Let's love animators
a Blender's animation proposal

September 2009 - Gianmichele Mariani - g.mariani@liquidnet.it

Introduction

With this proposal, I'd like to explore and contribute to the development of the animation system in Blender, with a particular emphasis on workflows and tools from an animator's point of view.
Most of the solutions I'm proposing come from the needs of day to day work and I've tried to keep them as much as workflow independent as possible.

During my career as an animator I've worked with a lot of different softwares and found out that for animators is actually easier to switch package since they have to deal with less tools than let's say a TD.
Talking with other animators the recurring theme is always one: the way of working of a CG animator is moving more and more towards what a traditional 2D animator has always done. Even animators that have only worked in 3D are now thinking more in terms of "drawings" and not keyframes or curves. They want to deal with the performance and acting in a visual way as much as possible.

It's funny how the simplicity of the basics is almost always the solution to even the most complicated problem.
In this view the less the artist had to think about the tools is using, the greater the time can be spent on being creative, especially with the tight deadlines of today's productions.

Bearing this in mind, there are three main areas that I'd love to discuss with Blender's developers and community to help the software make another step forward on the animation side:

- Timeline enhancements
- Armature and Pose Mode enhancements
- Animation Tools

Timeline Enhancements

Situation: Right now the timeline in Blender acts only as a display and scrubbing tool, and I guess it was made like that mainly to support the sequencer, and not as a tool for animators.

While I agree that most of the functionalities I'm proposing are already or could find their way in the dope sheet (action editor), having these tools in the timeline will help reinforce the mindset that we're manipulating drawings and not keyframes.

Especially during the first stages of animation, the so called blocking, the animator keys every controller the character has on a single frame.
In this phase what is important is being able to quickly key a pose and move it in time without too much hassle.

A workspace with the action editor and the 3d view visible.
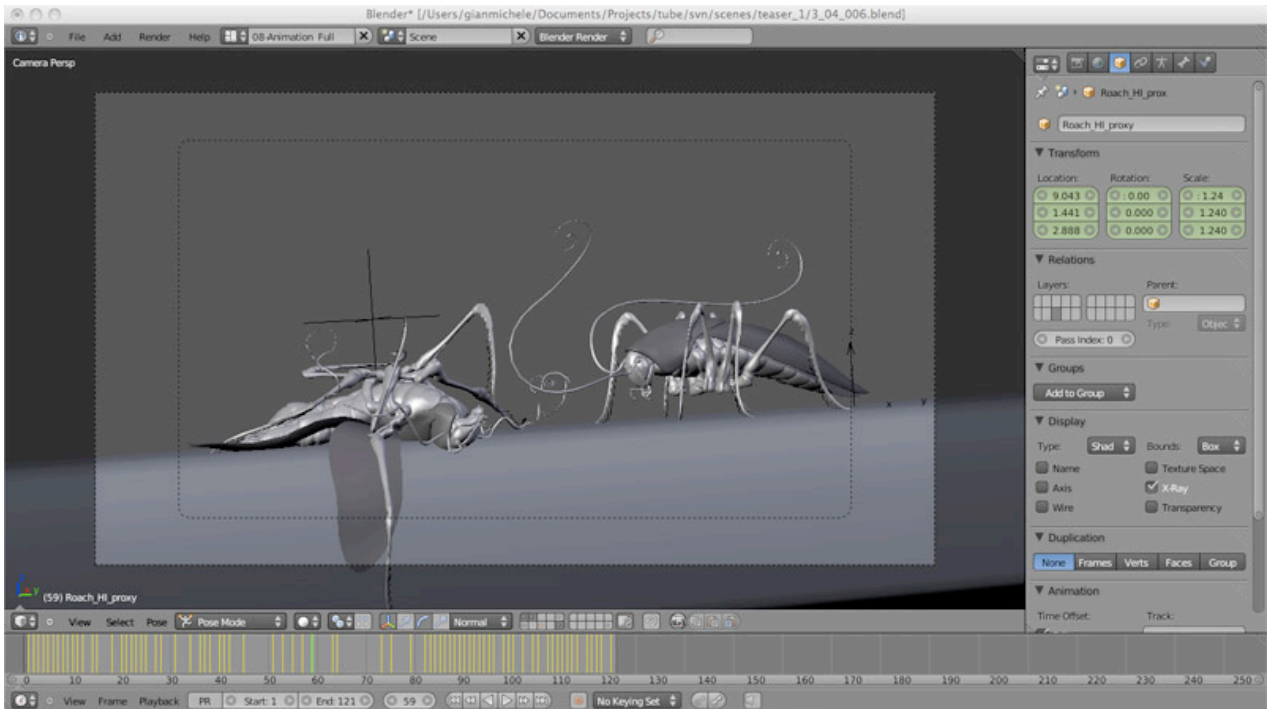
A workspace with the 3d view and the timeline.

As you can tell by looking at the two previous pictures, being able to visualize all the keyframes on each and every controller is just redundant if you need to work with "drawings" and also, on single monitor, is a real waste of screen space.
Later on during the process, when keys will start to be offset, the dope sheet really comes in handy.

The focus is posing and timing, just like in the 2d realm, and by using just the timeline an animator can work as fast as flipping a bunch of sheets.

Proposal: to be able to fully support this workflow, while the keying part is already really good, especially with the addition of keying sets in the new Animato system, the timeline has to be enhanced.

The functionalities needed are really straightforward and I will try to describe them in a more visual way:

Copy/Paste/Cut/Delete Keyframe(s)

The ability to edit keyframes in the timeline is essential. This should be based on single or multiple keyframes selection.
If no keying set is selected the tool will use the current selection, otherwise the keying set will have precedence.
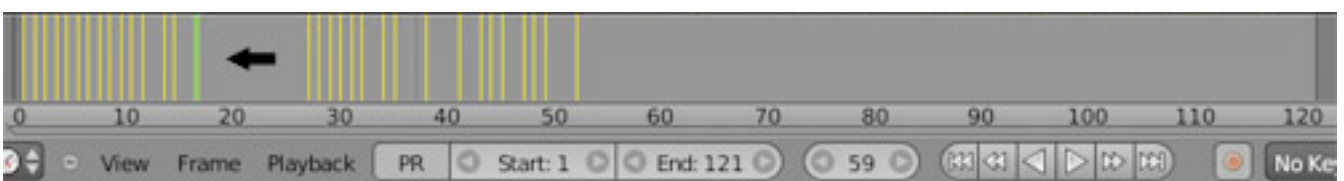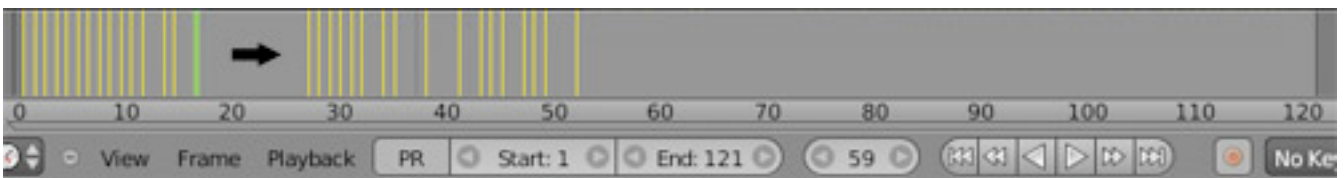
To select multiple keyframes the user can simply Control+Click Drag on the timeline.
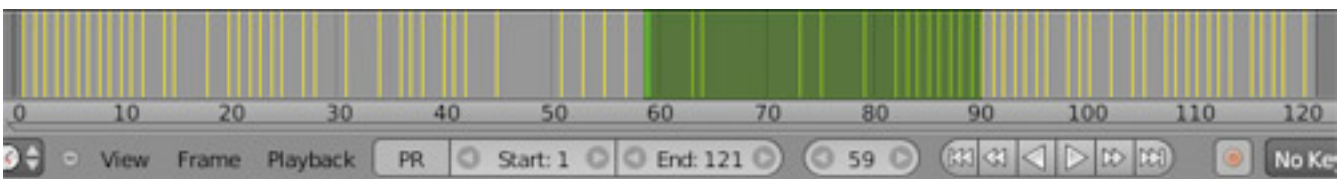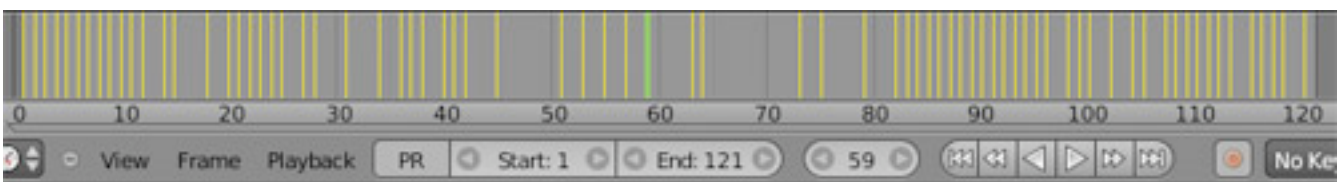
Timeline showing single and multiple selection

Shift Keyframe(s) Forward/Backward

This function will let the user shift keyframes forward or backward from the position of the time cursor. It will essentially add or delete blank frames.

Shifting keyframes in the timeline.

Timeline Colors

While more of a visual aid than a tool, it would be really helpful to be able to have different colors for key poses and breakdowns. The workflow could be set to insert Key Poses when the I is pressed and breakdowns when it's pressed I twice quickly (like with border select).
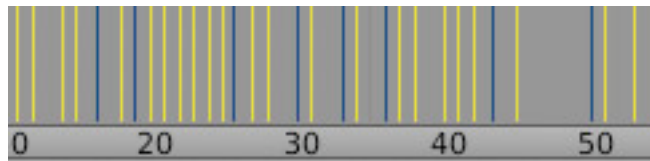
Breakdowns and Keys with different colors

HINT: once a keying set is active, pressing the I key should insert the key on the keying set automatically, without visualizing any menu.

Armature and Pose mode Enhancements

Situation: Pose mode is not a problem in itself. It works quite well and to be honest I really like the separation between this and the other modes (I would even call it Animation mode).
The major problem resides in the way character rigs are usually presented to animators:


A typical character rig interface

As you can see, even though this rig is pretty polished (great work Nathan!), the viewport is still cluttered, and would be worse with many characters and lots of controllers for each of them.
Every time an animator has to fight to select a control, loses focus from his job: giving life to a puppet.

While this is related not only to Blender, but to all the animation softwares, Blender could really define the way to deal with it in a more elegant and efficient way.

Solution: the solution here presented is roughly inspired by what Pixar has been doing since The Incredibles.
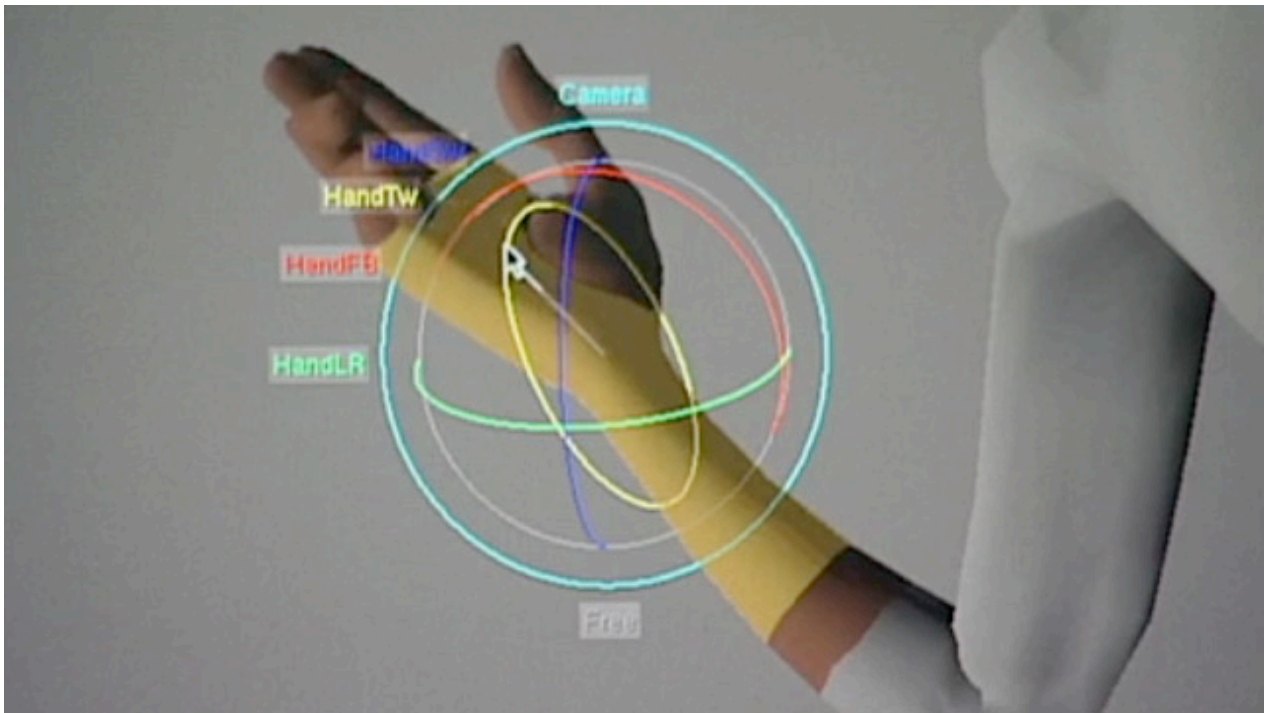
Pixar's Marionette

What I'm proposing is a different method to attach a controller to an armature. Instead of using a shape or the normal armature visualization, we paint a vertex map defining an area on the mesh.

In pose mode then, when the mouse overs on one of these areas, the corresponding body part gets highlighted (pre-selection highlighting). Different events could then be triggered by pressing one of the three mouse buttons like left for selection, middle to clear location/ rotation/scale, right to set a key. These events thanks to the new event system in 2.5 could be customized via python scripts.

Pre-selection highlighting on character left shoulder, with tooltip visualized

Multiple layers of selection on the same part of the mesh could be differentiated by color and eventually a tooltip to provide information to the user.

A positive side effect of this new visualization method for armatures would be the ability to hide parts of the rig/mesh using the same vertex map information.

A lot of times animators want to concentrate on just one body part at a time to really polish it, be it an arm, the torso or a tail.

The way this is achieved now in production is by having a low res rig with the mesh broken into pieces and parented to the bones. These parts can then be hidden separately (see the following picture).
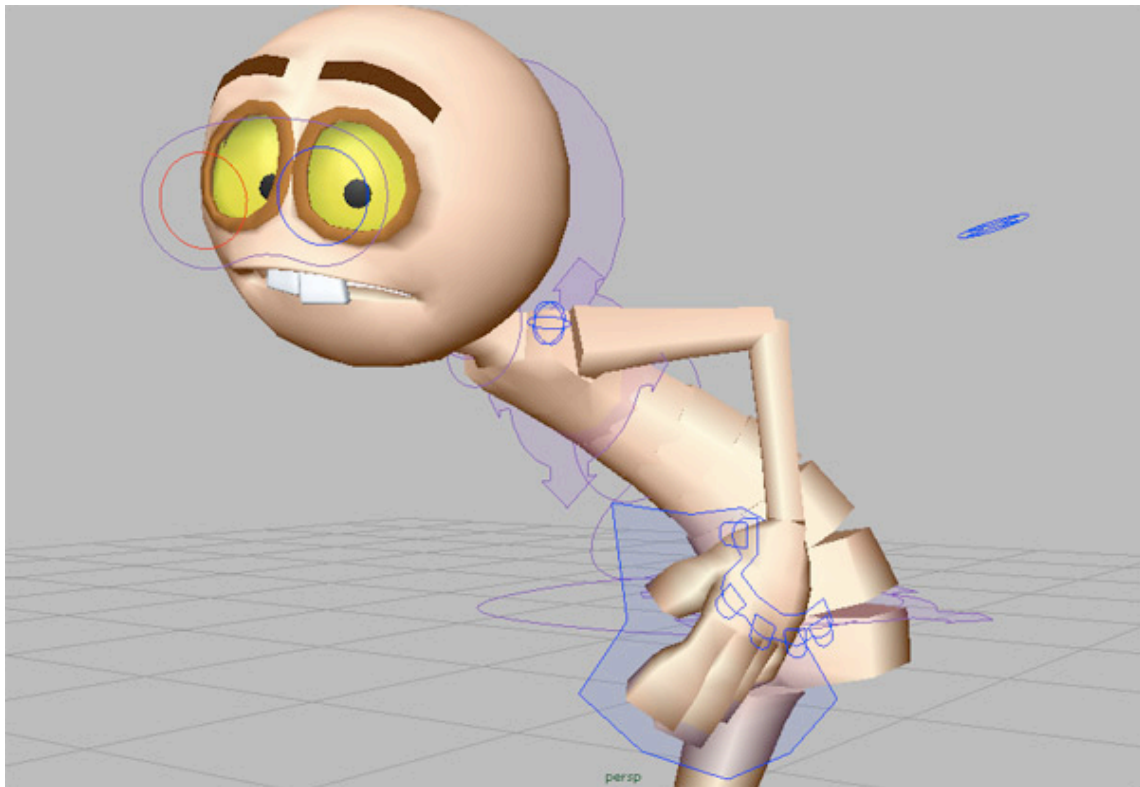
Moom rig for Maya in low res and with limbs hidden

While this mostly works, animators loose the ability to also check deformations while polishing.

The vertex map defined as a controller can so act also as a visualization aid. The animator could simply switch on or off the controllers for visualization, and the corresponding mesh part would be hidden.

This system could also be mixed with the other visualization types for armatures. It would make sense to not use it for the pole vector controls of a leg or an arm for example.

Mesh isolation based on a vertex map for animation purpose.

The last part of my proposal for pose mode is probably the one that'll generate a lot of discussions.

Having always in mind the clutter in the viewport, we probably need something to group controllers that are logically connected under the same roof. In a typical foot rig for example we have a controller for the toe, one for the heel, one to roll and bank the foot, etc.
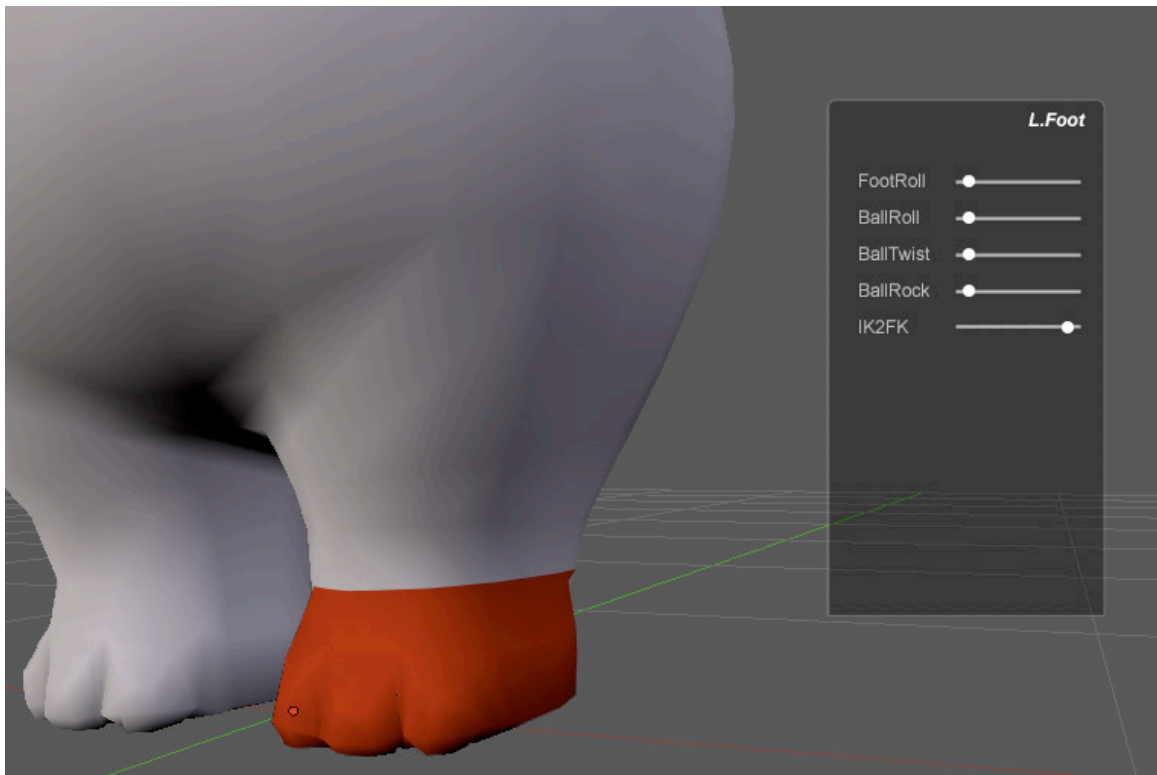
Hud window linked to the foot controller

By having an attribute window attached to a controller (or an armature bone) where one can link different "drivers", TDs could have a unique space where to place parameters for animators, while maintaining a logical and clean organization.

Imagine now selecting the head controller, and in the window or panel attached, have a series of thumbnails linked to facial poses, or a button that resets all the attributes of the face.

Panel with facial poses

Obviously by having such a tool, with the extended possibilities of a python API, both TDs and animators will have a much clear and efficient way to deal with rigs presentation.

HINT: this kind of window could become a generic tool not necessarily tied to armatures.

Animation Tools

This part of the proposal is about tools that do not find a specific collocation inside the Blender interface. At this point I'm not really sure where I would put them and also what would be the workflow to use them, but I thought that they'd be a great addition to the already incredible toolset of Blender.

Match transforms: matches the transformation of an object based on another one, be it rotation, translation or scale.

Color Keyframes on the Stamp: this is to complement the keyframe/breakdown color differentiation mentioned in the timeline enhancements.

Spacing tool: with this tool an animator can decide with a slider which key he wants to favor, essentially deciding the spacing of the key and helping create breakdowns. The common workflow with this tool would be:

* Select a controller
* Invoke the tool
* Position the cursor of the timeline or the action editor/dope sheet at the desired frame
* Move the slider to decide if at that frame in time the pose should be more like the previous or the following keyframe
* Set the key if the autokey is off

Euler Filter: since Blender 2.5 now works with euler on armatures too, this little tool will help whenever there's an excessive rotation problem. The Euler filter de-mangles discontinuous rotation anim curves into smooth curves.

Ghosting and editable paths in the viewport: these topics are being discussed right now in the Animato mailing list. The thoughts expressed in there are perfectly in line with mine, so I'm not going to comment on them further, but I'm really looking forward to trying them once they're implemented.

Conclusion

Blender is already a power house as the Open Movie productions have already demonstrated. Everyone witnessed the tremendous speed up that development has during and after an Open Movie and since Durian is about to start, this could be the right time to lay down the foundation for such a proposal.

Most of the tools and ideas here presented come from the experience during these years working with both motion capture and keyframe data. While tools don't make you a better animator, having your mind free from technical problems will let you focus more on your art and performance.

All the mockups found in this proposal are just "sketches" to show what a feature could look like. I'm not really interested in the graphical design of the interface, but more in the functionality that it offers. I'm pretty sure the developers can come up with a better design and I would also like to hear what the community thinks about this.

I'd love to thank all the developers and especially Aligorith that is doing an immense work on the animation system in Blender.

Thank you all for reading!

CREDITS:

Roach model and rig from the tube project (http://tube.freefac.org)

Big Buck Bunny model and rig (c) 2008 Blender Foundation (http://www.bigbuckbunny.org)

Moom version 4.0.2 by Ramtin Ahmadi