CSE 165: 3D User Interaction

Lecture #17:

UI Evaluation

Announcements

- Homework 5
  - Due March 17th at 11:30am
  - To be presented in CSE 1202
- Input devices can be returned
  - in office hour Tue 1:30pm
  - after final presentation
  - any time I'm in the office
- WAVE tour next Tuesday

3D UI Evaluation

Why User Evaluation?

- Need to compare
  - devices
  - interaction techniques
  - Applications
- Problem identification and redesign
- General usability understanding

Some Terminology

- Usability – everything about an artifact and what affects a person's use of an artifact
- Evaluator – person who designs, administers, implements, or analyzes an evaluation
- Subject – person who takes part in the evaluation

Evaluation Tools

- User task analysis
  - generates list of detailed task descriptions, sequences, user work, and information flow
- Scenarios
  - built from task analysis
  - important for experiment design
- Taxonomy
  - science of classification
  - break down techniques into components
  - used in evaluation process
- Prototyping
  - need to have something to test
  - paper-based sketches
  - Wizard of Oz approach

Evaluation Methods

- Cognitive walkthrough
  - Walk through every step of the study with expert
  - Reveals potential usability problems
- Heuristic evaluation
  - Walk through an evaluation checking whether guidelines are being followed
  - Example: check for guideline "Eliminate extraneous degrees of freedom for a manipulation task"
- Formative evaluation
  - observational user studies
  - questionnaires, interviews
- Summative evaluation: compare various techniques in a single experiment
  - task-based usability evaluation: more structured, aimed at improving the interface
  - formal experimentation: have a formal design, analyzed statistically
- Questionnaires
- Interviews and Demos

Evaluation Metrics – System Performance

- System performance metrics
- Average frame rate (fps)
- Average latency / lag (milliseconds)
- Variability in frame rate / lag
- Network delay
- Distortion

- Only important for its effects on user performance / preference
  - frame rate affects presence
  - network delay affects collaboration

Evaluation Metrics – Task Performance

- Speed / efficiency
- Accuracy
- Domain-specific metrics
  - education: learning
  - training: spatial awareness
  - design: expressiveness

Evaluation Metrics – User Preference

- Ease of use / learning
- Presence
- User comfort
- Usually subjective (measured in questionnaires, interviews)

User Comfort

- Simulator sickness
  - Kennedy - Simulator Sickness Questionnaire (SSQ)
- Aftereffects of VE exposure
  - Stanney 1998: Aftereffects from virtual environment exposure: How long do they last?
- Arm/hand strain
- Eye strain