Interactive Media & Pure Data

//Patrick Pagano

When people ask me about how I got interested in computers, I always say that I was an artist seduced into technology. Like Harry Partch, the American artist, who created his own instruments, I felt drawn to creating instruments that apparently did not exist yet. I spent about 20 years studying Hindustani classical music and the visual aspects of meditation—the Yantra in particular always interested me. The Yantra is defined as a "mystical diagram, mainly from the Tantric traditions of the Indian religions" and the eye is drawn to, the "Bindu," a point at its center—or in computer terms the "Pixel."

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This mathematical beauty brought together my interests at that time: musical meditation (Raga), with visuals and mathematics (harmonics). This led me to a series of works that united extensive musical durations (lasting longer than humans could play) with musical intervals and visuals that transformed over days, weeks and months. For some pieces, I had designed the harmonics and the visuals to evolve over years and in one particular piece, "Reveal Archon," the piece would unfold and exist over many lifetimes. In the "Choir of Past Lives" I would join myself and previous incarnations to accompany the visuals that at that point only my mind could see. I soon realized that my ideas which many kindly called "esoteric" could not be realized without some technological advancements.

During the summer of 1994, I was the curator of a studio that was hosting a set of Harry Partch's instruments. The studio was the South East Just Intonation Center; a Harmonic Theory School dedicated to teaching a system of tuning described in Plato's "Timaeus" called Just Intonation. The system of Just Intonation designates pitch and musical chords with small, easily understandable, mathematic ratios. The intervals are more pure than traditional western instruments (such as Equal Temperament) can produce. Our cerebral cortex responds to these intervals with intense focus or euphoric feelings and some claim it exhibits healing properties. Once again, the precise intervals I was focusing on to produce brilliant harmonics needed some sort of technological advancement for me to fully realize the "sounds in my head."

That summer, I was given a 386 computer by Allen Strange who was on the board of the Just Intonation Center. Allen wrote one of the first books on how to compose electronic music with synthesizers. I found that with some tweaking I was able to run a program called "C-sound" originally written by Barry Vercoe in 1985. Prior to this generous gift, I could not afford a computer. In high school they had taught us "Basic" with the final project objectives of spelling your name with asterisks. This is what I call the "bear skins and knives" (i.e. primitive) days of computing. I spent the summer learning C-sound and dove headfirst into a new mystical world of computing that not only mirrored the crazy "esoteric" ideas spinning around in my head, but extended them to include the visual range of frequencies and color that were simply higher octaves of sound in the form of audio-reactive screensavers. Computing was now a way for me to transform the durations, intervals, and harmonics into realms that others could experience. Years later, in my installation and live performances I created doorways for others to enter and participate in the pieces if they so wished via Interactivity.

I found that the easiest way to convey ideas about programming interactivity to students, or to express what I was thinking to collaborators, was through music. Almost everyone

could relate to music and could then when they were comfortable make the leap "UP" several octaves to the visual realms of light. Almost magically, though, the next semester I found that there was a class in electronic music being taught at the university and they were teaching: C-sound; just another of numerous coincidences I have found in my life regarding my interests and computing. I took the class and because I had spent the previous summer ingesting C-sound, I did very well. So well, that I was allowed into a graduate course being taught on "MAX"—a program originally developed @ IRCAM by Miller Puckette and named after the father of computer music, Max Matthews of Bell Labs. Though as a poor graduate student I could not afford an expensive Macintosh in those days, the professor took a liking to me and allowed me to use a studio computer: A purple SGI O2. But because it was an SGI it could not run MAX—only an experimental version of MAX called PURE DATA. I soon found that not only did Pure Data run faster than other programs, it also had a visual component library called "GEM" written by Mark Danks, who went on to create multi-million selling video games for The Lord of the Rings. The Graphics Environment for Multimedia basically makes all of OpenGL—the most powerful computer graphics language available for interactive control inside the open source—and the still free Pure Data. I was in heaven.

Suffice it to say that after about 25 years of programming with Pure Data I still use it daily on personal projects, inside Unity3D—a popular game engine, on iPads, iPhones & androids in musical synthesizers, in my personal graphics and interactive installations, and in my international presentations and workshops ranging from Florida to Australia, NYC to India. And now it is my complete joy to employ it as a tool to teach interactivity in the DMD program at the University of Connecticut, Stamford Campus, in a variety of our courses in the Web & Interactive Media Design Track, to illustrate "Interactivity."