Motion Capture & Blender

Past, Present and Future
Introduction

What is Motion Capture
- Pros: Animation on a budget
- Cons: Ok, now what?
- Acquisition & Production

Blender and Motion Capture
- Motion Capture Add-on (GSoC 2011 project)
- Retargeting
- Advanced Editing Methods

The Next Generation
- Facial Motion Capture
- Partial Body Capture
- Motion Capture Libraries
- Acquisition in Blender
Who am I?

- Benjamin Cook
- 23 years old
- Live in Tel Aviv, Israel
- Senior in interdisciplinary program at TAU, Film and Computer Science
- GSoC Student for Blender this year (2011), implemented a Motion Capture Workflow add on
- Main Interests: Applying AI Techniques in Film, Animation and Interactive Media.
- Current Employer: SteVie (an Israeli startup), work on next-gen television.
Motion Capture Overview
What is Motion Capture?

• Capturing real (human) actor’s motion, and using that data to drive virtual character’s animation.

• 3 major steps in the process:
  • Acquisition
  • Managing the data
  • Animating the character with the captured motion(s).
Pros: Animation on a budget

- Cheaper
- More accessible
- Faster
- More realistic (maybe)
- Great for directors
- Re use!

Less Animators on staff
James Cameron directing “Avatar”
Cons: Capture means Captured!

- Difficult to edit/manipulate.
- If using existing clips, might not be exactly what we need.
- Limited by human anatomy.
Due to Gollum’s inhuman nature, and the intricacies of the facial performance, a mix of motion capture and keyframe approaches were used, including rotoscoping the performance.
The Good News

• These limitations can be alleviated by good, high level, motion editing capabilities.
• If we had great motion editing capabilities, we could have used motion capture for 90% of the Gollum shot.
Acquisition

- Most popular technique: Use multiple cameras and Computer Vision algorithms and techniques to capture optical markers.
- Other techniques: Mechanical exoskeletons, Electromagnetic sensors.
Motion Capture in Blender
Acquisition in Blender?

- Short answer: Not possible (yet...)
- Blender uses libmv – lacks support.
- Alternatives:
  - Kinect / Brekel
  - OpenCV
  - Even if you need to use commercial software, you can still create mocap on a budget, with a few consumer DV minicams, or even webcams!
OK, we have the data. Now what?

- Basic motion editing
- Retargeting.
- Other types of editing
Motion Capture Add-on

- My GSoC Project – provides a high level workflow for working with motion capture. Provides:
  - Basic Editing
    - Looping, Conversion to Keyframes, Denoising
  - Retargeting
    - Great and automatic for simple rigs
    - Good for complex rigs, but requires more artist involvement.
  - Advanced Editing
    - Blending / Stitching Animations
    - Path Editing
    - “Post Retarget Fixes” – suite of tools to deal with artifacts arising from retargeting, and high level tools for interaction with the environment.
Tour of addon

- Retargeting Video
- Path Editing
- Floor Constraint

http://www.youtube.com/watch?v=zDXfu7kUykc
The Future

(of Motion Capture in Blender)
The Future of Motion Capture (& Blender)

- Facial Motion Capture
  - Requires a different workflow. Based on “point clouds” that guide deformation of the target mesh.
  - What file format?
  - Do we need to design different rigs?
  - Not just deformer bones:
    - Shape keys
    - Lattice deformation
- Acquisition in Blender
- More work on Motion Editing
  - Equalizer tools
The Future of Motion Capture (& Blender)

- Partial Body Motion Capture
  - Attaching “prosthetics” to real video context.
  - An amalgam of VFX motion tracking and motion capture.
The Future of Motion Capture (& Blender)

- Motion Capture Libraries
  - Automatically categorized by subject, movement, performance (i.e. semantic sorting)
  - Creation of new animations based existing ones
  - Maybe even in real-time!
- [http://www.youtube.com/watch?v=WPoXNL_8Z5w](http://www.youtube.com/watch?v=WPoXNL_8Z5w)
What you can do:

- Bug me (literally)
  - Use the add-on and file bug reports
  - Think of new stuff I could implement
- If you are an animator/rigger I’m interested in your workflow in general, so we can make work with motion capture seamless
- Anything else you can think of...
- Best way to reach me:

  benjytcook@gmail.com
Thanks for listening!

- Questions?

- References:
  - James Cameron, Avatar, 2009
  - Peter Jackson, The Two Towers, 2002
  - Automated Extraction and Parameterization of Motions in Large Data Sets by Lucas Kovar and Michael Gleicher, University of Wisconsin – Madison
  - Hollywood Camera Work – VFX For Directors

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