

The MIT Media Lab logo is displayed in white, bold, sans-serif font against a dark blue background. The background features abstract, glowing blue lines and shapes that create a sense of motion and depth. The text is centered horizontally and positioned in the upper left quadrant of the image.

MIT Media LAB

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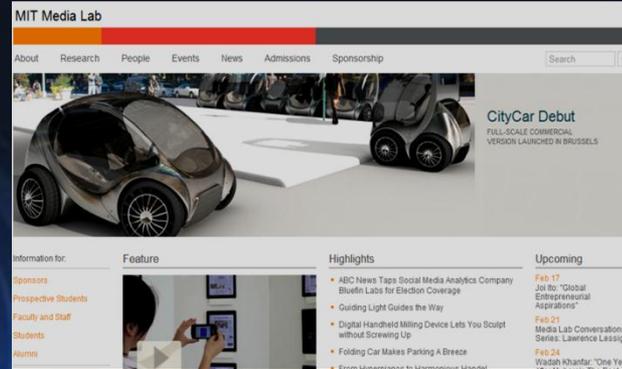
❖ About MIT Media LAB

❖ Research Group

- Affective Computing
- Changing Places
- Information Ecology
- Opera or the Future
- Personal Robots
- Responsive Environments
- Software Agents
- Tangible Media

About MIT Media LAB

- Year founded: 1985
 - Graduate concentration: Media Arts and Sciences
 - Number of graduate students (2011-2012): 141 (61 master's, 80 PhD)
 - Number of faculty and principal investigators: 28
 - Number of sponsors: 70+
 - Annual operating budget: approx. \$35 million
- Unconstrained by traditional disciplines, Lab designers, engineers, artists, and scientists.
- More than 350 projects that range from neuroengineering.
- 26 Research Groups
- Affective Computing, Biomechatronics, Camera Culture, Changing Places, Civic Media, Cognitive Machines, Digital Intuition, Fluid Interfaces, High-Low Tech, Human Dynamics, Information Ecology, Lifelong Kindergarten, Macro Connections, Mediated Matter, Molecular Machines, New Media Medicine, Object-Based Media, Opera of the Future, Personal Robots, Responsive Environments, Social Computing, Software Agents, Speech + Mobility, Synthetic Neurobiology, Tangible Media, Viral Spaces

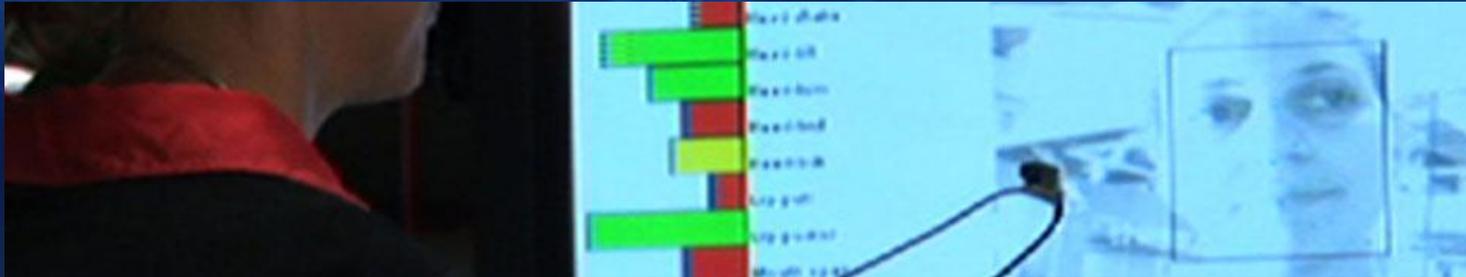


Research Group

- **Affective Computing**
- **Changing Places**
- **Information Ecology**
- **Opera or the Future**
- **Personal Robots**
- **Responsive Environments**
- **Software Agents**
- **Tangible Media**

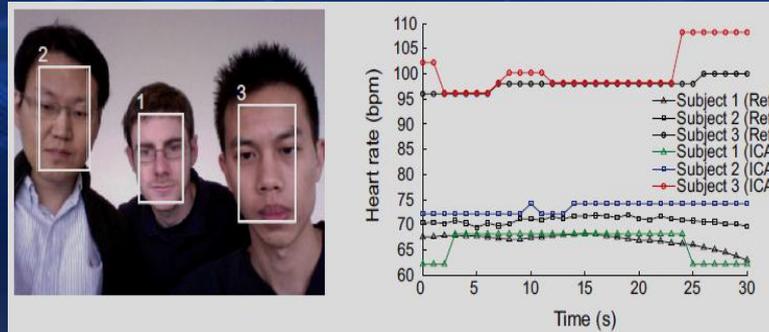
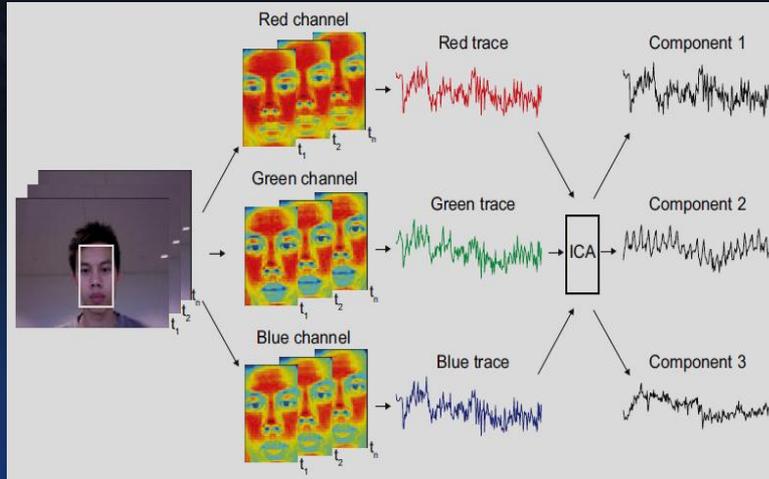
Affective Computing (1/3)

- How new technologies can help people better communicate, understand, and respond to affective information.
- Bridge the gap between human emotions and computational technology.
- Research Area
 - machine recognition
 - modeling of human emotional expression



Affective Computing (2/3)

- **Cardiocam**
- **Low-cost.**
- **Non-contact.**
- **Measurement of physiological signals such as heart rate and breathing rate.**
- **Using a basic digital imaging device such as a webcam.**

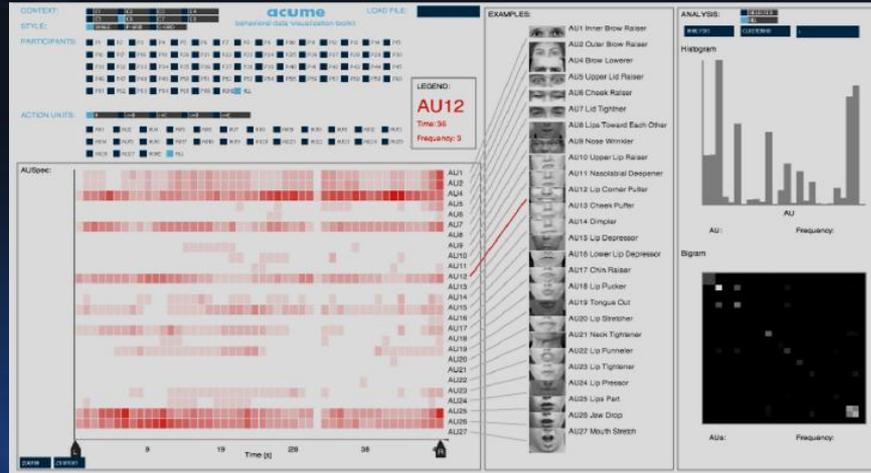


Affective Computing (3/3)

■ What Do Facial Expressions Mean?

■ Automatic recognition of positive/negative facial expressions.

■ A toolkit, Acume, for interpreting and visualizing facial expressions whilst people interact with products and/or concepts.



Changing Places (1/3)

- How new strategies for architectural design, mobility systems, and networked intelligence can make possible dynamic, evolving places that respond to the complexities of life.
- Research Area
 - Creating the places where people live/work, and the mobility systems that connect them.
 - Urban architecture. / Personal vehicles.
 - Understand and respond to human activity, environmental conditions, and market dynamics.
 - Optimal combinations of automated systems.
 - Just-in-time information for personal control
 - Interfaces to persuade people to adopt sustainable behaviors.



Changing Places (2/3)

- CityCar
- Foldable, Electric, Sharable, Skid-steer 2-passenger vehicle for crowded cities.
 - Working with Denokinn.
- Wheel Robots
 - Integrate drive motors, suspension, braking, and steering inside the hub-space of the wheel.
- Related Projects
 - CityCar Driving Simulator
 - CityCar Folding Chassis
 - CityCar Half-Scale Prototype
 - CityCar Ingress-Egress Model
 - CityCar Testing Platform



Changing Places (3/3)

- CityHome
- 840 square feet space (small) can function as an apartment two to three times that size.
- Transformable wall system which integrates:
 - furniture, storage, exercise equipment, lighting, office equipment, and entertainment systems.
- Open/Close kitchen depending on the purpose.
- Auto personalized design.

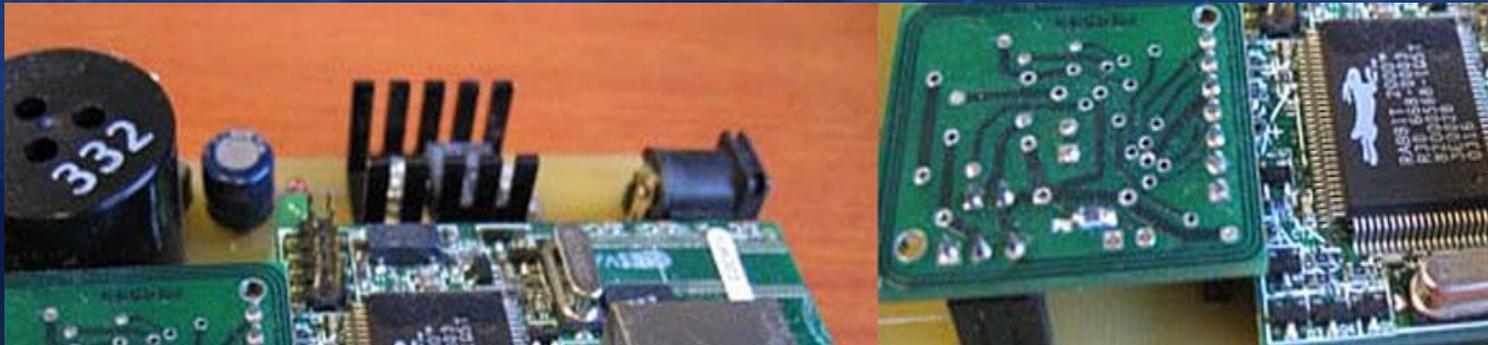


Information-Ecology (1/2)

■ How to create seamless and pervasive connections between our physical environments and information resources.

■ Research Area

- Ways to connect our physical environments with information resources.
- Seamless and pervasive ways to interaction.
 - Sensors/Consumer electronics each other.

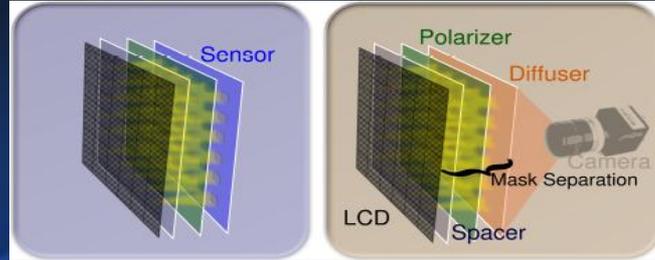
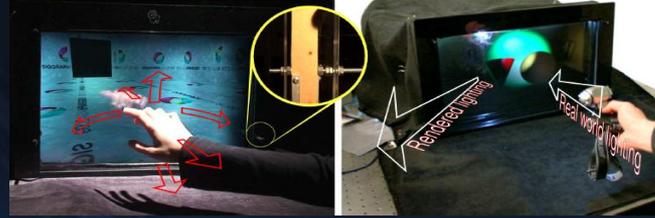


Information-Ecology (2/2)

■ BiDi Screen

■ New type of thin I/O device that capture images and display them.

■ 3D gestural and 2D multi-touch interfaces.



Raw Data Capture



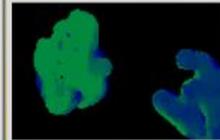
Heterodyne Decoding



Synthetic Aperture Refocusing



Maximum Contrast Operator



Depth Map

Opera Future (1/2)

■ How musical composition, performance, and instrumentation can lead to innovative forms of expression, learning, and health.

■ Research Area

- Concepts and techniques to help advance the future of musical composition, performance, learning, and expression.



Opera Future (2/2)

- Vocal Augmentation and Manipulation Prosthesis (VAMP)
- Gesture-based, wearable controller for live-time vocal performance.
- Control by drawing from a familiar gestural vocabulary.



Personal Robots (1/3)

- How to build socially engaging robots and interactive technologies that provide people with long-term social and emotional support to help people live healthier lives, connect with others, and learn better.

- Research Area

- Build capable robotic creatures with a "living" presence.
- Gain a better understanding of how humans will interact with this new kind of technology.



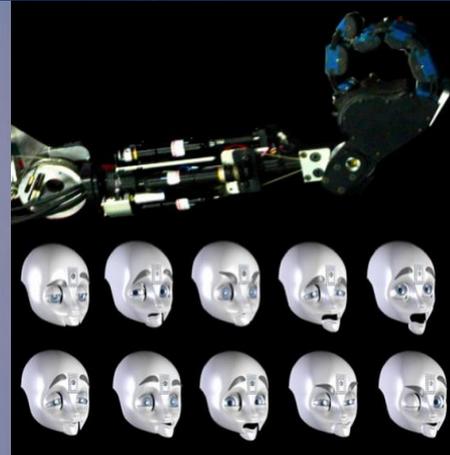
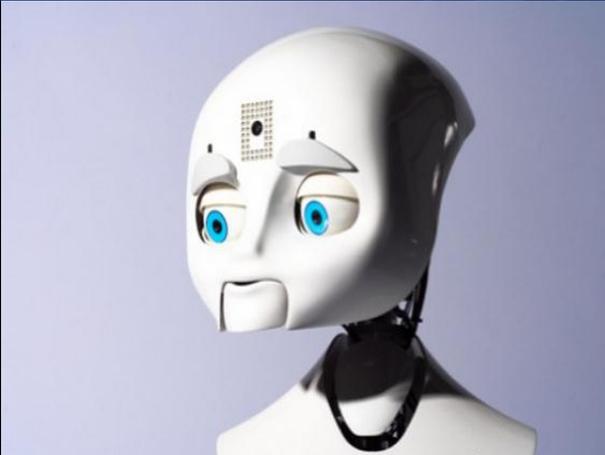
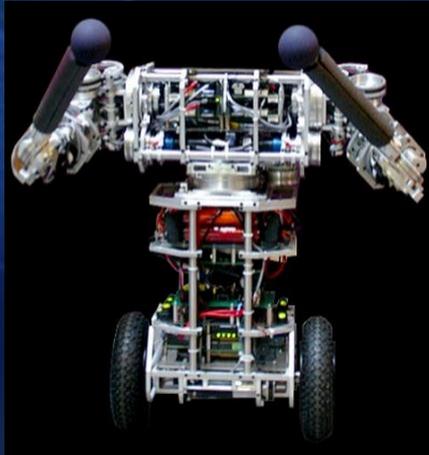
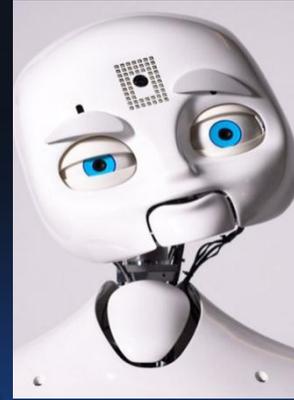
Personal Robots (2/3)

- MeBot
- Semi-autonomous robotic avatar.
- Richer way to interact remotely.
- With phone and video conferencing.
- Convey the non-verbal channels of social communication.



Personal Robots (3/3)

- Nexi
- Novel combination of mobility
- Moderate dexterity
- Human-centric communication and interaction abilities.
- For human-robot interaction, teaming, and social learning



Responsive Environments (1/2)

■ How sensor networks augment and mediate human experience, interaction, and perception.

■ Research Area

- Various types of sensor networks.
- Energy harvesting and power management.
- Technical foundation of ubiquitous computing.
 - Automotive systems, Smart highways, Medical instrumentation, RFID, Wearable computing, Interactive media.



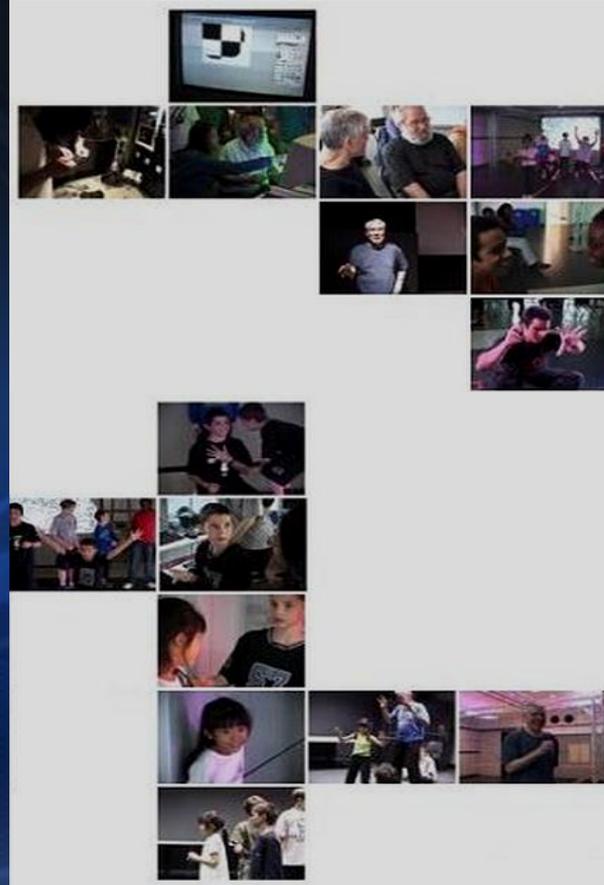
Responsive Environments (2/2)

- Beyond the Light Switch: New Frontiers in Dynamic Lighting
- Lower energy consumption, but also enable new ways to specify and augment lighting.
- Dynamic lighting controlled by a single user, or even an entire office floor.



Software Agents (2/2)

- **Storyed Navigation**
- **Offering little help in developing a story's plot.**
- **To tell a story:**
 - The user inputs a free-text sentence.
 - The system suggests possible segments for a storied succession.
- **The system achieves the association between the input and the segments' annotations using:**
 - The WordNet semantic network.
 - Common-sense reasoning technology.



Tangible Media (1/3)

■ How to design seamless interfaces between humans, digital information, and the physical environment.

■ Based on:

- Physical form to digital information
- Seamlessly coupling the dual worlds of bits and atoms.

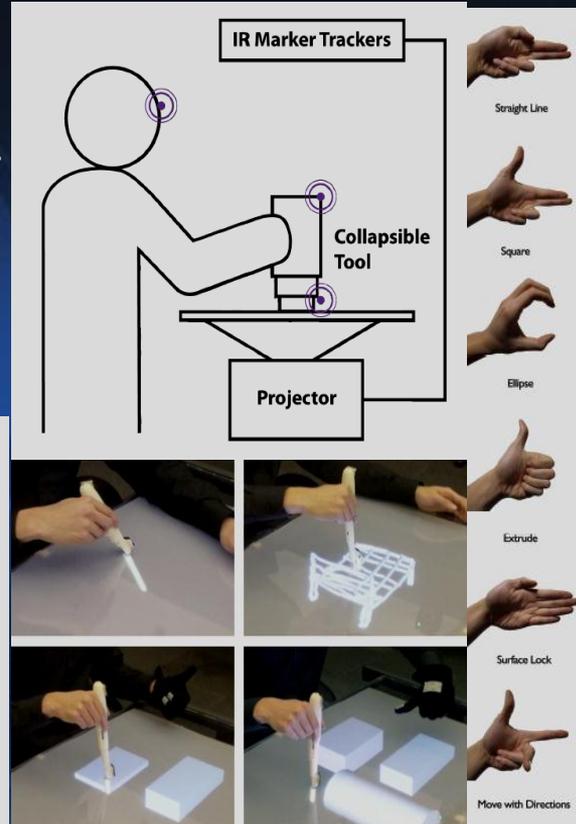
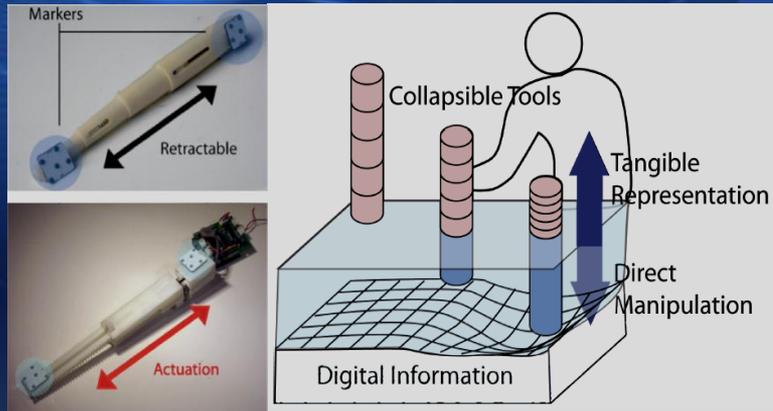
■ Research Area

- Changing the "painted bits" of GUIs to "tangible bits,".



Tangible Media (2/3)

- Beyond: A Collapsible Input Device for 3D Direct Manipulation
- Input device for direct 3D manipulation.
 - Allows users to interact directly with 3D media.
 - Without having to wear special glasses.
 - Avoiding inconsistencies of input and output.
- Sculpt in 3D virtual space, and seamlessly transition between 2D and 3D manipulation.



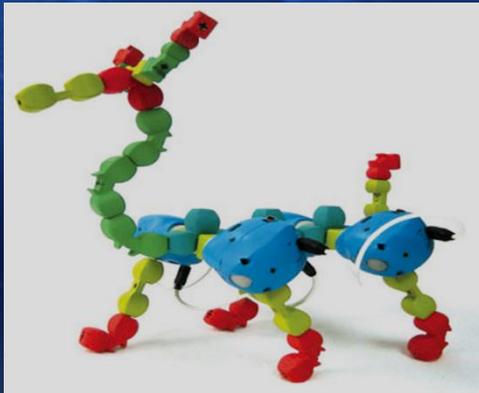
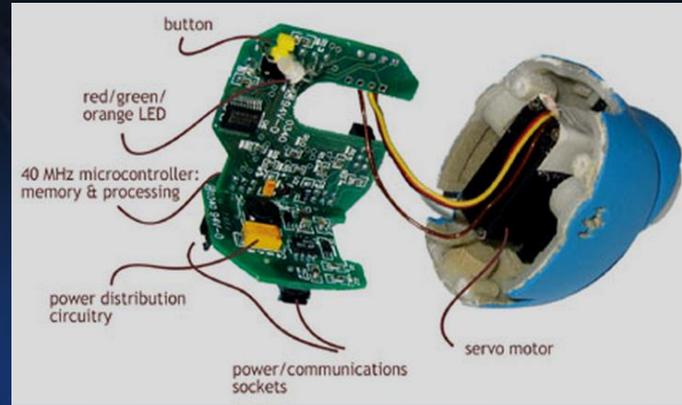
Tangible Media (3/3)

■ Topobo

■ Programmable Block

■ 3-D constructive assembly system embedded:

- Kinetic memory—the ability to record
- Play back physical motion.



Summary (1/2)

- MIT Media Lab.은 디지털 기술을 이용한 표현과 커뮤니케이션의 교육과 미래를 연구하고 있으며, 사용자 인터페이스에 대한 많은 연구성과를 내고 있다. 다양한 리서치 그룹을 통해 특화된 연구개발을 진행중이다.

1. Affective Computing

감정정보를 이해하고 반응하여 더 나은 커뮤니케이션을 도울 수 있는 기술 연구

2. Changing Places

복잡한 환경을 좀 더 효과적으로 사용하게 하는 지능 공간에 대한 연구

3. Information Ecology

물리적 환경과 정보를 연결하는 기술에 대한 연구

Summary (2/2)

4. Opera or the Future

방송, 연예, 예술을 발전 시키는 과학/공학적 기술에 대한 연구

5. Personal Robots

인간의 상호작용, 더 나은 교육, 건강한 삶을 돕기 위한 로봇에 대한 연구

6. Responsive Environments

인간의 경험, 상호작용, 예측을 증대시키기 위한 센서 네트워크 기술에 대한 연구

7. Software Agents

사용자의 요구를 미리 알고, 상호작용에 대해 이해함으로써 더 나은 소프트웨어 연구

8. Tangible Media

디지털 정보와 물리적 환경과 인간 사이의 상호작용에 대한 연구

End