Sneak peak into future classes

UCSD CSE 167
Tzu-Mao Li
Course evaluation!

- Please let us know if you have any feedback regarding the course

- https://academicaffairs.ucsd.edu/Modules/Evals?e11081128
Recall: three “core” fields of graphics

- modeling/geometry
- animation
- rendering
Recall: three “core” fields of graphics

- modeling/geometry
- animation
- rendering
CSE 168: Rendering

UCSD CSE 168 Computer Graphics II: Rendering

Images we will render this quarter. 3D data courtesy of the Stanford 3D scanning repository, Benedikt Geisler

UCSD Spring 2021
CSE 168 Computer Graphics II: Rendering

Instructor: Prof. Ravi Ramamoorthi, Email: ravi@cs.ucsd.edu
Tuesday/Thursday 9:30-10:50, Please see Piazza for Zoom URL.
Head TA: Alexandr Kuznetsov Second TA: Mohammad Shafiei

Overview

2022 final project from Danica Xiong and Jakob Getzel
Acceleration structures for ray tracing
Frequency analysis for sampling and reconstruction

\[ \text{point sampling} \]

\[ \text{mipmaps \& linear interpolation} \]
Texture filtering algorithms
Monte Carlo integration

\[ \int_{c}^{d} \int_{a}^{b} f(x, y) \, dx \, dy \approx \frac{|b - a| \, |d - c|}{N} \sum_{i} f(x_i, y_i) \]
Importance sampling
Microfacet BRDFs

$\omega_o$  $\omega_i$  $n$

$m = h$
Image-based lighting
Tonemapping

v.s.
Hardware tessellation
Irradiance caching
Photon mapping
Denoising and adaptive sampling

renderer

noisy image

denoised

estimate error
Path guiding v.s.
Order-independent transparency
Light baking
Homeworks: build a path tracer from scratch
Recall: three “core” fields of graphics
Summary

This advanced graphics class focuses on the programming techniques involved in computer animation. Algorithms and approaches for both character animation and physically based animation will be covered. Particular subjects may include skeletons, skinning, keyframing, facial animation, inverse kinematics, locomotion, motion capture, video game animation, particle systems, rigid bodies, clothing, hair, and other techniques. A good understanding of linear algebra and computer graphics is essential and CSE167 or approval from the instructor is required.

Announcements

02.29.2020 - Project 5 has been posted, it is due Thursday, March 12th.
02.13.2020 - Project 4 has been posted, it is due Thursday, February 27th.
01.29.2020 - Project 3 has been posted, it is due Thursday, February 13th.
01.23.2020 - New starter code added, it should work on all both Apple and Windows and has all the interaction implemented.
01.17.2020 - Project 2 has been posted, it is due Thursday, January 30th.
01.10.2020 - Project 1 has been posted, it is due Thursday, January 16th.
Skeleton animation
Skinning
Blendshapes / facial expressions
Keyframe animation
Inverse kinematics

$$J(e, \Phi) = \begin{bmatrix} \frac{\partial e_x}{\partial \phi_1} & \frac{\partial e_x}{\partial \phi_2} \\ \frac{\partial e_y}{\partial \phi_1} & \frac{\partial e_y}{\partial \phi_2} \end{bmatrix}$$
Cloth simulation
Collision detection
Gaits motion
Fluids simulation
Recall: three “core” fields of graphics

modeling/geometry

animation

rendering
Geometry processing classes:
CSE 274 & 275

CSE 274 (WI 2022) Discrete Differential Geometry
Welcome to CSE 274 "Selected topic in computer graphics" — Discrete Differential Geometry.

- **Lecture**: Tue Thu 3:30pm - 4:50pm
- **Classroom**: Warren Lecture Hall 2207.
- **Instructor**: Albert Chern (Office Hour: Tuesday afterclass (5-6pm), CSE Building 4112)
  - **TA**: Dylan Rowe (Office Hour: Wed 3:30-4:30pm, location: CSE Building B215)
- **Sites**:
  - [This page](#): Slides, lecture notes, HW
  - [Canvas](https://piazza.com/ucsd/winter2023/cse274 Q&A forum for the class.
- **Lecture note**: Discrete Differential Geometry

Visit Canvas (for all info including Zoom links), Gradescope (HW submission) and Piazza (Q&A).

Deep Learning for 3D Data
CSE275 – Fall 2023

### Announcements
- 09/19/2023: Welcome to the course!
- 09/19/2023: Homework 0 will be released on Piazza, due 10/03/2023 23:59 PM

### General Information
- **Times & Places**
  - MoWeFr 6:00PM – 6:50PM, Warren Lecture Hall
- **Course Staff**

<table>
<thead>
<tr>
<th>Role</th>
<th>Name</th>
<th>Email</th>
<th>Office Hours</th>
<th>Location</th>
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<tbody>
<tr>
<td>Instructor</td>
<td>Prof. Hao Su</td>
<td><a href="mailto:haosu@ucsd.edu">haosu@ucsd.edu</a></td>
<td>Wed 2:00pm-3:00pm</td>
<td>CSE 4114</td>
</tr>
<tr>
<td>Teaching Assistant</td>
<td>Yunhao Fang</td>
<td><a href="mailto:yuf026@ucsd.edu">yuf026@ucsd.edu</a></td>
<td>Thu 12:00pm-1:00pm</td>
<td>CSE B250A</td>
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More classes: CSE 272

UCSD CSE 272: Advanced Image Synthesis (Winter 2023)

Images we will render during the course. 3D data courtesy of Wenzel Jakob, Jonas Pilo, and Bernhard Vogl.
More classes: CSE 273

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
UNIVERSITY OF CALIFORNIA, SAN DIEGO

CSE 273: Computational Photography

Winter 2022
More classes: CSE 274

Sampling and Reconstruction of Visual Appearance: From Denoising to View Synthesis

CSE 274 Topics in Computer Graphics, Fall 2021, Prof. Ravi Ramamoorthi Time and Place: Tu/Th 9:30-10:50, EBU3B 4140

Overview
More classes: CSE 291
Differentiable Programming

• I will offer it the first time in Spring : >

• about compiler technology for computing derivatives and their applications
Graphics industry

- video games
- visual effects
- web design
- architectural/product visualization
- manufacturing/3D printing
- computational photography
Graphics industry

- autonomous driving
- medical imaging
- virtual/augmented reality
- architectural design
- scientific visualization
- user interface