CSE682 - Computer Animation

Rick Parent
DL787
parent@cse.ohio-state.edu
292-0055
Tentative office hours:
T 1:30–2:30; F 1:30–3:30
Animation

Animating – Making something appear to move that doesn’t move itself

Procedural Animation is Emphasized

Motion Control Techniques and Algorithms

Producing animation:
Aesthetics
Animation Production
Digital Post-Processing
Class: Wi '09

Eng. Majors: 13
MPS majors: 5
Grads: 5

All CS majors
Some Alumni

Beth Hofer, M.S. – PDI
Kirk Bowers, B.S. – Disney
Mark Fontana, B.S. – Pixar
Kevin Rogers, M.S. – PDI
Saty Ragavachara, M.S. – Imageworks
Brad Winemiller, B.S. – Pixar
Steve Anderson, M.S. – Electronic Arts
Doug Roble, Ph.D. – Digital Domain
Dave Haumann, Ph.D. – Pixar
Ferdi Scheepers, Ph.D. – Pixar
Rob Rosenblum, M.S. – PDI
Nathan Loofbourrow, M.S. – PDI
Steve May, Ph.D. – Pixar
Brent Watkins, M.S. – Pixar
The Class

In-Class
Lectures
Videos
Project reports

Grading
Homeworks – MEL exercises
Midterm – lightweight
Final – lightweight
Project documentation
Project

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Computer Animation
Lectures

**High-Level Algorithms**
- Forward/inverse kinematics
- Physical simulation
- Flocking
- Particle Systems

**Natural Phenomena**
- Plants
- Water
- Clouds
- Fire

**The Human Form**
- Reaching
- Walking
- Hair

**Background**
- Perception
- Conventional Animation, History,
- Video Production
- Background Math

**Low-Level Control**
- Interpolation
- Speed control along a path
- path following

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Computer Animation
Videos

Previous Animations from Class

Conventional Animation (e.g. Disney)

Historic Computer Animation

Recent Computer Animations
Student Animation Project

Vignette
Short action sequence
Part of a story
Use a procedural model

Composition

Camera control

Lighting
Project Groups

Groups: 3–4, mix backgrounds

Design and present storyboard

Give progress reports

Present final project
Student Presentations

Rough Storyboard

Storyboard (revised)

Detailed Storyboard and sample stills

Sample stills and low-quality rendering of sequences

Finished sequence (finals week)
Storyboard

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Computer Animation
Class Software

Maya

scripting (MEL)

C++ API
Hardware Facilities

CL112D
10 Maya licenses
Hope to have 5–6 Premier licenses
## Motion Specification and Control

### Techniques: Aids to user
- Interpolation
- Path following
- Keyframing
- Languages
- Morphing

### Algorithms: Procedures
- Inverse kinematics
- Physics of rigid bodies
- Flexible bodies
- Particle systems
- Flocking
- Autonomous Behavior

### Figure animation
- Reaching, Walking
- Facial animation
- Clothes
- Hair
- Skin

### Natural phenomena
- Plants
- Water
- Clouds
- Fire

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Computer Animation
Technical Groups

Technical group – learn one major facet of software

Each technical group
At least one person from each project group

Technical groups

- **Modeling**: polygons, NURBS, subdivision surfaces
- **Animation**: Forward kinematics, IK, particle systems
- **Rendering**: playblast, rendering qualities, recording frames, video editing, post-processing
Immediate Tasks

Form into groups

Start thinking of animation project

Consider software tasks
By End of Week

Form groups
4–5 CSE students

At the end of Wednesday’s class, anyone not in a group will be put into one

Have an idea of technical group assignment