Modeling Teeth for Facial Animation
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Purpose: Create a Realistic Set of Teeth for a Visually Realistic Talking Head

Figure 1: the talking head and its teeth

The purpose of this project is to create a set of realistic teeth that fit a realistic talking head. Talking Head (figure 1) uses a generic set of teeth that only fits a small number of faces. This project has two goals. First, to create a 3D model of a specific set of teeth. Secondly, to create a system that will help a modeler quickly and easily create a realistic set of teeth that will fit any head.

Goal 1: Using a Plaster Cast

To solve the first part, we obtained a plaster cast of the individual's teeth. Then, using the digitizer, we took a set of points along the cast. The digitizer is a robotic arm with a pen on the end that measures the position of points in space. These measurements were taken for the curve of spine (the curve of the teeth as seen from the side), the Wilson curve (the curve of the gums as seen from the back), and the arch curve (the curve of the gums as seen from the top). These curves were used to create a mesh that the teeth (modeled separately by hand, will be arranged on, as in figure 3.

Goal 2: General Use

Since it is not always possible to obtain a plaster cast, and this is an expensive and time-consuming process, we desire a system that can create customized teeth. The second part of this project focuses on making the plug-in easily accessible for modelers, by allowing it to be used one of two ways. First, the user can enter equations for the three separate curves and the plug-in will generate a set of teeth and gums that follows the user's specifications. Another way it can be used is to give the user the option to create a generic set of gums and teeth and then adjust them based on slider bars and checkboxes.

Results and Future Work

This research is still in progress. Some features that will be added in the future is the ability to customize not only the shape of the gums, but also some key features of the teeth. Most notably, the spacing, width, crookedness, and size. These will be packaged in an easy to use interface for the average modeler or animator. We are currently concentrating on the spacing of the teeth, utilizing Bolton's research on tooth size and it's effect on malocclusion.[1]

References and Acknowledgements


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