Open Source Animation: 3D Done Wrong
ITPG-GT.2643.1 Call#21241
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Tue. 6:30pm–9:00pm, rm. 406

This class uses open source software to solve interesting problems in animation. We'll be focusing on 3D CG, with the goal of knocking it off its pedestal as the intimidating "most advanced" form of animation around—instead of having to memorize and stick to an often-tedious workflow, recent advances in technology mean we can freely sculpt, draw, and puppeteer our creations in ways that weren't practical for independent artists until now. We'll learn how to work with 3D scanning, motion capture, and other kinds of live performance data too. Our core tools will be Processing, Unity, and Maya, but we can explore many other options depending on student interests; you can create anything from pure visual music to narrative character puppetry. You'll need either some prior animation or coding experience to get off to a good start in the class—but you don't necessarily need to know anything specifically about 3D CG animation yet to do cool stuff with it.

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1. (2 sep 14) Introduce Maya and demonstrate basic animation techniques. Introduce Maya's Python scripting language. Experiment with the Maya hardware renderer.

2. (9 sep 14) Introduce Unity and its C# scripting language. Review Processing and compare. First look at the Oculus Rift.

Assignment 1, Test Drive: Create an experiment using one or more techniques discussed in class.

3. (16 sep 14) Review the Kinect and explore its uses for 3D scanning. Introduce Zbrush and Mudbox for modeling and painting, with a special focus on repairing scanned meshes.

4. (23 sep 14) Introduce Kinect mocap processes; discuss rigging and its automation with Python scripting. Demonstrate ways to create procedural graphics by combining Processing and Python.

Assignment 2, Visual Music: Create an abstract animation timed to sound. One approach is to begin by designing simple elements, then steadily build up a library of compositions. Experiment with rhythm, motion, repetition, and color choices that complement your music selection.

5. (30 sep 14) Introduce Unity's Mecanim animation system. Discuss strategies for moving assets from Maya to Unity, and common pitfalls.

6. (7 oct 14) Continue exploring Mecanim. Demonstrate features of cameras, lights, and shadows.

Assignment 3, Rotoscoping: Film or appropriate a clip with a live actor to use as a basis for rotoscoping or motion capture. Animate a character based on the actor's performance.

(14 oct 14) no class.
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7. (21 oct 14) In-depth exploration of materials and Unity's ShaderLab shader language. Discuss differences between realtime and non-realtime CG.

8. (28 oct 14) Explore ways to build complex 2.5D or 3D environments, including for VR, and combine them with various camera techniques.

Assignment 4, Rube Goldberg Machine: Create an extremely complex environment or machine that accomplishes a simple task, and navigate through it with an unbroken tracking shot using a virtual camera.

9. (4 nov 14) Discuss strategies for realtime video in Unity, including live feeds and high-res sources using the Hap codec.

Assignment 5, Screenplay and Storyboards: Write a screenplay, if your film involves dialogue. Create a set of storyboards, scanned and ready to use in an animatic. Remember that storyboards are practical tools; they don't need to be works of art, but they have to unambiguously communicate what's going on in each shot.

10. (11 nov 14) Experiment with realtime camera control ("virtual cinematography"). Explore techniques for incorporating mocap and other controller data (for example, Leap, Wiimote, drawing tablets, phones). Review OSC and its uses.

Assignment 6, Voice Track and Animatic: Record your voice actors and any other sound elements that will be critical to sync. For a narrative project, try cutting your storyboards to the sound in Premiere or Final Cut.

11. (18 nov 14) Explore spatialized sound in Unity. Discuss the stages of audio production, and demonstrate some essential audio editing techniques. Explore realtime control options using combinations of MIDI, OSC, and audio data.

Assignment 7, Rough Animation: Create a complete rough animation based on your animatic, concentrating on broad strokes and large character movements.

12. (25 nov 14) Review projects in progress; explore topics of interest suggested by students. Lab time, with individual assistance.

Assignment 8, Sound Mix: Rough animation with finished, spatialized soundtrack. A little extra detail invested in your sound effects can have a disproportionately great payoff in the emotional impact of your work.

13. (2 dec 14) Review projects in progress; discuss remaining technical challenges. Lab time, with individual assistance.

Assignment 9, Fine Animation: Do a detailed last pass over the project, looking to correct mistakes, tweak effects and colors, and improve character performances.

14. (9 dec 14) Critique of final projects.