



CSE 190: 3D User Interaction

Lecture #13: System Control 3
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Announcements

- Homework assignment #4 due Friday, March 8th at 1pm in Sequoia lab 142
 - Grading starts at 12:30
 - Sign out Kinect in my office

Paper Presentations Next Lecture

- Alisha: Simultaneous categorical and spatio-temporal 3D gestures using Kinect
- Alvin: 3D-2D spatiotemporal registration for sports motion analysis
- Edward: TBD

Paper Presentations Today

- Kristina: The acute cognitive benefits of casual exergame play
- Miguel: The King-Kong Effects: Improving Sensation of walking in VR with visual and tactile vibrations at each step
- Andrew: Biofeedback game design: using direct and indirect physiological control to enhance game interaction

System Control Cont'd

Graphical Menus – Design

- Placement

- world-referenced (freely in world)
- object-referenced (centered to object in world)
- head-referenced (view centered)
- body-referenced
- device-centered

- Selection

- Degrees of freedom, constraints

- Representation and structure

- form, size, space
- hierarchy: functional and semantic grouping, context sensitivity, control coding

Voice Commands

- Speech recognition
- Spoken dialogue techniques
- Requires
 - speech recognition engine
 - speaker dependent vs. independent
 - varying vocabulary size
 - good microphone
- Invisible to the user
- Push to talk

Gestural Commands

- One of the first system control techniques
- Posture – static hand configuration
- Gesture – dynamic movement



Gesture Command Types

- Speech connected gestures: spontaneous gesticulation while talking
- Mimic gestures: directly describe a concept
- Symbolic: e.g., thumbs up
- Sign language: artificial vocabulary



Tools

- Provide directness of interaction
- Familiar (real-world devices)
- Physical tools
 - real physical objects (props)
 - may have graphical representation
- Virtual tools

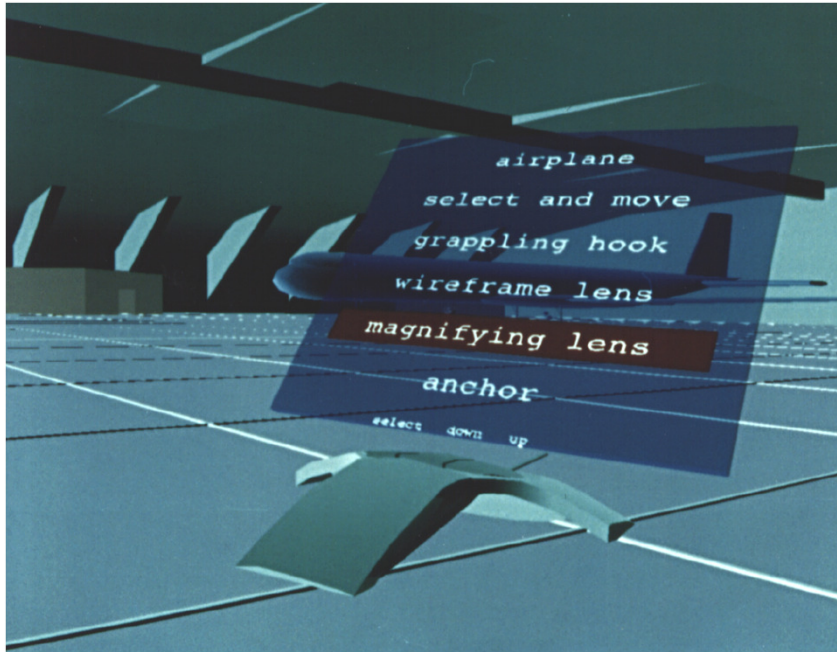


*CavePainting
(Keefe 2001)*

Tools – Virtual Tool belt



Tools – Tricorder



- Physical input device has virtual representation
- Functionality changes according to selected tool

Tools – Tangible User Interface



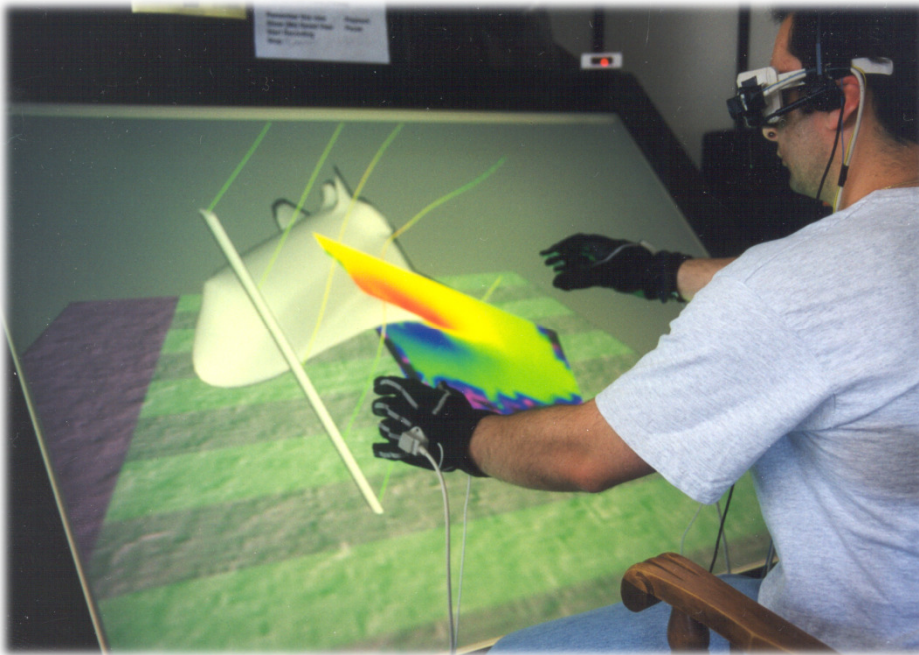
Reactable (Jorda, 2005)



Multimodal System Control

- More than one input modality (speech, gesture, facial expression, etc...)
- Advantages
 - Allows decoupling of interaction modes
 - Avoids switching between, e.g., navigation and other interaction mode
 - Error reduction and correction
 - Flexibility and complementary behavior
 - Control of mental resources: reduce cognitive load

Multimodal Interaction – Examples



Hand gestures and speech [Van Dam et al. 2000]