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Theory IV- Composition

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For my project, I wrote a program and python that takes a video file and procedurally generates an audio track to go along with it. This means that, with the program, you can an arbitrary video file and get a piece of music as a result. The program takes in the video frame by frame, and based on certain parameters gleaned from analyzing the video, it decides what frequency of tones to play during that frame.

The most evident type of tone is a sine wave that corresponds to the intensity of color in that frame. Intensity is a measure of the Red, Green, and Blue values of each pixel in the video frame, with a higher intensity corresponding to closer to white and a lower intensity corresponding to closer to black. A higher intensity means higher pitch, and vice versa. As well, I added the partials to the base sine wave frequency and followed decibel attenuation related to how the overtones usually appear (so the fundamental is at a certain volume, the first partial is at half the volume, the second partial is at a fourth, etc.).

Other sound possibilities include noise in the lower audio range when there is a lot of yellow in the frame (3 sine waves around 220 Hz) and an ascending and descending line in the midrange when there is a lot of green in the frame (Between 700 and 900 Hz).

Originally, I had the idea to imitate the ideas of Stockhausen and implement many more different audio tracks, each coming in and out as the video analysis told it too. I was coming up with ideas for what would be considered points, groups, and fields. However, this came with a dilemma. As I altered the program more and more, I got to a point where the music became more and more disconnected from the video itself. Without just more basic ideas, it was much harder to tell how the audio corresponded to the video.

More importantly, my altering also created a philosophical dilemma. In going the path of Stockhausen, I lost the more Cagean path that I thought my project should take. Cage was a proponent of leaving many musical choices up to chance, while Stockhausen's music (*Kontakte* as an example) have a clearly rigid structure to them, while something like Cages *Music of Changes* can feel much more random. In the video we watched of Cage in class, Cage states that he doesn't want sound to pretend to be something it isn't, like a bucket or a president. Cage just saw sound as something that should be, and my project is an attempt to do this.

In writing a program to make music, you inevitably have to make a lot of decisions about what sounds the program is going to make. Sure, there is an element of randomness with the choice of video and some of my parameters have randomness built into them as a necessity, but eventually, you're kind of just constructing a piece with delineated sections and a well-thought-out beginning, middle and end.

Because of this realization, I decided to add the bare minimum to create something musical, yet random all the same. Most of all, I wanted my piece to feel natural, although natural might not be the right word, since the tones are all pure sine waves. In using things like the harmonic series to generate the tones, and having some randomness in tone choice, I attempted to bring my piece closer to the natural.

Included with the program are four video/audio combinations that display what the program is capable of making. Of course, since this program takes in arbitrary videos, there are necessarily infinite possible musics able to be produced from this program.

A lot of the parameters were decided either from things in nature (overtones) or randomly. However, this program is alterable such that the composer's input becomes less and less recognizable in the work, which is another Cagean idea that I ascribed to in the writing of this program.