Project Review

Team: Sdmay23-04

Introduction

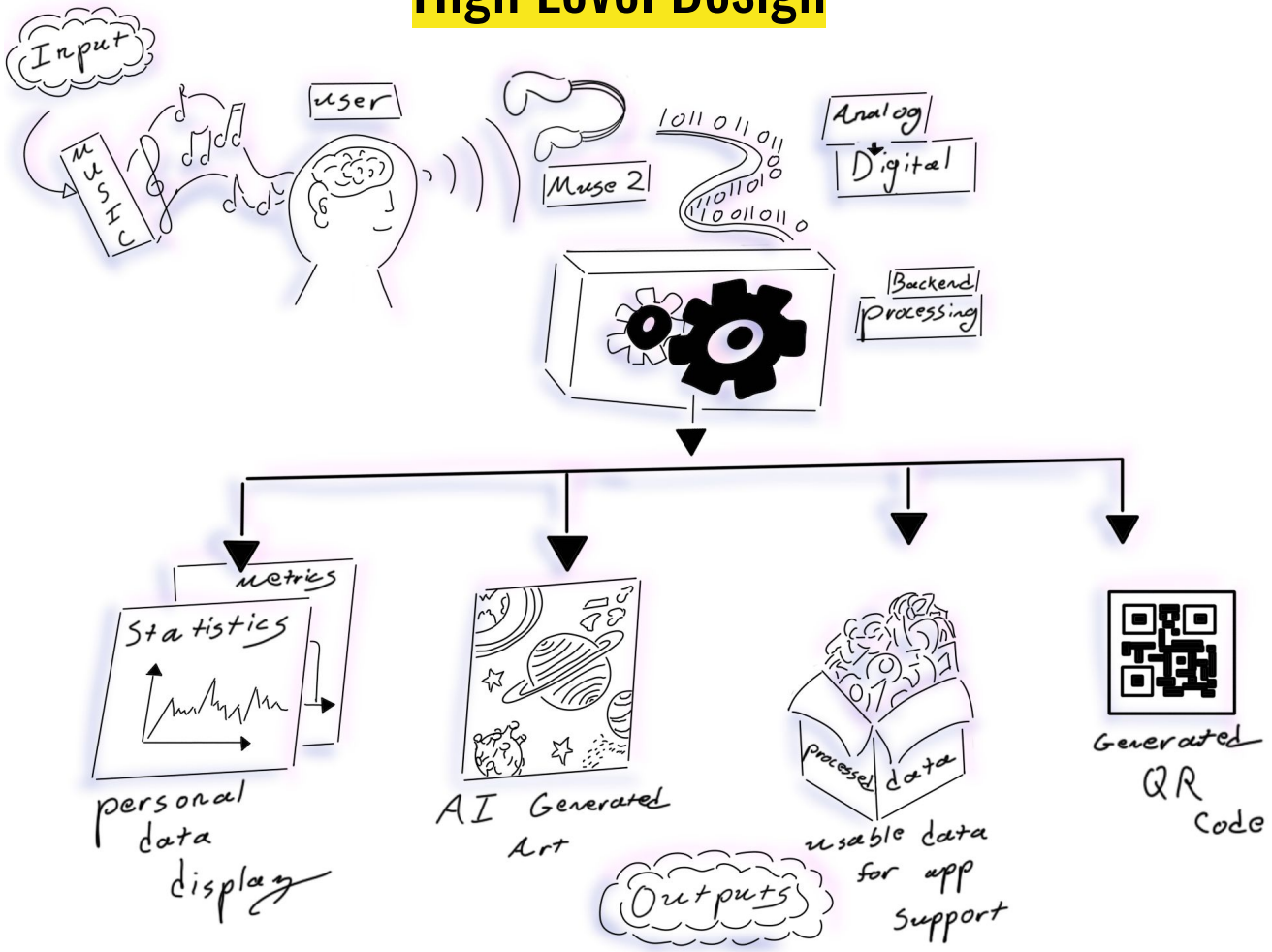
Problem Statement

Focused Problem Statement:

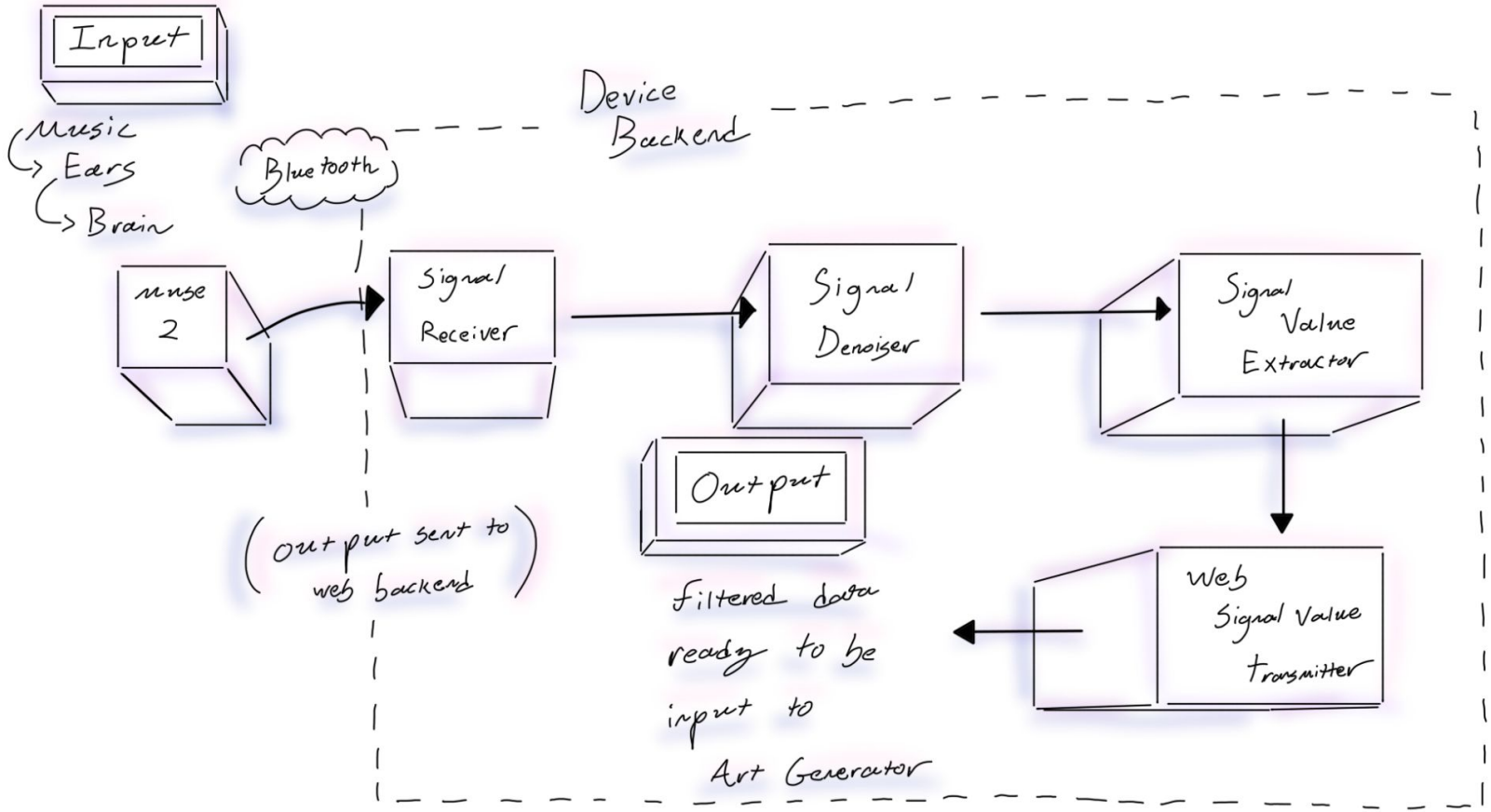
"Reverse engineering the brain is one of the National Academy of Engineers' 21st Century Challenges—a list of complex problems that are tightly intertwined with engineering and the future. Medical and technical personnel around the world are working toward solutions that will have applications in artificial intelligence, medical treatments, and prosthetics. The knowledge of this challenge is crucial to garnering public support and increased funding. Our goal is to inform and gain the interest of the general public and potential engineers through an interactive art exhibit that converts brain wave activity generated from listening to music into art."

Implementation

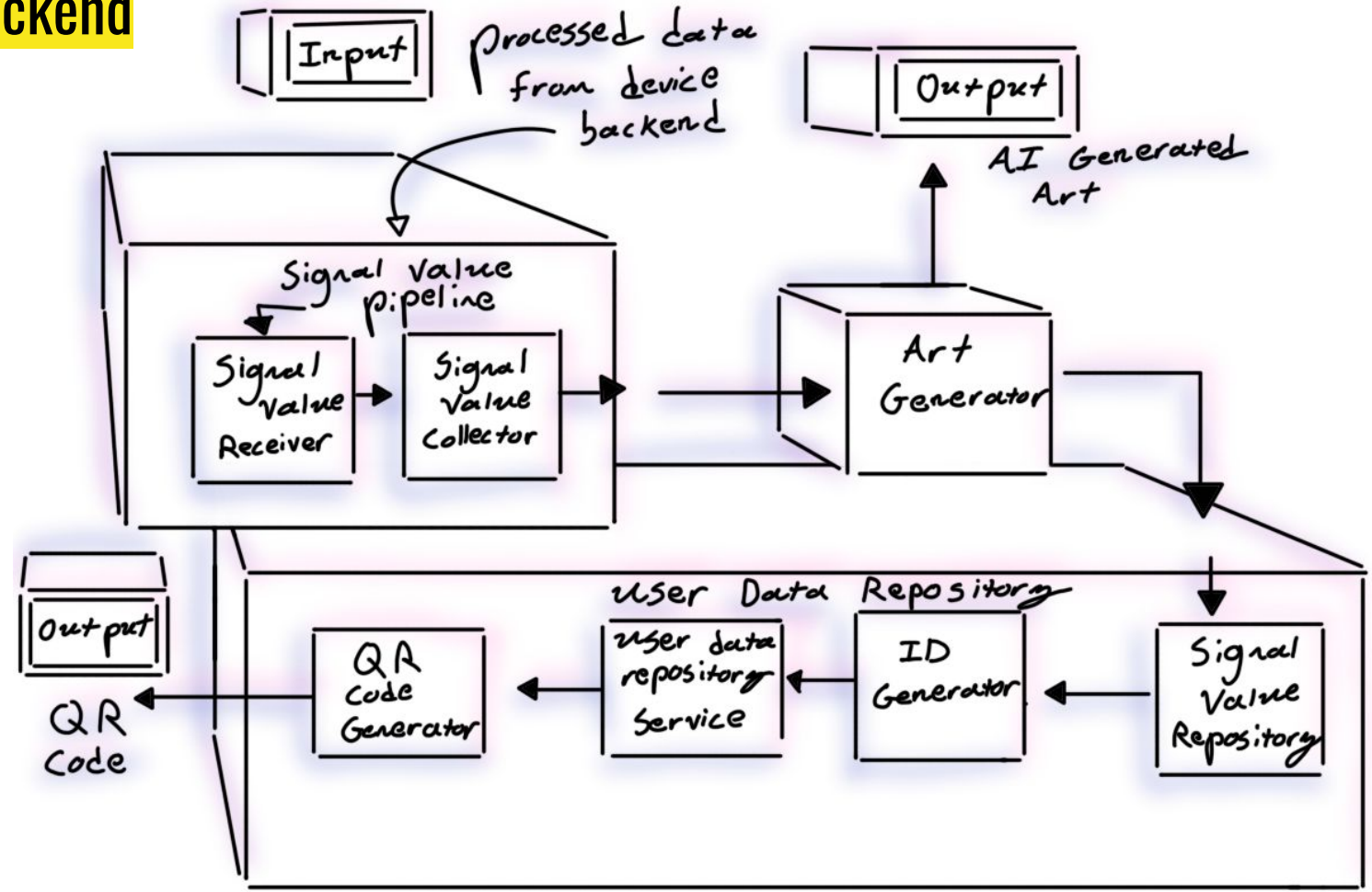
High Level Design



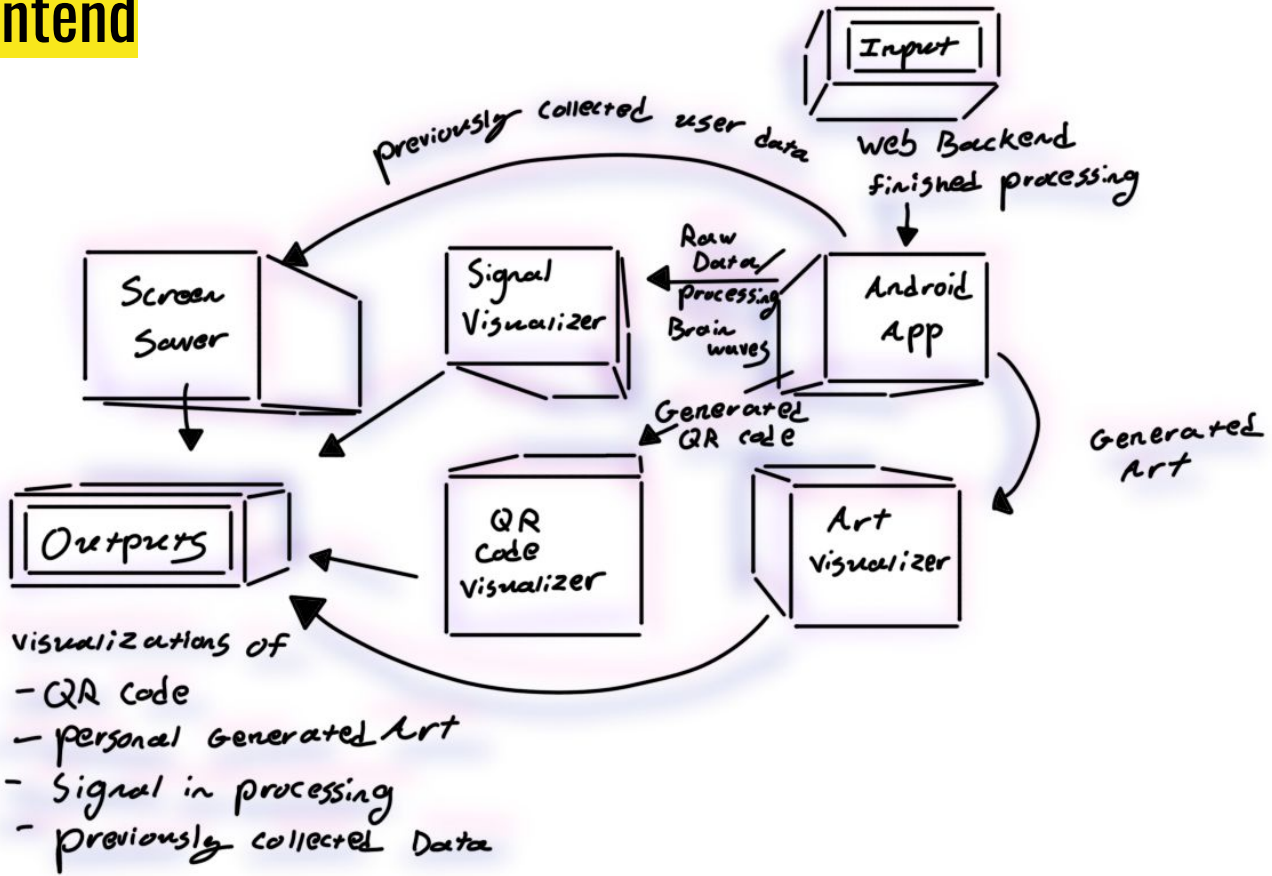
Device Backend



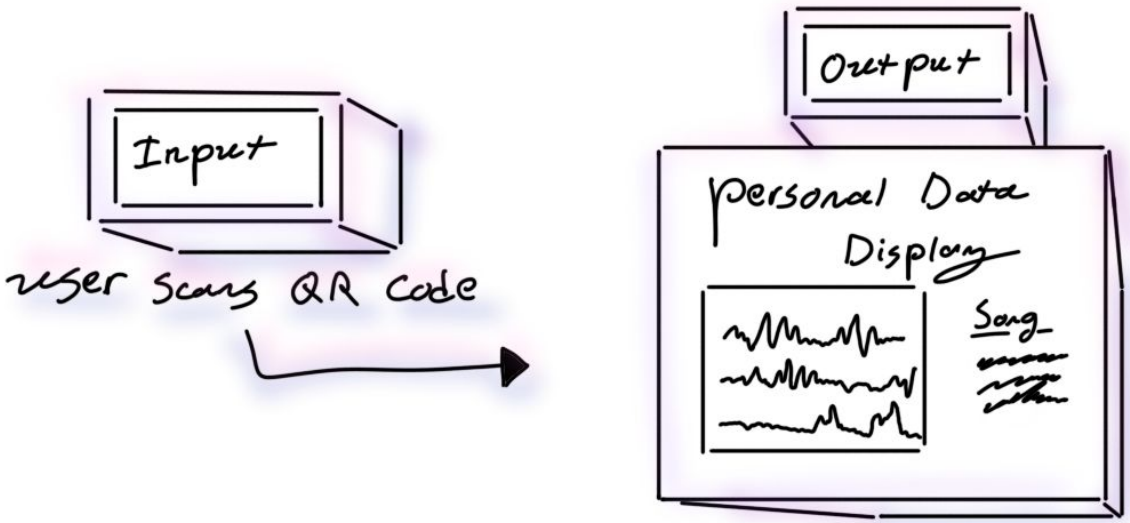
Web Backend


Input
Processed data from device backend
Output
AI Generated Art
Signal value pipeline
Signal Value Receiver
Signal Value Collector
Art Generator
Output
QR Code
QR Code Generator
user Data Repository
user data repository Service
ID Generator
Signal Value Repository

Device Frontend



Web Frontend



Work Progress

Front End Tasks	Explanation	Completion Percentage
Tablet	Ordered tablet that meets project specifications	100%
Process Book	A website for displaying our design activities with images and annotations.	60%
Figma Prototypes	Three different prototypes for our tablet and web frontends.	100%
Polish Senior Design website	Added new team member to website and still need to add a consultants page, also upload bi-weekly reports	85%
Web Site	A website the user will go to for viewing their Muse brainwave data, read from the art installation.	25%
Tablet	A user interface interacted with during the art installation.	20%

Back End Tasks	Explanation	Completion Percentage
Virtual Machine/Server	Requested server that meets project specifications	100%
Data Processing	Turned usable data into a readable CSV file	100%
Connection to Muse	Automated connection to Muse with required settings	100%
Security Evaluation	Stored data will be anonymous and only accessible through a unique user code	80%
Generate Test Art	Generate art using MATLAB, other processes	85%

Installation Tasks	Explanation	Completion Percentage
Research on Crt Art	Research art installations/exhibits such as Nam June Paik's and research crt hardware hacking	100%
Initial Sketches of Installation	Crt and old radio DJ board.	100%
Acquire Crt(s)		200% (2 acquired)
Document Experimentation (Crt, DJ board)	Turn Crt into signal visualizer by attaching amplified data to deflection coils of vertical beam. Experiment with potential displays of different formats of data	10%
Final Design	Iterate on final design of installation	20%
Installation	Set up pop-up experience and have users walk through the installation	0%

Key Contributions

Key Contributions

1. Liz - Muse SDK Initialized, successful data transfer, getting usable data into CSV file, requested server.
2. Tomas - Project frontend team, Muse testing, P5js tinkering, ordered tablet.
3. Juno - Android tablet client project initialization.
4. Parker - Muse testing, design consultant for installation, crt exploration.
5. Derrick - Figma prototypes, two React applications initialized and progressed on.
6. Shelby - MATLAB image generation, meeting documentation, music and licensing research.
7. Cosette - Ordered Muse, applied for SDK, muse testing, crt installation design.
8. Nathan - Security evaluation and research, Basic Spring application for Backend.
9. Ayden - Project frontend pairing.

Challenges & Solutions

Challenges

- **CHALLENGE:** Team Size
  a. **Description:** With so many members, it has been hard to coordinate between every individual on the team and finding times that work best for everyone.
     i. **Solution:** We split ourselves into smaller teams to work on different portions of the project.

- **CHALLENGE:** Incompatible hardware
  a. **Description:** The tablet we received from ETG had specifications that didn't adhere to our project.
     i. **Solution:** We ordered a new tablet.

- **CHALLENGE:** Getting usable data into CSV format
  a. **Description:** The packets need to be processed in a sophisticated way that was difficult to understand given the sparse documentation. .
     i. **Solution**: The packets are queued and dequeued to an offload thread for data processing.

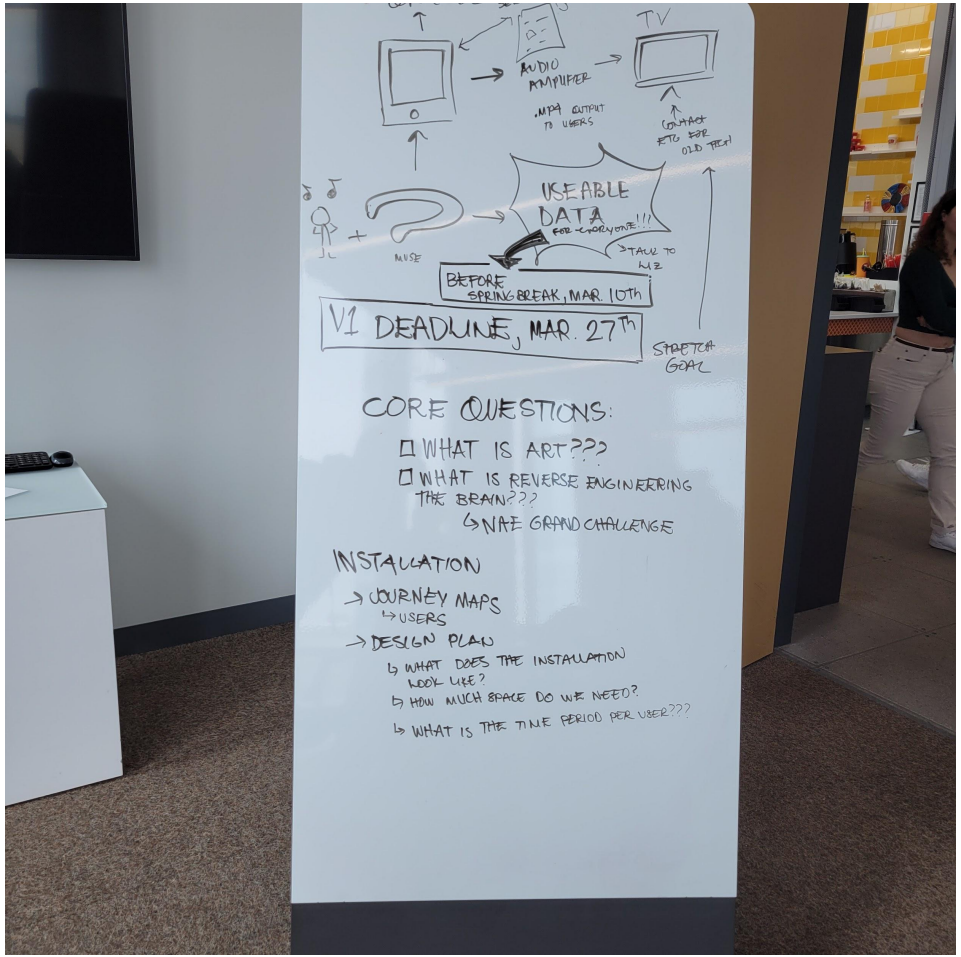
Remaining Work

Left To Do

- Complete Process Book
- Polish Senior Design Website
  - Add additional pages and personnel to them
  - Upload weekly reports
- Version 1 deadline
  - March 27th
  - Marry frontend to backend
- Project boards
  - Journey Maps
- Installation

- Informatic Slideshow
- Pipeline setup
- Graph CSV file
- Reserve space in SIC
- Testing
  - Informal
  - Formal
- Refine and answer abstract core questions

Conclusion


TV
AUDIO AMPLIFIER
.MP4 OUTPUT TO USERS
CONTACT ETC FOR OLD TECH
USEABLE DATA FOR EVERYONE!!!
MUSE
TALK TO LIZ
BEFORE SPRING BREAK, MAR. 10th
V1 DEADLINE, MAR. 27th
STRETCH GOAL
CORE QUESTIONS:
WHAT IS ART???
WHAT IS REVERSE ENGINEERING THE BRAIN???
NAE GRAND CHALLENGE
INSTALLATION
JOURNEY MAPS
USERS
DESIGN PLAN
WHAT DOES THE INSTALLATION LOOK LIKE?
HOW MUCH SPACE DO WE NEED?
WHAT IS THE TIME PERIOD PER USER???