Using a 3D Modeling Package as a Synth Controller

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Abstract

A commercial 3D modelling and animation package is suggested as an interesting platform for control and visualisation of computer music. A simple example is provided to show some possibilities of this method.

Introduction

As the realtime capability of personal computers increases, visually rich interfaces become less a luxury and more a necessity. In Derivative's realtime 3D modelling package, Touch Designer, http://www.derivativeinc.com it is possible to work with visual and interactive material in much the way that Max and Pure Data are used for sound.

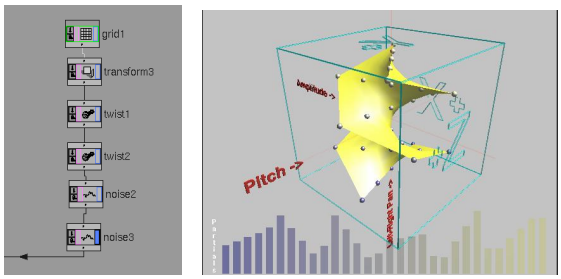

Figure 14. Operators (L) create geometry (R)

Points to Partials

Our goal was to make a simple and visually interesting controller for sound that uses the global positions of a set of points in an imaginary 3D space to control a set of sound parameters for making music. It should be possible to look at the visuals and listen to the sound, and understand the relationship between the two. We opted for a simple sine wave additive synthesis model to make it easier for the user to see and hear the relationship between the video and the sound.

First a bank of 30 oscillators was made using the Pure Data synthesis environment. The oscillators were tuned to the first 30 partials of a harmonic series relative to the tuning of the first oscillator, so that each oscillator's frequency is multiplied by the index or partial number of the oscillator. In Touch Designer, a set of 30 points is animated to control the synthesiser.

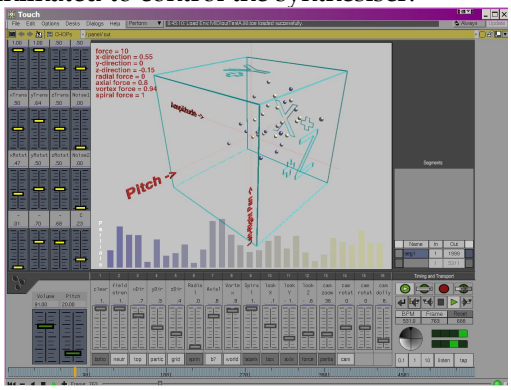

Figure 15. Particle paths in controller space.

The project has three modes of operation:

1. Particle mode, where 30 points move in a particle system subject to various forces that 'blow' them around in a cube (representing the amplitude, panning and pitch bend parameters of the oscillators) onscreen.
2. Grid mode, where each oscillator is represented by a point on a grid that is then distorted to change timbres.
3. Spring mode, a modification of the particle mode, where points are not emitted from a central point, and do not 'die' after a period of time). Lower partials have more physical mass than higher ones, thus affecting the way harmonics move in relation to each other.

The Touch Designer project is set up so it can be controlled using an external midi fader box or a set of on-screen graphical fader widgets. A future version will use OSC via a network socket.

Summing Up

The result is an interesting way of controlling more than 90 parameters in real time with a relatively small number of faders. We would encourage others to try Touch Designer as a relatively painless way to introduce some exotic control approaches to music synthesis and composition.
http://www.mis.atr.jp/~rodney/other/points_to_partials Project funded in part by NICT Japan