Berklee College Of Music – Valencia Campus

"Environments":

Live audiovisual performance

A Thesis Submitted in Partial Fulfillment of the Degree of

Master of Music in Music Production, Technology, and Innovation

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Abstract

The evolution of concerts throughout the years has enticed the inclusion of technological elements to enhance the musicians' performance onstage and the audience's experience. This inclusion has evolved into practical results achieved by using modern tools that bring about numerous possibilities. The addition of visuals in live shows has been a logical path in this audiovisual generation and it's becoming even more recurrent in preset-day acts. The main focus of this project is to create an audiovisual performance that generates visuals reactant to the music being played in real time. This approach opposes a typical modus operandi of prerecorded videos, which are sequenced to play at specific points throughout a more conventional (but not limited) concert setting. The music is broken down and arranged into sequences that are triggered to recreate and remix original electronic music tracks while visuals are generated and manipulated by audio and MIDI. Through improvisation, spectators are able to appreciate the relation of the music with the imagery.

1. State Of The Art

In the 1960's, liquid light shows emerged as visual accompaniment for bands and clubs, and became one of the first of their kind. It consisted in dropping colored oils on slides placed on an overhead projector that would beam colorful shapes on stage while bands were performing.[1] Today, with the use of computers, it is possible to project digital media through LCD projectors and map on any type of surface, as well as use LED screens to display; this has become a staple for modern musicians, performers, pop artists, mainstream acts, and even festivals that include stage productions that are visually engaging. VJs (Video Jockey) have become an essential character in electronic music, making their performance crucial at nightclubs or alongside DJs.[2]

Artists in the past have aspired to encapsulate their own visual aesthetic and produce a unique performance, for instance The Chemical Brothers, Underworld, Tame Impala, and Tycho have notable shows, particularly because of their visuals (See Figures 1 and 2).

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[1] Zinman, Greg. "Joshua Light Show 1967 – 68," joshualightshow.com, accessed June 1, 2017, http://www.joshualightshow.com/about-classic/joshua-light-show-1967-68.

[2] Lublin, David. "VJing – WTF Is It?" davidlublin.in, accessed June 1, 2017 http://www.davidlubl.in/blog/2014/vjing-wtf-is-it.
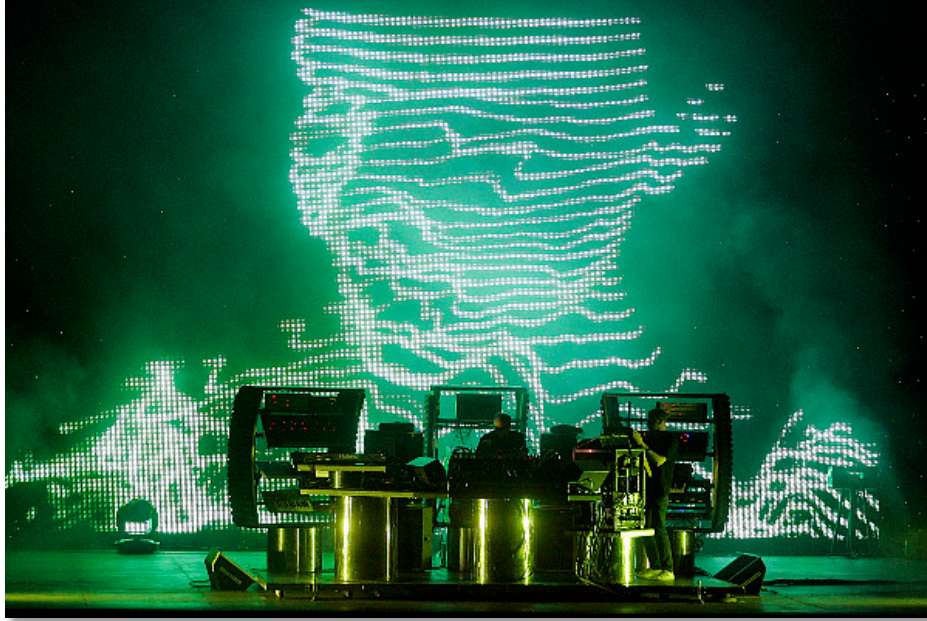
Figure 1. Friedman, Gary. "Chemical Bros." Digital image. Los Angeles Times. August 30, 2010. Accessed June 01, 2017. http://latimesblogs.latimes.com/music_blog/2010/08/ live-review-the-chemical-brothers-at-the-hollywood-bowl.html.

Figure 2. Steve St. Jean. "Tame Impala at Massey Hall." Digital image. Blare Magazine. May 21, 2015. Accessed June 1, 2017. http://blaremagazine.com/2015/05/21/photos-tame-impala-at-massey-hall/.

While these examples mentioned are performances based on sequenced prerecorded visuals that accompany the music, some audiovisual artists have created works where their visual components react to sound or MIDI (Musical Instrument Digital Interface) signals for a real-time interaction between the two mediums.

"ALPHA" is an audiovisual performance by Julien Bayle in which he plays live and at the same time, the music is analyzed through a system designed by him to generate visuals for projection (See Figure 3).[3] Cyclo is a collaborative project between Ryoji Ikeda and Carsten Nicolai that focuses on the visualization of sound through phase analyzing equipment. Their live performance consists of a modular setup played live while software visualizes the sound in real time.[4] Mark Eats created an audiovisual piece titled "This City" where he performs a soundtrack to a virtual world similar to that of a videogame, which is affected through MIDI inputs as he's playing (See Figure 4).[5] Andrew Quinn, who has worked on digital effects for the movies, "The Matrix", "Tomb Raider", "Dark City", among others, has worked with several musicians to carry a number of performances with sound-reactive visuals.[6]

[3] Julien Bayle, "ALPHA," Julien Bayle, 2016, accessed June 01, 2017, http://julienbayle.net/works/creation/alpha.

[4] Cyclo -LIVE @ TAICOCLUB'11, perf. Cyclo, August 10, 2011, accessed June 1, 2017, https://www.youtube.com/watch?v=lk_38sywJ6U.

[5] *This City*, dir. Clay Weishaar, perf. Mark Eats, September 21, 2015, accessed June 1, 2017, https://vimeo.com/140019134.

[6] Excerpts: Romaeuropa 13,14 nov. 2015, perf. Nikolay Popov, Andrew Quinn, Sebastiano di Gennaro, Sergej Tchirkov, January 21, 2016, accessed June 1, 2017, https://vimeo.com/152565133.
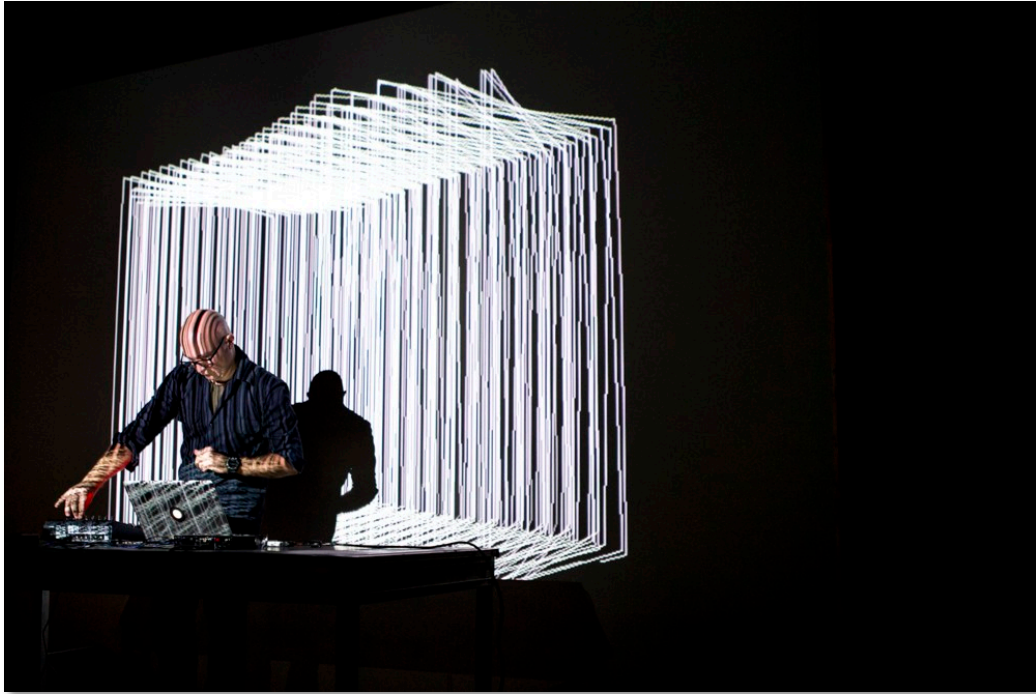
Figure 3. Sauerzapfe, Sigrun. "ALPHA." Digital Image. Julien Bayle. 2016. Accessed June 1, 2017. http://julienbayle.net/works/creation/alpha/.
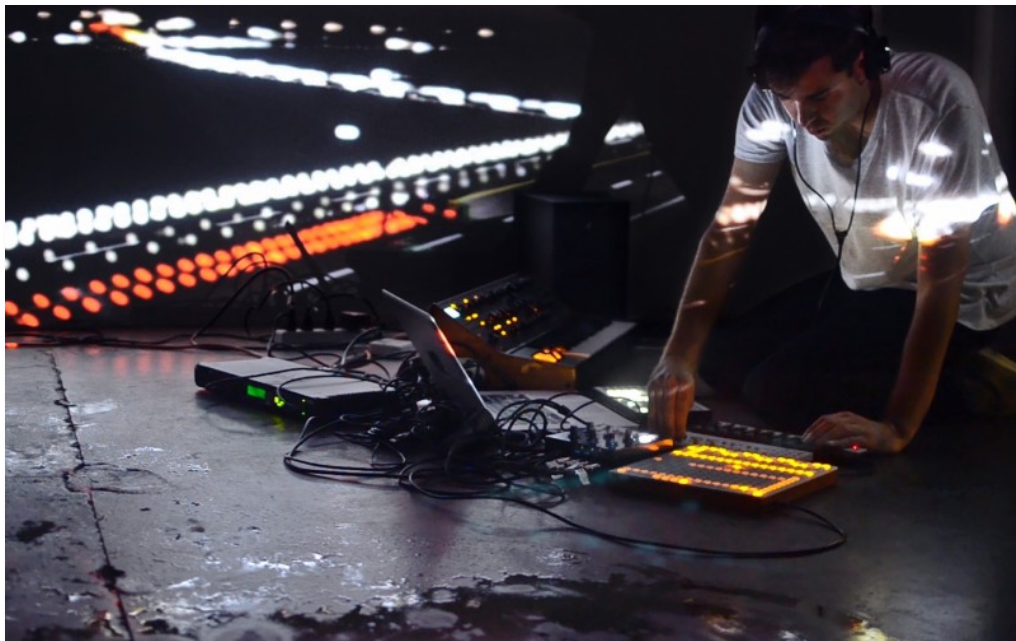

Figure 4. "Mark Eats - This City." Digital Image. Creative Applications. September 22, 2015. Accessed June 1, 2017. http://www.creativeapplications.net/openframeworks/this-city-audio-visual-performance-of-a-simulated-world/.

2. Project Description

The setup consists of a Macbook Pro running with Ableton Live, Max and Quartz Composer, a Novation Launchpad, Behringer BCR2000 and Evolution UC-33e MIDI controllers, and a projector for two-dimensional surface mapping. The performance is made up of live recreations of original electronic music tracks with accompanying real-time visuals that react to both sound through OSC (Open Sound Control) and MIDI signals (see Figure 5). The MIDI controllers are mapped to different parameters in all three software to automate the sound and at the same time have it affect the visuals in real time.

Figure 5. Hardware and software setup.

2.1. Music arrangement

Each music track is separated into sequences, loops, and samples in Ableton Live within eight distinct channels labeled as "Drums", "Loops", "Bass/Lead", "Bells/Lead", "Pad", "Pad 2", "Pad 3, and "Pad 4/Samples", in additionally to three return tracks for effects and two dummy MIDI tracks (See figure 6). The first scene of each track has its title written with its corresponding tempo and time signature set to automatically change whenever a new track is triggered. The tracks are color-coded so all its scenes along with its clips and instruments will be easily identifiable.

Figure 6. Ableton Live set.

Some channels include audio tracks with audio loops or samples, while others include an instrument rack to group multiple virtual instruments within a single MIDI track (see Figure 7). In doing so, more than one instrument can be played simultaneously within a particular channel by dividing the key zones for each instrument (See Figure 8). Each instrument is assigned to a chain within its instrument rack so that when a particular chain is selected, all the tracks inside the rack not assigned to that chain are muted (See Figure 9). Mapping the chain selector to a macro control of the instrument rack and subsequently automating that macro value inside a clip's Envelope Box facilitates changing instruments by launching clips (See Figure 10). Additionally, instruments' device activators are mapped to the macro control to bypass the entire device chain, which as a result, saves CPU processing. In the case of the "Drums" channel, its instrument rack is made up of different drum racks for each corresponding track.

Figure 7. Instrument Rack layout.

Figure 8. Instruments with Key Zones assigned.

Figure 9. Instrument Rack chain assignment and selection.

Figure 10. Clip chain selection automation

2.2. MIDI arrangement

Each channel includes a dummy MIDI track that outputs MIDI notes through the

IAC (Inter-Application Communication) Driver to individual channels in Max and Quartz

Composer with the objective of triggering or toggling certain visual effects (See Figure

11). When a new track is played, one of the two dummy MIDI tracks operating in the

session changes audio effects in the return channels through a Max for Live device by

mapping it to the chain selector responsible for changing the chain (See figure 12). The

effects chain is adjusted by launching an empty clip that includes the chain selector's

value to switch to in the same manner as instrument racks activate specific instruments

(See Figure 13).

Figure 11. Dummy MIDI track inside a channel.

Figure 12. Max for Live device to switch the return's effects.

Figure 13. Return Audio effect rack.

2.3. Visual arrangement

Max patches and Quartz Composer compositions for each track were created and grouped in a single patch and composition, respectively (See Figures 14 and 15). The visuals' signal flow begins in Quartz Composer where they are generated and then is sent to Max through Syphon, an open source plugin that allows one application to share video

to another. In both software, there are MIDI modules that receive messages from the

MIDI controllers, and Ableton Live to automate and trigger parameters either generating

or processing the visuals. One of the two dummy MIDI tracks in Live triggers clips with

a MIDI note to activate the switch between sub patches in Max and macro patches in
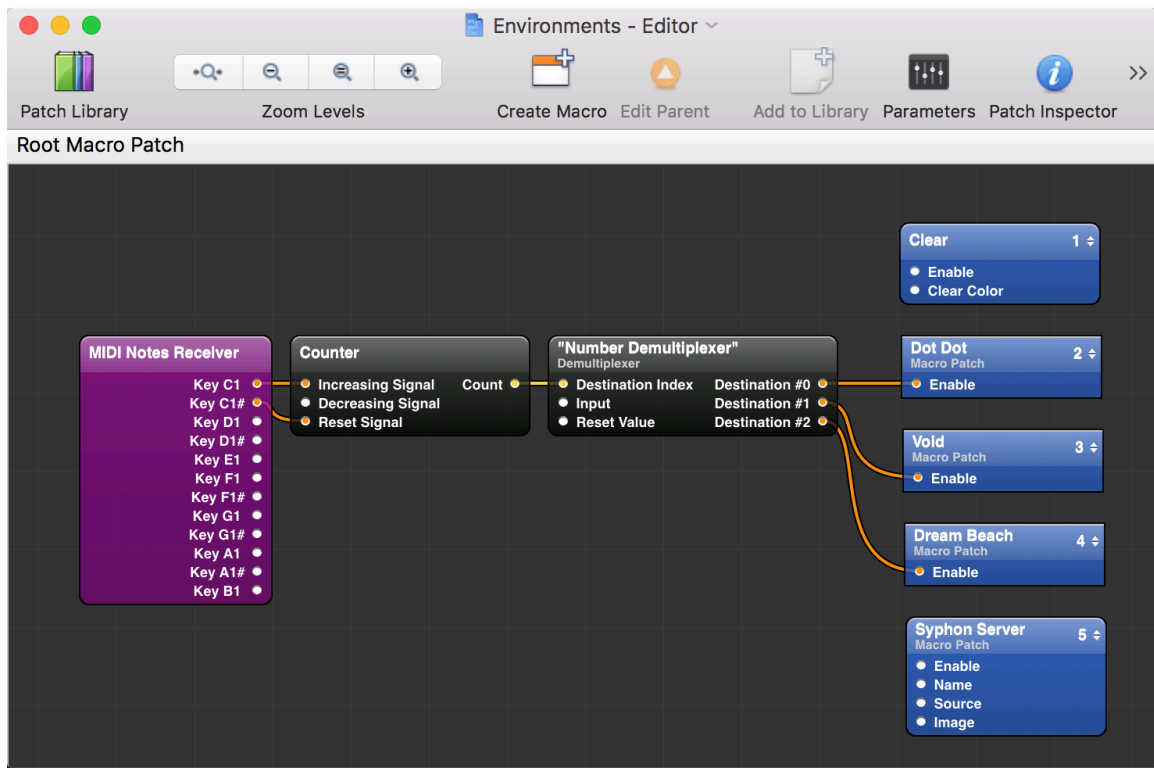
Quartz Composer.

Figure 14. Quartz Composer composition with subpatches of all the visuals.
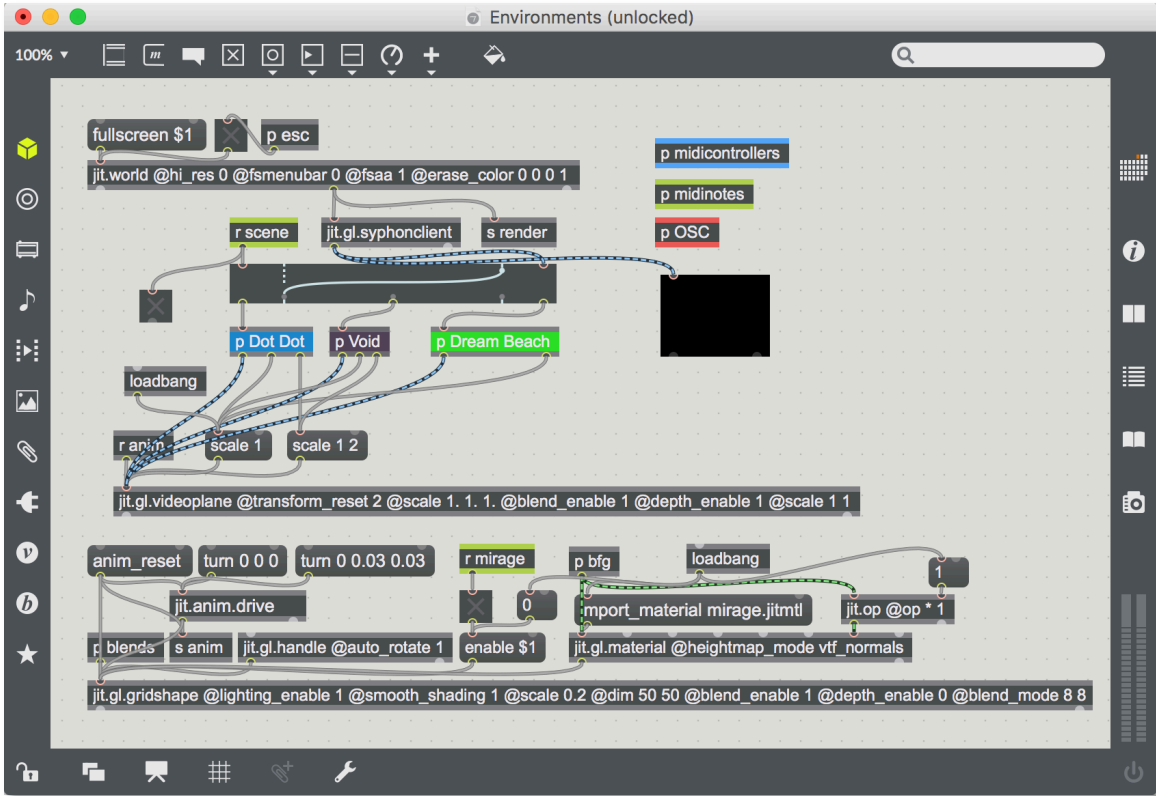
Figure 15. Max Patch.

In Ableton Live, some audio and instrument tracks contain a Max for Live device that can send audio data through OSC from Live to Max. The audio serves to manipulate particular parameters in the Max patch to alter the visuals in real time (See Figure 16).
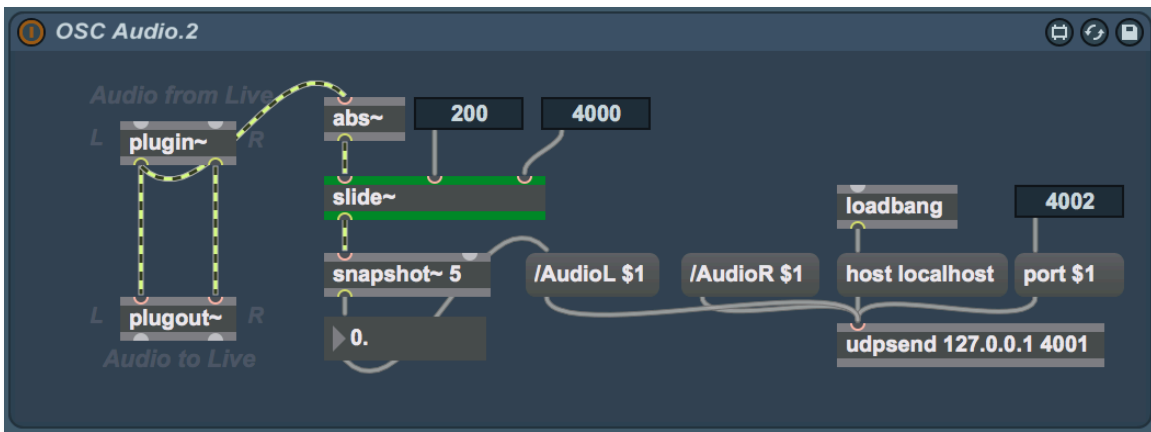

Figure 16. Max for Live device to measure audio signal.

3. Innovative Aspects

The accessibility of audio software enables anyone with a computer to become a bedroom producer. Ableton Live is a powerful software program that not only encourages producing, but also potentiates the option of becoming a performer. Numerous amateur and professional artists have found comfort in this "instrument" to take their music outside their bedroom studio and present themselves to an audience.

The purpose of *Environments* is the integration of visuals in a performance, which is an enhancement for a musical act that enriches its originality and gives it an identity with tools that are accessible but overlooked (See Figures 17 and 18).
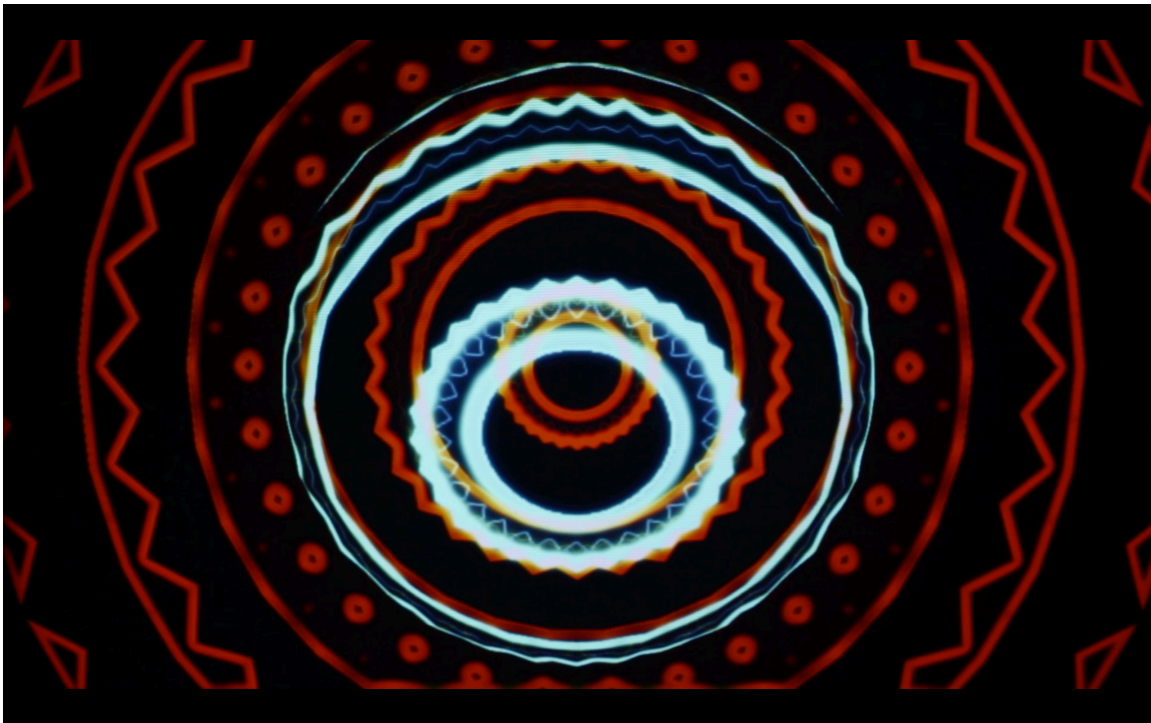

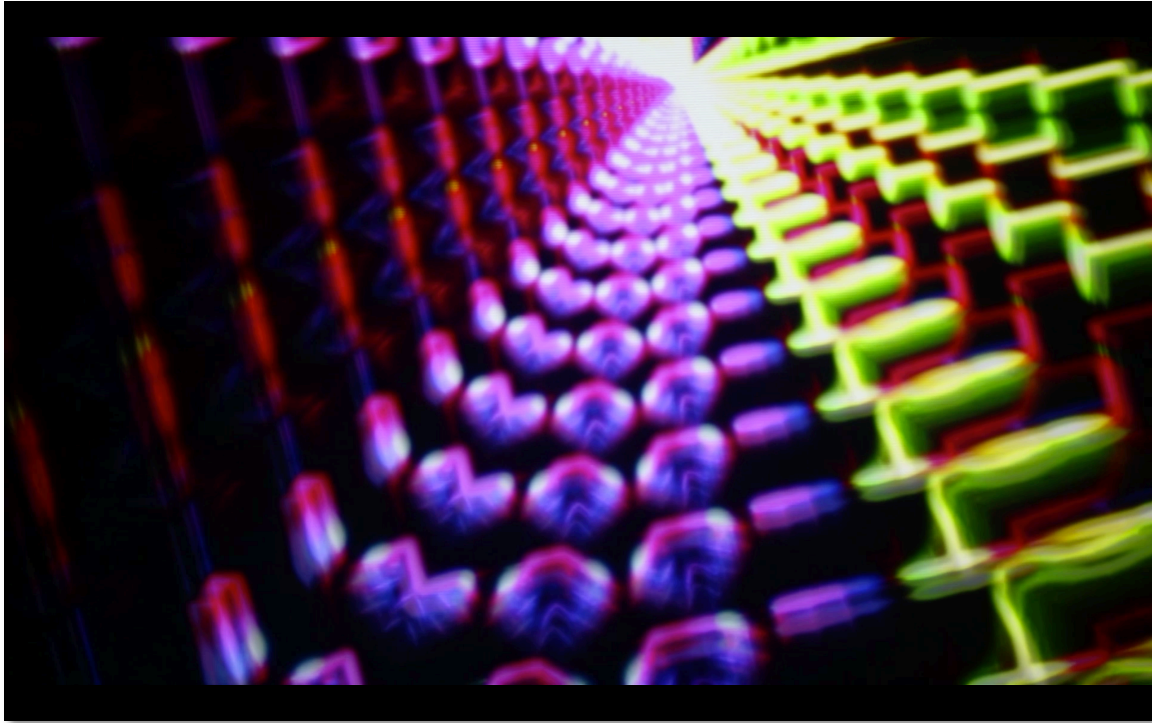Figure 17. Visuals from *Environments*.

Figure 18. Visuals from *Environments* 2.

4. New Skills Acquired

In the past, object-oriented programs such as Quartz Composer and Pure Data have been personally acquainted, though previous ability of programing was short. The skill level obtained for Max has proved to be sufficient and useful to carry out this audiovisual project and to implement customized Max for Live devices. Previous live performances in Ableton Live had been performed with a lesser level of complexity and fixed playback timing. With *Environments,* the expertise of programming, preparing, mapping, routing and planning an elaborate live performance in Ableton Live has resulted in a live set programmed to be a fully free performance with a fair degree of improvisation.

5. Challenges, Both Expected & Unanticipated

The vision for this culminating experience has always aspired to be an audiovisual performance in nature, this originated from the inclination to producing a project that could be artistic and could be presented publicly. The initial ideas that this concept revolved around included the involvement of audience participation through biosignals and smartphones, which resulted in proposing the creation of an app for users to interact with an audiovisual performance. The task of researching and working with app development resulted complicated and demanding for the amount of time to be devoted to this culminating experience. Coming to realistic terms on what project was to be pursued and completed, gave way to the first challenge of accepting and determining on a feasible project. Subsequent to renewing the proposal to be an audiovisual performance of original music, an EP was to be produced as well. However, the result of numerous demos that did not fit a desirable concept for a proper release led to the abandonment of the record and resubmission of the proposal to be solely an audiovisual performance composed from an earlier produced EP. Despite the absence of new material to be included in the set, the project itself was a major challenge due to very limited experience in live performance and little knowledge of visual programing for a project of this caliber. Visual content proved to be the most demanding, Quartz Composer is a software with a friendly and straightforward user interface but proved to be difficult to master. Max also was challenging to work with at times, being the software with the least amount of personal experience.

6. Future Ramifications

Environments is the first and current version of the performance but iterations will be made and in due course updated and renovated musically, visually and technologically. Currently, *Phonometrics*, which is the only EP released under the moniker Psychics, is the only music included in the live set. Future performances are indefinite but planned to take place in Mexico, starting in Monterrey where there is a personal involvement with the local electronic music scene. It is aspired to gain acknowledgment as a multi media artist through this audiovisual performance under the Psychics moniker.

8. Conclusions

Preparing and programming a live performance proved to be more challenging when implementing visual content, especially since this was not a familiar discipline. Nonetheless, putting into action an audiovisual performance has proven to be a more attractive and engaging one than if it were just music. By completing this project, not only is a new artistic path initiated, but a technological one as well, initiating a multimedia profile. To update the interface for reactiveness of sound and image, it will certainly require more practice, research and in depth learning to hone the skills necessary to do so.

List of Figures

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