

3D Character Extension for Stop Motion Puppets

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1 Introduction

The short film “Puca”‡ combines live action sequences with stop motion puppets and 3D. The challenge was to integrate the puppet monkeys with the realism of live actors performances. In stop motion animation it is very difficult to create realistic and lively eye movement. The goal was to achieve humanlike and expressive eye and upper facial movement by employing a 3D digital character extension. The idea was to place filmed sequences of human eyes on the puppet monkeys head.

2 Preproduction

In the preproduction phase extensive tests were done on how to integrate real eye sequences or 3D digital eyes with the stop motion puppets. Animation and 3D tracking tests were performed to find the range of head rotation in which a believable upper facial head replacement could be created. Video sequences of real eyes mapped on 3D geometry proved to give a more realistic result than 3D animated eyes.

3 Creating a 3D character extension pipeline

A 3D model of the puppet monkeys head was created and utilised as a reference for matching the 3D head movement to the puppet animation movement in the background plate.

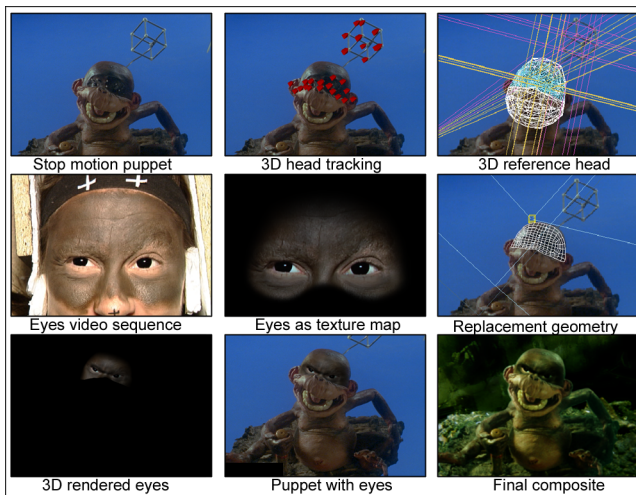


Figure 1. 3D character extension pipeline.

The upper facial part (eyes and forehead) being used as a 3D character extension was modeled with more detail and allowed to give each monkey character their individual eye and eyebrow shape through geometry deformation.

To achieve precise 3D rotational values in the head tracking process, a wire cube was attached to the head on all blue screen shots. Sequences shot in live action sets were filmed without the tracking cube and thus the head rotation often had to be manually corrected and animated.

Live action footage of the eye and forehead area were shot on DV. To match the monkeys skin, special effects make-up was applied to the actors face and black contact lenses were used. The eye sequences were performed by Animation Director Anja Perl to match the monkeys animation and the story context.



Figure 2. Different monkey looks through texture distortion.

The stabilized, color corrected, and masked eye sequences were texture mapped (diffuse, alpha and bump maps) on the 3D upper facial replacement model.

By distorting the texture mapping coordinates of the monkey head different eye shapes and character looks were achieved (e.g. shy monkey, mean monkey).

Standard 3D lighting techniques were used to recreate the on set lighting. Whenever the moods and story context required a flickering lights situation on set, separate light and dark lit passes of the monkeys were shot. Accordingly, a light and dark lit scene of the eye sequence was set up and rendered in 3D.

In compositing, the blue screen stop motion puppet, the rendered 3D eye sequence and the live action background plate were combined. The flickering lights atmosphere was achieved by mixing the light and dark monkey and monkey eye layers to match the background plate.

The achieved result gave the puppet monkeys a unique look and helped integrate them well into the live action performances.

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