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Tool Study #1 – Audiovisual interface, performance

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A video documentation of performative demonstration of audiovisual interface for sound-synthesis and control. Technical realization of this work is pre-defined by open-ended possibilities of Pure Data and physical constraints of MIDI protocol. A concept of the proposed system is based on the ideas of "wavetable synthesis" and "wave terrain" that harked back to the digital sound experiments in the 1980s. In this work, a specific 3D "wave surface" is formed by arbitrary recordings of incoming audio signals in real-time. The recording is automatically sliced into 8 fragments, each 1-second long, which are stored in [Array] objects.

To demonstrate the prototype, I programmed 4 independent monophonic sound engines, each of which consist of 8 sine wave oscillators. Each oscillator is binded to one of eight arrays with recorded audio that they can "scan" in the manner of conventional 1-dimensional wavetable synthesis. However, additional functionality allows crossfading between oscillators' outputs, extending wavescanning to two dimensions.

On the projection screen, a "wave terrain" is visually represented by a 3D grid created by means of objects from the GEM library. X and Y dimensions refer to the time domain, while the height of each of its 64 vertices is related to amplitude values of audio samples (why only 64 values are visualized explained below). At the same time, each sound engine is visually represented by colored cubes moving across the 3D grid.

Performative part of this work supposes redefining sound engines trajectories ("orbits") across wave terrain and, at the same time, morphing the terrain itself by arbitrary recordings of new audio data by the performer. Control of orbits is realized by manipulation of the MIDI controller Novation Launchpad that contains an 8x8 buttons grid. Each row of buttons is binded to one of 8 arrays (X-indices), and each of 8 buttons in the row correspond to 8 fixed time points in that array (Y-indices). Thus, the 8x8 buttons' interface correlates to 64 vertices in the visualized 3D grid.

Pressing buttons, the performer can define linear and quasi-linear orbits across the wave terrain: 2D wave scan trajectories. The latter, in fact, are realized as linear interpolations. Configuration of orbits affects timbral and rhythmic characteristics of sound events. To overcome limitations of the 64-button controller, controls of dynamic change of "playback" speed (i.e. frequencies of oscillators in sound engines) and interpolation speed were introduced. Also, to generate rhythmic patterns I programmed a simple functionality for an amplitude envelope triggering. This altogether allowed me to obtain a variety of abstract textures and discrete sound events.

Also some parametric control functions were defined. Two sound engines have additional outlet modules that work in parallel with their audio outputs. These modules sample audio outputs' amplitude at a defined sample rate, and send it as control signals to an additional sine wave oscillator. Even though this part of the system is in its rudimentary stage, it defines the prospective development of this system. For future versions of the interface I consider transposing this concept into a VR scene. This will allow performers to define orbit and shaping of wave terrain with hand gestures in a more intuitive and flexible way.

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