

The Role of Hand-Drawn Animation in Disney's *Moana*

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Figure 1: Left: Maui shown with “Mini Maui” - his tattoo alter-ego. Right: Animated hand-drawn tapa mixed with CG animation.

ABSTRACT

The art direction of *Moana* called for the use of hand-drawn animation to be intimately mixed with the primarily CG film. This direction pushed us to develop new workflows in order to not only achieve the very specific look but also allow for the direct interaction between the various CG and hand-drawn elements. Exploring these workflows has further bridged the gap between hand-drawn animation and CG animation, opening the way for continued exploration into hybrid animation.

CCS CONCEPTS

•Applied computing →Media arts;

KEYWORDS

animation, graphics, drawing

ACM Reference format:

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1 INTRODUCTION

This process was facilitated using two different workflows in order to fit the two different needs of the show.

Firstly, one of the main characters, Maui, has tattoos all over his body that not only animate, but also contain a supporting character

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known as “Mini Maui”. There are a number of sequences in the film where the direction called for Maui to directly interact with his miniature form.

Secondly, there are two sequences in the movie that contain hand-drawn elements representing animated tapa - a form of cloth made from the bark of Mulberry trees that are abundant in the Pacific. These animated tapa had a very specific and detailed art direction requiring the use of computer-assisted inbetweening and also a post-processing step which 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, requiring visual feedback to be passed between hand-drawn and CG animators.

2 TATTOOS



Figure 2: Scanned rough animation within template (left). Animation and template applied to geometry in Maya (right).

Maui's tattoos exist in 12 distinct regions over his body. Each region has a 2D template with the base static tattoo and the outline of the area where animated elements are to be drawn.

The tattoos are initially rough animated on paper, cleaned-up on paper, and then scanned and painted using Toonboom's Harmony. The tattoos are then subsequently rendered and converted to a

sequence of animated ptex textures and projected onto Maui's body during the final render in our pipeline. The animated textures are also baked onto Maui's body mesh for interactive visualization in Maya. This baking process allows 3D animators to interact with the tattoos during character animation.

In one example, Maui fistbumps his miniature-self. The animation workflow begins with the hand-drawn and CG animators roughly discussing timing and blocking. The hand-drawn animation is done first and then projected onto the 3D character, such that the CG animator can synchronize the interaction. The CG animator also has the ability to deform the underlying body mesh such that the tattoo animation is better represented relative to the camera.

3 TAPAS



Figure 3: Single frame of clean-up animation in Meander of one element (left). Final lit and composited frame (right).

The tapa process starts the same way as the tattoo process in that the rough animation was done on paper - but that's where the similarities end. The art direction required for the tapa was very intricate and would've been too time consuming to clean-up every frame by hand, as was done with the tattoos. For this clean-up process, Meander [Whited et al. 2012] was used as the authoring tool. Meander is a vector-based drawing/animation system that also supports computer-assisted inbetweening and curve editing.

The rough animation was scanned and loaded into Meander as reference, and the clean-up animator 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.

4 CONCLUSION AND FUTURE WORK

Disney Animation has a long legacy of hand-drawn animation, which has been relatively incompatible with modern CG workflows. While there are several examples of mixing 2D and 3D, both by Disney Animation and others, the work done on Moana helps further bridge that gap, making the benefits of hand-drawn animation more accessible in the CG pipeline for future shows should the art direction call for it.

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