CSE 165: 3D User Interaction

Lecture #1: Introduction

Instructor

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Adjunct Professor in CSE Department

Office hours: Tuesdays 3:30-4:30pm on Zoom

Course Staff

- Tutors:
  - Haoqi Wu
  - Robin Xu
- See Piazza for office hours

Class Goals

- Provide in-depth introduction to spatial 3D user interfaces
- Introduction to VR authoring toolkits
  - Unity
- Strengthen 3D graphics programming skills
- Practice internet research and presentation skills

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

Prerequisites

- CSE167 (Introduction to Computer Graphics) or equivalent
  - Linear algebra
  - Coordinate systems
  - Graphics programming in C++ and OpenGL, or Unity/Unreal Engine

Course Resources

- Web site (wiki):
  - http://ivl.calit2.net/wiki/index.php/CSE165W2021
- Canvas:
  - Grades
  - Assignments
  - Pages entry for presentation scheduling
- Piazza:
  - Discussion board

Synchronous Events

- Lecture:
  - Tue/Thu 2:00-3:20pm on Zoom
  - Will be recorded and available on Canvas
- Homework Discussion:
  - Mon 4-4:50PM on Zoom

Assignment Submission

- Submissions are required for each homework project:
  - all source code and scripts you wrote
  - Quest app file or Windows executable
  - No need to upload other Unity files
- Subject to change

Recommended Textbook

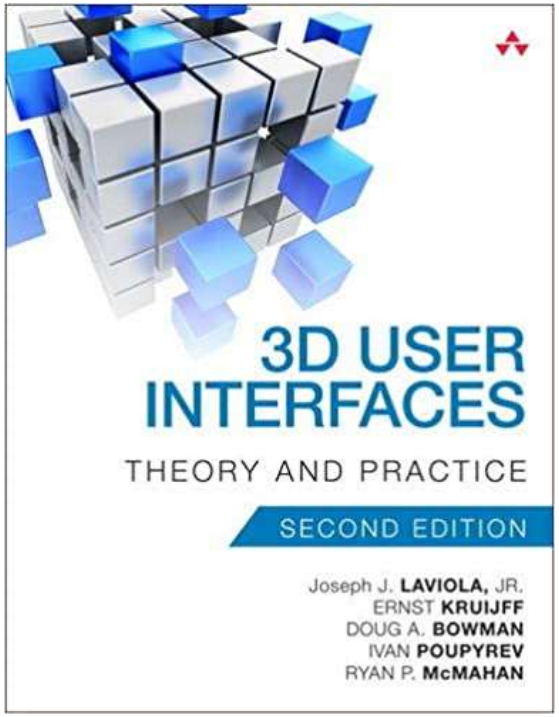
LaViola, Kruijff, Bowman, Poupyrev, McMahan

3D User Interfaces: Theory and Practice

2nd Edition

Addison Wesley Longman Publishing Co., Inc. Redwood City, CA, USA 2017

ISBN: 978-0134034324



Class Structure

- Lectures
  - Fundamentals of 3D user interfaces
- 4 structured homework assignments
  - 2 weeks per project
  - No teamwork
- Final Exam
- Presentations
  - You pick a online video on 3D UI techniques
  - 5 minute presentation, followed by short discussion

Grading

Project 1	15%
Projects 2-4	20%
Final Exam	20%
Presentation	5%

Cloud Storage

- Each student is responsible to keep their code, homeworks, design files and other course work off of publicly accessible internet sites.
- Example: it is not allowed to put code in a public Github repository.
- These rules expire after finals week.

Programming Assignments

- Two weeks per project
- No teamwork
- All projects involve 3D UI techniques with a VR headset and controllers

Programming Assignments

- Operating system: Windows or Mac
- Developed with Unity
  - Can opt for other environment but without IA support
- Developed for VR system
- Graded by submission of app file (Quest) or video (PC VR)

VR System for Projects

- You need a VR system (PC based or standalone) that has full 6 DOF head tracking and dual 6 DOF controllers
  - We recommend Oculus Rift S, Oculus Quest 2, HTC Vive, Valve Index, MS Mixed Reality
- Otherwise, those who requested it will get a loaner Oculus Quest 2 in the mail
  - Needs to be returned to CSE department at the end of the course

Presentation

- Each student needs to present a video on an innovative 3D user interface from 2020/21
- Submit your preferred presentation date, video title and URL to Canvas under Pages link
- You have 5 minutes for the presentation.
  - Includes showing of the video or parts of it
  - Also includes slide show
- Important deadline:
  - By January 17th: pick a presentation date and schedule it on Canvas Pages

Late Policy

- Late submissions are allowed within 7 days of the original deadline but incur 25% penalty on score
- Exceptions for documented extenuating circumstances only