



## Information and Resources for Blender Users

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### Blender Character Animation PART 2

Well, here we go with part two. The next two components that are really requirements for high quality character animation are weighted target morphing, and IK and constraints. We touched on constraints in part one, when we looked at how you can make tow bones' rotation match perfectly and save yourself the stress of trying to drill through a complex scene to get to a specific bone, and we'll get into more on constraints and IK shortly. First, let's look at the most important tool in your arsenal for those who intend to do lip sync animation - weighted target morphing:

The idea behind weighted target morphing is pretty simple. You start out with a base model, such as a head (here's one from a TV commercial I'm working on :



Then you alter the mesh to express different phonemes of speech or expressions :

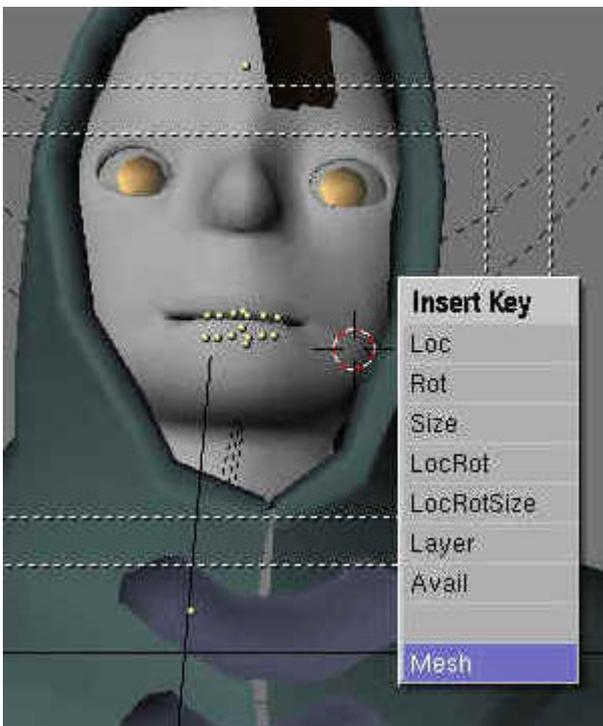


These altered shaped are created by moving around the vertices of the model (obviously). However, the altered vertex positions are stored internally by

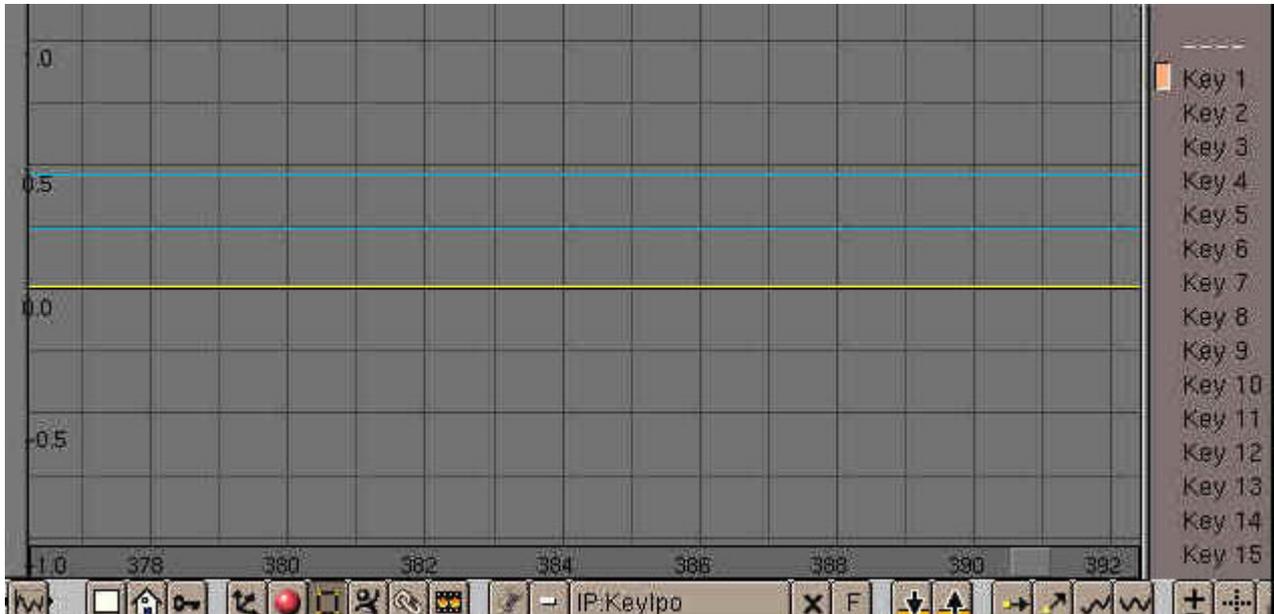
Blender as offsets from the base models vertex positions. In other words, these shapes are stored with the model. This is different from many other (kind of stupid) programs like 3DS Max that force you to create umpteen copies of the base model, then hide all the copies so you can use them as "morph targets" for creating animated speech, etc.

Blender's system really makes a lot more sense, and here's how it works :

Create your base mesh as seen above, then create a keyframe to "store" the shape of the mesh - known as a "mesh key", or "vertex key", by the way :



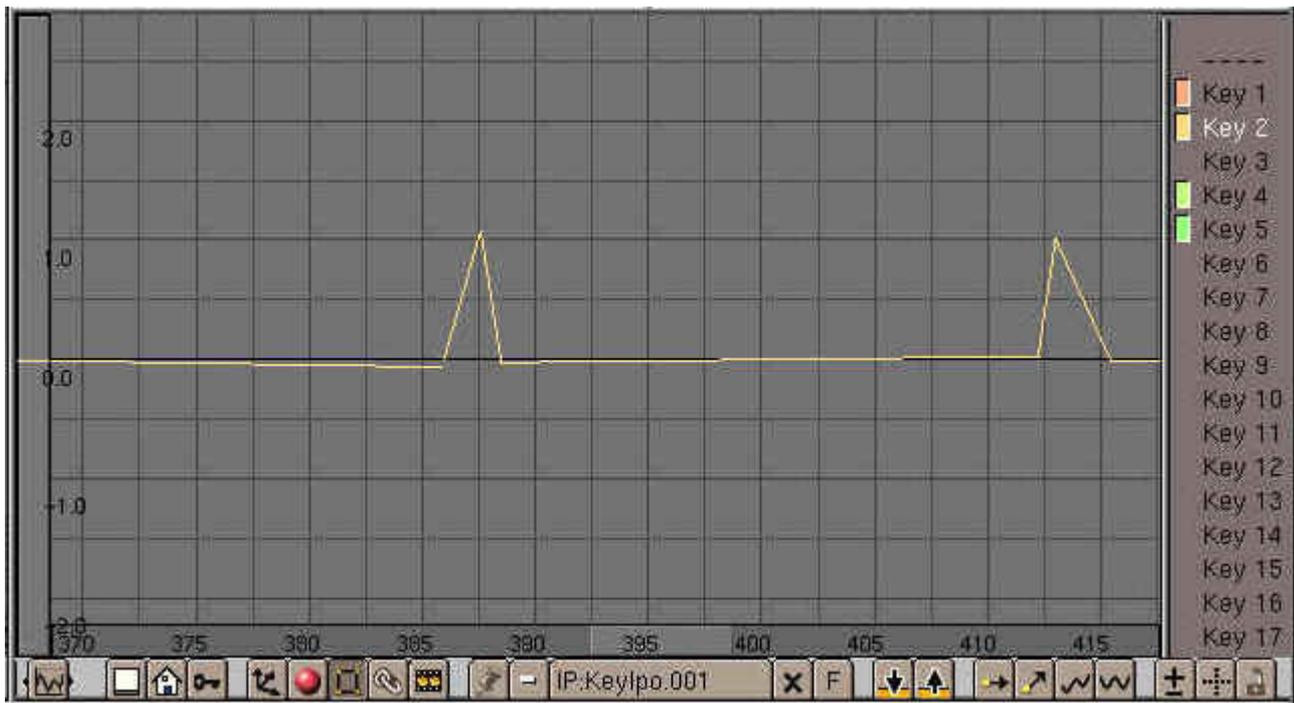
Make your expressions, and create vertex keys for each of these shapes. If you open an IPO window, you can choose to view vertex keys (in the pic below it's the 7th little button from the left on the bottom of the window - Blender's default is to show the object keyframes - the 5th button from the left), and you will see a yellow line representing the base shape, and blue lines representing keyframes for each of the target shapes, such as expressions or phonemes.



Be warned. There are a number of details to be aware of here. First of all, you must understand Blender's default behavior as it creates these mesh keys. By default, the mesh will simply morph from one shape to the next over time in a linear fashion. That's why, when you create mesh keys. Blender inserts a default IPO curve that passes through these lines. That, friends, is WHY the mesh keys are represented as lines.

Also note that the yellow line represents key zero. This is the shape the mesh will return to if the blue keys are not active. So key1 is actually represented by the first blue line from the *bottom*, and the next line up is Key2, etc. If you right mouse click any of these lines, in the 3d window you will see your model immediately change to the expression represented by whatever key you click, by the way.

By editing the IPO curve and the positions of the lines, you can precisely determine when the model will be morphed 100% into any given shape. In the example here, you can see that the model will be morphed into the shape represented by key2 around frame 387 and 412. Get it?



Now, this is only half the story, and is a limited solution at best for lip sync animation since your IPO curve has to travel in linear fashion through several shapes to reach any specific shape target. And indeed, by copying keys and creating shapes (mesh keys) to represent every conceivable expression, you COULD create a servicable, if laborious lipsync animation. But of course, that would be patently insane, wouldn't it?

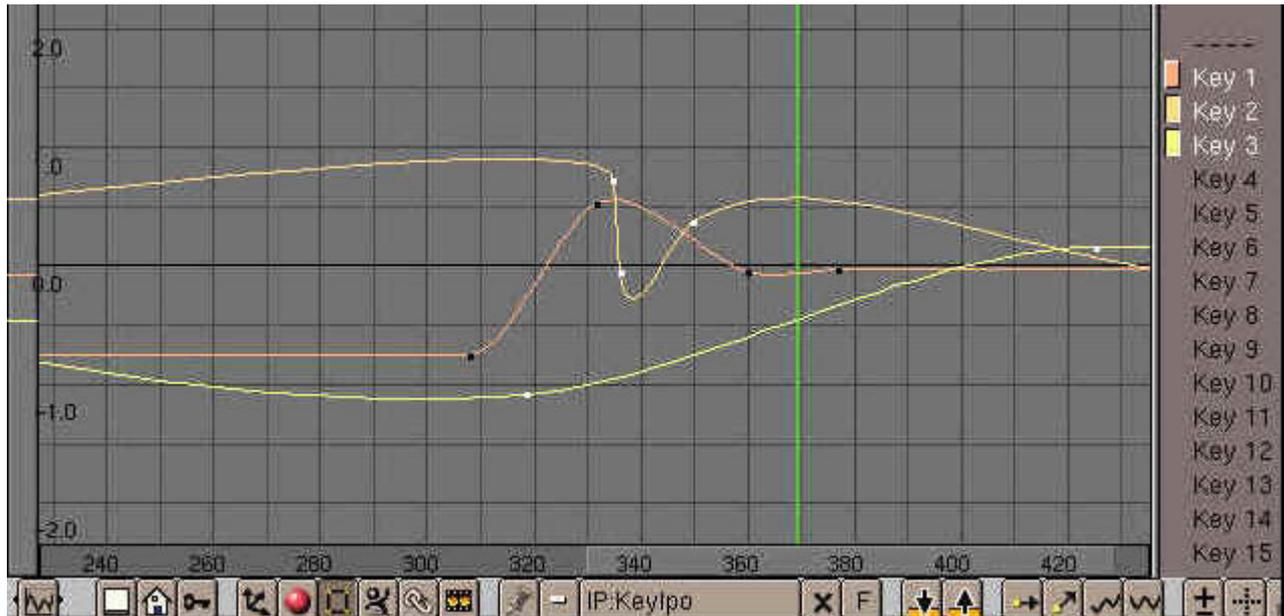
What you really want to be able to do is fade in the strength of any given shape at any time, and mix these strengths, or *weights* in varying degrees to obtain an infinite variety of expressions - right?!? Hence the term "weighted target morphing", which is the industry standard term for this type of lipsync animation.

Blender has an elegant solution. Just open the animbuttons window (F7 Key) and click this little button :



Now, all the mesh keys you created for the model will become *relative* vertex keys, now each target key can have it's own IPO curve associated with it. That means any given shape can be faded in and out at any time with an IPO curve, and all the shapes can be mixed and matched as you see fit. I won't belabor the point. In the IPO window, you simply RMB click any of the Key names like Key1, Key2, etc. and you can draw an IPO curve for that key. By shift clicking you can view multiple key curves at the same time, and yes, Virginia, you CAN draw the IPO curve with negative values, so you effectively *negate* a key's effect, such as to turn a smile into a frown. Unfortunately, you cannot change the names of the keys, so you can't change "Key1" to "SMILE", "Key2" to "MMM", etc. Write your targets on a piece of paper or (what I do) open a text

window and write them there, so they are saved with the scene.



All of Mr. Potato Head's speech was created with just 5 targets : MMM, SMILE, OOO, AHH, and RELAXED OPEN MOUTH.

### **ADVANCED TIP worth it's weight in gold :**

You may have wondered, as I did, if it is possible to gain access to RVKs (relative vertex key's) WHILE setting poses. For serious character animation, this is almost a requirement, because you want to be able to block out your character's bone animation, while doing lipsync over the same range of frames. It's especially critical if, like me, you like to set up a basic bone rig for the face, and use bones to do broad facial animation such as eye blinks and jaw openings, but use vertex keys for subtle tweaks like lip positions. There is a way!

While in pose mode, open an OOPS window and CTL+RMB click the rectangle that represents your morph mesh (such as a head). Now the mesh is selected even though you are still in pose mode. Now your IPO window will be activated for the mesh instead of the armature, and you can now pin this IPO window by pressing the little "pin" button.

Net result : you can continue to create actions and poses to block out facial animation with bones, while at the same time perfecting it with RVKs.

That's it for now, gang - we'll have to touch on constraints another day!