Current Trends in Animation

Current trends in animation

Current trends in animation:

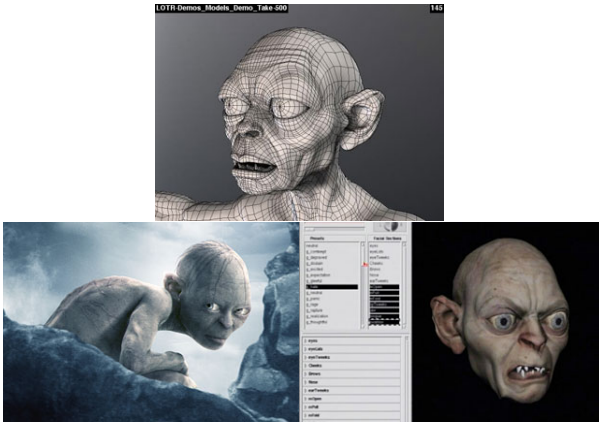
- Geometric modeling and instrumentation
- Realistic rendering
- Physical simulation
- Controllable simulation
- Digital humans

Geometric modeling and instrumentation

Building characters with the right shape and control points is time consuming..

Want the “right” set of controls

- Control points
- Muscle groups
- Blending example expressions
- “Instrumentation” controls



In order to animate Gollum’s face, Bay Raitt, Jason Schleifer and Tom Kluyskens designed this unique interface, which allowed for a maximum of control within a minimum of space. Each animator could create various “poses” of the entire face for easy emotional manipulation, while still maintaining absolute control over each muscle motion. There were more than 800 individual sculpts used in the final facial system. Unless otherwise noted, all images © 2003 New Line Prods. Photos by Pierre Vinet.

Realistic rendering

Research in rendering materials accurately is ongoing.

Recent progress in Bi-directional Subsurface Scattering Distribution Functions (BSSRDF’s) is changing the look of everyday things…and skin.

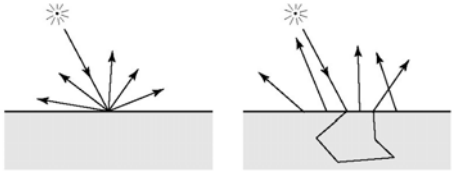
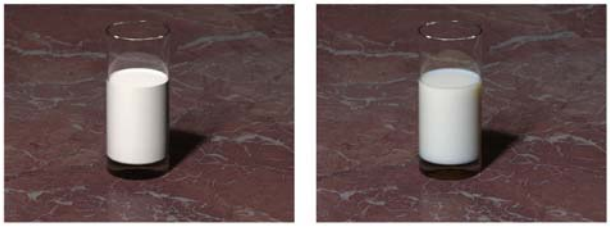


Figure 1: Scattering of light in (a) a BRDF, and (b) a BSSRDF.



http://graphics.ucsd.edu/~henrik/images/subsurf.html

Realistic rendering (cont'd)

http://graphics.ucsd.edu/~henrik/images/subsurf.html

Physical simulation

Some effects are too difficult to model by hand (fire, snow, steam, rustling trees, hair, cloth, etc.)

Can do simulation (both physical and non-physical)

- Particle systems
- Fluid flow and turbulence modeling
- Rigid body dynamics
- …

http://graphics.stanford.edu/~fedkiw/

Physical simulation (cont'd)

http://graphics.ucsd.edu/~henrik/papers/fire/

Controllable simulation

Want to have some interactive control.

Example: insert cloth wrinkle here.

- How do you merge this with the physical simulation without starting over?

http://people.csail.mit.edu/jovan/rbedit-project.html

Controllable simulation

Controllable simulation

Controlling fluids

- Bunny reloaded

http://grail.cs.washington.edu/projects/control/

Digital humans

Making realistic human bodies and faces and animating them is really hard.

Example-based methods using motion capture and scanned shape data hold some promise.

Digital humans: motion capture

Making a realistic human body motion is hard

Solutions

- Computer vision using raw video footage
  - Typically not accurate enough
- Special sensors that give joint angles and/or positions
  - Wires get in the way
- Optical tracking with markers
  - Can be hard to find the markers
  - Must handle occlusions

Digital humans: motion capture

Current “best” solution:

- Cover person with white or retroreflective targets like ping pong balls.
- Lots of cameras.
- Some software processing to fill in missing parts

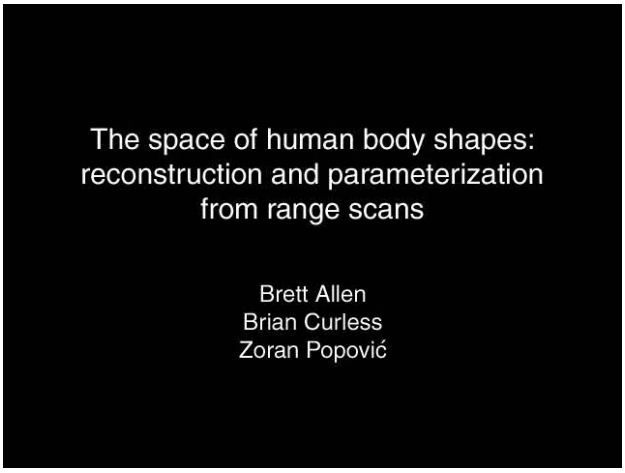


Motion processing

- Motion data is often noisy → filter it with smoothing filter.
- Can apply a variety of filters
- “Re-targeting” motion is main challenge now

Digital humans: body shape modeling

Digital humans: body shape modeling



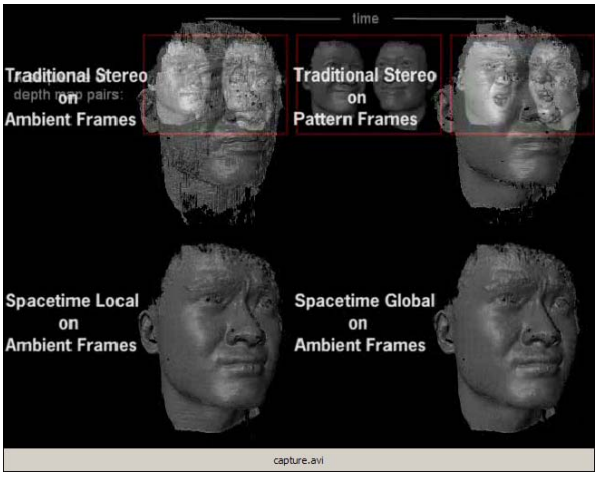
http://grail.cs.washington.edu/projects/digital-human/pub/allen03space.html

Digital humans: facial animation

Future input device: performance driven facial animation

- animator makes faces
- video camera watches
- computer processes in real time
- character's face comes to life
- animators are actors!!

Digital humans: facial animation

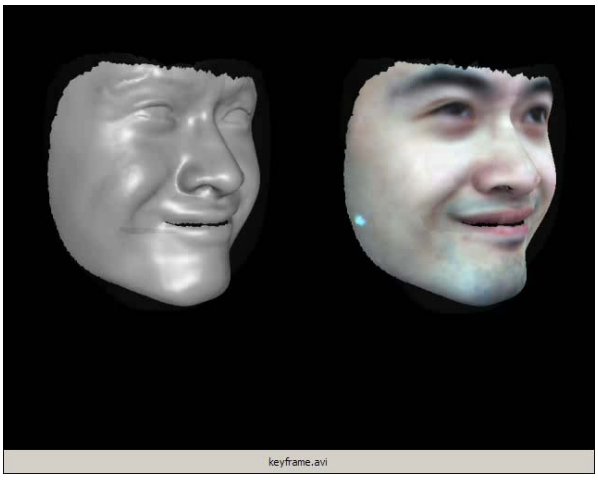


http://grail.cs.washington.edu/projects/stfaces/

Digital humans: facial editing

http://grail.cs.washington.edu/projects/stfaces/

Digital humans: facial animation



http://grail.cs.washington.edu/projects/stfaces/

Final exam

When: Monday, June 5, 10:30am - 12:20pm

Where: Regular classroom (EE 037)

Format: Closed book

Material:

- Covers everything up to and including subdivision curves and surfaces.
- I will ask about material covered in lecture; i.e., I *won't* ask about material covered in the book that isn't covered in lecture.
- Can use homeworks and summaries at end of lectures as a guide for what you should know.

Extra office hours:

- I'll hold extra final exam office hours on Friday, 4:30-5:30. Drop in and ask questions.

This sheet is posted off of the lectures page.