

CSE 165: 3D User Interaction

Lecture #3: Overview

Announcements

- Sign up for video presentation
 - by Sunday 1/21
- Form a team
- Get Rift access

Course Topics

- Introduction to 3D Interaction
- Application Domains
- Input Devices
- Selection and Manipulation
- Navigation (Travel, Wayfinding)
- System Control
- Symbolic Input
- 3D user Interface Design
- Evaluation

What are 3D UIs?

- 3D interaction: human-computer interaction in which the user's tasks are carried out in a 3D spatial context
 - 3D input devices
 - 2D input devices with direct mappings to 3D
- 3D user interface (3D UI): A UI that involves 3D interaction
- 3D interaction technique: A method (hardware and software) allowing a user to accomplish a task in a 3D UI

Why 3D UIs?

- 3D applications should be useful
 - Immersion
 - Natural skills
 - Immediacy/directness of visualization in general
- But, many real world applications have low complexity of interaction
 - Don't need 3D UI

Goals of 3D UIs

- Performance
 - efficiency
 - accuracy
 - productivity
- Usability
 - ease of use
 - ease of learning
 - user comfort
- Usefulness
 - interaction helps meet system goals
 - interface transparent so users can focus on tasks

What makes 3D interaction difficult?

- ◉ Spatial input
- ◉ Lack of constraints
- ◉ Lack of standards
- ◉ Lack of tools
- ◉ Lack of precision
- ◉ Fatigue
- ◉ Spatial scene layout

Universal 3D Interaction Tasks

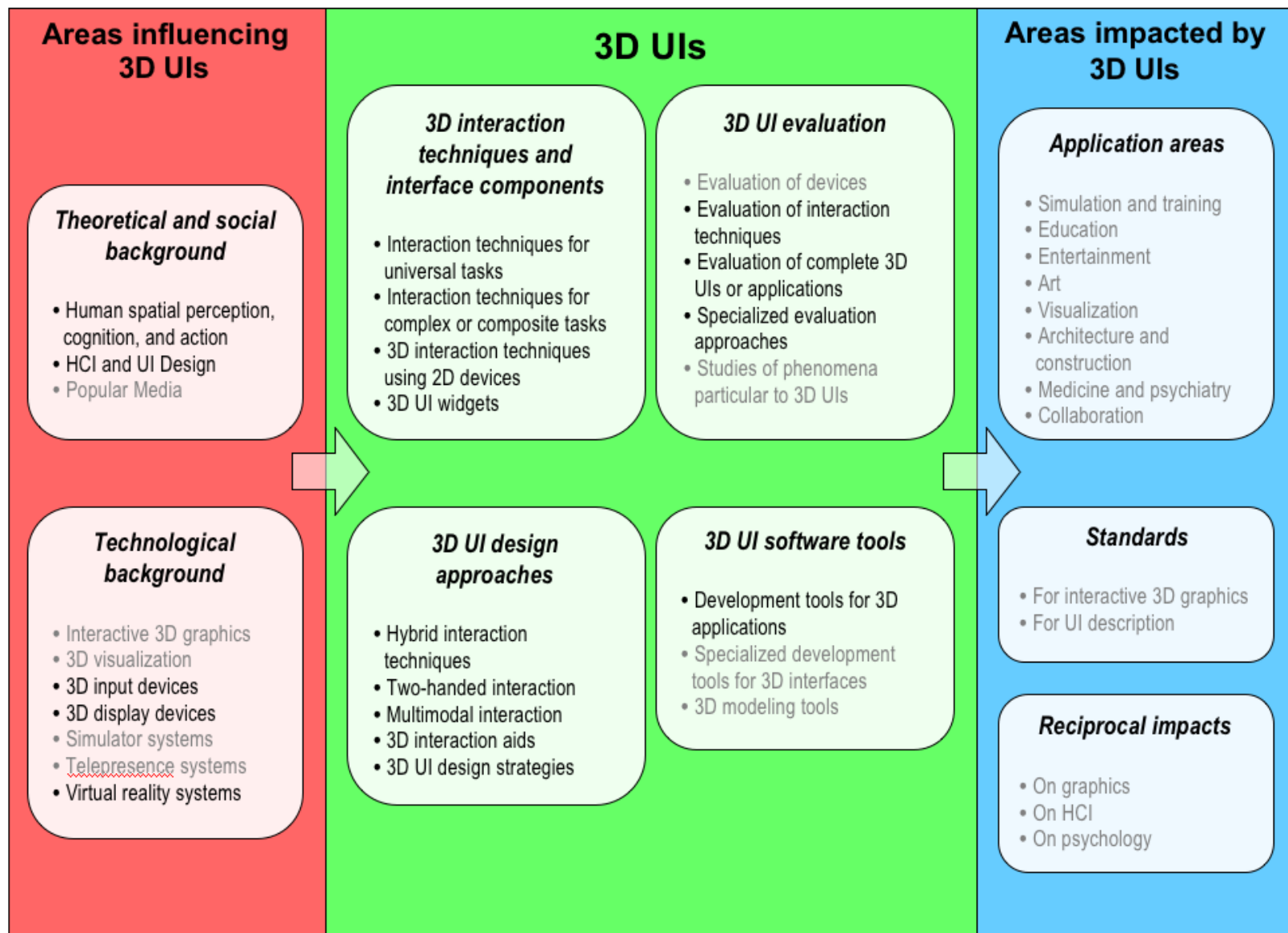
- Navigation
 - travel: motor component
 - wayfinding: cognitive component
- Selection/Picking
- Manipulation
 - specification of object position & orientation
 - specification of scale, shape, other attributes
- System Control
 - changing the system state or interaction mode (e.g., menus)
 - may be composed of other tasks
- Symbolic Input (text, numbers)

3D UI Design Philosophies

- Artistic approach: Base design decisions on
 - intuition about users, tasks, and environments
 - heuristics, metaphors, common Sense
 - aesthetics
 - adaptation/inversion of existing interfaces
- Scientific approach: Base design decisions on
 - formal characterization of users, tasks, and environments
 - quantitative evaluation results
 - performance requirements
 - examples: taxonomies, formal experimentation

Applications

- ◉ *Games*
- ◉ Architecture / CAD
- ◉ Education
- ◉ Medicine
- ◉ Manufacturing
- ◉ Simulation / Training
- ◉ Design / Prototyping
- ◉ Information / Scientific Visualization
- ◉ Collaboration / Communication



Interaction Workflow

