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OUT OF SYNC: Live Visual Performance Design

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OUT OF SYNC:
Live Visual Performance Design

A Thesis submitted in partial fulfillment of the requirements for the degree of Master of Fine Arts in Computer Graphics Design

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December 1, 2015
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00 Abstract

“Abstract art enables the artist to perceive beyond the tangible, to extract the infinite out of the finite. It is the emancipation of the mind. It is an exploration into unknown areas.”

- Arshile Gorky

Live visual performances are often combined with and serve as enhancement to musical performances. As a result, visual content is informed by, and responds to audio content. How does the situation change if the performance is based around visuals? Can audio accompaniment be performed independently, and the two come together during performance? Without a musical subtext, what form will the visuals take? What would be the ideal performance environment for optimal creative freedom and control of performance parameters?

Keywords:

Live design, visual performance, VJ, live cinema
01 Introduction

1.1 Background

Although my experience with desktop video and electronic music performance go back to the 90’s, I first chose to explore live visual performance in a course I took in 2009. For this course, each student developed a single project; it was like a semester-long version of a thesis, and each week we would meet to track progress. We had a week to decide what our projects would be, and I quickly made the decision to develop a live visual performance - something I had always wanted to work on. Again, without too much thought, I chose to design my project around the general theme of ‘time’: clocks, time passing, etc.

For this project, I sourced content from the public domain archival footage provided by the Prelinger Archives at archive.org (“Prelinger Archives”), and subject them to editing and effects processing using Adobe After Effects. The Prelinger Archives are a source of public domain ephemera, consisting of thousands and thousands of pieces of archival footage from the 1920s and on. My experience with these archives dates back a long time. For my early projects, I often scoured Prelinger for public service, demonstration, and training films of all kinds from the 30s and 40s. They’re free to use for any purpose imaginable.
I also created a six-minute soundtrack of music and sound effects in the digital audio program Ableton Live. For the project, I assembled the video clips together in the program Arkaos GrandVJ, and practiced performing them together with the soundtrack for the final piece. Within Arkaos, I applied additional transformations and effects that I was able to control in real time using a controller keyboard (Figure 1). I also used the keyboard to trigger the video clips.

Figure 1. MAudio Oxygen8 Keyboard used to trigger clips and effects during performance.

**1.2 Thesis Planning**

After the experience of working with live visuals, I knew that I wanted to explore it in more depth for my thesis. I wanted to continue working with pre-rendered clips, as opposed to algorithmic, generated graphics, because I believed that would be the only way to achieve the look I was after; I wanted the performance to be interesting and
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engaging on a visual level, much like a live abstract painting. I thought the key to achieving this would be the quality of the video clips, and that during performance I would have limited control over creating the kind of visuals I was going after other than basic transformations. Above all, I was most curious how emotion and feeling could be communicated through visual performance.

At first I struggled most to find a concept to build my thesis clips around, the way I had built my earlier project around ‘time’. I considered concepts related to computer networks, social media and relationships as well as programming concepts. Ultimately, focusing on one theme seemed too limiting. Chris Jackson suggested that I center my theme around the elements of design (Landa, 2014). This would enable me to create clips that focus on simple visual relationships while in performance I could combine them to create complex designs with the potential of a variety of conceptual interpretations.

The title of my thesis, “Out of Sync”, grew from the concept that I would develop several pieces of original content, such as animated video clips, without planning their direct relationships to each other. Zerbe Sodervick helped to conceptualize the performance/exhibition nature of the project; I would build this material around five selected elements of design: point, line, shape, texture and color and the final ‘design’ of my project would be created as a momentary artifact of performance. The design would never be completely final as it occurs continuously while I mix and transform the visual material.
Development of the audio content to accompany the visuals would come secondary, but I would take the same approach. Rather than develop a soundtrack to 'match' the visual content (somewhat the reverse of the idea of developing visuals for a specific soundtrack), I would synthesize and process audio clips that would be arranged and performed in a similar manner to, and along with, the visuals.
02 Research

2.1 Visual Research

A major dilemma I faced at the beginning of production was how I would produce visuals that were interesting and emotionally expressive while at the same time meeting the design requirements. The practice of VJing or performing pre-rendered visual material live is far from being a new or unique endeavor (Spinrad, 2005), so I was pretty certain that it would have to be my approach to content design and performance that would set my contribution apart adequately from the rest of the field.

When I proposed my thesis, I’d already been referencing abstract animators from the 30s, 40s, and 50s, whose work look very much like the kind I’ve been doing on my project. I started by collecting clips of filmmakers that I admired, and that I could imagine “remixing” together: Oskar Fischinger, Stan Brakhage, Len Lye, Norman McLaren (Jennings, 2015). Much of the work of these artists allowed for expressive mechanisms to emerge from basic elements of design such as line, shape and color, and I had hoped to explore this in my own work, juxtaposing one type of clip with another, like a blue clip to a red one.

I began to experiment with vector illustration, generative and particle systems, as well as abstract shape transformations, but as I would bring each of these together in
Resolume to mix, none of them inspired me in the way I had hoped. These images looked too generic and auto-generated.

It was a visit to the New York Museum of Modern Art (“MOMA”) in the fall of 2014 that ultimately gave me the focus I was searching for. While exploring the museum for the first time, I discovered their collection of abstract expressionist art. Here I found the opportunity to view the works of artists such as as Paul Klee, William de Kooning, Franze Kline, Jean du Buffet, and Jackson Pollack up close; to examine the paint strokes, the lines and splatters, and textures that until then I had only previously admired in pages of art books (Britt, 1989). These are artists I always connected with visually, and seeing their work in person really added a new dimension. Some of the pieces were incredibly huge; by walking up close to them it was possible to examine every paint stroke. It was like being in the presence of the artists. I was eager to explore the possibility of capturing the immediacy and expressive energy that I felt in these works in my visual performance. I wanted it to look like a painting and feel like art.

Shortly following this trip, I was going through work that I had created in a film production course that I took while an undergraduate student at the State University of New York at Buffalo. These were several reels of 16mm film that I used to create drawn-on-film, or direct animation, inspired by the work pioneered by artists such as Len Lye, Norman McLaren and Stan Brakhage (“Free Radicals”). Using markers, watercolors and ink, I filled the frames with shifting lines, dots and washes of color that
bled into each other across the length of the reel (about 100ft). When projected, the splotches and colors danced across the screen, unfolding in and out of each other as the background colors shifted the mood from bright to somber and back again. This immediately struck me as the unique look I wanted for my thesis. It felt natural to fall back on textures and colors that meant something to me, and I realized it was an abstract painterly look that I connected with.

This goes back to my art background at Monroe Community College; as a Fine Art student, my experience at MCC was my first connection to the art world though courses such as art history and painting. When I continued on to SUNY Buffalo after MCC, I was initially enrolled in the Communication Arts program, which, as it turns out, was their undergraduate graphic design program. At the time I knew little about design, let alone a career as a designer, and though I appreciated learning the concepts of typography and layout for the first time, I felt out of place and had no emotional connection with what I was doing the way I did with fine art. It was in that first semester that I also discovered the fledging Computer Art program. This was not so much a major as a collection of interrelated courses with a focus on experimental multimedia and computer imaging for fine and conceptual art. I immediately felt at home in these courses and created many friendships. I also discovered the Department of Media Studies and went on to take courses in film and video production. In the end I had to petition to create my own degree from the wide range of courses I took in order to graduate.
### 2.2 Technical Research

Determining the appropriate software to use in performance, as well as some method to control the visual parameters in real time, was the next thing to figure out. As far as software was concerned, there were many off-the-shelf solutions to choose from that were suited to live performance; as mentioned, I had previous experience using Arkaos GrandVJ in performance situations, however I wanted use this as an opportunity to be certain it was best suited to my particular application. I found that most video performance applications made it easy to mix video clips of different lengths and formats with a variety of real time effects, transformations and ability to map control to external devices.

![Figure 2. VDMX interface.](image)

Modular video applications such as VDMX and PureData offered endless flexibility. After trying out VDMX (Figure 2) in a performance at the Rochester Museum and Science Center (RMSC), I found it to be a bit too open ended for my purposes. I realized my needs were more modest, focusing on loading, mixing and layering clips.
Other applications I tried, including Modul8 and Arkaos, were a bit too restrictive in terms of real time control.

Ultimately, I found that the Resolume Arena offered the best combination of modularity and structure. It allowed me easily build up multiple layers of clips, drag clips between them and modify qualities such as blending mode and opacity. Parameters such as playback direction and speed, position, scale, rotation and just about anything else can be automated via an independent timeline, matched to a global BPM or easily mapped to an external control surface for manual control. Clip playback can also be automated via a built-in clip triggering system, externally triggered via MIDI from another application or an external controller.

The next step was to decide on physical controllers surfaces. I would want a way to trigger my clips Resolume as well as control select parameters, such as fading layers in and out or changing the playback direction of a clip. For the “Time” project, I used an M-Audio Oxygen two-octave keyboard controller.

Designed for controlling music software, it also had assignable knobs to control effect levels. When I began using MIDI-capable video applications such as Arkaos, I would map these controllers to things like speed, translation, scale and rotation. Since that time, I had acquired a few more controllers, and one of these, the APK40, was particularly well suited to video performance. Designed as a controller for the audio
program Ableton Live, it contains sliders, pads and knobs in a performance-friendly arrangement.

![Figure 3. AKAI APC40 MIDI controller.](image)

I had an opportunity to test this system out for the first time via a three hour performance at the RMSC’s Science of Sound event (Figure 4). I didn’t have enough original content produced yet, so I supplemented it with public domain and abstract stock footage. Nonetheless, I was able to experiment with creating and triggering sets and layers of clips as well as get a feel for mixing clips together in response to live
For my thesis, however, I decided I would separate both the production and performance of the sound and visuals in order to keep the performance possibilities relatively open-ended. This also prevented things from being too much in sync with one another, an important quality to my thesis. I would assemble an audio performance separately and then control the levels of audio layers, as well as some simple effects such as reverb or delay, during performance. Any audio application would be up to this task, however I chose to use Ableton Live because I am most familiar with it. Live can send MIDI and other control information to Resolume to automate its behavior. However, I chose not to use them in this way, operating them autonomously instead.

So as not to confuse myself during performance, I chose to utilize a second controller, the Korg nanoKONTROL (Figure 5), a simple USB surface designed for Digital Audio Workstation operation,
to control the audio mix in Ableton Live. With its eight track-based faders, knobs and toggle buttons, it would give me the control I needed to adjust the audio mix in response to the visuals, and vice versa.

In addition to these controllers, I briefly explored the possibility of using an Apple iPad for control. iPad apps such as Lemur and TouchOSC not only give users full ability to design their own control interfaces but there are already several user-created templates designed for Rsolume and Ableton Live available for immediate use. The main problem I found was that the hands-on quality of the APK40 and Korg nanoKontrol gave me the ability to control more parameters at once as well as, most importantly, not have to look at what I was doing. Instead, I was able to focus on what was happening on screen.
03 Production

3.1 Content

Having defined a clear approach to visual production that I was satisfied with, I set out to create animated clips. In meetings with Marla Schweppe, we decided that producing a modular system of clips focused on one particular design element, such as point, line, texture, etc. would make them inherently more ‘mixable’ and easier to layer them over one another to create designs.

To produce the clips, I first went back to the experiments I had conducted with direct animation. This seemed to be the most logical way to capture the energy of painting and combine it with motion. It didn’t take me long to realize that the process of acquiring either 16mm or 35mm leader, not to mention the resulting digital transfer, was out of reach for the scope of this project.

But did I really need to use film? It occurred to me that simply utilizing large sheets of inexpensive clear acetate and cutting it into film-like strips would essential achieve the same effect. After drawing and painting on the acetate (Figure 6), I could digitize the strips in sections with a desktop scanner, assemble them back into long film-like strips in Photoshop, and then bring these strips into a motion graphics application such as Adobe After Effects or Apple Motion to animate their movement across the a frame much like film passing through the gate of a projector. I could play with timing and
movement as well as experiment with different frame rates before rendering them out and bringing them into Resolume for compositing with the other clips.

Figure 6. Painting on a strip of acetate.

Professor Schweppe suggested taking things a step further: there was no reason to confine myself to strips or otherwise vertical movement when animating. For the most part, however, I stuck to the strips as I was enjoying the results of exploring the film metaphor. At first I went as far as to divide the strips into sections that would be equivalent to a frame of 35mm film, approximately 24x36mm, by marking the edges of the strip with a permanent marker. This way I could deliberately create movement from frame to frame like I did before with my 16mm film. As it turned out, this proved to be needlessly complex and time consuming and didn’t produce result any less satisfying to
me than simply treating the entire strip like a giant single canvas and covering it from top to bottom.

As mentioned before, the process of creating these strips was inspired by the direct animation technique of drawing, etching, and hand-painting on film. Additionally, because the strips would not be projected, I could glue, tape and otherwise mangle the strips as I pleased, just so long as it could be digitized in some way. I focused on one element at a time - sections of lines that gradually shift direction (Figure 7), points that change size or definition, large washes of watercolors that bead and splotch across the surface of the acetate (Figure 8).

After scanning a strip in the largest sections my flatbed scanner could fit, with a little overlap so I could line them up easier in Photoshop, I would create a 300,000 pixel tall document in Photoshop (Figure 9), the largest height supported by the present version. I set the width to 1920 pixels in order to support HD sized video. Then I reassembled the strips by placing them one after the other, using the overlaps to guide me and making adjustments to get the strips to fit the 1920 pixel width properly.
I created an action in Photoshop that takes the finished composition and divides and exports it into twelve 1920x30000 strips at the resolution of 72 pixels per inch (Figure 10); this is after I encountered memory issues bringing the 1920x300,000 original into After Effects. By breaking the strip down into smaller pieces I could then bring them into After Effects, build separate compositions for each strip and then combine them together into a final, ‘master’ composition.

Figure 8. Watercolor wash across acetate

Figure 9. Photoshop settings dialog box.
In After Effects, I assembled a 1920x1080 composition that lines up each strip one after another and animates its position vertically or horizontally across the frame (Figure 11). Nesting this composition in another, I would then experiment with different frame rates, motion blur, frame blending and focal lengths to evoke the effects of running film through a projector. This is then rendered and exported into a format that Resolume can use. Although I started out rendering clips out as PhotoJPEGs, a low-bitrate/high quality format commonly used in live VJing, I eventually settled on Resolume’s native DXV format which is optimized for use within that program.
Figure 11. Strips arranged for animation in Adobe After Effects.

This process interconnected well with my theme of creating elements ‘out of sync’ from one another in the hope that they would come together in performance. Each strip I created was a stand alone piece of artwork and not specifically designed to go with any another strip. Clips that focused on point, line, color, texture and shape could be used alone or in juxtaposition with other clips in any number of ways during performance. This left me the freedom to design each piece in any way I felt inspired with the intention that larger visual relationships would be imposed in performance.
3.2 Performance

The final stage was to assemble the clips into sets in Resolume. Although I initially added clips to Resolume fairly randomly, I was able to refine their arrangement, the layering and the effects over the course of several performances.

My first performance of this content took place during Imagine RIT in May 2015 (Figure 12). My setup consisted of the APK40, the Korg nanoKONTROL, a four-channel audio mixer and the projector and screen in the back studio. This performance lasted for about six hours, which gave me a lot of time to build and develop the set. Feedback forms provided for visitors revealed that, in most cases, it seemed that regardless of my motivations for making visual choices, audience members were seeing what they wanted to see, some figurative and others emotional.

Figure 12. Performance at Imagine RIT, May 2015.
Changes to the set can all be saved and recalled, so I can pick up the next performance where I leave off in the last. Each of the shows I’ve performed up to this point have been long ones, so I spend the length of each show building the set in some way. Applying effects here and there, arranging clips in different ways, layering, and then I’ll go on to the next show and continue where I left off, so it develops over time. It constantly evolves, and each performance is unique.
04 Conclusion

Professor Schweppes often reminded me that this project was a beginning and not an end, and to that point, reaching the end has indeed brought me to a new starting point. When I began my thesis, abstract, non-representational graphics were a means to an end; I was looking for a way make live design fluid and expressive, creating a set that could be expanded and adapted to a wide variety of situations. Developing an approach to production and performance that were independent from each other, or ‘out of sync’, was a way to maintain this open-endedness. I hadn’t considered the impact the abstract imagery would have on the audience, yet this turned out to be the area I received the greatest amount of feedback. Viewers responded to the performance visuals, whereas the majority of my time has been concentrated on the content development. This has kept me from seeing the ‘big picture’, and audience feedback has made me more aware of this.

During the thesis defense, Peter Byrne and Dan Deluna were very supportive of the abstract nature of the project. When I performed Imagine RIT, some viewers suggested I develop a narrative to the performance to make it more accessible. Professor Byrne, however, suggests that abstract visual structures can stand on their own, leaving viewers to attach their own meanings. The viewer feedback I’ve received supports this.
When I participated in the ROC the Year of Light festival in June of 2015 as part of a joint performance with Professor Schweppe, I projected my performance on the side of a building for an entire evening (Figure 13). One viewer, Christine Adamo, was so moved by the visuals that she wrote an in-depth article about it for arthousemag.org, stating, “The installation is inspired, unfolding in an act of improvisation so striking it stops you dead – mouth agape and eyes transfixed,” ("Chuck Miller Takes It to the Street: An Installation Worth Staying Up For").

At another showing, for Professor Schweppe’s Production Design course, one of her students commented that my performance inspired him to want to learn more about abstract art. This makes sense as, for me, the content creation process is comparable to creating abstract art. When I combine clips with others in a performance, they complete the design by coming together in ways both in and out of my control. This can’t be over-planned and spontaneity is key. My role is split between the creator of content, and later as a sort of a director/performer, choosing which clips to bring in or out and how they should work with the others.

In hindsight, I could have spent much less time researching performance applications and production methods. I eventually arrived at the realization that any of the different applications and control devices available could help me to achieve the result I was after, more or less. The solution was settling on applications and controllers that I felt most productive with and then getting to work. I probably would have benefited by putting more energy into performance development. I would have realized the
importance of audience feedback sooner. It was really in the concentrated push to finish my thesis that I discovered what I was really searching to achieve.

Moving forward, I anticipate the challenge of seeking out more occasions for exposure. Every day I'm finding more ways, both online and within the community, to develop an audience and give my work a greater cultural presence.

Figure 13. Live performance setup at the ROC the Year of Light Festival, June 2015.
05 Bibliography


5.1 Selected Performances

RMSC After Dark, The Science of Sound, October 2014

Imagine RIT, May 2015


ROC the Year of Light, July 2015

5.2 Citations