24 FPS
Interaction

Jackie Lee
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Information Architecture Lab
Department of Architecture
National Cheng Kung University
Tainan, Taiwan

http://www.arch.ncku.edu.tw/lee

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http://www.arch.ncku.edu.tw/lee
jackylee_ap@hotmail.com

Information Architecture Lab,
Department of Architecture,
National Cheng Kung University,
Tainan, Taiwan.
Jackie Chia-Hsun Lee was born in 1978 in Taipei, Taiwan. Jackie studied architecture at National Cheng Kung University in Tainan, Taiwan. He received his B.Sc. in Arch in 2000 and M.Sc. in Arch in 2002. He is an active student and showing great interests in computer-aided design. He was a research team leader in the Information Architecture Lab (IA Lab ’01~’02). By focusing on the human-computer interaction in design studios, he self-studied most programming and 3D modeling skills. He was awarded the Best Presentation Prize in the seventh international conference in Computer-Aided Architectural Design and Research in Asia (CAADRIA 2002).

This book collected Jackie and his colleges’ research works in IA Lab (’01~’02).
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The next generation of architectural spaces will consist of new artifacts with embedded intelligence and wireless network. The future of human environments will become intelligent, informative, and interactive.

Through the advance of sensor technology, spaces will be decorated into truly responsive environments. Physical materials and digital information are obtrusively coupled here. You may not feel anything which is "virtual". Because everything in the virtual world has its augmented reality in the real world.
The diagram of future environments

Interactive

Human-Centered

Intelligent

Informative

The diagram of future environments
Vision Connector

Concept

In the 90's, we are used to generate computer graphic models which looked like the real objects in the physical world. Through mouse manipulation, we could interact with virtual objects. We drag, pull, push, and Zoom the virtual one to get better understanding from it. But these kinds of actions are unnatural. Why should we have to use view commands instead of just watching. It seems that Virtual Object drives our physical actions. Why should we stare at the monitor, watch them in the pre-defined ways.

Here, a device named "Vision Connector", is a composition of a physical model and orientation sensor connected to PC. Once you move the physical model, the view angle in the cyberspace is relatively moved. Through the manipulation of the physical object you can manipulate the digital information physically and directly.
Space Navigator

Media

Concept

In this experiment, we purpose that we can act on the virtual objects as the same way to act on the real objects.

We use a device named "Space Navigator" with a plan drawing of our building on it. This device could response the position of section line of the drawing and cutting the virtual section of this building.
Water Window

Concept

"By touching the window, you will see the ripples of bits disturbing the cyberspace."

Water Window is an application using touch-sensitive pad and a ripple program written in C++. I try to make a linkage between our senses from physical world to virtual environments.
Intelligent Corner

Concept

An Intelligent Corner is a corner space decorated by pervasive computational devices (i.e. Notebook PC, Projector, Tablet PC, PDA).

Within our implementation, intelligent corner is a temporary spatial setting to enhance presentation activities with digital devices in order to make better understanding. Through the direct manipulation on certain devices physically, we purpose that the other devices will generate peripheral digital information in return.
In the beginning of 21st century, digital information is pervasive and ubiquitous for design representation and communication in digital design studios.

Here, I try to draw a framework of future design studio where digital media plays a more active role and become a truly inhabitant in digital design environments.

"Interactive Studio" integrates digital information and physical material that both serve for designers. Here, information is active for better communication, representation is active for better understanding, and human actions are natural for better user experience.
Designer as Conductor

Concept

Designer is like a symphony conductor to interact with digital design media directly through natural acts.

A designer is used to express design concepts through voices, gestures, annotations and design media.

Here I propose that a designer could conduct his orchestra of design media to control remotely or grasp directly.
Interactive Table

Concept

Designers could collaboratively interact with a VR model physically to explore its section information on a table.

The Interactive Table allows designers to use gestures to CUT sections on a projected plan. With a tablet dynamically moving above the plan drawing and display related information, designers could have better shared understanding with the spatially-aware interactive media.
Interactive Pointer

Concept

Interactive Pointer is a laser pointer remote control system for designers to manipulate digital information directly and remotely.

Image processing technologies and a WebCam are used to sense the color difference of laser spots and apply certain executable commands, such as Zoom-In and Zoom-Out view commands.
Designers are allowed to use natural gestures to directly manipulate the position of digital images.

Digital images, which help designers to explore ideas, should be active and informative to designers. When images became tangible and graspable, designers could deal with them naturally as other physical objects.
Tangible Navigator

Concept

Physical model is a tangible media to explore its further information according to its identification.

In future design studios, each physical model has its identification (RFID) to distinguish itself in such a responsive environment. Designers could navigate digital information through placing physical models in proper places.
Interactive Surfaces

Media

Concept

A flat layer above tables, walls or other physical materials that delivers responsive abilities for mix virtuality and real environments.

Designers, who designed places, now should consider where to place interactive surfaces that major activities may occur around them.
Interactive Desktop

Media

Concept
A desktop is an interface for retrieving information that may consist of both physical and digital. It allows designers to interact in a natural way by touching and dragging information over horizontal and vertical displays.
In design studios, there are a plenty of paper that deliver information. Digital information, now, is another kind of paper without physical form.

I propose that digital paper should behave as normal papers to carry information. Once paper placed on the desktop will be scanned and left a digital copy. Designers could easily transform the paper into in forms of digital or physical.
Informative Book

Media

Concept
Digital information is active and attached to books. When you open the book, digital images will find suitable places to demonstrate themselves.
Meeting Corner

Space

Concept

Designer communicates and exchanges ideas remotely via a networking enhanced corner.
**Interactive Wall**

**Media**

**Concept**

A semi-transparent glass wall with rear projection makes direct interaction possible. An user could use hand gestures to manipulate projected information contactless.

A Camera is set behind the wall with image processing technologies to recognize hand position and gestures.
Concept

The iCube system is a spatial setting incorporated with digital devices organized in the spatial size of S, M, L, XL.

iCube_S is a personal workstation for designer to work with. In the iCube_S, designer performs tasks on the desktop.

Information stored on the desktop is mostly related to each other, but it certainly had loose connection between digital and physical ones.

The iCube_S, as personal workstation, is a working environment where all necessary materials should present themselves at the right time. And designer could manipulate them through the most effective way.
ICube_M, supporting small group discussion activities, consists of interactive surfaces, including an interactive table and a whiteboard.

ICube_M is an informal meeting places for a small group to discuss and brainstorm. Each designer spreads out related materials on the table and shares their opinions on the whiteboard. Tables and whiteboards are simultaneously used for several designers to explore and exchange useful information collaboratively.
ICube_L

Presentation

Concept

ICube_L, supporting presentation activities, consists of an intelligent corner and remote control media. Here, designer could demonstrate design works as a conductor. By waving hands and gestures, a conductor mediate the digital information presented to express concepts.

ICube_L, when not holding a presentation, could also be set into an exhibition place. Every visitor could be a conductor here to explore design contents through interactive table or other tangible media.
**I presentation**

**Concept**

I Presentation is to provide an intelligent environment for presenter who can access information via keyword recognition and add annotations directly on the touch-sensitive panel.

**Media**

Oct. '01

F22
Context Manager

Concept

When interactions among system components are getting complex, resource management has become an essential part (Coen, 1999).

I purpose a Context Manager to manage the event network in background serving two purposes. First, Context Manager captures events that occurred externally by multi-modal inputs or physical actions on tangible user interfaces. Secondly, Context Manager manages service events internally to execute low-level commands or operations.
From a biological point of view, sensory perception of human acts results in multimodal interaction, such as gazing, voicing, pointing, drawing, etc.

Instead of meaningless keyboard and mouse manipulation, natural kinds of interaction should be further investigated.