CSE 165: 3D User Interaction

Lecture #8:
Input Devices Part 2

Instructor:
Jurgen Schulze, Ph.D.

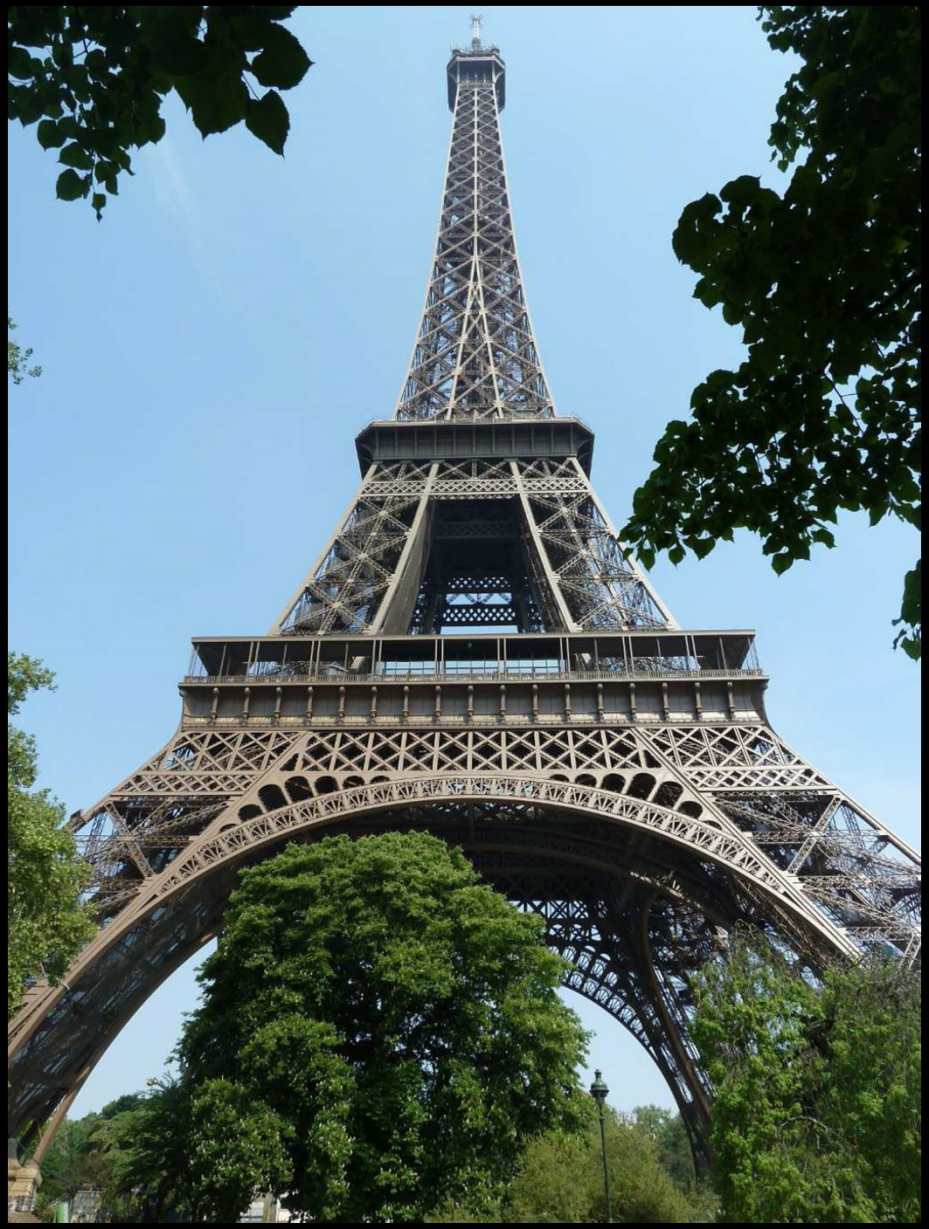
Announcements

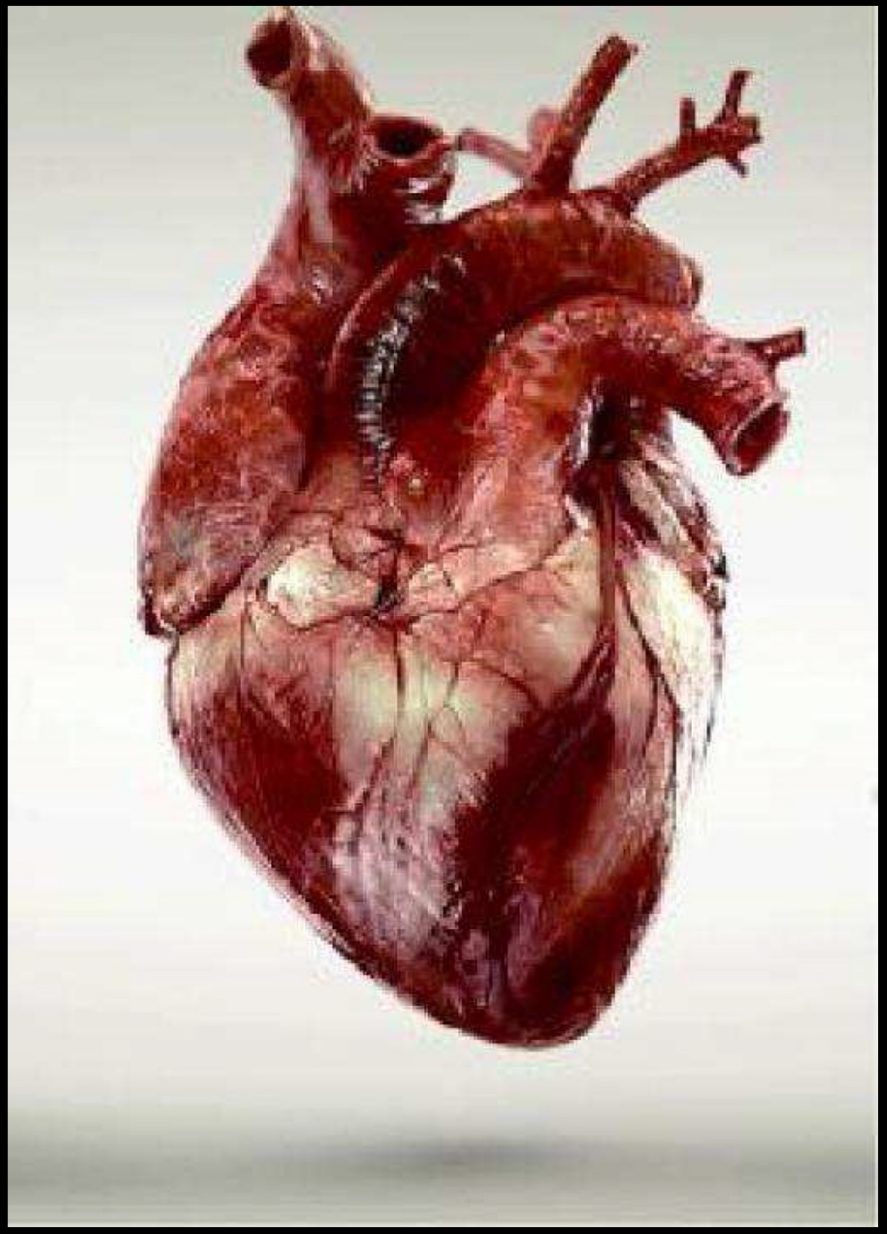
- Homework Assignment #2
  - Due tomorrow, January 30th at 1:00pm
- Next project will use Sony Move
  - To be handed out tomorrow during grading

Input Devices

Augmented Reality

- Android app:
  - Download "Augmented Reality Try it Free" by CreativiTIC from Google Play Store
  - App uses Vuforia from Qualcomm for image recognition
- Then point at images on next slide





Optical Tracking: HiBall

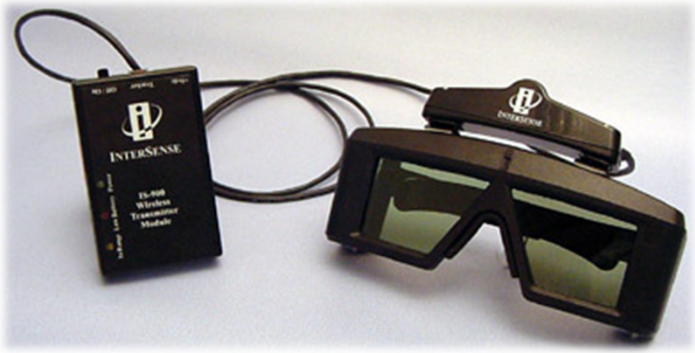
- HiBall-3100 tracker system, distributed by 3rd Tech
- Developed within wide-area tracking research project at UNC Chapel Hill
- System is composed of:
  - HiBall Optical Sensor
    - Views infrared LEDs in beacon arrays on ceiling with 6 lenses and photodiodes
    - Ceiling beacon arrays
- Tracker update rate: 2,000 Hz
- No metal or sound interference

HiBall beacon array

Ultrasonic Tracking

Logitech 3D Mouse

- Systems measure duration of an ultrasound signal to reach microphones.
- InterSense system uses combination of ultrasound and gyroscope.



InterSense IS-900 tracker

InterSense IS-900 Wand

Hybrid Devices: Haptic Feedback Devices

- PHANToM haptic device
- Force feedback joystick
- Exoskeleton-like devices

Microsoft force feedback joystick

LEXOS: Frisoli et. al., Italy

Immersion CyberForce

SensAble PHANToM

Tracking Devices: Bend-Sensing Gloves

- CyberGlove, 5DT
- Reports hand posture
- Gesture:
  - single posture
  - series of postures
  - posture(s) + location or motion

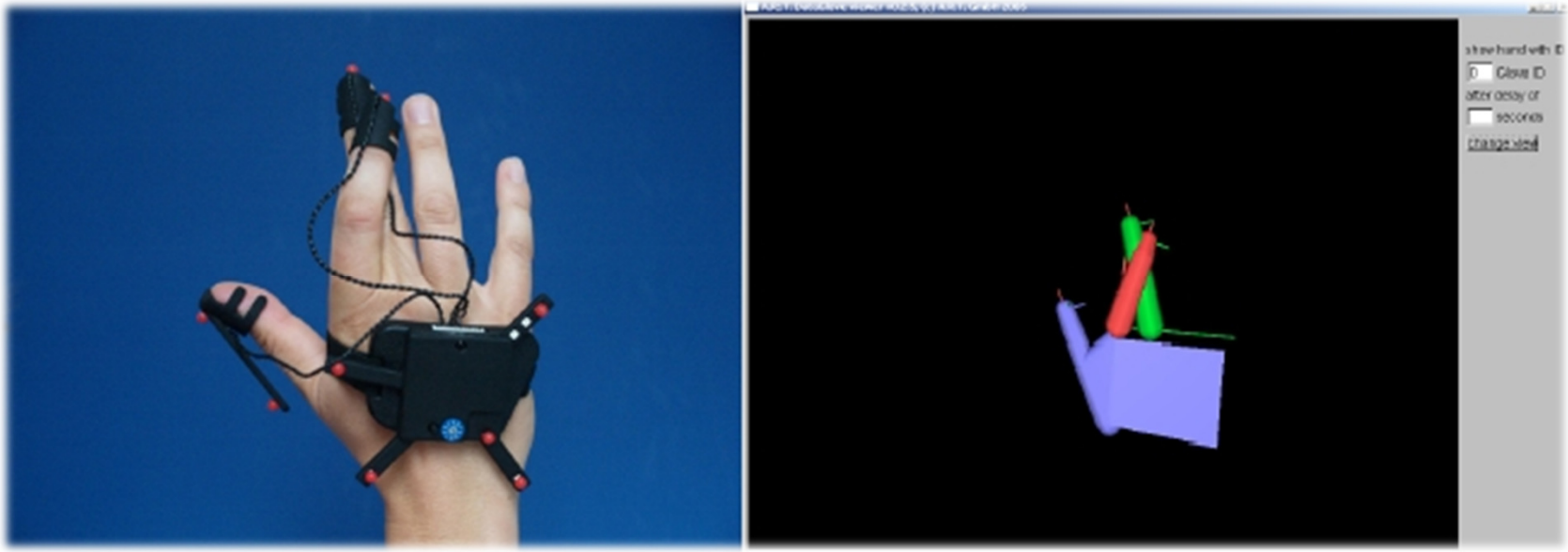
Pinch Gloves

- Determine if two or more fingertips are touching
- Use conductive cloth to close circuit
- Tethered to controller box
- Designed for pinching and grabbing gestures
- Recognize any gesture of 2 to 10 fingers touching, plus combinations of gestures
- Had problems with reliability

www.fakespacelabs.com

Optical Finger Tracking

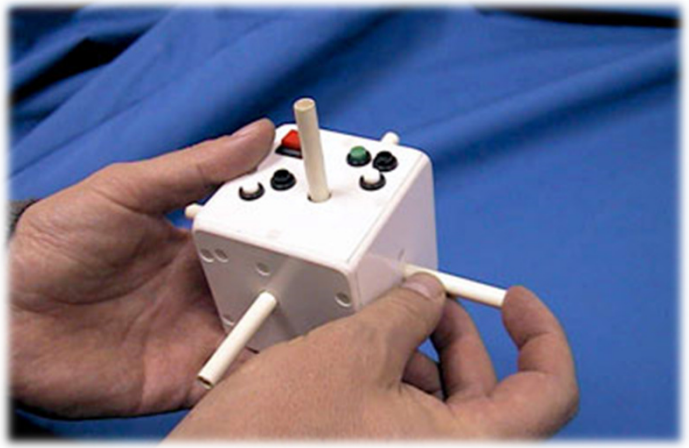
- Extension of ART system
- Tracks three fingers and the hand



Optical Finger Tracking

- Oblong Industries g-speak
  - Video: http://www.youtube.com/watch?v=9OpmxbPzDM0

Special Purpose Device: Cubic Mouse



- Developed at Fraunhofer Institute by B. Frohlich and J. Plate
- Cube shaped box with three rods represents a physical coordinate system
- 6DOF tracker is inside cube
- Rods used to manipulate x-, y-, and z- coordinates of an object (built for controlling cutting planes)
- Target application area: volume rendering for oil and gas industry

Cubic Mouse Video

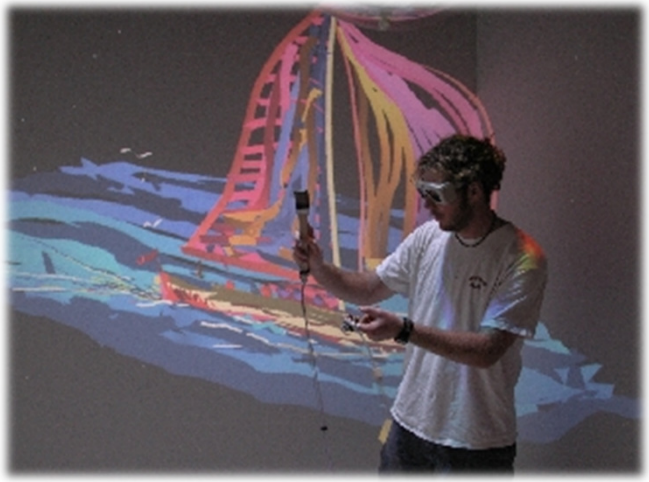
- http://www.youtube.com/watch?v=1WuH7ezv_Gs

Application-Specific Devices

- Virtual hang-gliding over Rio de Janeiro (L. Soares at. al.)
- Virtual canoe, Siggraph 2005
  - Real-time water simulator with pre-computed 3D fluid dynamics
  - Creates realistic wakes and force feedback of water resistance

Cave Painting

- Physical props (brush, color palette, bucket) allow intuitive painting
- System created by Daniel Keefe at Brown University (now Prof. at Univ. of Minnesota)



Cave Painting Video

- http://www.youtube.com/watch?v=WQv-LnHrmwU