WAVEFORMS

Michele Zaccagnini

Brandeis University
michelez@brandeis.edu

ABSTRACT

WAVEFORMS is the latest installment of my ongoing compositional research which aims at creating pieces that truly exist at the boundary of aural and visual senses. To achieve this perceptual blurring of senses I implement algorithmic compositions that can be rendered as sound and images synchronously. My approach to composition is tied to the world of visual arts in three different ways. Firstly, my musical aesthetic draws heavily from abstract expressionism: my music is textural and lacks inner contrasts, i.e. my pieces are "sound panels" rather than musical narratives based on the ideas of variation or development. Secondly, I use visual stimuli and processes to generate rhythmic structures and manipulate the piece's *gestalt*. Finally, I incorporate some of the visual elements I have used to compose the piece as part of the piece itself, as a multi–sensorial accompaniment.

1. CONCEPT

Generally speaking, when multi–media composers are faced with the issue of connecting aural and visual elements they can work on a continuum of a spectrum that spans between "high level" and a "low level" perceptual connection between aural and visual elements. The former is an abstract connection: a scene from a film is accompanied by a soundtrack that musically suggests what kind of emotion the viewer "should" feel. At this side of the spectrum, the multi–media creator can work in procedurally loose fashion as she is allowed to freely associate sounds and images based on a general aesthetic idea. On the other hand, when working at the "low level" end of the spectrum the multi–media creator aims at creating a tight knit perceptual relation between sounds and visuals so that virtually *all data represented in the aural realm find a correspondent in the visual realm (and vice versa)*.

This approach comes with a fair amount conceptual and technical issues of its own. Conceptually, a group of issues to grapple with is the idea of *mapping* data into sounds and visuals. If, for example the goal is to represent a musical pattern (rhythm, pitches, timbre) how does one map musical data into visuals? Exploring different solutions to such problems and matching the results to their perceptual outcomes is one of the more compelling aspects of this kind of research. But, as my ongoing efforts have shown me, it is equally crucial for the multi–media composer to carefully choose programming tools and practices that are best suited to achieve just that aesthetic goal. Not dissimilarly from a traditional composer who adjusts her writing according to the instrument or combination of instruments she is writing for, creating audio–visual compositions of the kind I have just described requires the multi–media composer to program the pieces in a way that is idiomatic to the chosen programming platform so that she can achieve a certain quality of outcome, crucial for a certain idea to perceptually come through.

2. TECHNICAL DETAILS

This installation draws from a series of tools and practices I have developed and differers from other kinds of audio-visual works in fundamental ways. As I was *zeroing in* the issue of "low level" connection between music and image I realized how the common approach to audio-visualization, commonly defined as "audio–reactive," was proving excessively cumbersome and computationally expensive: the use of audio–reactive algorithms can majorly limit the possibilities of representing musical events in a discrete manner especially in the case of polyphonic music. Since my approach to composition is algorithmic at its core, I am able to bypass the audio–reactive step. by feeding matrices of raw musical data that I gathered from my algorithms into rendering.

3. PRESENTER'S BACKGROUND

I graduated with a Ph.D. in Music Composition and Theory at Brandeis University in 2014. My research focuses on generative algorithmic systems, interactivity and music visualization. In my recent projects I challenge traditional ways in which music is experienced by creating interactive platforms for immersive multi-sensory experiences. Along these lines of research, I developed CINC (Computer Interface for Neuro-Composition) an audio-visual interface that reacts to a user's Electroencephalogram data feed generating audio-visual textures. I have presented this work at various conferences in England, Brazil and more recently at the MIT Science Museum as part of a Dinosaur Annex Music Ensemble commission for the Cambridge Science Festival. I am also working on several projects as a free-lance software developer on different platforms such as MaxMSP, Python and Javascript. I recently joined the *Consciousness Hacking* team to work on Group Flow: a project aimed at creating open–source sensor sonification software for meditative practices. I am currently developing software tools and practices to write generative audio-visual pieces.