

Final Project Paper

Glasses at a Picnic

My goal for this instrument was to build an interactive piece for a general audience that produces soft sounds that compliment glasses resonating and natural sounds. When I think of the instrument I imagine a setting on a cliff near an ocean, where a small tea party/picnic is occurring, surrounded by sounds of ocean waves crashing below me, wind blowing through bright colorful flowers, glasses clinking and a ukulele playing in the background. Its supposed to be a very relaxing and calm setting, which I believe is portrayed in the final performance through the small gestures and sonic features of the performance.

The Physical and Interaction Aesthetic

Beginning with the setup of the instrument, its a tabletop with 3 main regions and separate glasses that are sensitive to their position within a ring. The manipulation of sounds on the instrument involves slow gestures of picking up and placing down cups, moving them around and fiddling with their orientation. All of these gestures are very minute when compared with the bigger stronger

gestures such as those of playing with chester, or the harshness of Author & Punisher's rails. They also involve a much smaller spacial region in which sounds are produced — just the small ring as opposed to Autumn Roger's Gloves or Roosna & Flak's pieces that involves the full range body motion sometimes across an entire stage. However, what I find very appealing in the restricted small space is that it can contain just as much complexity in the types of sound control, but requires much more attention to be able to control it in a way you want. Something about the intimacy of smaller gestures seemed to attract me more and more over the semester towards liking these smaller gestures and I tried to base my final instrument design mainly on smaller gestures.

Marije's talk about her experiences performing were specifically insightful where I realized how much power the use of scenes can have. At this point I had seen the ability of triggering scenes in Roosna & Flak's works with certain postures, however, something about Marije's performances and the way she described the use of scenes made it sound even more appealing to me. I think it comes down to the idea of being able to generate a completely different aesthetic with the sound space using the same gestures. This is where the original idea of having multiple objects of interest on a tabletop came (as opposed to my original idea of only one object being explored on a table top). These multiple cups provide a new dimension of interaction with the sounds where they represent scenes, and these scenes can be active at the same time. If we look at individual cups, they represent a certain sound feature, for instance, the thick blue cup

controls the ocean and wind sounds, as opposed to the black cup that controls higher frequency chirps and the string instrument sounds.

One thing that is really cool is seeing how my idea of interaction methods changed over the semester. I came to the class thinking about bigger motions, more chaotic sounds; I was a huge fan of death grips. I also always associated digital instruments with big performances, even though as we have seen throughout the semester, it really isn't like that. Through the artists, I fell in love with the smaller gestures, especially in performances like Roosna & Flak's more recent performances (2020-2021) toes in the snow or propping themselves up and down a wall.

I also really enjoyed the presentation about STEIM, especially where we learned about how they approach digital instruments. I think the instrument design is inspired a lot by the vases where people from the public interact with them and try to learn how they work through their interaction. A huge part of the inspiration used for my instrument stemmed from asking myself if I had that vase in front of me, how would I try to make sounds? I think it felt very natural for me to tap the vase with my knuckles and nails, and this made me want to have a main instrument that is resonant — hence my choice of the most resonant object I could think of, wine glasses! Other forms of interaction would be trying to move it around, rotate it and perhaps lift it up. All of which are mapping I ended up putting into my final instrument, which is why I think subconsciously I was inspired greatly by that vase instrument.

The Sonic Aesthetic

For the sounds, the performance uses 3 types of sounds: soft pure tones, faux nature sounds created by oscillators and samples. Every wine glass (or equivalently, scene) contains a combination of two of these sound types. They are all made to be very soft and low volume, such that they don't take away from the sound of interacting with the instrument. I think the ability to touch the instrument and feel it is very important, this ties into the reading we had by Bert Bongers that outlines interactions with instruments, where I realized how feedback from an instrument changes the type of metaphors attached to the instrument. In this instrument, since it is supposed to be a table with glasses on it, I think the sound of glasses being placed on the table, knocking on the table or clunking of glasses are all sounds that really shouldn't be overshadowed by the generated sounds, after all the sounds were designed to compliment them as opposed to using the setup solely as a controller.

The sounds all contain breathing motions by applying sinusoidal envelopes on them, a metaphor to the calm nature of the instrument that forces the performer to slow their breathe to match the instrument, effectively both breathing together in sync. Most of the samples were made by sitting next to a small river with a wine glass, thinking about what compliments a wine glass resonating next to a river and trying to interact with my surroundings. I interacted with tree barks, pipes and stones to find sounds that I thought fit my vision and

sampled them. I found it very interesting that the sounds I ended up choosing as samples are the least natural sounding sounds, while the wind/water sounds were all produced using oscillators.

I also liked how some of the performers we saw had their audience sit around them as opposed to in front of them (Marije and Roosna & Flak both had such performances). This made me start thinking about spatial performances, where the performer gets closer and farther away from you even though you could be anywhere around them. This inspired the spatial features of the sound, while the cup moves around a circle, a metaphor of a performer on a circular stage, the sound also moves closer and farther away from an audience (and the performer!), where now instead of the performer moving closer and farther it is the sound of the performer moving around as the cup moves around the circular metaphor of a stage.

How it felt to play

When designing the instrument, I found myself designing for a performer rather than an audience, so I think the feeling of playing is an essential part of what the instrument is. I planned for the instrument to be a performance to the self as opposed to an audience, and watching how I looked like performing in videos is very cool especially when contrasted with other instruments I performed on. When playing I noticed that the instrument forced me to take a breath and

pause on multiple instances. At no point did I feel a rush similar to the ones I associated with Chester that triggered big motions and chaotic sounds or did I start bobbing my head following a beat like when performing with Knuckles. Instead it was a very slow paced performance that made me pay attention to every move, I looked really focused. Before beginning the performance, I had multiple instances where the person filming me would give a queue to start, I would stare at the table for a bit, take a long breath and then start. She even noted how focused I looked when performing.

Another feeling I enjoy is the touching of glass cups and placing them being such a powerful motion (it controls all the sounds produced) even though they are such delicate objects. The weight of wine glasses and fragility associates a very nice metaphor to me, picking up the glass and placing it, moving it along the table and feeling it resonate as you hit it adds to the feeling of the performance. The feeling of an instrument strikes me as the most important part of an instrument, I was obsessed with Author & Punisher's big aluminum knobs, the reason for that is probably the way he described them. It seemed like the weight of the knob and the momentum required to stop them meant a great deal to the performance, and similarly I wanted a feeling that compliments a soft performance, in this case fragile thin glass as opposed to big metal knobs.

Challenges and Reflections

Throughout building the instrument, multiple challenges popped up in different parts, I will first discuss the soundscape of the instrument. A lot of the time I would imagine a sound and find that even though it sounded really well and complimented the sounds, it didn't really compliment the interaction. I spent a really long time finding metaphors that match interaction with sound; moving a cup around should increase the breathing effect but not move too much in 3D space if the cup looks heavier. Tuning those little interaction-sound metaphors took time but once I had defined a strict interaction-to-sound mapping idea in my head (doing x induces y but impacts z), it became much easier.

In terms of the interaction, the user had to find it intuitive to interact with it, so I found myself needing to step back and trying to experience the instrument from another persons perspective. I found that it was hard to not over focus on certain interactions having worked with fine tuning them a lot. The way I ended up approaching this was taking an entire weekend where I didn't touch the instrument at all and took a video of myself with multiple glasses interacting with them in different ways. Rewatching these clips made me realize that rotating the glasses was a much more prominent interaction than resonating the glasses, which in hindsight makes sense. I also found new interactions that way (such as lifting and fiddling the glass midair), which didn't need a new mapping, but when performed on the instrument gave different sonic responses that sounded cool.

Being so close to the programming part, I feel like I wouldn't have noticed that aspect of interaction if I always performed on the instrument as opposed to video myself fiddling with glasses outside the idea of an instrument.

Implementation wise, I faced some problems initially, which made me re-approach how I originally planned to detect the cups. I ran into issues where the intense resources required would cause the audio in pd to start clipping and this made me move away from the complex CV algorithms to a more basic (but equally interesting) fiducial markers called AprilTags. I also had to find a way to position the cups in 3D space without needing a lot of resources, and that ended up requiring the fiducial glasses that introduced a whole new method of controlling parameters and with some geometry, you could map a 2D image to the position of 8 cups on a 3D plane!

I definitely think taking steps back from the original design in all these cases was very helpful for achieving what made it feel like a—in some sense—complete instrument that delivers what I had in mind. I am very excited for this summer, where I think I will get much more time to work on the sonic features and being able to deliver these features properly possibly using a surround sound system. I think there is a lot of room for improvement in the sounds I chose and a better way of experiencing the sound will also help in merging the performer with the instrument.

Appendix



The 4 voice glasses next to each other, from left to right, (1) the thicker more stout glass moves less in space, controls natural sounds (rain and ocean) produced by oscillators, it also controls two samples of a thick wine glass resonating under a thumb pressure and the depth and volume of two oscillators I built from scratch in pd that produced whale-like low frequency sounds. (2) the thinner blue glass moves around space more and controls sounds similar to those of Capacit and the frequency, sharpness and 'flux' of the two oscillators which the thick cup controls - this means that using glass 2 without 1 has a completely different sound than when 1 is active (or in the hold/decay region). (3) the pink glass is the one that moves the most in 3D space due to its geometry and lightness, it mainly controls the sounds produced by the pipe rotating and changes their frequency and pitch. (4) the black stemmed glass mainly controls a string instrument playing different melodies.

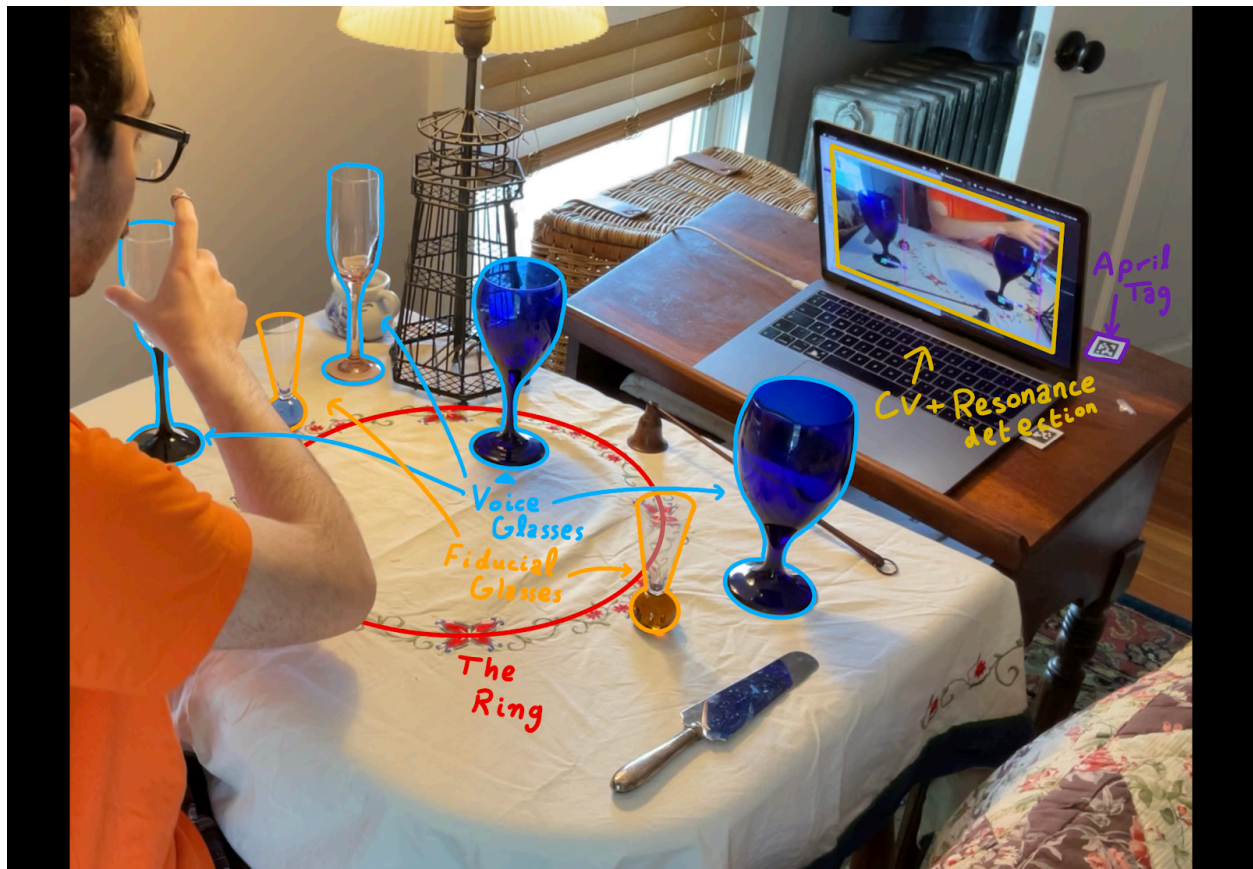
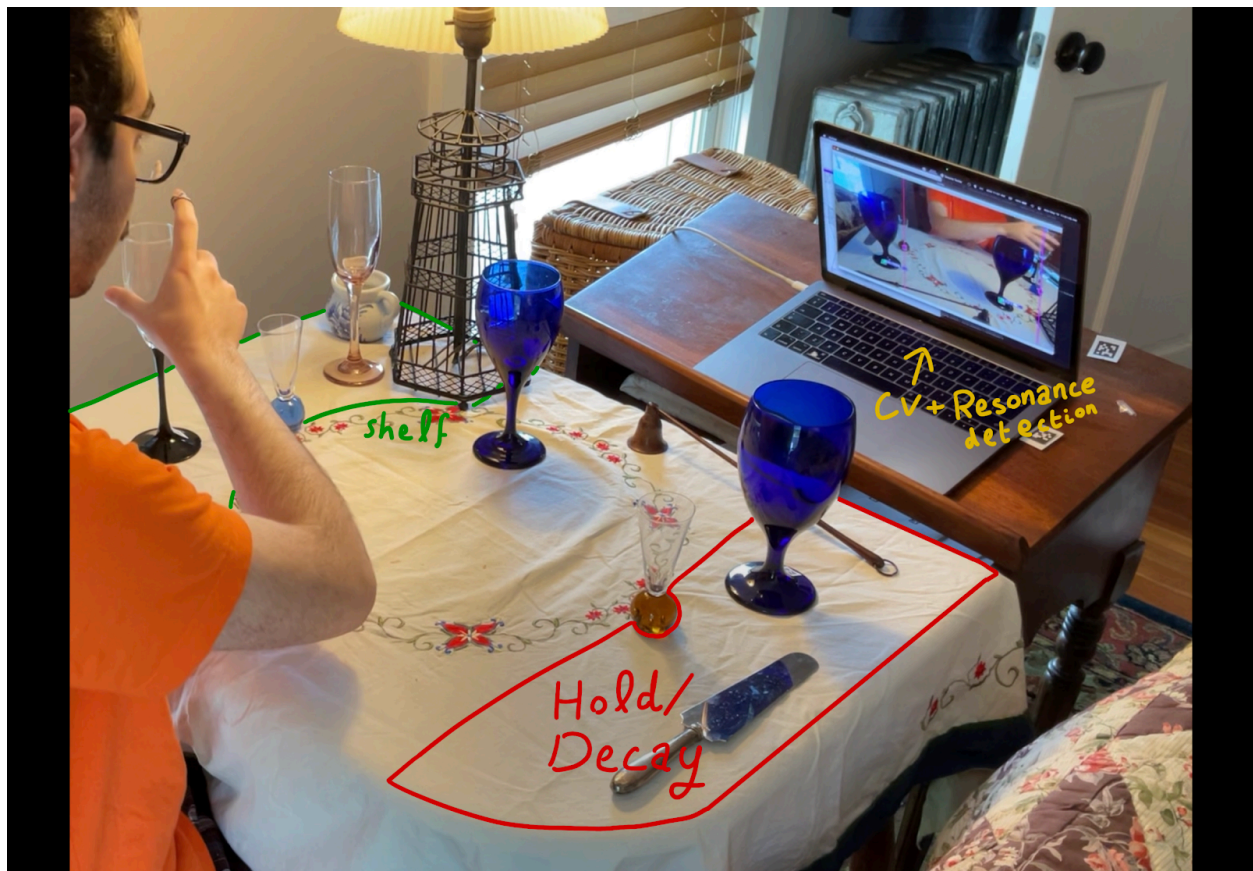


Image from behind the performer showcasing the two types of glasses (voice and fiducial), the ring that activates voices, the AprilTags used for detection and the CV window that might guide the performer if they choose to perform with it.



Same perspective as before showcasing the two regions other than the ring that affect the voice qualities.