Welcome to CS 231

Topics in Computer Animation

Victor B. Zordan
EBU II 337
vbz@cs.ucr.edu

Overview

Administrivia
Projects
History of animation
Research Areas
About me

Mech Engineering (BS)
Computer Science (PhD)

www.cs.ucr.edu/rgl

About me

Character Animation Techniques

Keyframing
Motion capture + Physics models
Class Projects

This is a warm-up for research in animation

Facial animation  Animation interfaces
Human dynamics  Motion capture editing
Animating nature  Rigging/Deformation

Production / Research

Types of animation

- Keyframing – tweening, interpolation
- Rotoscoping/Match-moving
- Stop motion animation
- Procedural animation – 3D algorithmic
- Simulation – 3D physical modeling
- Motion Capture
Animation Timeline
100 years of animation

First animations
Blackton, McCay
Hand-drawn

Gertie (1921)
Animation Timeline
100 years of animation

- 1900
- 1920
- 1960
- 1980
- 2000
- Today

Age of Disney
1923-1950
Cel Animation
Multiplane Camera

Snow White (1937)
Animation Timeline
100 years of animation

1900 1920 1960 1980 2000 today

First Computer Graphics
Experimental Animation
“Visual Music”

Realistic 3D
Disney’s Tron (1981)
Animation Timeline
100 years of animation

First 3D Feature
Pixar’s Toy Story
(1995)

2000s
Photorealistic humans
(Final Fantasy, Beowolf)
Real-time complex
worlds on consoles
(PS3, Xbox360)
Animation Timeline
100 years of animation

Today - what's left?

Animation Research
Topics
Animation Research Topics

Topic: Human motion capture
Uses: Interactive applications, games, specific actors
Issues: Capturing, editing

Animation Research Topics

Topic: Performance capture
Uses: Interactive applications, games, specific actors
Issues: Real-time editing
Animation Research Topics

Topic: Rigid body simulation
Uses: Games, special effects
Issues: collisions, realism, speed

Animation Research Topics

Topic: Control for simulation
Uses: Training applications, games, lifelike motion
Issues: Control algorithms, speed
Animation Research Topics

Topic: Deformable modeling
Uses: Medical surgery simulation, games
Issues: speed, accuracy

Animation Research Topics

Topic: Cloth modeling
Uses: Games, special effects
Issues: speed, accuracy, real-world capture
Animation Research
Topics

Topic: Facial animation (also hair, eyes, lip sync, etc)
Uses: Interactive applications, telecommunication
Issues: Capture or underlying model, intense realism

Animation Research
Topics

Topic: Water/Fluid simulation
Uses: Special effects, movies
Issues: Realism, speed
Animation Research Topics

Topic: Fracture/Explosion/Fire simulation
Uses: Special effects
Issues: Realism, speed

Animation Research Topics

Topic: Plants - movement and growth
Uses: Automatic generation of worlds, special effects
Issues: Realism, user control
Animation Research Topics

Topic: Evolving artificial life
Uses: Games, populating virtual worlds
Issues: life is complex

Animation Research Topics

Topic: Other natural phenomena
Uses: Interactive applications, special effects
Issues: User control, accuracy
Animation Research Topics

Topic: High level or behavior control
Uses: AI controlled agents, games, multi-player
Issues: Complexity, modeling intelligence

Animation Research Topics

Topic: Animation Interfaces
Uses: Efficient, high-quality input
Issues: inference, 2D -> 3D, adaptability?
Animation Research Topics

Topic: Automatic camera control
Uses: Games, virtual environments
Issues: Smoothness, appeal

Animation Research Topics

Topic: Image based animation
Uses: Interactive applications, special effects
Issues: 2D vs. 3D, complexity