Name: Snehitha Ramasahayam

ID:01714702

Email:Snehitha_ramasahayam@student.uml.edu

Computer Graphics (Literature Review 2)

The primary article chosen by me for my literature review is Role of Hand-Drawn Animation in Disney's Moana was written by Kim Keech, Rachel Bibb, Brain Whited, Brett Achorn Presented at Proceedings of SIGGRAPH '17 Talks, Los Angeles, CA, USA, July 30 - August 03, 2017 and the secondary article which is a reference in the primary article, "Computer Assisted Animation of Line and Paint in Disney's paperman" was written by Brian Whited, Eric Daniels, Michael Kaschalk, Patrick Osborne, Kyle Odermatt.

Animation movies are very interesting to watch and it seems to us as the real objects performing the act on the screen. I often used to wonder how these objects are created in such a perfect shapes and I chose this article as it caught my interest on how the properties of Computer Graphics like coherence spatial ability and precise control are used to create the perfect shaped Animations.

So let's talk about the secondary paper referenced in primary paper. As in the title it is mainly talking about how the animation and human line drawn capabilities are combined to get the complete advantage into the animation. Initially the 3D animations are developed and later artist used 2D environment to draw the lines and then system moves through using the 3D vector fields. After these additional processes like Motion rendering, Silhouette ribbons Motion Paper are applied at initial pipeline stages and then Motion Pasting Motion Betweening for the improvement. At the end we get a better picture in the 3D by leveraging the above capabilities.

Going further about this process this talks about three processes in initial pipelining stage. First one is Motion rendering, here to avoid the drawings to be drawn by the artist the pipeline revolves around to create the motion fields thus preserving the temporal coherence and then artist can improve it further. Later on the additional models of the representative geometry such as planes, spheres, and cylinders are used. Motion Render is used where it tells at which point in CG model will be next frame. Secondly this talks about Silhouette ribbons where we can ensure that the character

stays on ribbon though the underlying geometry rotates out of plane. The main advantage is dealing with situation where one part of character moves front and another moves back. Thirdly to achieve stylized look texture is added to the strokes.

And this paper talks about the Final Line and painting where artists can now create key drawings in 2D vector paint program on top of CG renders. After this the motion fields allows to use to main powerful operations to drastically improve the workflow for creating the non-key drawings and preserving temporal coherence of the final-line stage - motion pasting and motion betweening. In Motion pasting a group of strokes in one frame are selected by the artist and then "pasted" into another frame, such that through all intermediate frames, the strokes move with the object of CG animation. In Motion Betweening this combines a curve interpolation technique with the motion field advection. Here artist selects a group of strokes in one frame, then selects a corresponding group of strokes in another frame.

The system is then able to compute the optimal correspondence using a simple linear programming technique thus achieving in between curve with linear blend weights favoring the closer key frame. This concludes that how these techniques motion pasting and motion between can be leveraged to get the perfect Key frame picture but lags in the interaction between CG and hand drawn elements and creation of workflows.

Here we come to the first article - ***The Role of Hand-Drawn Animation in Disney's Moana written*** by -

Kim Keech,

Rachel Bibb,

Brain Whited,

Brett Achorn

In Proceedings of SIGGRAPH '17 Talks, Los Angeles, CA, USA, July 30 - August 03, 2017

This article talks how to create workflow interactions between the various CG and hand-drawn elements. This article talks about two examples how this is used.

Firstly, one of the main characters, Maui, has tattoos all over his body that not only animate, but also contain a supporting character known as “Mini Maui”. There are are a number of sequences where Maui to directly interact with his miniature form. Maui’s tattoos exist in 12 distinct regions over his body where each region has a 2D template with the base static tattoo. On the outline of the area the animated elements are to be drawn. Initially tattoos are rough animated on paper, cleaned-up on paper, and then scanned and painted, and then they rendered and converted to a sequence of animated ptex textures and projected onto Maui’s body during the final render in the pipeline. The animated textures are also baked onto Maui for interactive visualization in Maya, which allows 3D animators to interact with the tattoos during character animation.

Secondly, there are sequences in the movie that contain hand drawn elements representing animated tapa that had been created with use of computer-assisted inbetweening and also a post processing step. This creates and animates the effect of rough edges along the outer boundaries of the hand-drawn elements. These elements, like the tattoos, also directly interact with CG elements, where visual feedback is passed between hand drawn and CG animators. Tapa is also same as tattoos rough animation that was done on paper but it is different where instead of cleaning up every frame by hand a vector based tool Meander that also supports computer-assisted inbetweening and curve editing. Here the rough animation was scanned and loaded into Meander as reference initially to the cleanup animator and then authored the final lines using Meander and its suite of tools. These cleaned-up drawings were then passed to the lighting and compositing department to add additional effects, such as the rough paper edges, crinkled paper texture and lighting.

This concludes that though Disney and other Animators have used the hand-drawn animation, they have been relatively incompatible with modern CG workflows. The work done on Moana helps in further to bridge that gap, making the benefits of hand-drawn animation more accessible in the CG pipeline for future usage.