CREATING A RESPONSIVE VISUALIZATION THAT REACTS WITH MUSIC IN

REAL TIME:

INTEGRATING ABLETON LIVE 9 AND CYCLING '74 MAX FOR LIVE INTO A

MUSICAL PERFORMANCE

By

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Approved by:

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# Abstract:

Over the past three semesters, I have been working on refining my Honors Thesis to meet exactly what I wanted to study. This is why when looking at what I wanted to focus on it, it was obvious that I wanted to integrate musical performance with a visual performance—similar to what a Video Disc Jockey (VDJ) might incorporate into a live set. Currently, there are a quite a few percussion pieces that use Max patches that process the sounds, or use pre-made visuals that play along with the music. My goal with this Thesis was to find a way to use a patch with the music that reacts to the visuals in real time. What makes this different from other performances is that each performance will be slightly different than the one before it or after it. To me, this is something that I find very exciting about music and technology. Throughout this essay, I will explain how I approach composing a piece specifically for this as well as my learning process to integrate a Max patch with the Music.

## Composing an Electronic Piece for this project:

As I was beginning to write this piece, I was working at a Summer Camp in Michigan and wrote down a few of the sounds that I was trying to achieve. Some of those brainstorming ideas were ethereal, space-like, underwater sounding. I also set the title to Submerged Fractals as one of the first things that was set in stone. From this point, I would work on creating small chunks and ideas to add to the Live Set that would eventually hold all of the sounds and MIDI (Musical Instrument Digital Interface) information. During this process, I would save a copy of what I was working on with the date and title of the file. The reason I chose to approach composing like this is because I wanted to track and see what ideas I had early on in the process and what ones were not used in the actual project. For me, finding a Digital Audio Workstation (DAW) to express my creativity became extremely important in the early ages of the process.

The DAW that I chose to use for this project was Ableton Live 9 because of its ease to create something "on-the-fly" and incorporate it into the song later on. Ableton has two "views" where you can work on a project. The two different views are as follows:

Session View:



Arrangement View:
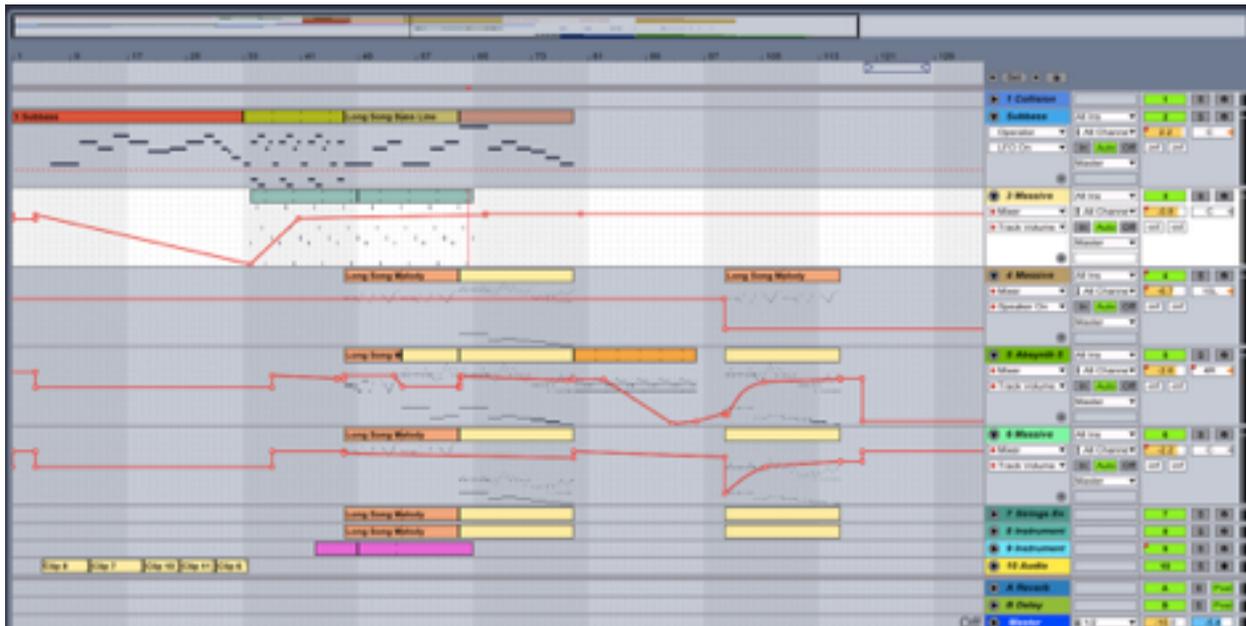
Ableton Live 9 works extremely well in both modes and each view had an importance in different steps of my working process. Early on in the project, it made sense to work in the Session view because of the ease of putting small ideas into play and then just repeating and playing around with multiple ideas at once. Looking back at some of my first iterations of the piece, there were many ideas that I thought about that never came through the final result and others that didn't surface until some of the last versions of the piece. When it comes to composing music in a DAW like Ableton, there are many different ways of going about it, and some peoples workflows are going to be much different than others. This composition introduced me to different composition techniques as well as finding inspirations for the piece.

As far as inspirations for my piece, I took a few different ideas from music that I found interesting and relevant in my life at the time and tried to incorporate those techniques into my own writing. Some of the inspirations that I used were soundscapes of bells with a lot of reverb that can be found in Porter Robinson's *Sea of Voices.* He uses a very large build-up of sound from eternal sounding bells that then lead to a melodic phrase after about a minute of tension. The tension/release that is created is something I find extremely moving in music and wanted to emulate that sound. In my composition, I have a bass line that descends down with the bells slightly lower in volume as to not overpower one another. The University of Arizona has a set of Tibetan Bells that sound amazing and I recorded those and sampled them to use for my own composition. With some slight Reverb, Pitch Modulation, and Equalization (EQ), I was able to create a very similar sound that can be found in *Sea of Voices.*

The melody that I use at the beginning is a simple lullaby that then evolves into a much more active interpretation of the melody. The two voices interact in a way that creates tension and release as well as melody and harmony. The structure of this piece is very much a slow introduction that slowly builds and adds different sounds to the texture. Halfway through the piece, it evolves into what may seem like a new idea, but it is more of just an improvisation that I played on the Ableton Push—an electronic musical instrument that greatly impacted my creativity. Finally towards the end of the piece, I bring back the melody of the lullaby that diminishes and fades to basically nothing at the end of the piece. In the way that a lullaby slowly gets quieter as a child falls asleep, I wanted to leave that affect on the listener. From September

of 2014 until March of 2015, I continued to refine and tweak some of the sounds and levels of the piece.

Composing an original piece of music is something that a handful of people can accomplish well and to perform that piece of music is a completely different experience. In this six-seven month process, I was able to learn about what sounds I like to incorporate into music as well as different techniques that make the music interesting to listen to without making it confusing on the listener. Music composition is something that I had only briefly worked in before this, but it definitely pushed me to use my musical theory knowledge as well as my creativity in a way that I had not done before. While this part was difficult in the creative way, it was no where near as difficult as learning how to create a visualization with the music.

## Learning about Cycling '74 and Max/MSP/Jitter

To begin, Max is visual programming language that works particularly well with Music and other "artistic" mediums. Max is a programming language that has an extremely steep learning curve that requires a great deal time and effort in learning the basics before attempting to create a "patch" on your own. From April 2015 to November 2015, I spend on average about twelve to fifteen hours a week working through books, tutorials, and other devices to help me learn more about creating and using the different patches. In addition to going through books like *Electronic Music and Sound Design Vol. 1 and 2* by Alessandro Capriani, I took copious notes about the different functions that are used in the program.

When starting with the program, it gives you a blank screen to work with and then you go from there. This makes it extremely intimidating to jump right into things and without guidance on how to approach it, it is extremely difficult. With the two books that I worked out of, there are patches included that take small steps into learning about the program as well as teaching what everything does at a basic level. As progress is made in the books, the "assignments" that are included progressively get harder and more complex. While this is something that can be extremely challenging, it sets the programmer up with exercises that can be looked back at for help on how to work with everything.

As it reached the end of September, I switched my focus of the books and looked more into the Jitter tutorials that are included in the Max program. The reason why I switch towards this point is because Jitter is the video/visual aspect of Max that I was trying to learn. The interesting Jitter is that until you have a handle on the flow of objects in Max and MSP, you can not successfully navigate through Jitter. Here is a brief view of what a Jitter patch looks like.



All of the different objects represent different things that then trigger other objects in the patch. Connecting everything to the right object is extremely important because when it is not connected properly, it tends to not function in the way that it is meant to function. As I worked on adjusting and tweaking the patch that was eventually included in the final presentation, I had to adjust, route, and make significant changes. This technique of trial-and-error was something that seemed to work extremely well and only became possible because of the patiences and time that I had put into the project already. By the end of the whole thesis project, I would guess that I put in close to 300 hours of work between the composition and learning and designing the Max patch that I used in the performance. While this is a considerable amount of work that was put into the whole project, I do not think that I am anywhere near mastery of either program or skill set.

# Synthesis of the Project

Using Electronic Percussion with Live visualizations is a very new practice in the world of music and with that in mind, it was challenging to look to guidance of projects similar to this. That being said, I worked with Dr. Weinberg to fine-tune my composition and find ways to make it a more interesting piece. With my first iteration of the piece, I came with a very flat and boring piece that did not really have a whole lot of interesting sounds or movement in the piece as a whole. We talked in depth about what a piece of this caliber should sound like and how to make it more exciting for the listener to listen to. As the end of the composition became more apparent, our talks focused on adjusting minor things which then turned into analyzing the piece as a whole. Our conversations continued as I worked on learning and understanding Max, but he was able to only push me to learn and show progress on the programming.

Max is a programming language that not a whole lot of people know how to use and at the University of Arizona, there are only a handful of people that I know of that actually know a substantial amount with the program. This made this process somewhat daunting and exciting at the same time because of the great task that I had given myself. While I was not able to get as much feedback on the work that I was doing with Max, I was able to see and specifically show progress in the learning as I became more familiar with the program. There are many Max patches that you can look at and I found myself looking to other people's work a good amount of the time to see what they were doing. There is a large online community of Max users that share ideas on a daily basis that are always looking to get feedback on a patch. This tradition of collaboration is something that I had not been used to, but by the end of this project, I feel like I was able to complete the project with the help of the other people around the country and world.

Music as a visual art is something that has been around for a number of years, but is still fairly new in terms of the materials and resources out there. When finding ways to integrate visuals into an "aural" medium—one that focuses on the auditory functions that come with the performing arts such as music—it is important to find a balance between the two mediums. This was something that I worked on throughout the process of my Thesis and something that I am continuing to work on in my study of music and visuals.

# Conclusion and Assessment of Success

On November 21, 2015, I performed my Senior Recital and ended the recital with my Honors Thesis composition. All of the time and effort that I put into the project was shown through a seven minute performance of the composition with the visualization. Everything functioned well with the performance, and at the end of the performance I received a lot of great feedback about the composition and visuals. While there are always going to be things that I want to improve upon in a performance, I think that it was a very strong representation of the hard work that I put into the project. Overall, I was very happy with the quality of work that I showed in the performance.

Even though I have finished this project, I do not want to stop working with visualization in Music. I think that this project was just the start of what I would like to work on, and I think that I can continue to learn about the program and find new ways of creating visualizations. This is not something that will happen over night, but I think that with the right amount of focus and determination that comes with anything, this Thesis can continue to grow into something more than what I presented on my Senior Recital. The most important thing that I learned from the Honors Thesis is that when you put a lot of work into one thing, you are going to get a great result. It is not going to be an easy road to go down, but the end result will be something that will be greatly appreciated and enjoyed by all.