

“Breath and Brass” wrap-up

My Contribution and Analysis

When our group (Michael, Quincy, Mauricio, Francesca, and me) started this project, we had two goals in mind: to visualize the music in a spatial fashion, and to tie this to the physicality of the musicians' breathing. Our original concept statement: “We will visualize breath data and the notes, volume and speed of the music in conjunction to reveal the connection between the physicality of music making and the relationships of the sounds and instruments to each other.”

I participated in the initial brainstorming sessions and we determined to use two techniques, related to the two goals. The first was audio analysis, meaning we would set up a microphone on or near each instrument to record the sounds it generated, then use a computer program to convert the sound into usable data. This would utilize existing equipment and impose minimal effect on the musicians; the stress would be on the code we wrote to parse the data and transform it into something interesting (other than sonically). The second technique was breath analysis, meaning we would monitor the musicians' breathing and use another computer program to convert that into usable data. This would be simpler from a code perspective (returning only a single type of data, easy to parse) but would require us to build our own equipment and impose the use of it on the musicians. We would combine the information from the two data sets into some kind of unified expression of the music performance.

We settled on the Poulenc piece for three brass instruments, ideal for our breathing-focused goal since playing a brass instrument requires strong breath control. While Michael and Quincy focused on designing and building the breath-monitoring equipment and putting together the code to read the data, Mauricio and Francesca and I tried to figure out what

we should do with both data sets. We had already discussed ideas around giving each instrument a visual representation that would behave according to the musician's performance. Eventually Francesca and Quincy created some aesthetic mockups and Mauricio and I got to work developing them in prototype form using openFrameworks.

There were two ideas. The first was a collection of concentric circles of increasing radius around which smaller circles would orbit, controlled somehow by the music. We further determined to make the radii increase and decrease as the musician breathed. The other idea was three organic, snakelike objects of varying thickness swooping about the screen and occasionally spiraling--each would represent one instrument and in this case too its behavior would be determined by the music, while its thickness would map to the musician's breathing.

Mauricio took on the concentric circles prototype while I took on the snakes. The first challenge for me was to come up with a system that would achieve the desired "breathing" aesthetic, and I fixed on composing each snake of many individual lines, perpendicular to the direction of movement and with length according to the breathing data. I created a faked breathing data stream using trigonometry to test out the prototype (since the real system was still under development). This generated a very nice seamless, organic look that truly suggested this was all one shape (rather than many lines next to each other) and it worked well with the faked breathing data and movement in a single direction. Furthermore, the individual lines created an unexpectedly beautiful gradient-like effect across the body of the snake.

However, if the movement changed direction, the seams between the lines became apparent and it was clear that this was not in fact a single shape. I experimented with some additional systems to deal with the gap, including one to fill in excess space with additional lines and another to vary the lines' thickness (actual thickness, not length) in the hope of a more consistent aesthetic, and I added some controls to turn these new systems on and off so we

could experiment with the varying effects. I implemented all three snakes and gave them different movement and colors so we could see how they looked together, though the visual aesthetic itself was still very bare-bones and the behavior (other than snake thickness) was not tied to incoming data. We still had to determine how the music would influence the creatures. Meanwhile Mauricio was working on the concentric circles example, and I helped him to debug the code and brainstorm implementation techniques for that concept.

At this point we had multiple separate openFrameworks code projects, created for specific ends--one for the breathing data, one for the snakes example, and one for the concentric circles. We also had a separate example provided previously to do audio analysis, providing the raw data. However, we would eventually need a single program incorporating all the functions. So, I took on the task of integrating all the individual projects into a single new one. In order to do so I created special functions for each aspect of the program (breathing, snakes, etc.) to easily turn portions on and off. This resulted in cleaner code, keeping everything sorted, and also simplified debugging. I encouraged people to work inside the integrated project.

Hoping to improve the visual aesthetic and lock down the behavior in relation to the music, I sat down with Francesca to show her how the code worked so that she could make revisions directly, building on the vision of her mockups. Implementing data from the audio analysis was more problematic. The example we had was overly-complex and made it hard to get the specific information we wanted. We eventually decided to abandon the example and use another, more accessible one; unfortunately we didn't arrive at that decision until the very end, just before the deadline, so there was not as much time to push the music-based behavior as we wanted. However, a final heroic push by those who went to Miami resulted in the beautiful final versions that played on-screen during the concert.