Names: Mars Lapierre-Furtado and Bianca Granata

Working Title: Synesthetic Keys / Synesthesia Lab

Summary:

A dual-interface soundboard that users can interact with both digitally, through keyboard keys, and physically, through a hand-crafted interface. Visuals (which can be projected to create a more immersive experience) will respond dynamically to sound inputs.

ARTISTIC VISION

Concept and Inspiration

After brainstorming ideas for this project, we chose to create a unique soundboard experience because we wanted to explore the intersectionality between interactivity, playfulness, and open-ended creative expression. This project is about exploration and the final product. We want users to actively engage with our soundboard and try every button to discover all of the possibilities.

Interactivity is such an important part of this project because the public is not a passive observer, they become active participants and co-creators. The design will encourage playful exploration because there is no right or wrong way to interact with it, just an infinite list of ways to experiment.

Artistic and Creative Goals

With this project, we try to break down the line between artist and audience. The project is not a static piece; the soundboard evolves with each interaction, allowing the user to become part of the creative process.

This project will also aim to merge art and technology and create a seamless experience between physical interactions and digital feedback. To achieve this we will not only craft a functional tool but an immersive work of art where sound and visuals are intertwined.

Our soundboard project will focus on user-driven interactions. Each user will interact with the soundboard in their own particular way which will consequently create their personal unique audiovisual narrative, reflecting the nature of creative exploration.

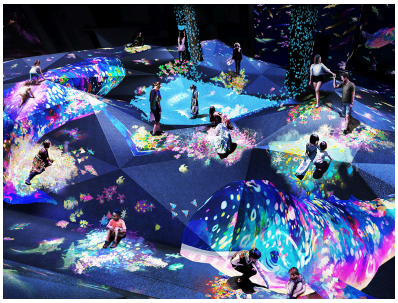
Inspiration

We took inspiration from a large variety of interactive and sensory-focused works that explore the connection between sound, visuals, and experimentation.

In CART 212 (Digital Media Studio I), we created a soundscape project which allowed us to explore the relationship and interactions between different sounds. This project reminded us of the power of sound in shaping an experience and how layering audio can create a completely new immersive environment. We developed this idea further by transforming sound, which can be atmospheric, into an interactive experience that is complexified with each button press.

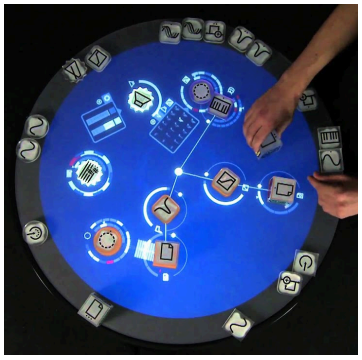
Classic soundboards are the foundation of our project. They offer intuitive one-to-one mapping of input to sound. We push this idea further by incorporating visuals to accompany the sounds to create a multi-sensory experience, and unique buttons hint at the possible output.

The phenomenon of synesthesia also inspires how we plan on connecting sound with visuals. By assigning distinct and unique visual responses to each sound, we aim to evoke the feeling of “seeing” the sound.



TeamLab’s Borderless exhibition, which features immersive creative worlds, inspires our vision for projection-based installations. While our project will remain functional without it, large-scale projection can amplify the feeling of being enveloped in a responsive world of sound.

90s funky carpets will influence our visual aesthetics as we are drawn to the bold, abstract and slightly chaotic patterns that bring a playful energy to the interface.



Lastly, Reactable, an interactive music table, inspires our approach to tangible interactions. This is reflected in the physical soundboard we plan on creating which we will use to incorporate different materials, shapes, colours, etc. to the buttons to allude to the type sound they will emit. Reactable also aligns with our goal of encouraging fun experimentation through play.

User experience

Our project is designed to be a playful and explorative experience, which will encourage users to discover and experiment with sound and visuals with intuitive and hands-on interactions. We will not provide clear instructions upfront to encourage curiosity when

engaging with the interface. Users will press different keys or interact with the physical board to uncover the full potential of the project.

Each key is preassigned a specific sound. Each sound will be accompanied by a corresponding visual effect to create a direct and engaging audiovisual pairing. This structure will allow users to quickly learn the cause-and-effect relationship: press a key, experience the sound and visual. This is the current plan but there is also the potential for some interactions to evolve , for example, if the key is held down, instead of just pressed, the visuals could transform or evolve, however that is just an idea to explore at a later stage.

In the context of a proper installation, we envision using a projector to fully immerse the user in the experience. We can project the visuals onto a large surface, either the wall or the floor, to create an enveloping effect that will draw users deeper into the interactive exploration. The projection enhances the impact of the visuals and also makes the space come to life, giving the illusion of stepping into the artwork itself. Regardless of the use of a projector, the design will maintain its playfulness and full functionality on its own. Even without a projector, users can still enjoy the fun exploration through interactivity.

Visual and Sound Design Approach

The general aesthetic we're striving for this project is widely determined by the user's interactivity with Synesthesia Lab/ Synesthetic Keys (name yet to be decided). Although the visuals are mostly determined by the user's interactivity, the overall look we are going for took inspiration from 90s retro arcade carpet type of style, with vibrant colored geometric shapes that are called in depending on the keys pressed. Therefore, the users can create their own design within the 90s aesthetic. The visuals themselves rely on which elements are being associated with their respective sound. For instance, depending on the keys or the buttons pressed from the board, they produce their own unique sounds that generate shapes onto the screen. What kind of sounds will users be able to create with our soundboard We will source these sounds in a variety of ways to ensure a variety of sound types : some copyright free sounds we will find online and modify for this project (from sites like FreeSound), some we will sample from the real world (like musical instruments, voice, or foley), and some which we will design digitally.

TECHNICAL CHALLENGES AND SOLUTIONS

Physical Soundboard Implementation

The physical soundboard will complement the digital keyboard interface by offering an active and interactive way for users to trigger a prime portion of the possible sounds. The keyboard keys will serve as the primary input method, we want the physical soundboard interactions to feel unique, distinct, and engaging. The buttons will distinguish themselves through their material, color, shape, or type, which will hint to the sound it produces, to enhance the exploratory and playful nature of the project.

To build the physical soundboard, we plan on using the school's workshops and are considering either 3D printing or laser-cut wood for its construction for the main body of our soundboard. We intend to discuss these options with our instructor and lab technicians to determine the best approach. 3D printing would give us more sculptural freedom and a wider variety of shapes, while laser-cut wood could offer a more sturdy and polished structure. Since we want very varied buttons, we hope to use both 3D-printed and laser-cut pieces, as well as metal and other materials, to create an extremely diverse tactile experience that visually and physically hint at the effect the button will have.

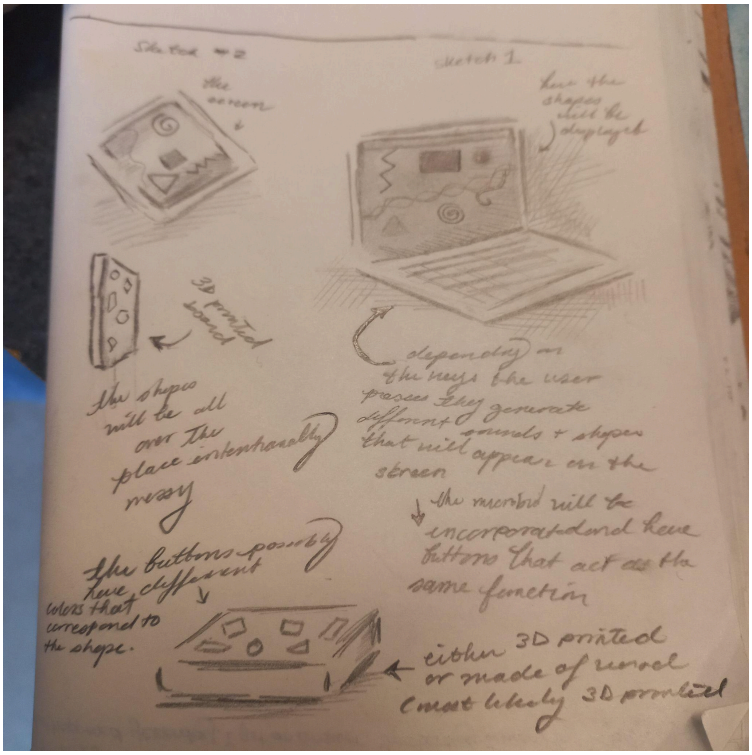
To detect user input, we are considering Arduino and Micro:bit, as we already have access to a Micro:bit with an extension board and believe we can easily secure an Arduino. Arduino is well-suited for detected button presses and sending data directly to the computer, we also like its flexibility and reliability. However, neither of us have used an Arduino before but we are ready to learn and adapt. On the other hand, Micro:bit is beginner friendly and one of us does have experience using it to create interactive projects. It also has built-in Bluetooth capabilities and is easy to program. However, it does have fewer input pins, which limits the number of buttons our soundboard can offer. Raspberry Pi is another option which we have access to. Regardless, it is more complex to set up and overpowered for the simple input detection therefore it is not a very practical option for this project. Overall, we will most likely be going to use an Arduino Uno because it gives us the option to add up to 20 buttons seeing as it has 14 digital input output pins and 6 analog inputs. Additionally it is the most used and documented microcontroller board.

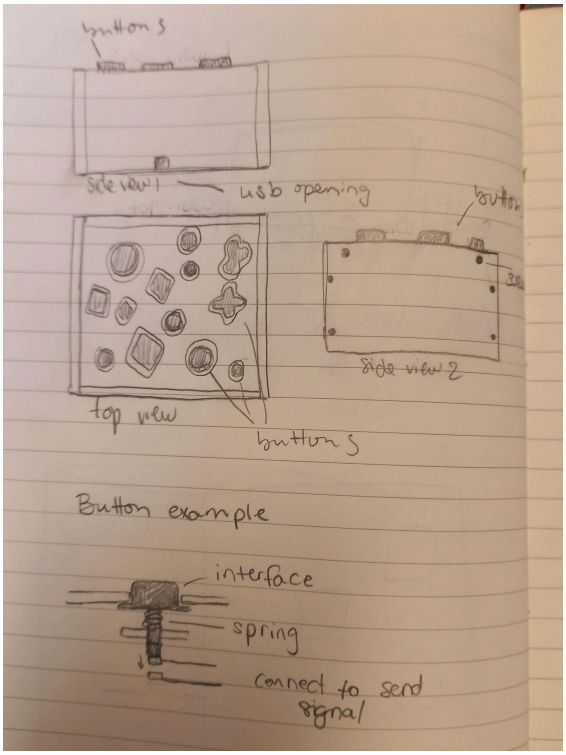
The physical soundboard will communicate with the computer through either USB or Bluetooth, depending on the microcontroller we choose. If we decide to go with arduino, it can send signals via USB as keyboard inputs or MIDI messages, which will allow seamless integration with our digital sound system. If we choose the Micro:bit, we have the possibility of Bluetooth (which does need additional steps to set up) or USB communication. Essentially, our goal is to create a responsible interactive experience where the physical soundboard feels just as engaging and intuitive as the digital keyboard, if not more, allowing users to explore sound through both physical and digital means.

Potential Challenges

The potential technical hurdles that could be encountered in the process of making Synesthesia Lab/ Synesthetic keys are as follows. Due to our project relies on numerous different sounds in order to make our vision come to life, the process of attaining and creating those sounds might be laborious to compile them all. Furthermore, because our vision has several steps involved as well as the physical creation of our soundboard, a potential challenge that we most likely encounter is dealing with the time frame and attempting to create our full vision with the time given in mind. However, if we ever encounter this issue, we'll take the following measures, of reducing the number of buttons and keys. In reducing, we'll ensure that it does not reduce the quality of the work, but that in diminishing it only makes our project more feasible. In ensuring that Synesthetic Keys/Synesthesia Lab avoids any major issues, our backup solution would be to test various types of technologies to make our physical soundboard work as well as which will best serve our goals.

SKETCHES





TIMELINE

Week	Goal	Notes
Week 5	**Project Proposal**	**Deadline:** February 11 11:59 P.M.
Week 6	**Proposal Presentation** Appointment with workshop to discuss project	**Deadline:** February 21 12:15 P.M
Reading Week	Make mockup of soundboard design Use mockup to plan dimensions and parts needed Soundboard sounds selected	Cardboard mockup to show that the buttons we plan on making / using will work before actually building the soundboard
Week 7	3D render parts to be printed/laser cut for the main body	Will consult with the technicians and use mockup to know shape, width, depth, etc.
Week 8	Have at least half of our sounds created/saved Print / laser cut the body of our soundboard	
Week 9	**Prototype Presentation** Around half of our sounds and visuals = functional Soundboard base functionality	**Deadline:** March 11 11:59 P.M.
Week 10	Have all sounds created/ saved All visuals created All soundboard buttons made	
Week 11	Assembly Final code integration Project completed Playtesting and Debugging	We plan on completing the project week 11 so that week 12 and 13 are dedicated to debugging and refining elements that are not essential but could use polishing
Week 12	**In-class presentation**	**Deadline:** April 8 1:15 P.M.
Week 13	**Final Deadline**	**Deadline:** April 15 11:59 P.M.