

Music in Motion Milestone (May 19th)

Project Members: Tyler Sadlier

Recap of proposal description: Music in Motion is an interactive sound-art installation that uses the motion of balloons through a performance space to modulate synthesized sounds in realtime. MiM will utilize two webcams and a computer vision python script to determine the XYZ coordinates, speed, and color of balloons thrown by participants. This raw CV data is fed into a Max host patch where it is trimmed, filtered, and sent to multiple plugins within a DAW. The motion data will be used to artificially pan synthesizers using first-order (at least) ambisonics plugins as well as modulate synth pitches, filter sweeps, and other sound effects in realtime. Different balloon colors will be tied to different timbres and “instruments,” as well. MiM should be tuned such that participants are clearly aware of *how* the motion of their balloons changes the sound in the space. Ideally, I hope for the motion tracking & ambisonics panning to be robust enough that a participant could throw a balloon and hear the perceived sound source of their balloon’s “instrument” move away from them, directly in motion with the balloon.

Developments: In preparing to present the Music in Motion installation at Frost on May 20th, I have had to make a few changes in development direction. The first change to my initial plans was deciding to use one webcam instead of two. Developing and programming my own method of detecting depth using a stereoscopic camera pair would itself be a quarter’s worth of work, especially with my relatively limited experience with computer vision. Additionally, using two webcams to detect depth would likely be a tuning nightmare, given that minute changes to their relative positioning could easily throw off depth calculations. A Microsoft Kinect could have potentially solved this problem, however I would need to rely on several community developed libraries to utilize the Kinect with my Mac (and I also do not have a Kinect). Instead, I opted to use the relative size of the balloons on the video feed to roughly guess depth, or distance from the camera. The second change in plans was to use the cv.jit Jitter library for Max for the computer vision component of the installation (which I previously had experience with) rather than writing a Python script and using the SimpleCV library like originally planned. While I was able to get decent motion tracking for single objects implemented using a Python script on a Windows computer with SimpleCV installed, I was having difficulty filtering out motion by individual objects. Additionally, none of the MIDI Python libraries I found online were capable of sending midi CC messages (which I was planning on using as my communication protocol between Python and Max/Ableton), and I found few workable solutions for sending the computer vision data to Max or Ableton via serial. I also could not properly install SimpleCV on my Mac laptop, even after several hours of troubleshooting. I ultimately decided it was not worth it to pursue writing the computer vision script in Python, even though it would theoretically provide better performance than the cv.jit library. A benefit of working in Max so far is that the GUI allows me to tune my video inputs faster and more easily.

In order to filter out irrelevant motion, I am mounting the webcam high above the ground (and using a USB extension cable). I’m still having trouble tracking multiple objects on the same color filter, so I may end up using only one balloon of each color in the final installation. I am currently using Envelop for Live for ambisonically panning sounds in Ableton Live.

Final Setup: The final setup of my project will be comprised of 4 loudspeakers mounted on speaker stands (and positioned in a ~12’x12’ square configuration), 6 balloons of unique colors (green, blue, purple, red, yellow, and pink), a Logitech webcam mounted 6 to 8 feet above the ground, and a MacBook Pro running Max, Ableton, and Jack connected to a 4 output audio interface. MiM will be installed near the entrance of Bing on May 26th and 27th, the two days of the CCRMA concert hosted in Bing Studio.