

Automatic Blend Shape Creation for Facial Motion Capture

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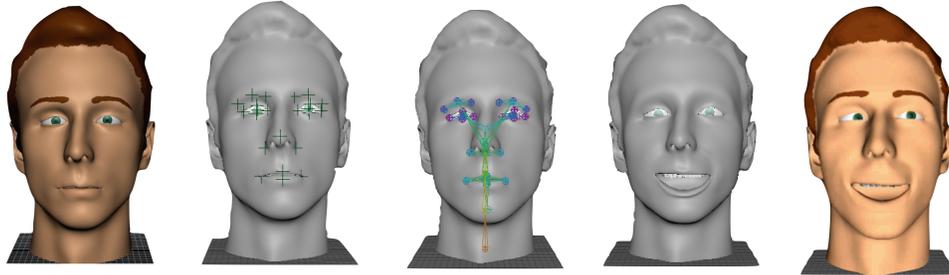


Figure 1: Test model during different stages of the automation process.

Concepts: •Computing methodologies → Animation; Motion capture;

Keywords: rigging, motion capture, blend shape animation

1 Introduction

Blend shape animation is one of the most common methods for facial animation used by animators. Creation of effective blend shapes is an investment as they can take a very long time to create, but once finished, help with consistency in animation. As this is a prime animation method, its extensive process can be off-putting to newcomers. This project is focused on creating a system that will automate the blend shape creation process. The resulting blend shapes could be used in a blend shape based facial motion capture system (eg. [Weise et al. 2011]). The goal of this application is to produce a comparable result to that of blend shapes done by hand for student projects.

2 Approach

Our solution consists of a set of scripts and a graphical user interface that accepts an unrigged facial model as input. This pipeline is outlined in Figure 2. This process consists of two parts, creation of a facial rig and using the rig to create blend shapes.

2.1 Automatic Facial Rig

The system provides locator points that highlight the regions of the face needed to create the rig; the eyes, eyelids, nose and nostril corners, the upper lip, the lower lip, and chin. The user starts by

positioning these points on their facial model. With these locator points positioned accordingly, a rig is computationally created by the system. The quality of the created rig is dependent upon proper placement of the locator points on the model.

2.2 Automatic Blend Shapes

Once the rig is created, the user will need to weight paint the constructed rig to their model before proceeding to create the blend shapes. The system will then automatically generate blend shapes for key facial expressions (eg. frown, smile, blink, sneer, etc). These key facial expressions are based on those required by the facial capture system available for student use at Rochester Institute of Technology. The system will allow the animators the option to make quick edits to the blend shapes afterwards to attain their desired results. With the model blend shapes created, sample motion data can be attached to the model and previewed.

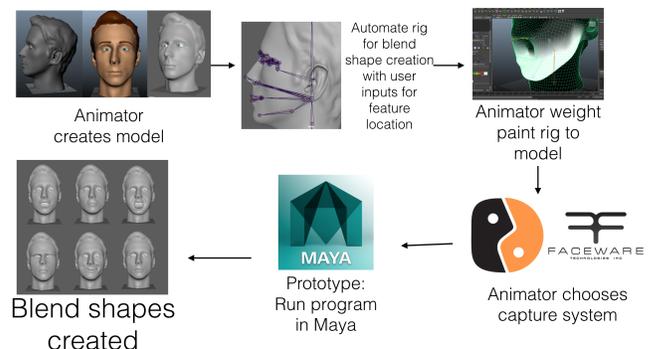


Figure 2: Project pipeline.

3 Preliminary Results

Figure 1 shows the different stages the model goes through from model input to rig creation to blend shape creation to final motion captured animation. Currently, different parameter sets are being explored in the creation of the blend shapes for given expressions. Figure 3 shows six of the blend shapes currently being generated alongside the neutrally posed model. Some of these blend shapes

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have very subtle changes as some are focused on small part such as the lower eyelid squinting for example.

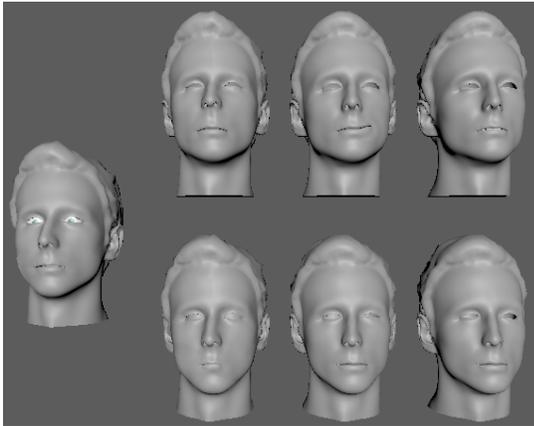


Figure 3: Examples of the resultant blend shapes. The model to the left is the neutral pose.

To evaluate the system, animations using the blend shapes created by the system will be compared to that of hand constructed blend shapes through animations by amateur and expert animators. The animations created using the blend shapes from the system and the blend shapes done by hand will be put beside an actor's recording to allow the comparison to evaluate realism (Figure 4).



Figure 4: Screen capture of evaluation animation with the face actor alongside the resultant blend shape animation.

The final system will be open source and made available to Rochester Institute of Technology and the graphics community. A library of facial motion data has been recorded and will be included in the system's package.

References

WEISE, T., BOUAZIZ, S., LI, H., AND PAULY, M. 2011. Realtime performance-based facial animation. *ACM Trans. Graph* 30, 4, Article 77 (July), 9 pages.