CSE 190: 3D User Interaction

Lecture #12: System Control 2

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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

Matteo: Portal 2 with Hydra

Paper Presentations Next Lecture

- 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: TBD

Paper Presentations Today

- Kit: CaveUDK: a VR game engine middleware
- Spencer: ?
- Ken: ?

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

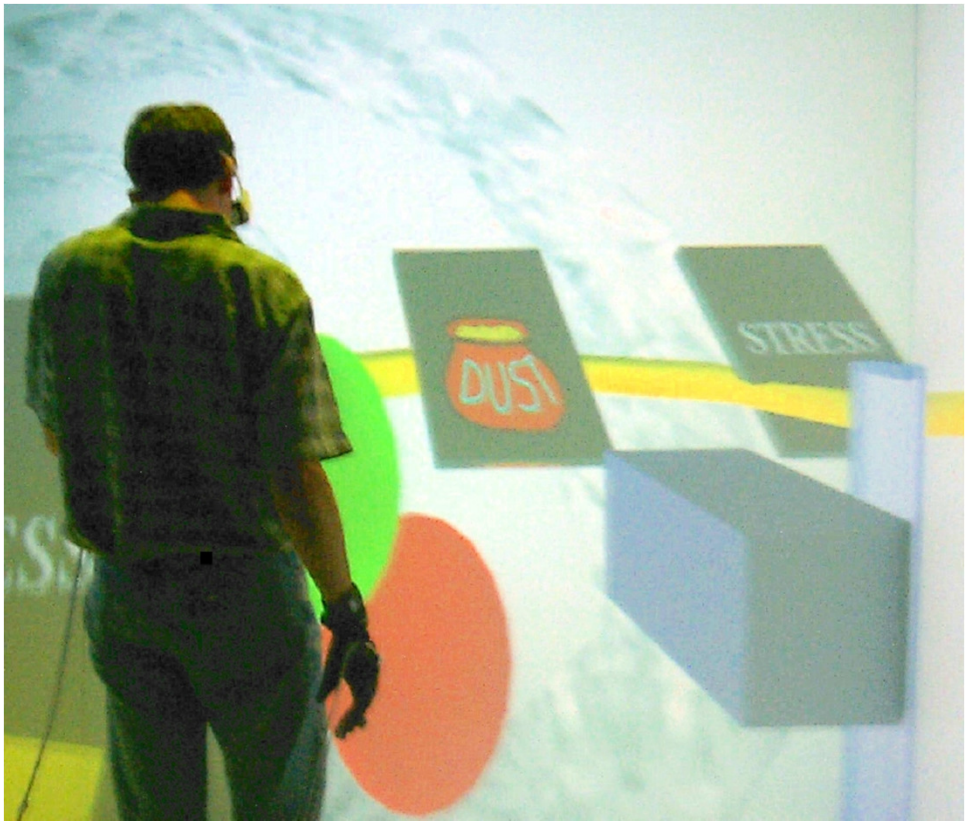
Gesture Command Types

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

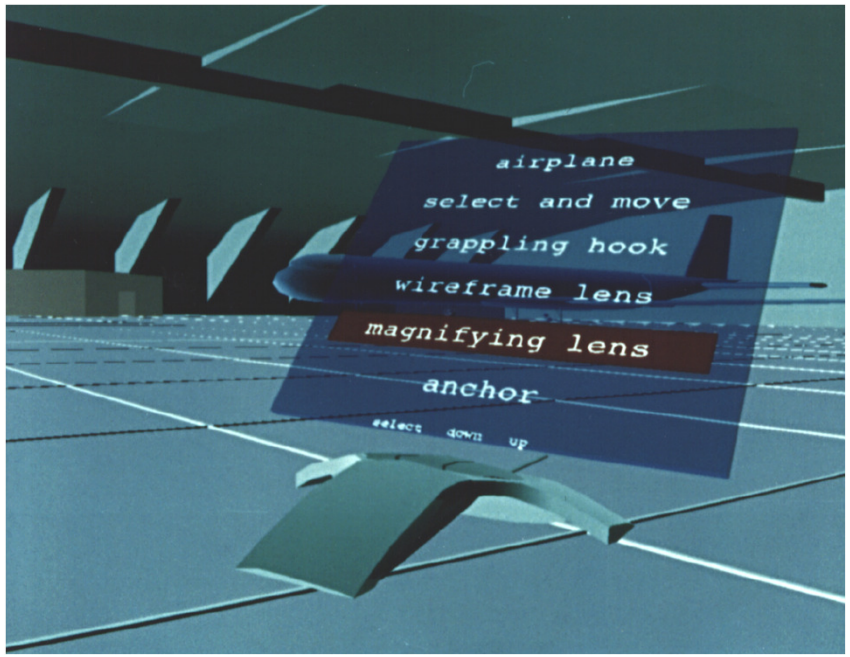
Tools

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

Tools – Virtual Tool belt



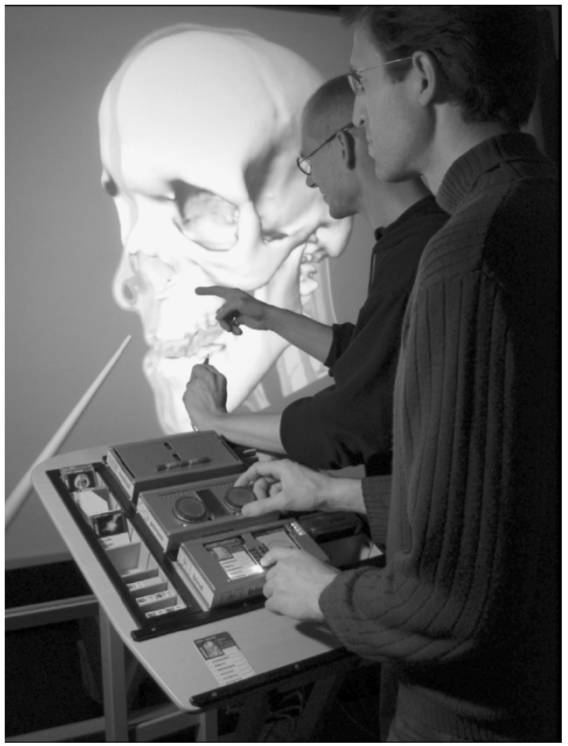
Tools – Tricorder



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

Tools – TUI

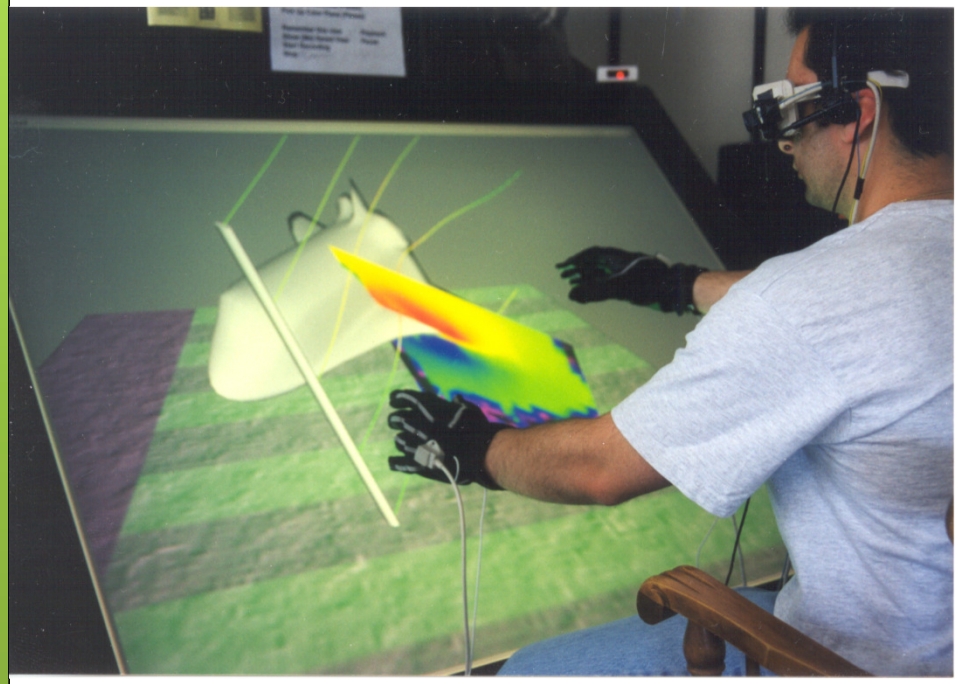
- Tangible User Interface



Multimodal System Control

- More than one input modality (speech, gesture, facial expression, etc…)
- Advantages
  - Decoupling
  - 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]