rich Media Natural HCI (Interaction)

Pervasive Software Infrastructure (Computing)

Sensor Network, NGI/NGN (Networking)

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Topics of HCI in PerComp

- **Natural User Interfaces**
 - **Pen-based Interaction on Large Displays**
- **Context Awareness**
 - **Location Aware**
 - **Computing Platform**
- **Experience Record**
 - **Live Experience Record**

Pen-based Interaction in Smart Space

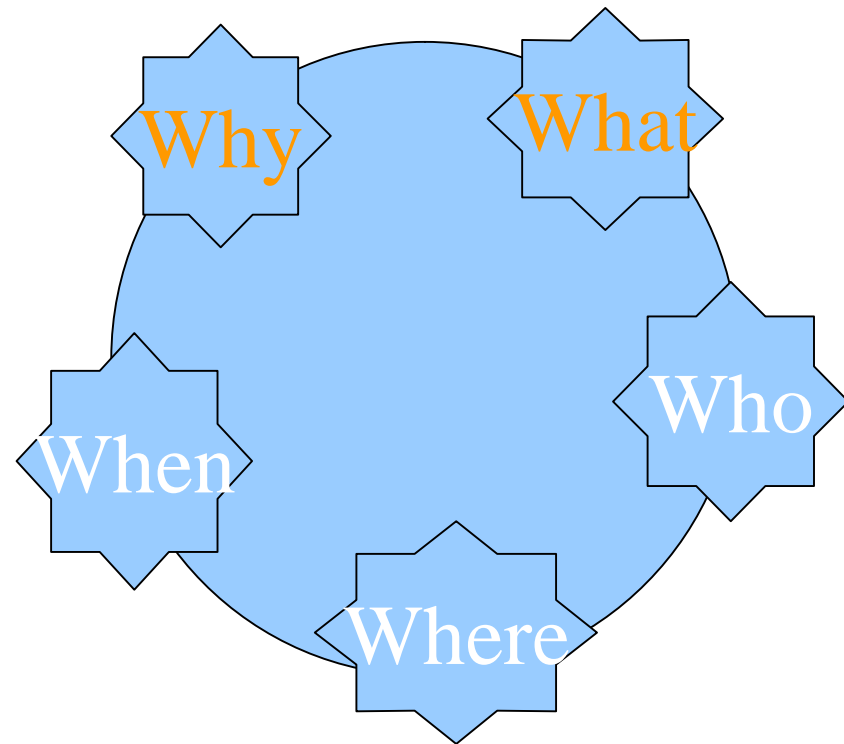
- **uPen**
- **uTable**
- **DirectPointer**

Topics of HCI in PerComp

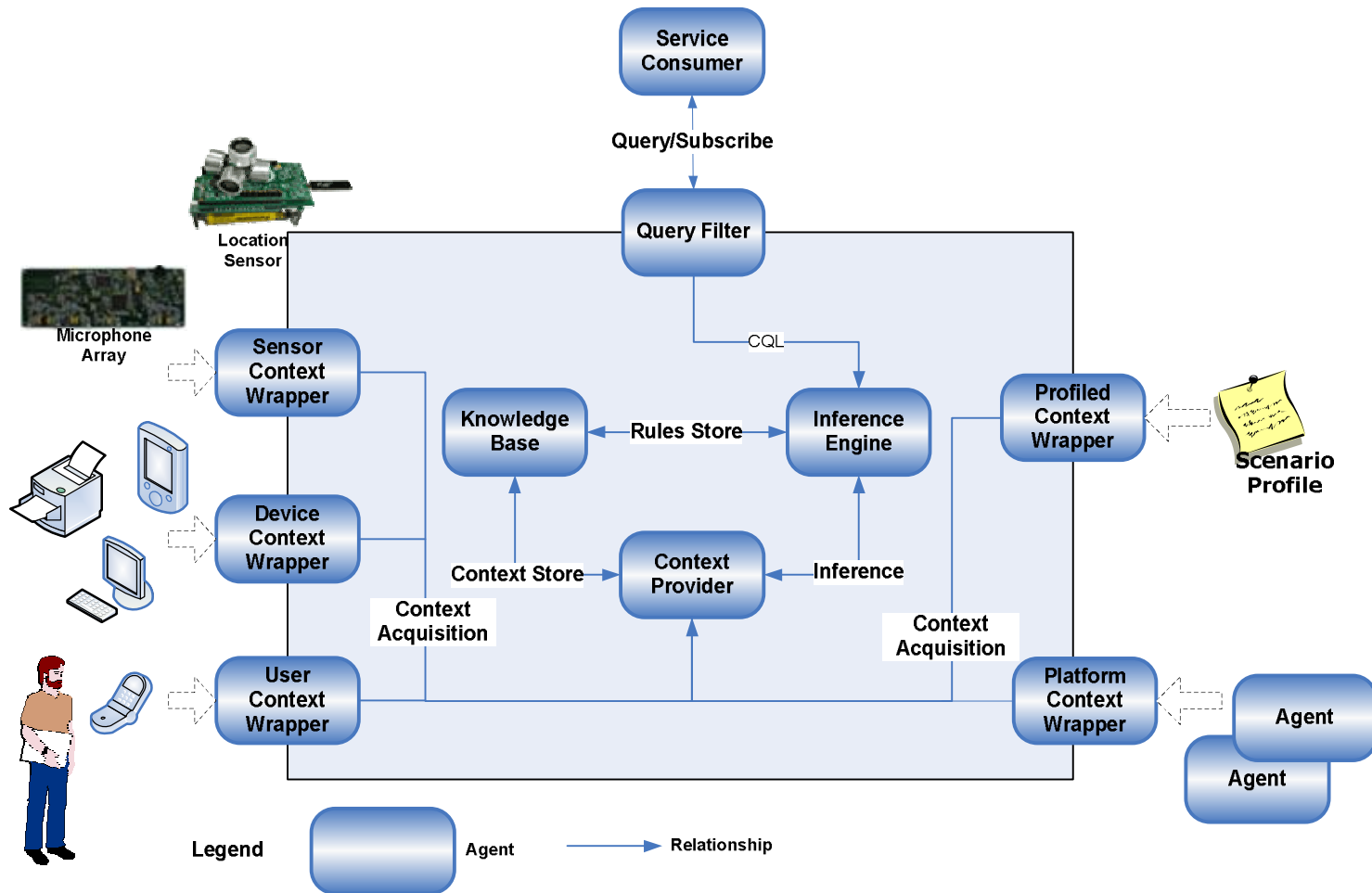
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Context Awareness

- Acquisition
- Representation
- Aggregation
- Interpretation
- Query
- Discovery



Context Awareness



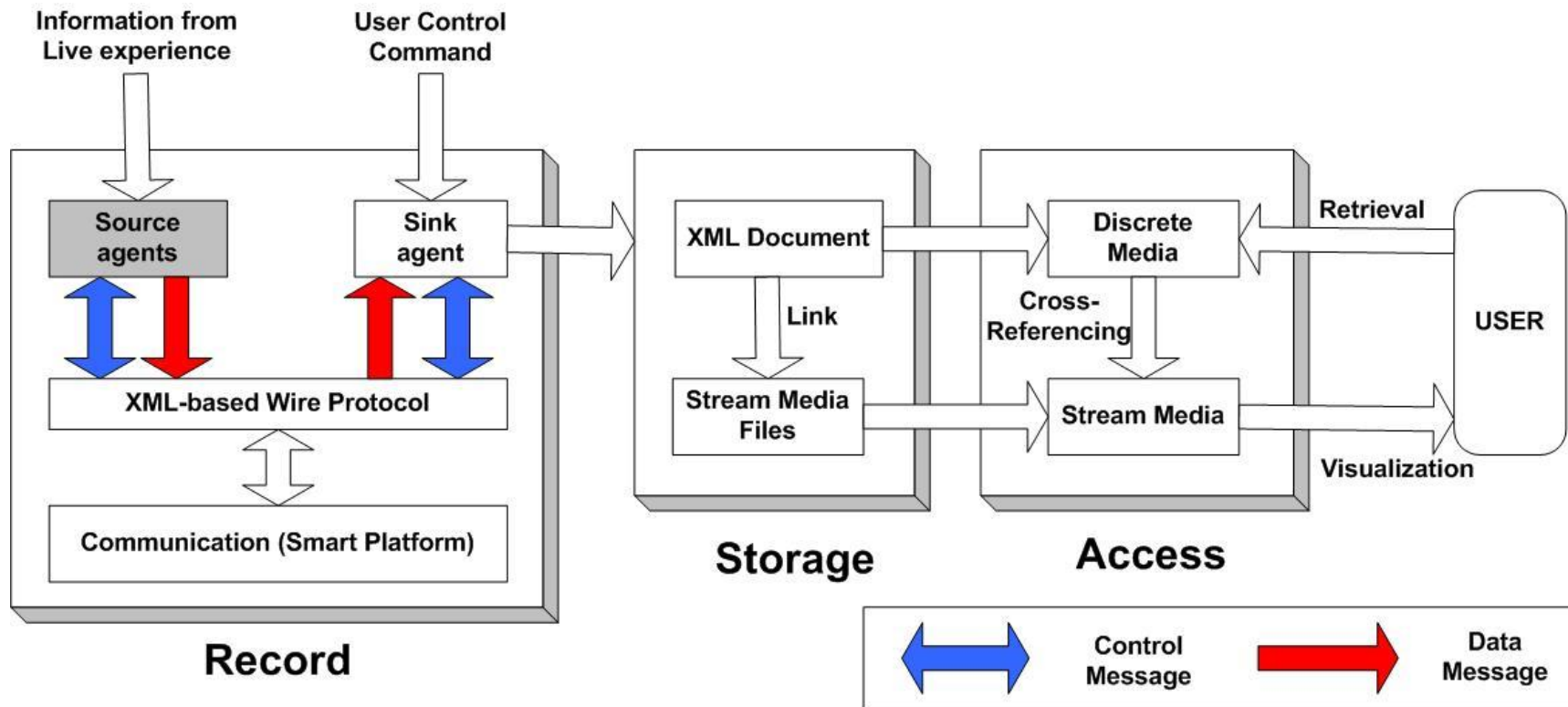
Topics of HCI in PerComp

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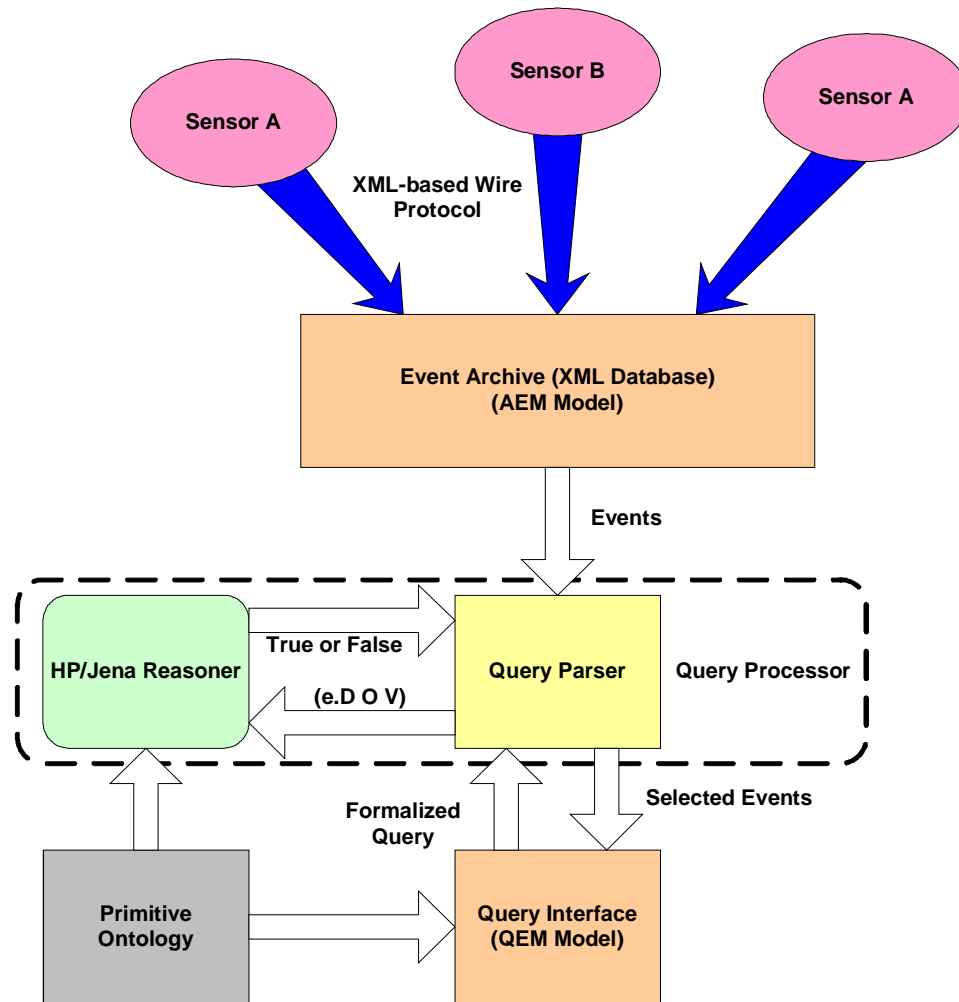
Experience Record

- **Semantic Event Detection**
- **Data Model**
- **Retrieval**
- **Summary**

Experience Record Service



Experience Record Service

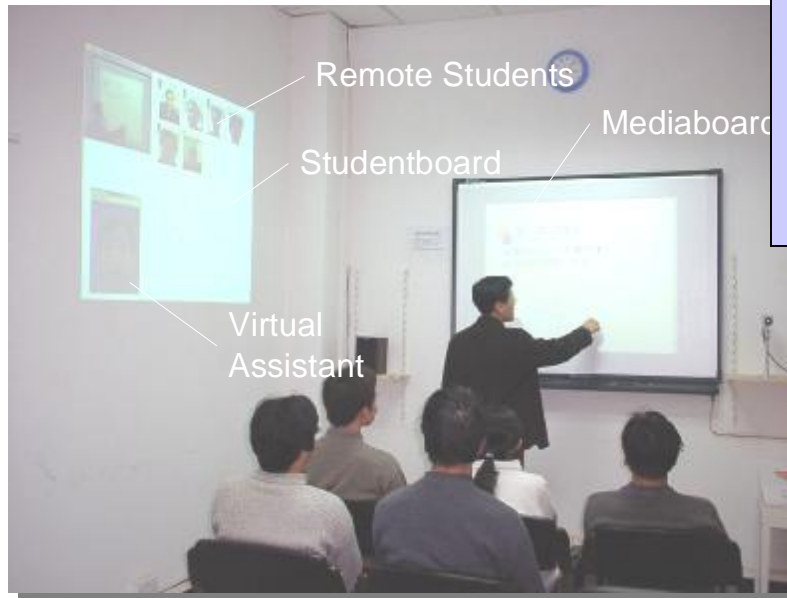


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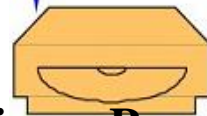
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The Smart Classroom Project

an augmented classroom where a teacher can instruct remote and local students at the same time and in a similar fashion.



Smart Classroom



Experience Record of the classroom

Realtime Distributed Multimedia Communication



Telepresence of Remote Students



[Http://media.cs.tsinghua.edu.cn/~pervasive](http://media.cs.tsinghua.edu.cn/~pervasive)

Project SEMIC

Smart Environment

for Multi-user Interactive Collaboration



- **Simultaneous multi-user interaction via multi-device**
- **Information seamless integration and accessibility**
- **Experience automatic record and retrieval**

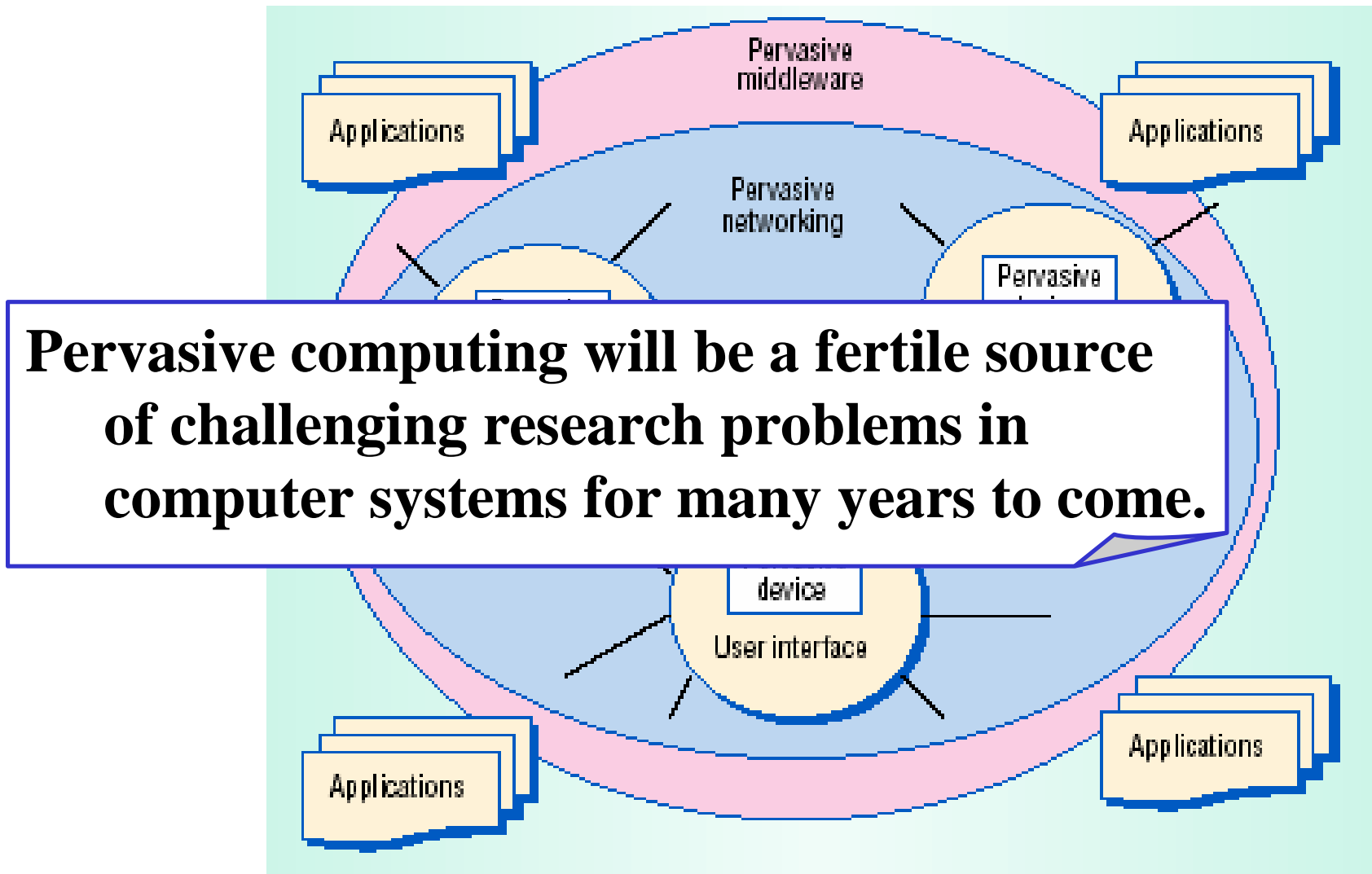
Project SEMIC

Smart Space as tested in our research

We are trying to reach

- **Multi-user Interaction Model**
- **Multi-modality Fusion Method**
- **New Metaphor of HCI in Percomp**
- **Spontaneous Interoperation Mechanism**

Conclusion



**picture from Debashis Saba et al Pervasive Computing: A Paradigm for the 21st Century. IEEE Computer. March 2003*

THANKS for your attention!