

SE / CybE / CprE / EE 492 - sdmay23-04

Engineering Art

Weeks 8-9 Report

03/05/2023 - 03/24/2023

Client & Faculty Advisor: Rachel Shannon

Team Members:

Derrick Brandt - SE, Researcher, Figma Wizard, Frontend Team

Ayden Boehme - CprE, Researcher, Frontend Team

Tomas Elias - SE, Researcher, Note Organizer, Frontend Team

Elizabeth "Liz" Fransen - SE, Researcher, Communications Guru, Backend Team

Shelby Murray - CprE, Researcher, Notetaker, Backend Team

Juno "Winter" Robertson - SE, Researcher, Android Expert, Frontend Team

Cosette Thompson - EE, Researcher, Electrical Expert, Installation/Backend Team

Nathan "Nate" Underwood - CybE, Researcher, Security Expert, Backend Team

Parker "Park" "Pork" Smith - Consulting Industrial Design Student, Installation Team

Johnny DiBlasi - Consultant, Assistant Professor of Art and Visual Culture at the College of Design

Weekly Summary

Data transfer from the Muse to backend and conversion of the raw data to CSV has been completed. The CSV file was used to generate a basic RGB visual in MATLAB, and additional testing is planned. We've researched and discussed alternative art generation and display options too. Our current work is focused on the first functional version of the entire experience: frontend, backend, art generation, display for users, and the connections between them.

Weekly Advisor Meeting Summary

Most of our discussions have been looking to the future: planning the installation and space requirements, setting up the process book and associated media, and honing in on the exact goal of our project. We set deadlines for our first version of the app and

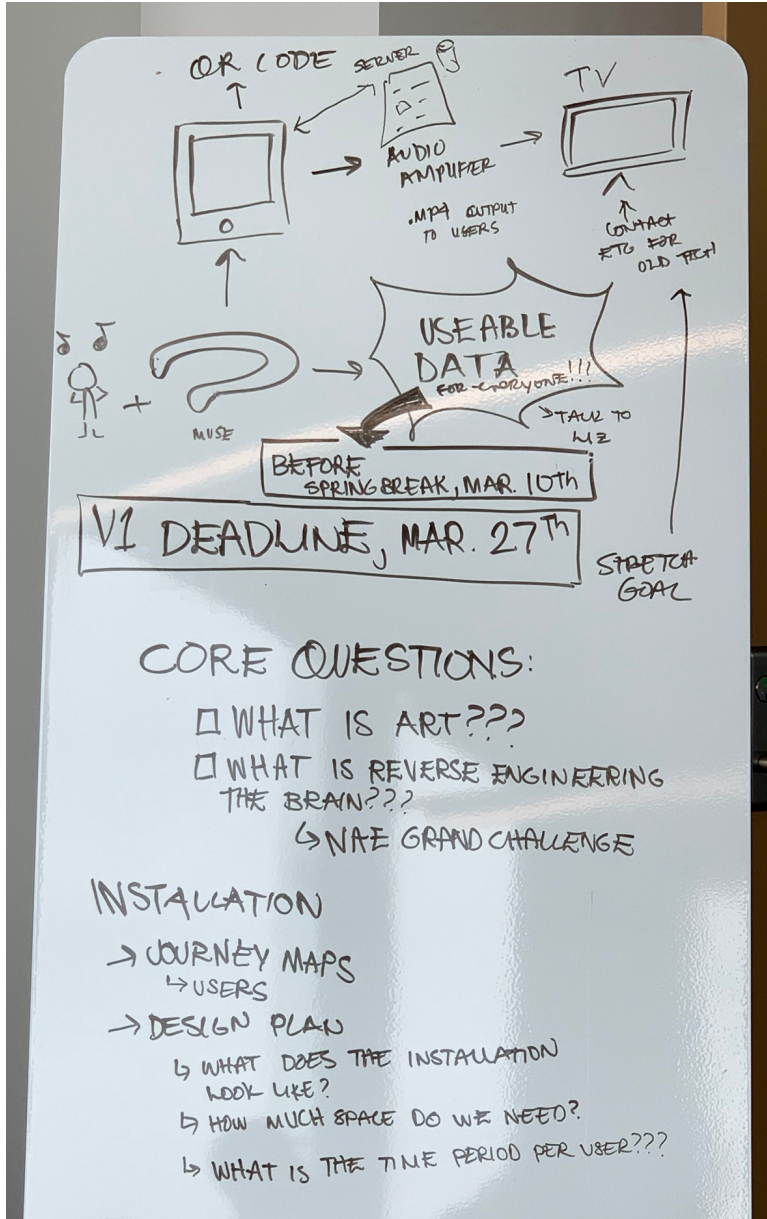
Past Accomplishments

Week 8:

- Plan to look at schedules and find new meeting time
- Research light and sound options - Cosette
- Research P5JS and [Processing](#) for art generation as recommended by Dr. DiBlasi
 - Works with sound, video, images, text
- Began planning user testing
 - Use friends
 - Informal testing
 - Location
 - Senior design lab
 - will get busier closer to the end of the semester
 - TLA
 - ECSEL Lab? - Juno & Shelby have access
- Reserve space in SIC
 - Reach out to Rachel Faircloth at SIC
 - Display gallery in the last two weeks of April
 - Design Gallery could also be an option, but it's typically booked
 - Rachel Connel
- Backend: real time data has gotten to server
 - Liz took Muse home over the weekend to work
 - CSV not expected to be difficult
- Frontend: working asynchronously

- Web frontend in progress - Derrick
 - Header completed
 - Working on components
- Researched P5JS - Tomas
- Need to answer some core questions: What is art? What is reverse engineering the brain?
 - Why is this art? What makes this an installation?
 - Something bigger you can't take home - Cosette
- Researched Microsoft Visualizer
 - A media player; research if a similar process is doable for P5JS
 - <https://support.microsoft.com/en-us/windows/visualizations-for-windows-media-player-00aa9db5-e1d1-4b37-d65a-69362493b380>
- Discussed art generation
 - Real-time data processing
 - more difficult, possibly a stretch goal
 - Static, process once at the end
- Discussed senior design website
 - Derrick needs access - Shelby contacted ETG
 - Work on consultants page for Park and Dr. DiBlasi - Tomas
- Discussed installation vs. frontend vs. what's required for 492
- Test conversion to sound (3 mm headphone jack) to TV - Park
- Check on opportunities for old tech
 - Campus radio station is getting rid of old stuff - Cosette
 - ETG may have old tech
 - old TVs - Park & Tomas
- Discussed timeline of project
 - V1 is essential
 - TVs could be a stretch goal
- Discussed need for usable data; want to resolve by spring break
 - CSV file - Liz
 - Test MATLAB LSL from previous week - Cosette & Shelby
- Set team deadlines
 - Usable data for everyone by Friday, March 10 (before spring break)
 - V1 by Monday, March 27th (a week after spring break)
- Discussed installation plans
 - Display of information: two posterboards
 - #1: Muse info
 - #2: Reverse engineering the brain
 - Journey Maps
 - Users

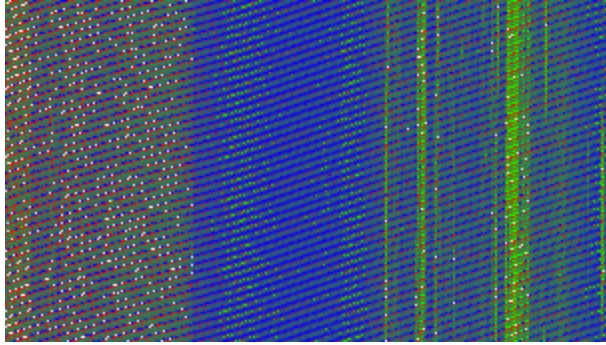
- Design plan
 - What does the installation look like?
 - How much space do we need?
 - What is the time period per user?
- What makes it an installation?
 - We're used to phones and tablets, so we need something special
 - Cosette
 - analog, crazy lights, etc. that catch attention at museums
 - Spread around the visuals, to divert attention from the listening person so they're comfortable and grab more attention - Derrick
 - Not something that can be taken home
 - Interactive component(s)
 - Is it possible to generate art in real time and show the process? A stretch goal
- Discussion of senior design presentation
 - Come up with our 'areas of expertise,' what questions we should answer so we have a cohesive answer and don't worry about people overlapping



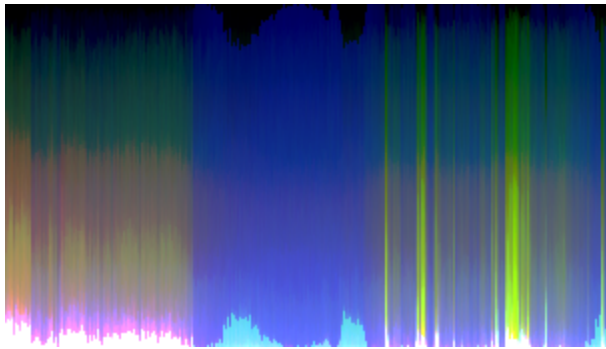
- Completed demo recording and presentation for 492
- Ordered new tablet

Spring Break (Week 8 ½):

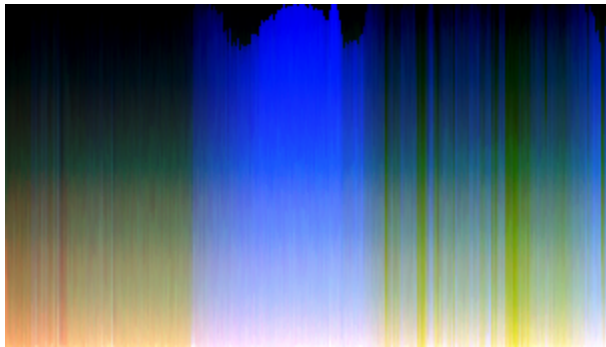
- MATLAB art generation from real data - Shelby
 - Colors are based on each type of EEG brainwave--one wave is ignored
 - A variety of sort methods used with a small sample below;



Generation on Total Proportion



Generation on Total Proportion with Sorting for all RGB



Generation on Max of Color Porportion with Sorting for all RGB

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Week 9:

- Added additional Installation team
 - Cosette & Park
- Contacted Rachel Faircloth about using space in SIC - Rachel
- Discussed dynamic color API for frontend
- Walked through project updates
 - Installation

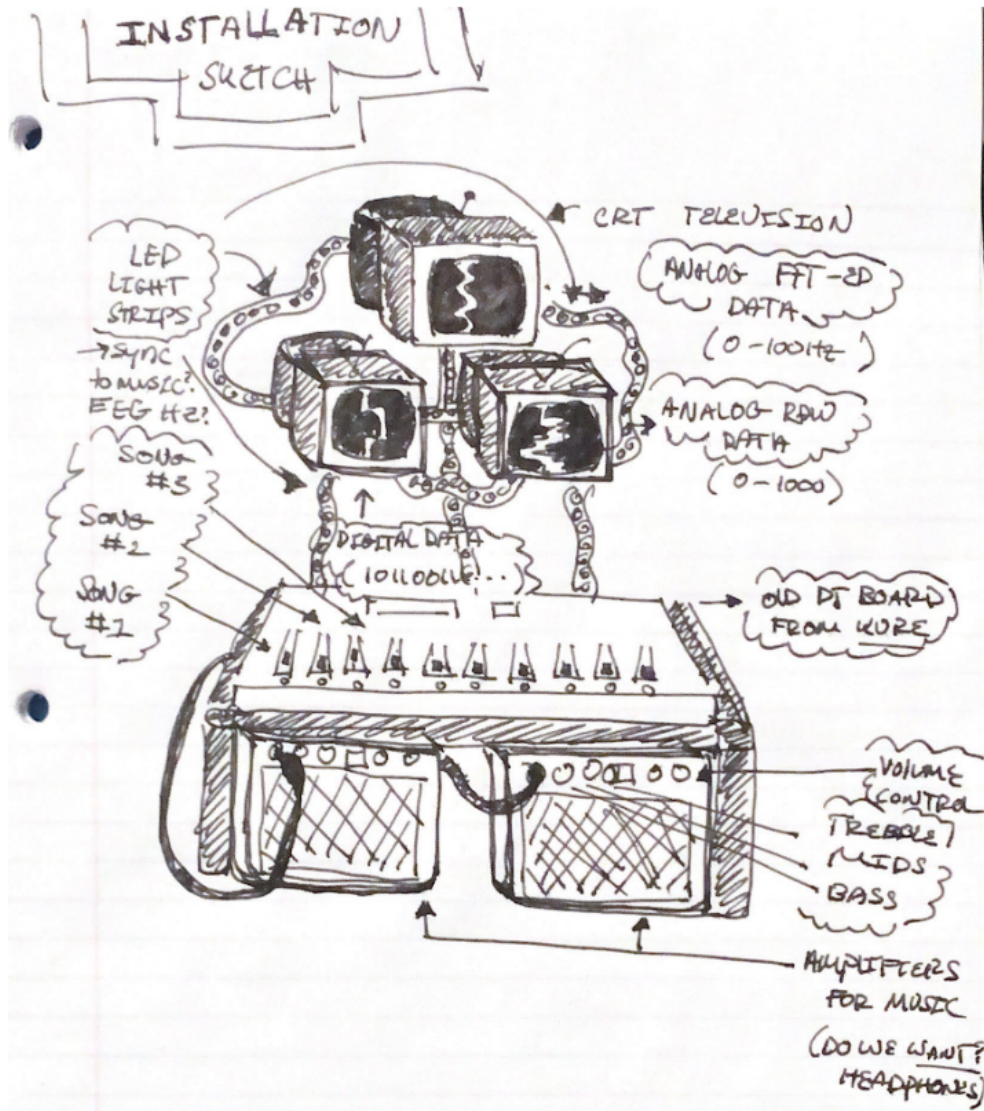
- Different displays for raw data, brainwave appearance data, and binary for users
- Possess three 12-inch CRTs
- Park:
 - Porthole 30s era display vs. 60-70s retro-future
 - Leaning toward 70s



30s Porthole Display

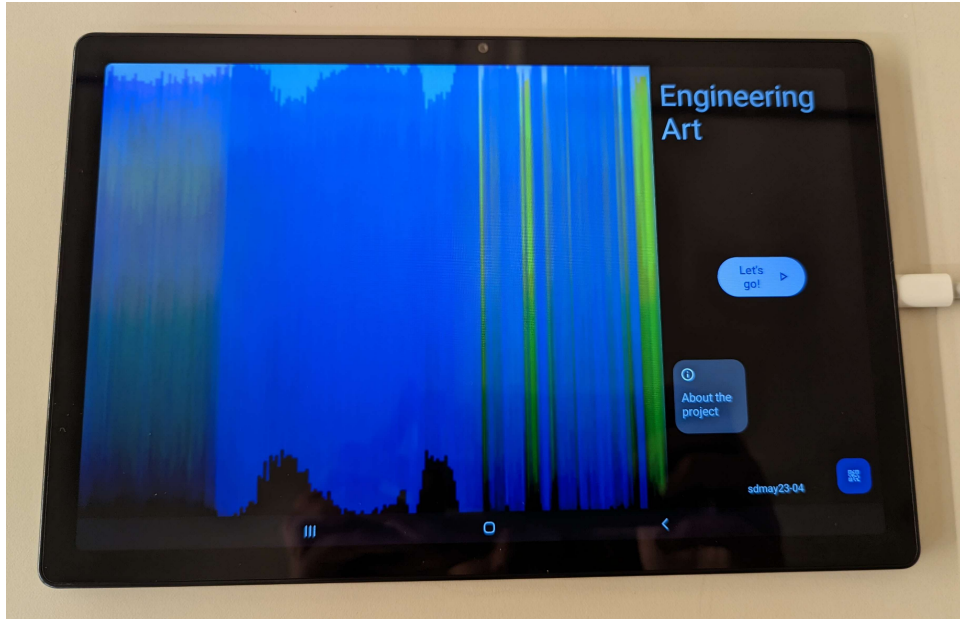
- Cosette:
 - Tested a 22-inch CRT
 - Has 12-inch CRTs
 - 90% approved to take old DJ board from the radio station
- TVs use deflection coils, and that's what we have to mess with
 - have to cross-connect one horizontal one to one vertical one
- For an open space, do we want to use headphones?
 - Could turn into mono audio
 - Cosette could donate an amp
 - Rachel has a spare set of headphones without an end
 - Old school oscilloscope
 - 80s era camera in a briefcase
- Installation and purpose discussion
 - What is our message with this?
 - How to avoid making users feel like victims of reverse engineering the brain/AI
 - We need to show the whole picture, pros and cons
 - Do we want the users or the proctors interacting with this?

- Consider user experience
- 50/60/70s is *the era* for industrial engineering
- Share ideas about user experience
- 60s is the first introduction of AI/reverse engineering the brain
 - Include a brief timeline
 - Could have an old styled AI-generated voice come from the CRTs
 - all Cosette's CRTs have VCRs
 - If mono speakers, can connect directly
 - Headphones can be connected via that
 - Park can run speaker wires to the vertical deflector
- We have an opportunity to get people excited--highlight positive exploration

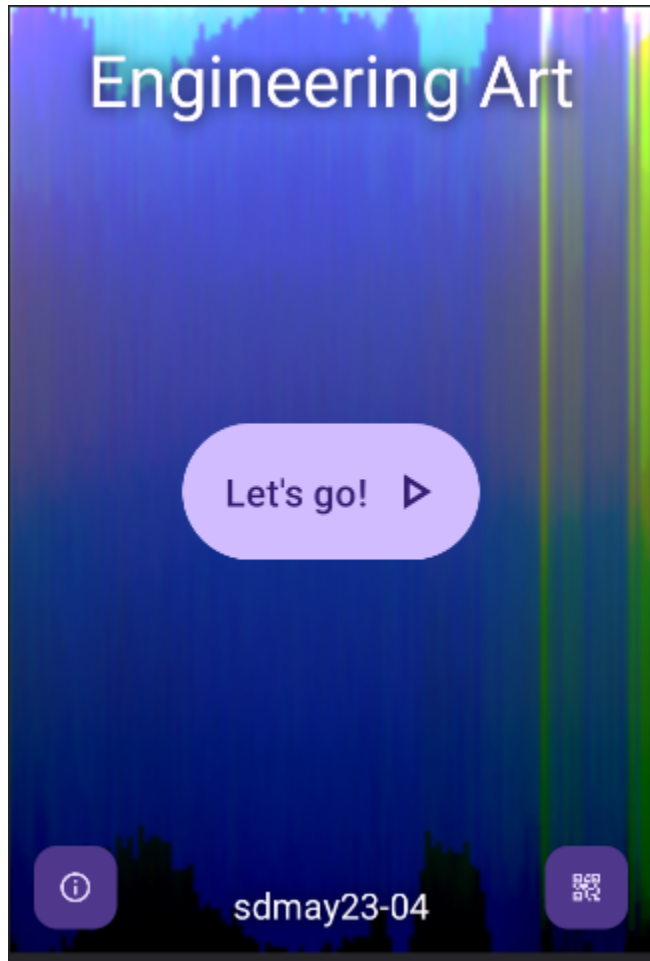


Installation Brainstorming

- Frontend
 - App - Juno
 - UI for user screen, core infrastructure exists
 - Liz will complete the interface to interact between the front and back ends



Initial Version of Frontend User App



Phone-Sized Display of App

- Process book React project - Derrick
 - Very close to operational
 - Need to gather photos together with captions
 - Structured to be able to copy-and-paste
- QR code page React project - Derrick
 - Completed landing page, title, popup dialog
 - Popup needs actual text
 - Need to connect with Liz on loading data from the backend
- Backend
 - Nate has been working on security
 - V1 art for MATLAB exists - Shelby
 - Could be used for early user testing
 - Need to continue testing/playing with it - Shelby
 - Completed data transfer and CSV - Liz
 - Discussion of other data formats (also described under Installation)
- Acquired DJ board - Cosette
 - Tested functionality and is in good working condition



DJ Board from KURE

Individual Contributions

| Name | Individual Contributions | Hours this Week | Hours Cumulative |
|---------|---|-----------------|------------------|
| Derrick | <ul style="list-style-type: none"> Process book React project QR code for user data React project | 15 | 45 |
| Ayden | <ul style="list-style-type: none"> More studying/practice with frontend software language | 15 | 43 |
| Tomas | <ul style="list-style-type: none"> Ordered new tablet | 15 | 45 |

| | | | |
|-----------|--|----|----|
| Elizabeth | <ul style="list-style-type: none"> ● Converted data to CSV ● Setup dual thread communication between app and server | 12 | 47 |
| Shelby | <ul style="list-style-type: none"> ● Meeting notes ● V1 MATLAB art generation | 13 | 43 |
| Juno | <ul style="list-style-type: none"> ● Frontend of user app | 14 | 43 |
| Cosette | <ul style="list-style-type: none"> ● Contacted KURE advisors and confirmed Donation of DJ board. ● Preliminary Exploration of old 22" color crt ● 2 12-inch crt's acquired ● Began testing DJ board function | 15 | 45 |
| Nathan | <ul style="list-style-type: none"> ● Backend Devo | 14 | 39 |

Pending Issues

- Began work on process book
- Keep track of all contacts reached out to
- Collect all photos (with captions) in a central location

Plans for the Upcoming Week

- V1 of entire experience due Monday, March 27th
- Find new meeting time where everyone can be there at once (hopefully)

Additional Comments & Discussion

- Scheduling continues to be more difficult this semester due to busy schedules and heavier workloads.