

Freeform Video Tooning Deformation

Abstract

Creating a stylized or cartoon video requires a great amount of artistic skill and a considerable amount of time. On the other hand, capturing a video of a live scene is as easy as pointing a video camera at it. Unfortunately, transforming such a natural video to a cartoon-like style is also a challenging problem.

In a predecessor paper, Video Tooning to appear at SIGGRAPH this year, we show how to segment a video into temporally coherent segments. These segments are then interactively joined together into spatio-temporal semantic regions (see Figure 1). The regions are sliced in time and rendered to create a Toon style of the original video (Figures 2 and Toon, top row).

Although the Video Tooning approach provides a simple means to create stylized videos, the results always directly mimic the motion in the original video. An artist may want to add exaggeration or squash and stretch effects not seen in the original video. In this abstract we demonstrate that the spatio-temporal semantic regions can be treated much like other 3D geometric shapes and subjected to freeform deformation (FFD) methods. FFD has been shown to be a very simple way to alter the overall shape of complex 3D objects by manipulating only a small number of control points that warp the space in which the object resides.

We extend the FFD methodology to operate on a hierarchical collection of spatio-temporal regions. The deformation framework is also extended to respect constraints such as foot positions in a walking sequence.

Once the spatio-temporal regions have been deformed, we slice them as in the previous work to render the exaggerated cartoon. We show a few results of the use of the system in Figures 3 and 2, and the accompanying video.

[Note to SCA committee: We have decided to limit our SCA submission to this short abstract and accompanying video. The technical details are still somewhat in flux and a full paper could not be prepared by the deadline. We feel confident, however, that we can provide an excellent demo of our system at SCA this summer. Thus, please consider this as a demo candidate, rather than a paper submission.]



Figure 1: Spatio-temporal semantic region representing the girl's pants.



Figure 2: Girl on monkey bars. Top: original Tooning results; Bottom: deformed results.



Figure 3: Man walking down steps. Top: original Tooning results; Middle and bottom rows: two different deformation results, bouncing vs. swaying.