

Circle Squared – a fingertip live algorithm for the Disklavier

Submission to Interactive Keyboard Symposium, 2012

I hereby submit a combined paper presentation, and a Disklavier concert performance, controlled by the composer through a remote performance interface. Duration is variable (5-10 min).

Abstract

I have previously worked extensively with generative music, where complex musical material was created from software in non-realtime. Recently, I have concentrated on performance technologies for improvisation, with direct control over the sound to achieve freedom of expression in an improvisation context. The complexity of generative systems was not available here.

So, I developed a way of controlling the parameters of complex generative algorithms in realtime, through an array of 16 pressure sensors, allowing everything from fingertip nuances to brute force to be mirrored in the musical output.

The input from the sensors is mapped through a dynamic vectorization algorithm to a set of parameters in the generative system. This allows the space of possibilities to be explored by ear. Minute variations and wild explorations are possible, and if interesting regions are found, the mechanism can be shifted for further exploration.

The pressure sensors are played live, as a meta-improvisation in the search space of the generative system. Dynamic expression is mapped directly from the total finger pressure, allowing very organic phrasing. The playing technique is not unlike the polyphonic touch sensitivity of the clavichord, which I studied a number of years ago. This has been a seminal inspiration.

The generative live algorithm is simple in structure but complex in results. It consists of a simulation of four virtual musicians, each listening to its neighbours. From what the neighbour is playing, it deduces next musical interval, dynamics, articulation, and duration. Since all four virtual musicians are connected in a circle (hence the title), complex patterns can emerge data feedback. Such systems are notoriously difficult to control, but since this is played by ear, I can respond immediately, and change or enforce the current direction.

With its predefined rule system, infinite variety, fingertip control and organic phrasing, it is truly a hybrid of composition and improvisation.

A sound example, a concert recording of the world premiere, can be found here:

http://dl.dropbox.com/u/1774293/circle_squared/CircleSquared.mp3