Creating animation rigs which solve problems, are fun to use, and don’t cause nervous breakdowns.

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Included Mel Scripts

js_attrDraggerSingle.mel
js_hashRename.mel
js_hashRenameUI.mel
js_replaceHash.mel

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Example – Standard Bipedal Rig

In Animator Friendly Rigging Part I, we learned how to create a bouncy ball rig using a set of standards to ensure quality rigging techniques. We can take those same lessons and extrapolate them to help us create other types of rigs. One of the most common rigs needed in the industry today is a bipedal rig. That doesn’t mean a rig that works on a bicycle, or a dual-pedestrian rig.. it’s a character that stands on it’s own two feet. A humanoid character. You know, “people”-ish.

Reference

So how do you start creating a bipedal rig that will work for your animators? The best way is to approach it the same way we looked at creating the ball rig: we looked at reference of what we expected the rig to be able to do.

Figure 1 - Human character doing various “humanistic things”. walking, lifting, standing, pushing..
Figure 2 - More poses that are standard for humans. Notice the interactions between various parts of the body, elbows on knees, hands holding up the head, etc.

As you can see from these images, the body can get into a number of various poses, and our control structure must handle as many of these situations as possible.

However, we’re not just creating a rig which can simply be posed, we have to create a rig which will support the type of motion the animator will want to create. So how do we determine what motion our rig will need to handle? The best way is to approach it the way an animator would: with reference.
Acquiring Reference

Go and grab yourself a video camera or web cam and shoot reference of the type of motion your character will be expected to create. If you don’t have a video camera, search online for video. Google Video®, You Tube®, and the BBC Motion Gallery™ have searchable video archives of motion just ripe for analyzing.

One of my favorite types of video to analyze involves the sport of Parkour, or free-running. Parkour is the art of running over, under, and through obstacles. It’s great reference for seeing what the body can do, and what kinds of extreme motion can be achieved.

Of course, while watching all this amazing parkour reference out on the web I became jealous of the fact that these people had the ability to move with such grace and agility. So some friends and I went out and shot our own parkour video. But.. alas.. we are not so graceful.

You can view the movie for yourself by looking in the included movies folder. The file is called parkour-H264.mov.

By analyzing the reference video, you can break down what type of motion will be necessary for your character. Take two or three frames of a movement and analyze it. Discover what is moving, what is staying still. Where to the moving parts pivot from? Where is the force of the motion? How would you want to move that bit of the body if you were to animate it? By doing this analysis, you can start to get an idea for what an animator does, and see how an animator thinks about motion.
The first thing you want to do is segment out the human into workable chunks. This can be done by thinking about how the character you’re creating moves, what individual pieces are involved, and trying to determine the easiest way to dissect the character. A human is relatively simple due to its familiar structure. But this same trick can be applied to almost any creature or shape. Analyze the structure and determine clean break points based on the anatomical structure and on how the creature moves. It’s imperative to start thinking about the creature as one that will be in motion even at this early point in the rigging process. Without the knowledge of how the creature is going to move and what types of actions will be required, it is impossible to rig a creature effectively.

**Creating the rig - Where to start?**

If you’ve had any experience with rigging before, or even talking about the body, think about how people talk about various body parts. “He put his arm on her shoulders.” “She nodded her head”. “He tweaked his back”. “She had long legs”. “That dude had wings, he must be a mutant”.

If you analyze the way people *think* about the body, you can start to break the body up into convenient segments-- parts that are unique and make sense to the animator to be broken apart.

Another way to think about it is to break up the body until there’s “one of each”. What that means, is how many torso’s are there? One. Arms? Two. Legs? Two. Head/neck? One. Looking at it this way, you can break apart the rig so you have *one of each*.
Figure 5 - Imagine a "popping" noise as the body separates.
Based on this, we can separate the body into the following sections:
  • Head
  • Torso
  • Arm
  • Hand
  • Leg
  • Foot

You can probably break these bits apart more, for example the hand can be broken apart into finger and thumb. However, for now this level of granularity will work fine for getting the general rig working correctly.

So where do we begin? We’ve got these six sections, what do we do first?

The best place to start is with the part of the body that causes the most motion, usually the part of the body with the greatest amount of mass. With a human, motion comes from the hips and torso. They affect every part of the body. So the torso is probably the best place to start when it comes to rigging.

**Rigging a Torso**

**Analyze the Reference**

But how do you start? Take a look at the reference drawings again and analyze how that part of the body is supposed to move. What is the range of motion? What type of motion is there? What are the limits? If you need more examples, get more reference.
There are four reference videos included with the documentation located in `movies/back/`. Watch each of the videos to begin analyzing the back.

If we look at some of the actions that we’ve drawn & how the torso relates, we can start to get an idea as to what type of movement is necessary.

![Figure 6 - torso motion as part of some basic actions](image)

If we analyze these actions, we can start to abstract the motion into it’s various parts. The torso consists of two main parts.. the hips and the shoulders. If you think about how you move around and how those two parts relate, we can extrapolate that they’re the most important part of the back.
It’s the relationship between the hips and shoulders that help define almost any action.

Let’s take a look at one of the simplest animations involving the torso. That would be a character sitting down.

![Diagram of a character sitting down with hip/torso broken apart.]

*Figure 7 - a character sitting down with hip/torso broken apart.*

The relationship here is quite simple, the torso is rotating about the hips. So if this were all the torso would need to do, we could simply get away with a very simple joint structure.
Unfortunately, things are rarely that simple. Let’s take a look at another more complicated example.. a walk.

Want to learn more? Purchase the entire DVD at:

http://jasonschleifer.com