Reflection on My Music Visualizer Journey

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> *"The absence of limitations is the enemy of art."*
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> — Orson Welles

From Technical Implementation to Experiential Design

Building upon the challenges I previously took in the first assignment, this music visualizer project allowed me to deepen my, although somewhat introductory, evolution as a designer. Moving beyond just visual aesthetics, to create an immersive multi-sensory experience that connects sound, vision, and physical interaction.

> *"The world as we have created it is a process of our thinking.*
> *It cannot be changed without changing our thinking."*
>
> — Albert Einstein

Change of Perception

When I first encountered the tunnel-based music visualizer on YouTube, I approached it as a technical challenge. Yes, I was very much drawn to the aesthetic, but I wanted to deconstruct and rebuild. The pivotal moment came when I stopped watching the visualization as a programmer and started experiencing it as a listener. During testing, in the beginning, I noticed that while bass frequencies triggered visual changes, the emotional qualities of the music weren't being captured.

This realization was the one that most shifted my approach, almost fundamentally, from asking "How do I make this work technically?" to "What do I want people to *feel* when they hear and see this?" My enhanced version shows this evolution with more nuanced understanding of auditory perception. I started with adjusting the parameters for identifying the frequencies, which was difficult, as it ultimately depends on perception. But this wasn't just a numerical adjustment, it represents my growing awareness that design must be grounded in human perception, not just technical parameters.

Finding Power in Constraints

The Welles idea about limitations, something a lot of people have touched upon, resonated deeply during this process. In early explorations, I experimented with numerous Arduino components.

Servos, multiple light arrays, various sensors for light, humidity, etc. Eventually, this just led to feature overload rather than cohesive design. I realized I was adding technical components purely because I *could*, not because they served the experience I wanted to create.

So this led me to a more disciplined approach. Asking "What will meaningfully enhance the connection between music and visual experience?" It gave me clarity and allowed me further to focus on the quality of interaction rather than quantity of features.

Music Theory Meets Visual Design

The most challenging aspect of this project was venturing beyond my technical comfort zone into music theory. Despite limited musical background, I implemented sophisticated features like contextual onset detection, dominant note selection (evaluating note strength decay, echo memory, perceptual thresholds, harmonic context, and energy spikes - all to decide when a chord has changed) among many others. They represent my attempt to mimic aspects of music cognition. Another example is my implementation of Scriabin's synesthetic color system. My girlfriend's musical expertise proved invaluable here. Which also to me highlights the importance of interdisciplinary collaboration. This taught me that meaningful innovation often happens at the intersection of different knowledge domains - a principle that extends to all design disciplines.

Context and Coherence

Implementing different modes for music versus voice, for example, showed me that context really matters in music. And voice having different frequency characteristics, requiring different processing approaches. And this, along other things, showed me that more than just the specific values (although a big part of it) - the idea was recognizing that good design adapts to different contexts of use.

Early in development, I implemented features in isolation - beat detection, chord recognition, camera controls. But they weren't exactly a unified experience, more standalone features and almost a way to just show complexity. I began creating systems for aesthetic coherence, no longer thinking about camera movement and beat detection as separate features, but as elements that needed to work together. And this holistic thinking is core to what makes a good design. Understanding that individual elements must support rather than compete with each other.

Physical Interaction

The Arduino-based physical controls emerged from a desire to create a more embodied experience, not just something one can do on a desktop. The ultrasonic sensor for controlling visualization speed transformed ordinary hand movements into expressive gestures. While ensuring the system remained fully functional with standard keyboard/mouse controls, the physical interface created a different quality of experience. These different interaction modalities don't just provide alternative control methods for the user but transform how one relates to a particular design.

Learning Arc and Future Direction

Now, comparing this to my first project reveals clear progression. My "Dimensional Vortex" focused primarily on visual aesthetics and technical implementation. This music visualizer represents a more sophisticated understanding of design as creating meaningful connections between many different elements (sound/vision, physical/digital).

My thinking ultimately evolved from "what can I code?" to "what experience do I want to create?" Whih is a fundamental shift to my point of view towards design that will influence all my future work. Especially the ideas of beginning with goals towards experience rather than technical specifications, consideration of perceptual factors alongside functional ones, prioritizing coherence and embracing constraints, and seeking interdisciplinary connections and collaborations.

My understanding of design as a discipline around experience rather than merely a technical one has most definitely grown throughout this course. I've moved from seeing code as "a means to solve technical problems" to "a creative medium with expressive potential." The beautiful connection between technology and design isn't found in technical complexity for its own sake. But in the thoughtful application of technology to create experiences.