Creative Technologist | Product Designer

2022-2023

Gracy Kureel

Hello.

I am Gracy. I am a Multidisciplinary Designer with an engineering background. Currently I'm a graduate student in the Master of Design program at UC Berkeley.

My interests lie in the field of Human-Computer Interaction, encompassing areas such as Ubiquitous Computing, Assistive and Educational Technologies, and Health Informatics. I possess a strong skill set in design, development, deployment, and evaluation of technology-based solutions aimed at augmenting human abilities and addressing real-world challenges in an ethical and sensitive manner.

Experience

Center for Autism Research, Children's Hospital of Philadelphia
July'23- Aug'23
I work as a Design Technologist, helping create emotion-monitoring devices for children with AutismSpectrum Disorder (ASD). This includes using ECG, heart rate, and movement sensors for real-time data collection. I also maintain the lab's user-friendly website.

Mindly
May'23-Jul'23
As a UI/UX Designer, I redesigned Mindly's website and app, focusing on visual appeal and user experience. Collaboration with clinicians and user research informed these changes.

IIT Delhi, Department of Design
Sep'21 - Jan'22
I worked as a Researcher on a WHO-funded project, collecting data on challenges faced by individuals with disabilities in SEAR countries. Our study contributed to WHO's policy improvements for affordable assistive technology in SEAR.

Chapman University, Department of Informatics
May '21 - Jul '21
As a UI/UX Developer I designed an Android app for children with ASD, enhancing bimanual coordination, self-regulation, and timing. I developed the app in Java using Android Studio, including animations and sounds.

Contact

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Education

University of California at Berkeley
2022-2023
MDes, Design, Innovation and Human Computer Interaction

Indian Institute of Technology, Delhi
2018-2022
B.Tech, Textile and Fiber Sciences

Skills

Computer Language : Java, Python, HTML+CSS, JavaScript

Software and Tools : Figma, Autodesk Fusion 360, Android Studio, Adobe Photoshop, Adobe Illustrator, Procreate,
Adobe XD, Adobe Premiere Pro, Adobe InDesign, AutoCAD

Technical Skills : Raspberry Pi, Arduino, 3D modeling, Wireframing, 3D printing, Prototyping, Storyboarding

Mycorrhizae. ***01***

Chrysalis. *02*

Mindly. *03*

Aiden. *04*


MYCORRHIZAE

Overview

Mycorrhizae is an interactive exhibit that explores the hidden communication within the underground forest ecosystem, known as the Mycorrhizal network, connecting plants and mushrooms.

Team

Justin, Neel, Albert, Helena

My Role

User Research , Ideation, 3D modeling, Prototyping, Testing

Tools

Fusion 360, p5.js, CNC, Projection Mapping, Computer Vision

Deliverables

Interactive exhibit

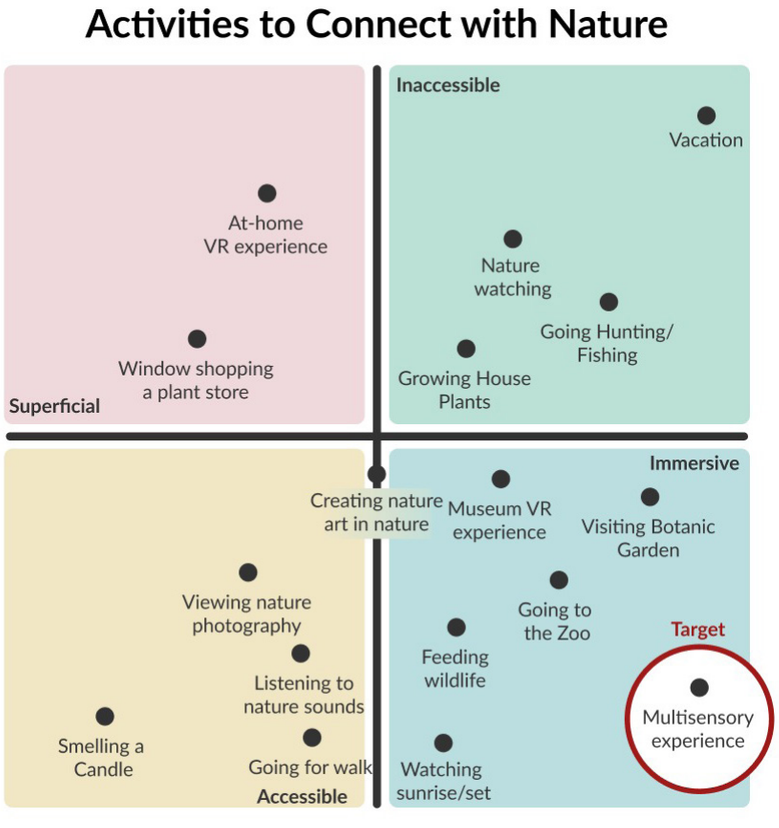
Motivation

In an increasingly digital world, the connection between humanity and nature is breaking down. To bridge this gap, we started with the following question: "How might we use technology to create stronger connections between humans and nature?"

Design Process

We conducted interviews in order to better understand a range of relationships that people may have with nature, to gain a thorough understanding of the key needs in our project's problem space.To synthesize our findings from our qualitative data that we gathered from interviews, we analyzed our data using a 2x2 matrix and journey map to identify recurring themes in our users' needs, in order to understand the core problems in our problem space.

We then conducted secondary research on existing products and research in order to understand what problems have been resolved, and what opportunities exist. Following this, we then ideated 100 solutions on sticky notes, and synthesized the solutions by seeing if there is an overlap in any of the potential ideated solutions, in order to focus on the compatible needs of all of the stakeholders that may be addressed.



Initial Sketches and Concept Generation

Following our project ideation and categorization, we then voted on which concepts to generate sketch prototypes of, and illustrated each of our concepts to demonstrate how they may resolve the key needs in our problem space.

From our initial interviews and solution ideations, we created a low fidelity interactive prototype that we used to test our concept. We developed a prototype and observed people as they used the prototype during usability tests, in order to pilot our solution and gather feedback.

Concept Name:

miniForest
(Artificial Air Generator)

Short Description:

A air generator that can have an actual plant inside or just a digital wall of nature that produces fresh air.
It will have in-wall speakers playing the sounds of nature for an immersive experinece.

Purpose:
Air pollution is a problem in almost every city in the US. This product will help the users to breate fresh air and also give them a forest experience while sitting in their homes.

How might we statement:
How might we access nature through technology?

Sketch by Gracy Kureel

Concept Name:

Biodome

Short Description:

Project:

A geodesic dome, built with sustainable biomaterials.

The materials create a rainbow inside the geodesic dome when light is shined on it.

The light that shines into the dome facilitates plant growth.

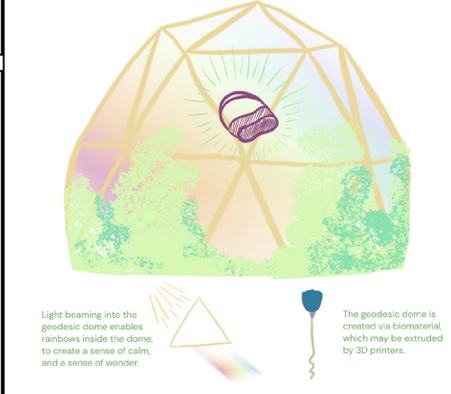
Inside the geodesic dome, the atmosphere of the nature and the rainbows create a sense of calm and a sense of wonder. Additionally, inside the dome there is a VR experience that inspired by nature. Alternatively, there could be an interactive projection of nature, or another medium of digital experience, that is inspired by nature.

The geodesic dome acts as a biosphere. One that gives people the feeling of being in a remote location, that simulates nature, and that is a habitable ecosystem.

Problem to Solve:
- Creating a habitble environment for humans to exist in that replicates the experience of nature.
- Creating an ecosystem that inspires a sense of calm, and a sense of wonder, to relieve stress.

Unanswered Questions:
- What biomaterial could the dome be made out of?
- What forms of nature will be put inside the dome?
- What technological experience would be best to feature inside the dome?

Sketch by Helena Kent



Concept Name:

Nature Transporter

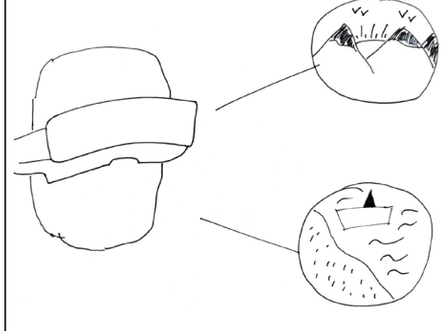
Short Description:

An AR/VR experience to witness the different natural landscapes over different periods of time.

How might we statement?

How might we connect with nature over different periods of time?

Sketch by Neel Shah



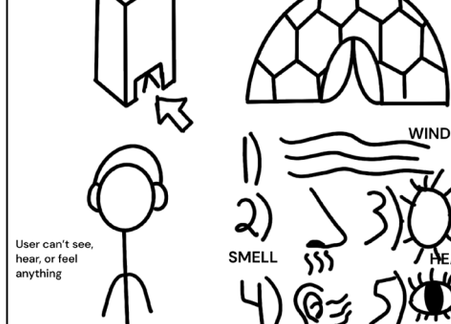
Concept Name:

Sensory Deprivation and Amplification Chamber

Short Description:

In this concept, a user enters an enclosed, pitch-black space while wearing noise cancelling headphones. Completely removed from their usual senses, we add them back one at a time, showing the building blocks of experiencing nature.

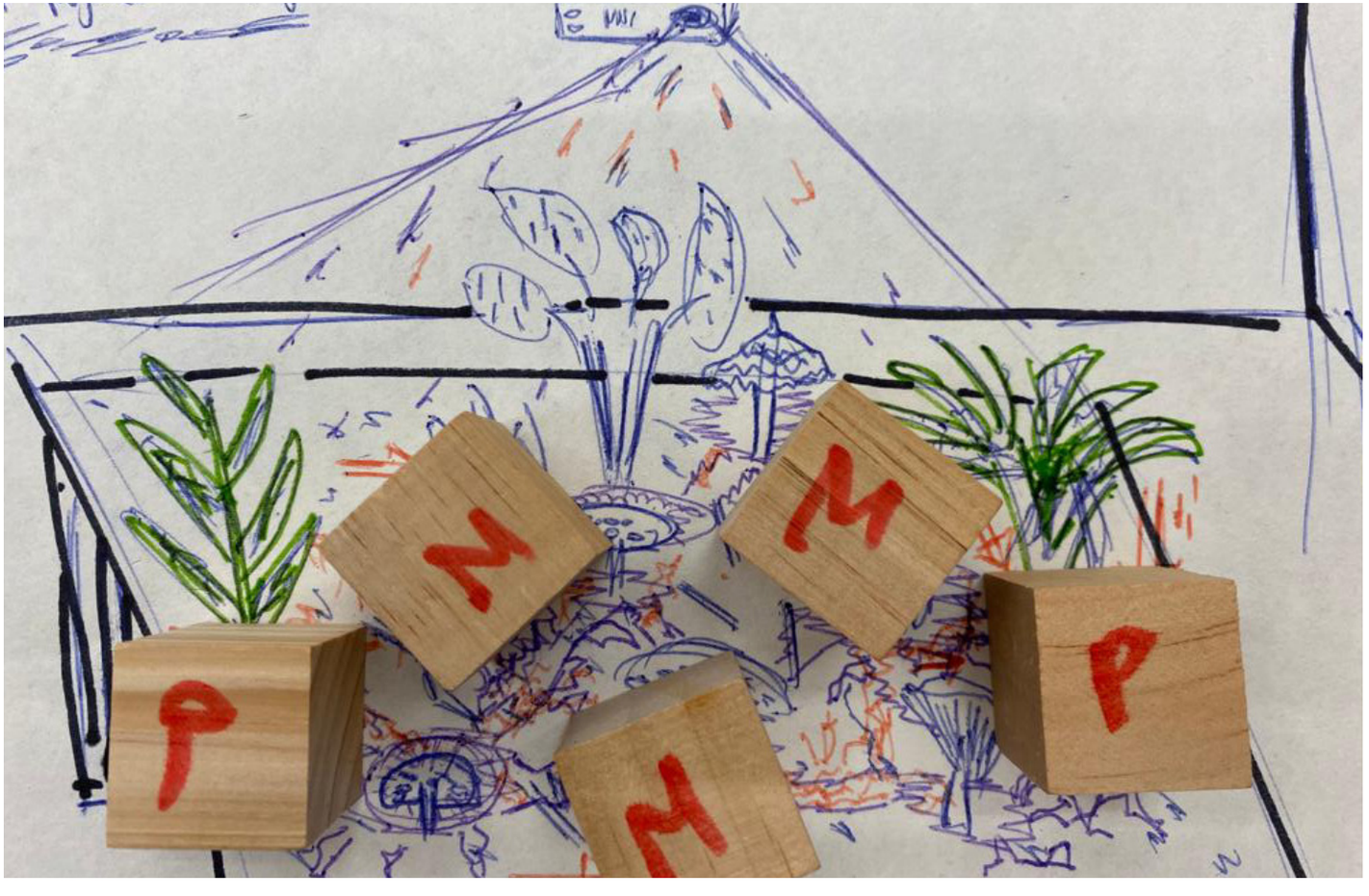
Sketch by Justin



Final Concept: Mushroom Communication

Scientists hypothesized that, just like signals sent by the human nervous system, fungi transmit electrical signals through these hyphae. Mushrooms use these electrical signals as a means of communication and as a way to react to their surroundings. Each tree in a healthy forest is connected to others through this network, allowing trees to share resources like water and nutrients.

Our interactive experience helps users understand the extraordinary intelligence of the Mycorrhizal Network, a symbiotic relationship between fungi and plants. There will be three mushrooms, each with a unique AR marker. The goal is to connect the Mycorrhizal Network by arranging the mushrooms and the two plants close enough to one another, such that ripples created by each mushroom and plant overlap to visualize mycorrhizal communication. Upon achieving this overlap, a sound of mushrooms communicating will be generated.

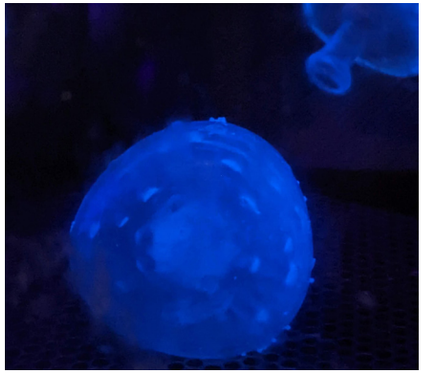
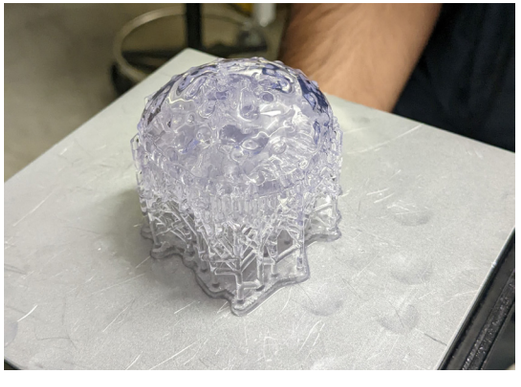


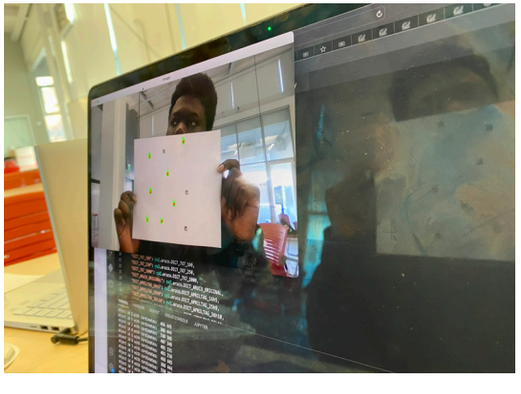
Making

Our form was built out of CNCed foam, and micro-landscape terrarium decor.

We used object tracking to detect the mushroom's placement on our project's form. Animations were created using Javascript in Processing. One of the major technical challenge that we faced while object tracking was to detect the cartesian coordinates of our mushroom AR markers, and mapping the coordinates correctly with the projections. Due to the different location of projector and camera, creating the mapping was a challenge.



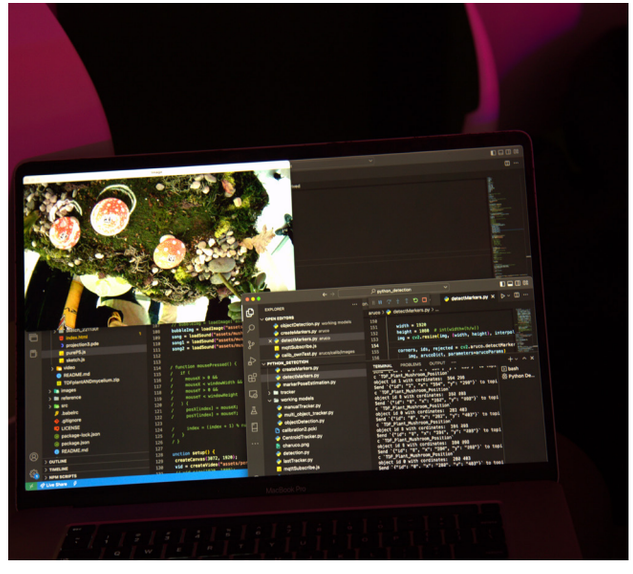




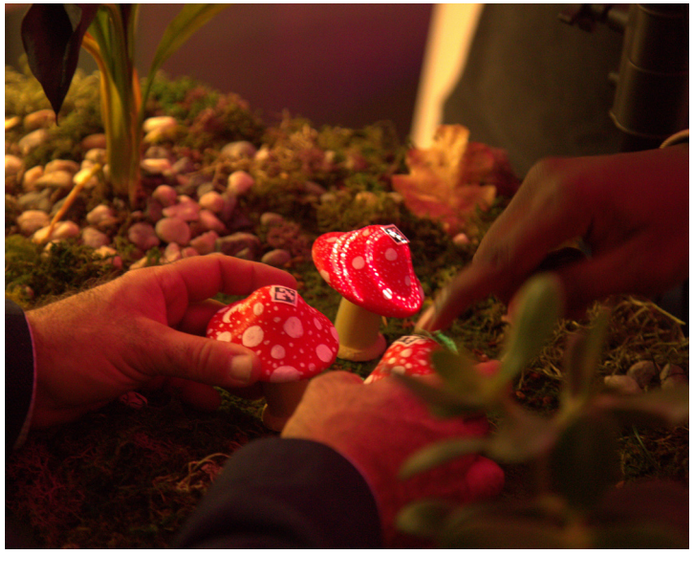




Final Showcase

The project helps its audience view and experience something that is not openly visible to our eyes and makes us aware of the brilliant intelligence of nature around us.

As for future work, we would like to extend the project to incorporate even more interactions, like watering of plants and touching the plants, along with more effects and better projection mapping.





Mycorrhizae. *01*

Chrysalis. *02*

Mindly. *03*

Aiden. *04*

Overview Chrysalis elegantly unravels the enigmatic journey of pupa formation and the ensuing butterfly metamorphosis within. Using soft robotics, we aspire to capture the most intricate and delicate aspects of this captivating transformation.

Team Winny, Wonjoon

My Role UX Research, Material Exploration, Fabrication

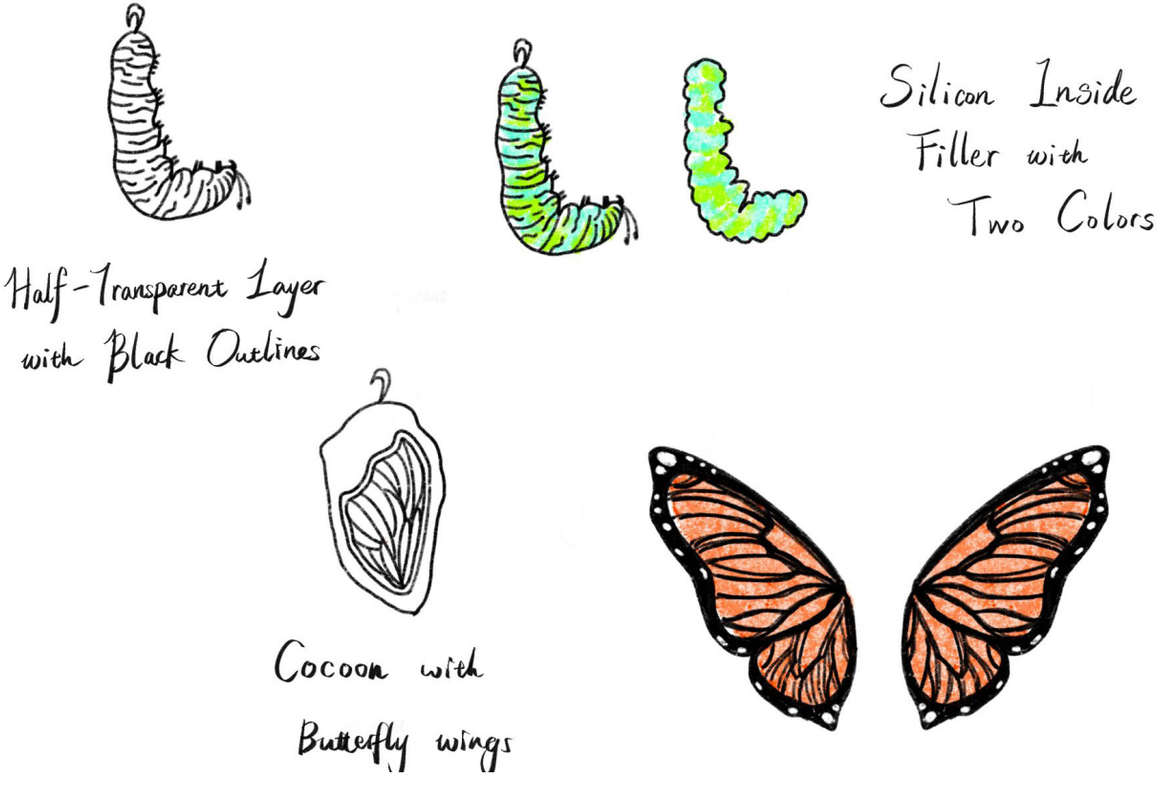
Deliverables Art Installation

Motivation

Our initial prompts were Persistence and Resilience, which sparked our exploration into the world of feral design—a concept that celebrates natural, organic, and spontaneous approaches to creating products or environments. Inspired by the remarkable adaptability and tenacity displayed by ecosystems and organisms in the face of ever-changing environmental conditions and disturbances, we were motivated to unravel the profound connection between persistence and resilience. Recognizing that these qualities enable nature to flourish, maintaining its vitality, diversity, and functionality, we set out to mirror this harmony in our project.

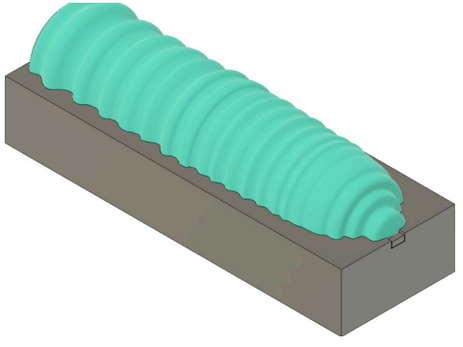
Initial Brainstorming

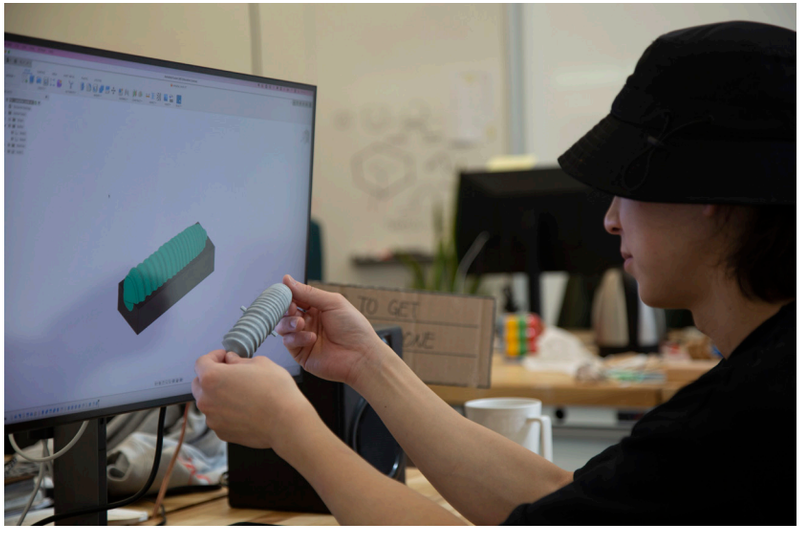
During our initial brainstorming sessions, the concept of metamorphosis emerged as a broad and captivating idea, encompassing four distinct stages: egg, larva, pupa, and adult. However, as we delved deeper, we found ourselves drawn specifically to the pupa stage—a remarkable period of dormancy and internal restructuring. It is within this chrysalis that the organism undergoes its awe-inspiring transformation. Fueled by our fascination with this phase, we set our sights on a singular goal: to meticulously capture the intricate details of pupa formation and the subsequent metamorphosis of the butterfly within it. By employing soft robotics technology, we aim to shed light on the hidden wonders of this natural metamorphic process.

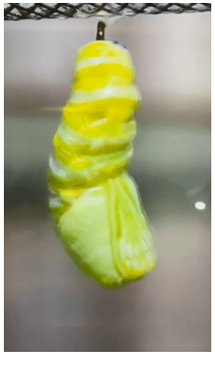


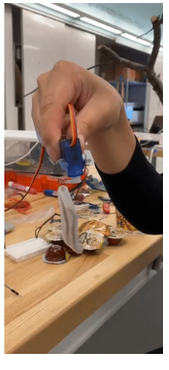
Formation of Pupa

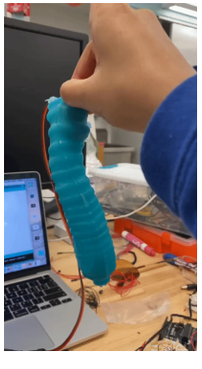
The formation of the pupa involved three crucial steps. To begin, we 3D modeled and printed a mold to shape the caterpillar structure. Next, we focused on enabling the caterpillar to move, simulating its natural behavior through the use of a motor. Finally, we successfully transformed the caterpillar into a cocoon by inflating it, representing the pivotal stage of metamorphosis.





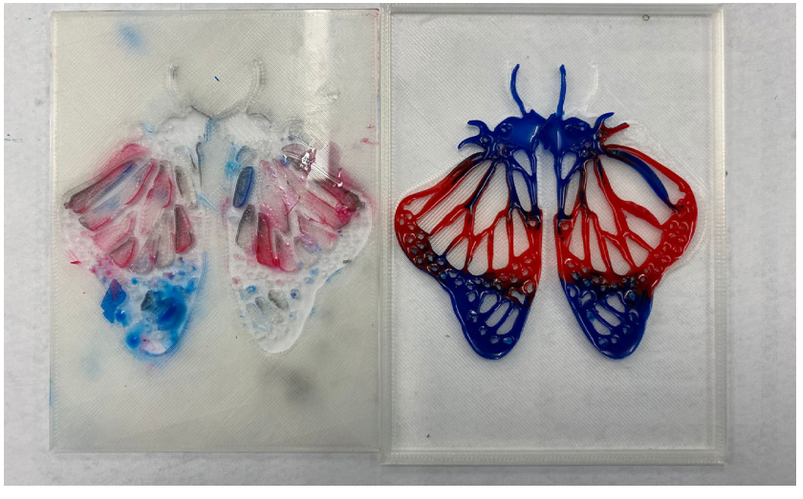


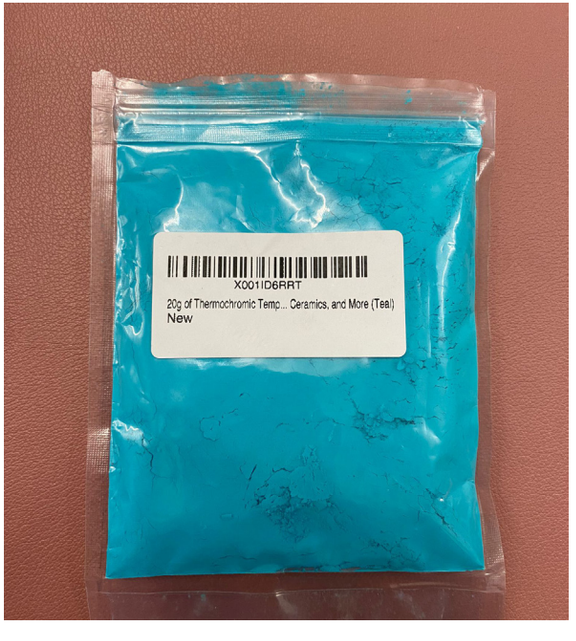




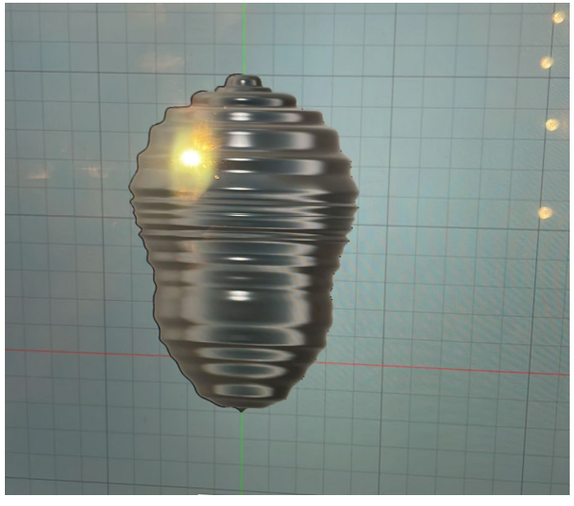
Formation of Butterfly

The butterfly formation involved three main steps. First, we 3D modeled and printed a mold for the butterfly wing pattern, paying close attention to its intricate details. Then, we mixed thermochromic color with silicone to create the cocoon, which changes color when exposed to heat. Lastly, we showcased the butterfly pattern through the transparent cocoon, achieved by inflating it with hot water.





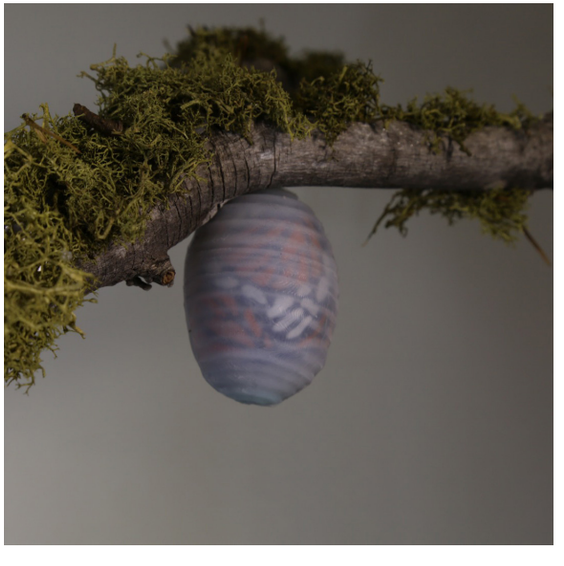
Final Showcase
Fabrication



Final Showcase

Our project has allowed the audience to witness the hidden marvels of nature's metamorphosis, fostering a deeper appreciation for its intelligence.

For future work, we can refine the showcase model, and incorporate interactive or educational elements for broader engagement and scientific exploration.



Mycorrhizae. *01*
Chrysalis. *02*
Mindlly. *03*
Aiden. *04*

Overview

Enhancing the path to precise symptom tracking for neurological disorders by revamping the digital infrastructure of Mindly, an early-stage startup originating at UC Berkeley. Mindly's core mission revolves around the creation of a comprehensive visual database. This database empowers clinicians to accurately monitor symptoms of neurological disorders in correlation with medication and therapy.

Team

Pooja Shah(Client), Srinija Maganti(Client), Third party Developers

My Role

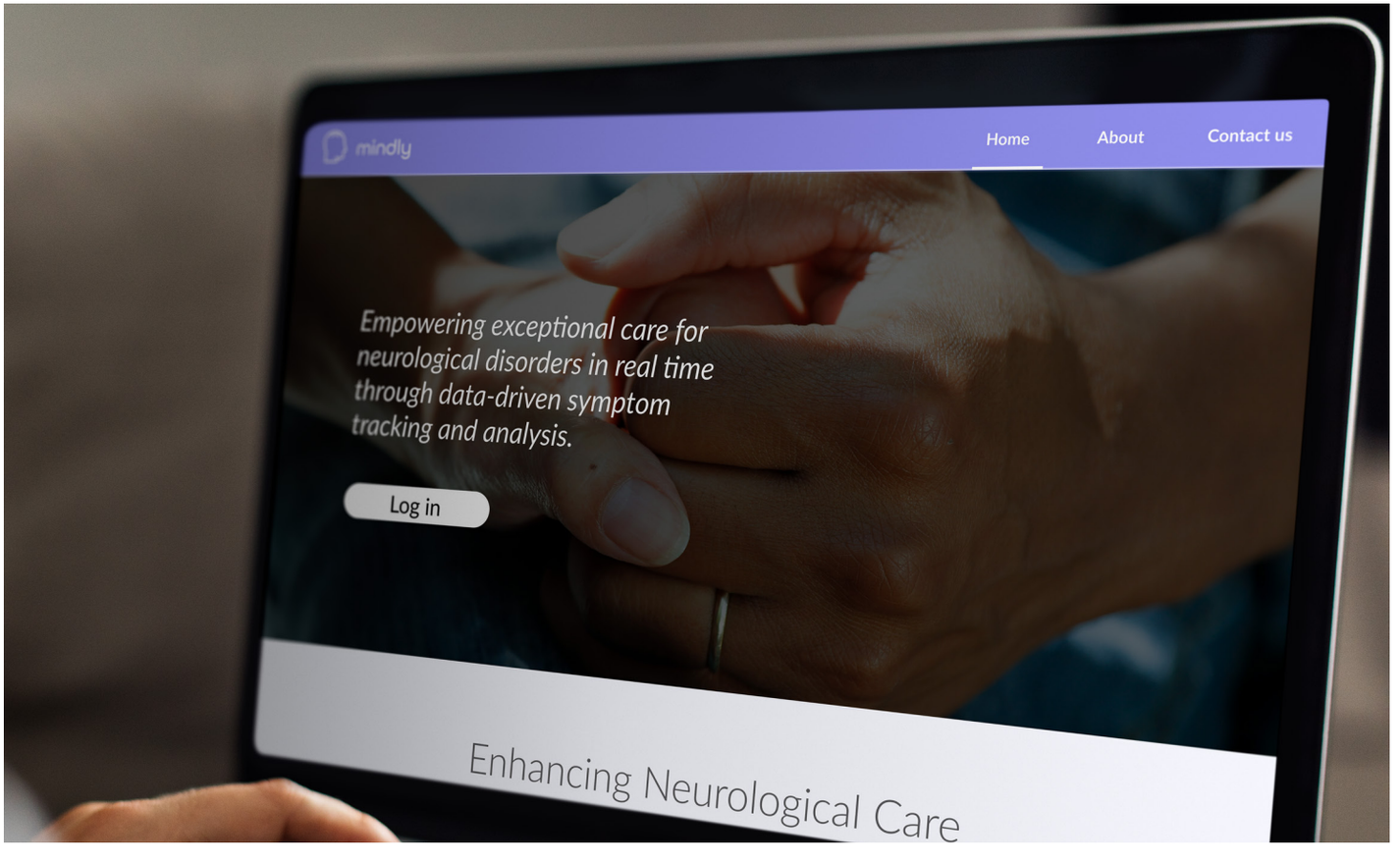
User Research, Ideating early concepts, UX Design, UI Design, Prototyping, Moderated usability testing

Tools

Figma

Deliverables

Hi-fidelity mockups, Interactive prototype

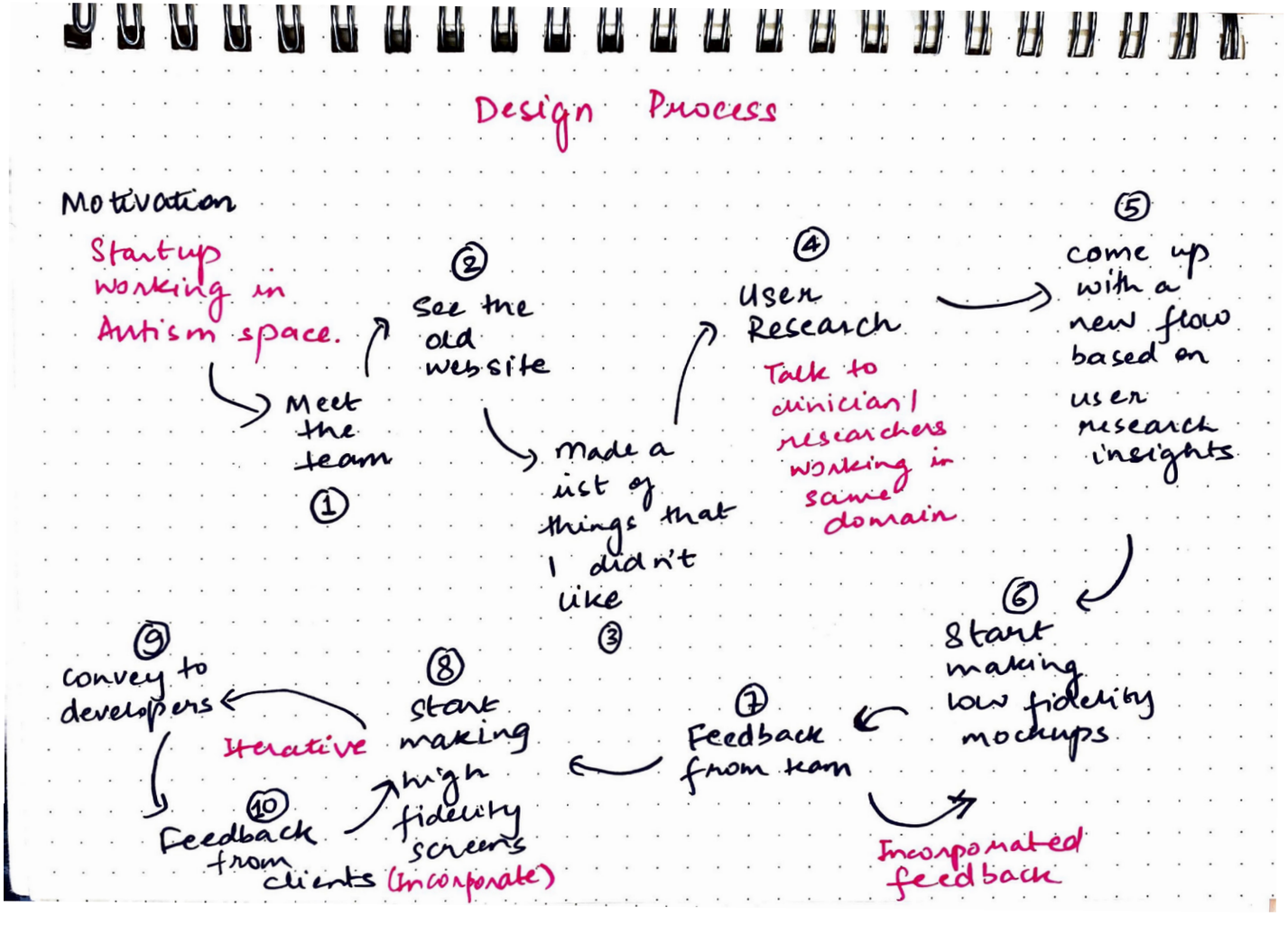


Problem

Mindly's current interface exhibits several issues, including repetitive and unintuitive functions, and usability challenges. Given the healthcare nature of the application, my goal is to create a minimalist and highly functional user interface. This UI should facilitate seamless video uploads, symptom tracking, and data analysis while maintaining a strong focus on user-friendliness. To bridge this gap, I started with the following question:

"**How might we optimize the Mindly platform to facilitate seamless interaction between clinicians and patients, ensuring efficient symptom tracking and empowering clinicians in the effective treatment of neurological disorders?**"

Design Process



User Research

I conducted a series of in-depth interviews with clinicians and researchers specializing in autism and diagnosis. The goal was to understand their current workflow, pain points, and their perspective on the need for a platform like Mindly. The user research revealed several crucial insights:

- Clinicians and researchers in the field of autism diagnosis are in need of a centralized platform that streamlines their workflow and integrates multiple functions.
- Key features such as calendar and appointment management, data insights, and a unified interface were highly sought after.
- The desire for a 'one-stop solution' underscores the need for Mindly to provide a comprehensive platform that addresses all the pain points identified by users.

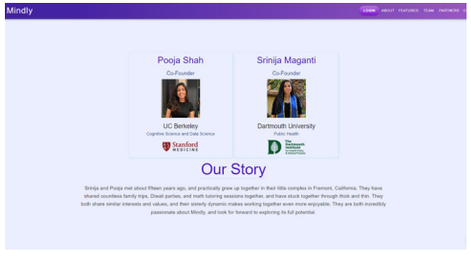
Optimizing the Clinician Workflow

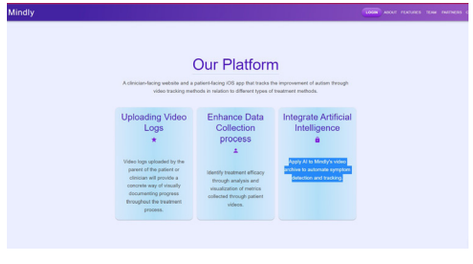
Mindly's current website was not fully developed, offering limited functionality for efficient patient management. This includes challenges like inefficient video uploading and analysis, limited data insights, and appointment scheduling.

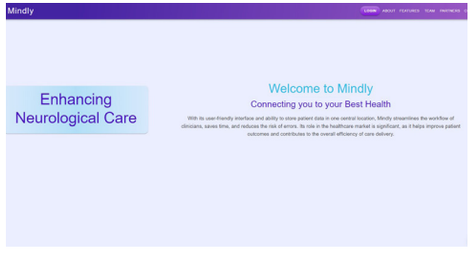
Heuristic Analysis Highlights:

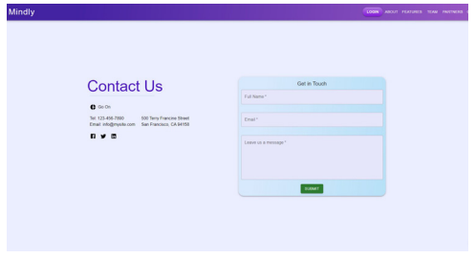
- Video Uploading and Analysis: The process of uploading and analyzing patient videos is inefficient and needs improvement.
- Data Tracking: Clinicians face difficulties in tracking patient progress due to limited data insights.
- Appointment Management: The underdeveloped system lacks user-friendly tools for scheduling and monitoring appointments.

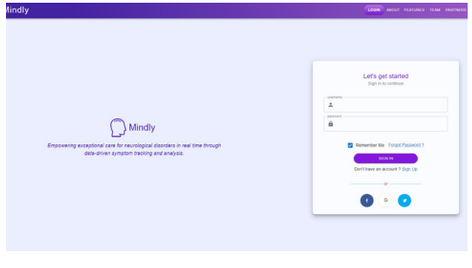
Old Screens

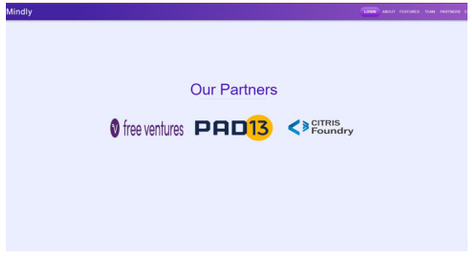






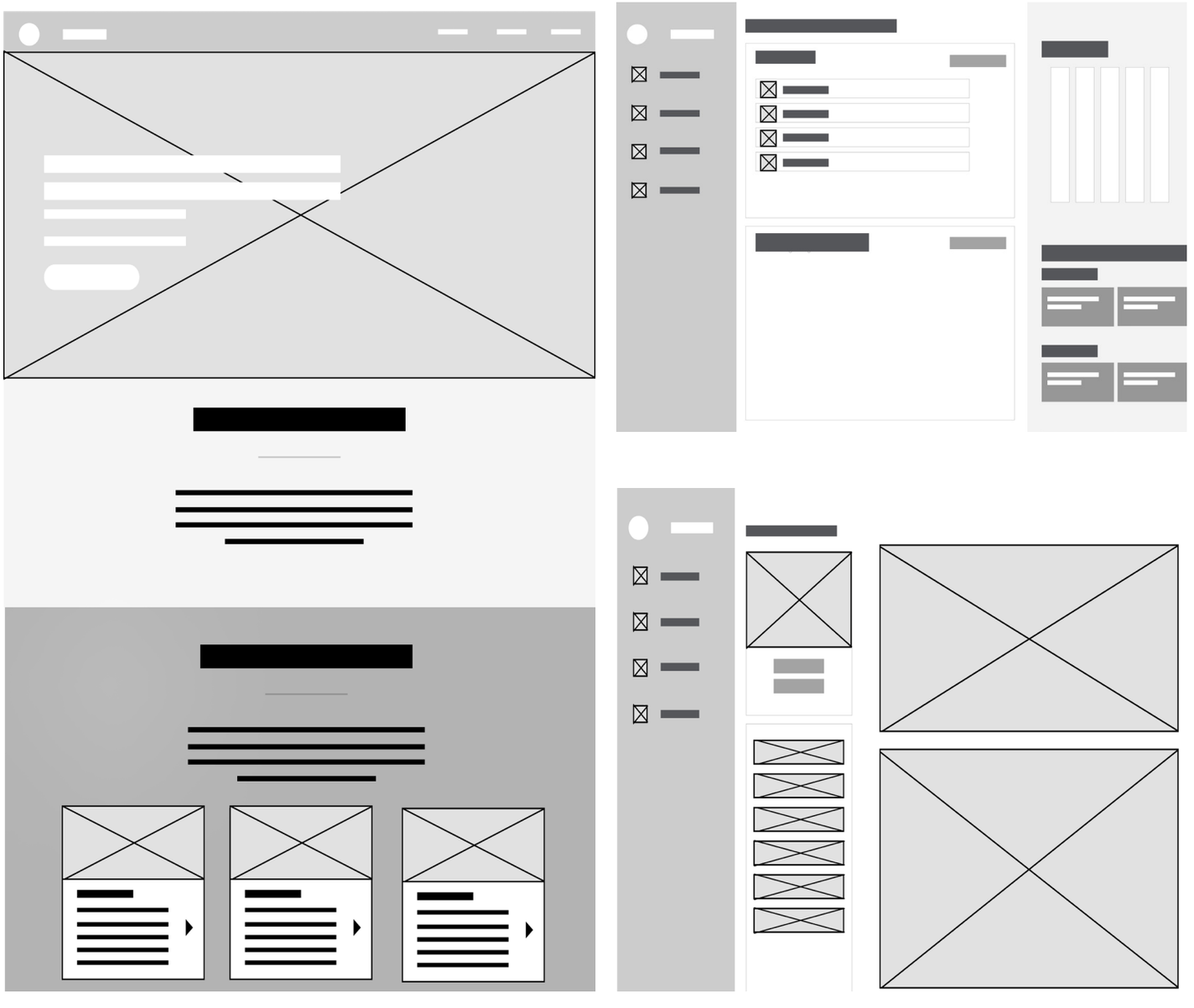






Low-fidelity Mockups

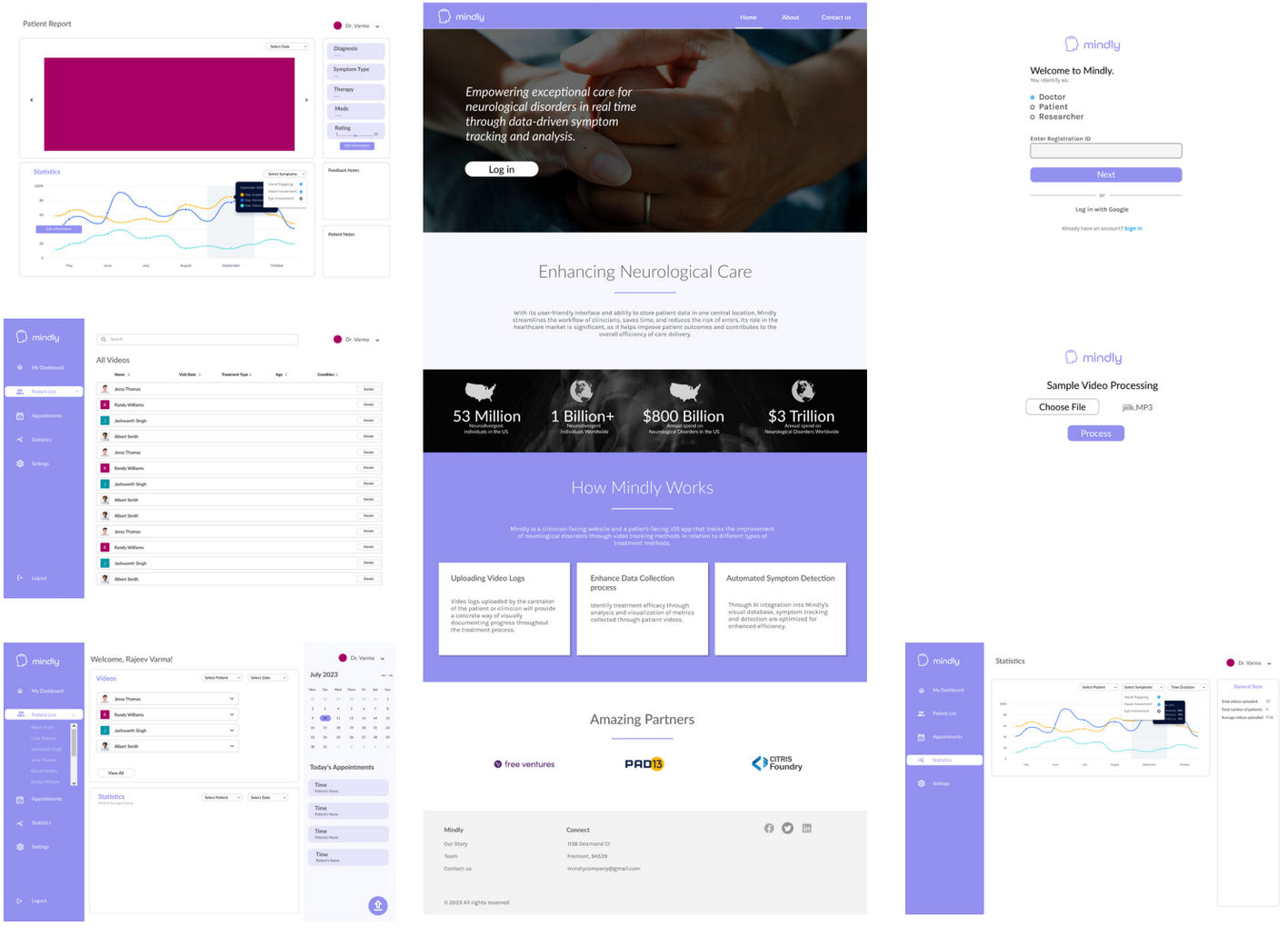
I created low-fidelity mockup screens based on project requirements and promptly shared them with our clients to initiate collaboration. Their input and feedback at this early stage allowed us to refine the design to better align with their needs, ensuring a more effective clinician workflow for neurological disorder management.



High-fidelity Screens

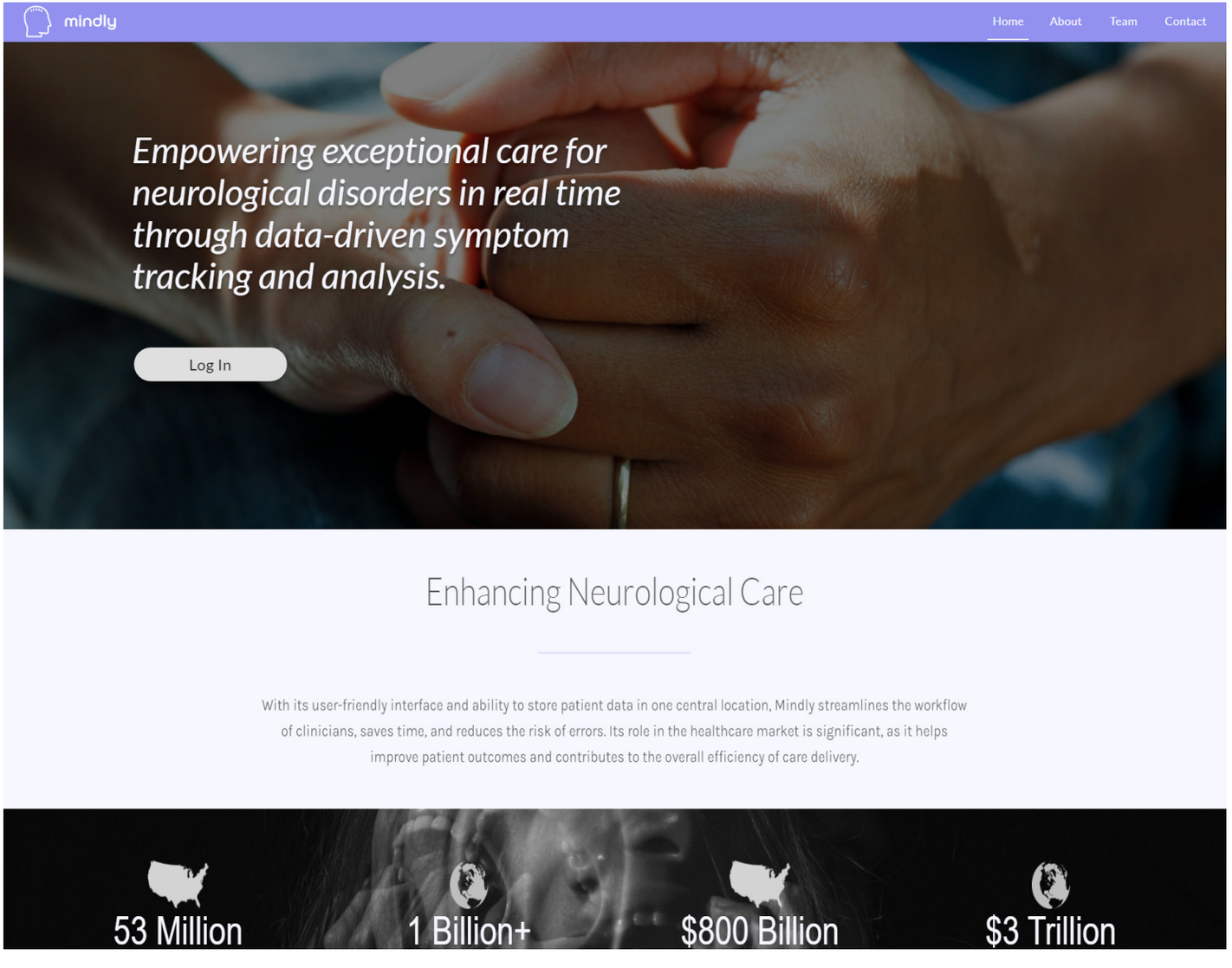
As we progressed, I transitioned from low-fidelity mockups to high-fidelity screens, incorporating feedback from our clients every two weeks.

Simultaneously, I closely collaborated with a third-party development team responsible for coding the website. This dual approach allowed us to work in tandem, ensuring that the design and development phases were seamlessly integrated. I provided continuous feedback to the developers throughout the process, maintaining open lines of communication until the final website was ready.



Final Solution

The culmination of our efforts resulted in a streamlined and user-centric platform. The final solution offers clinicians and researchers in the field of neurological disorders an efficient and intuitive workflow. It seamlessly integrates appointment management, data tracking, video analysis, and communication, all while providing valuable data insights. This solution not only enhances the efficiency of clinician-patient interactions but also supports research efforts in the field, ultimately advancing the diagnosis and treatment of neurological disorders.



Mycorrhizae. *01*
Chrysalis. *02*
Mindlly. *03*
Aiden. *04*

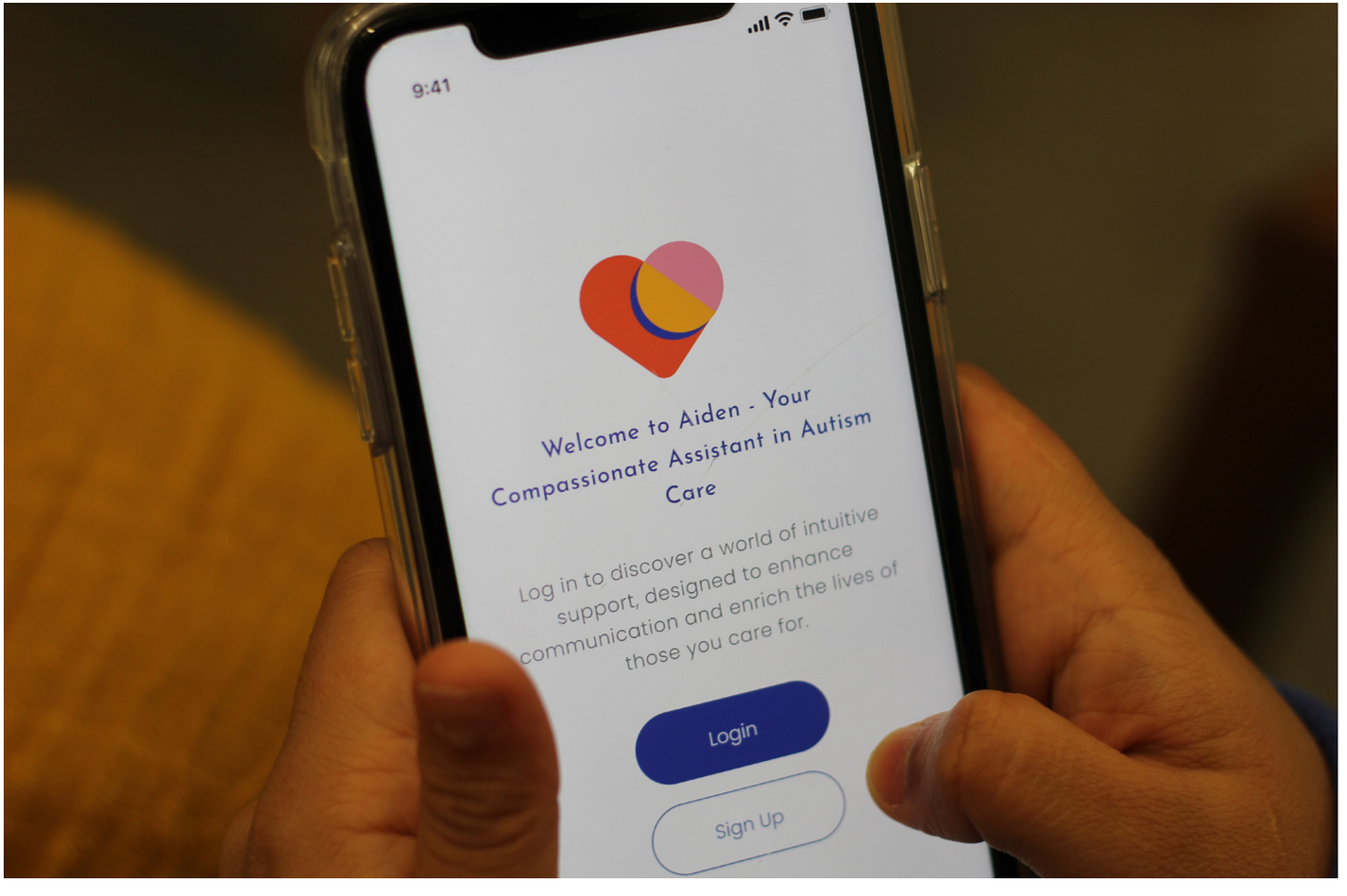
Overview

Project Aiden: Advancing Autism Care Through Wearable Physiological Sensing

This project addresses the significant gap in communication methods for individuals with profound autism. Leveraging advanced wearable technology and machine learning, it aims to develop an intuitive Augmentative and Alternative Communication (AAC) platform. This system is designed to interpret physiological and affect-based cues to help express basic needs like hunger and pain, thereby reducing caregiver burden and enhancing the quality of life for individuals with profound autism.

My Role

As the sole researcher and developer of this thesis project, my responsibilities encompassed the entire project lifecycle. This included conceptualizatin, data analysis and machine learningm and platform development.



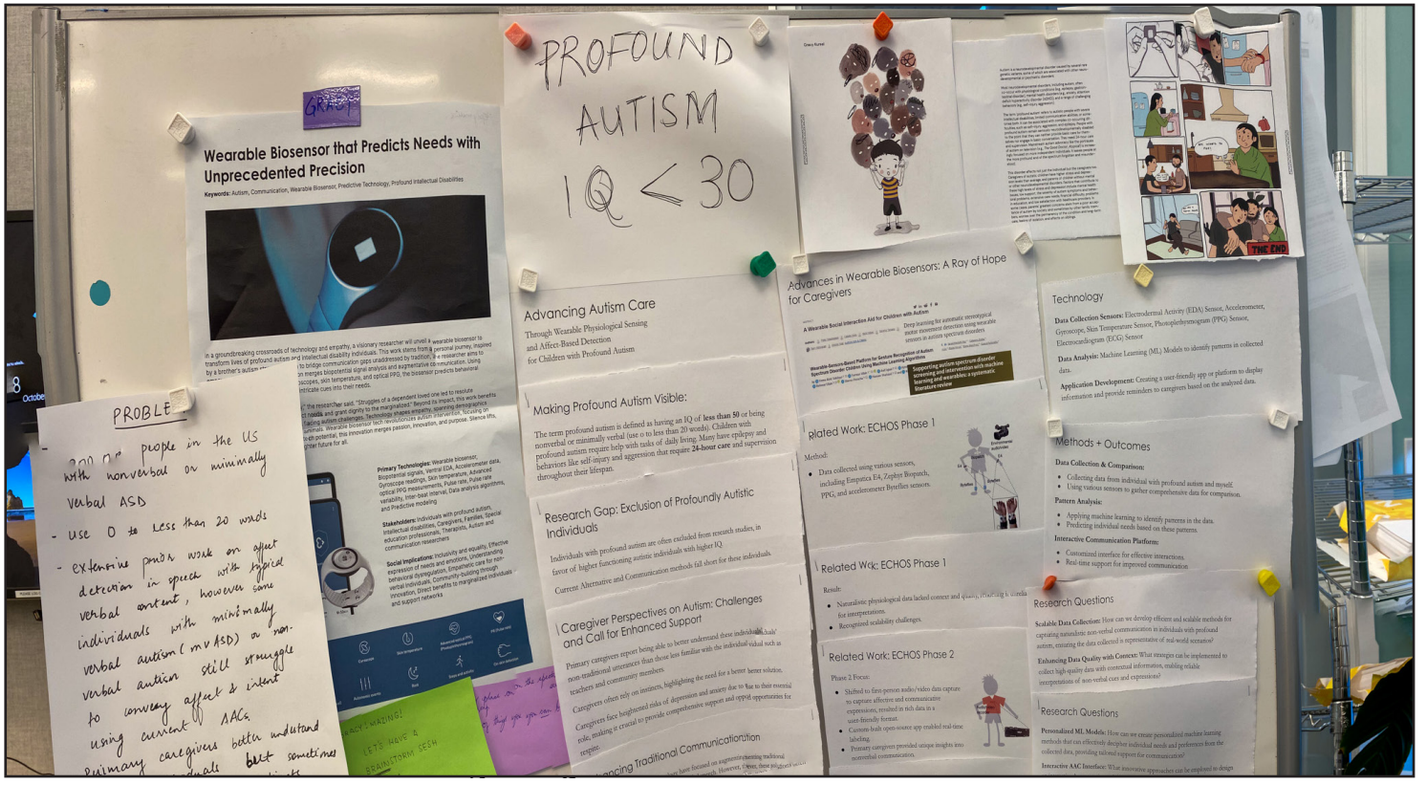
Motivation

The motivation stems from the urgent need for effective communication tools tailored for individuals with profound autism. Traditional AAC devices are often inadequate for this group due to their unique cognitive and motor challenges. This project aspires to fill this gap by providing a novel, non-speech communication method, significantly easing the burden on caregivers.

Design Process

The design process was iterative and user-centric, involving:

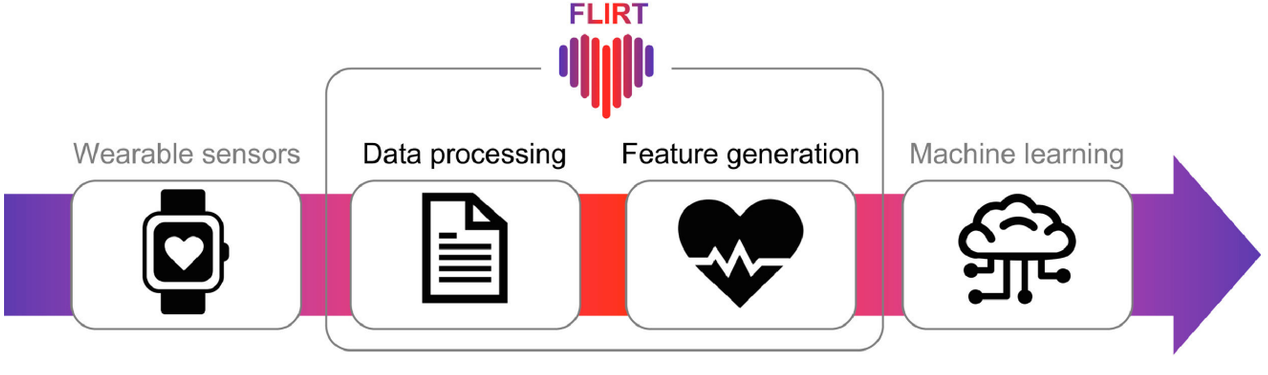
- Needs Assessment: Understanding the specific communication challenges faced by individuals with profound autism.
- Technology Exploration: Evaluating various wearable devices and machine learning techniques.
- Prototype Development: Building a functional AAC platform, integrating feedback from potential users and caregivers.
- Testing & Refinement: Conducting trials to refine the platform based on real-world usage and feedback.



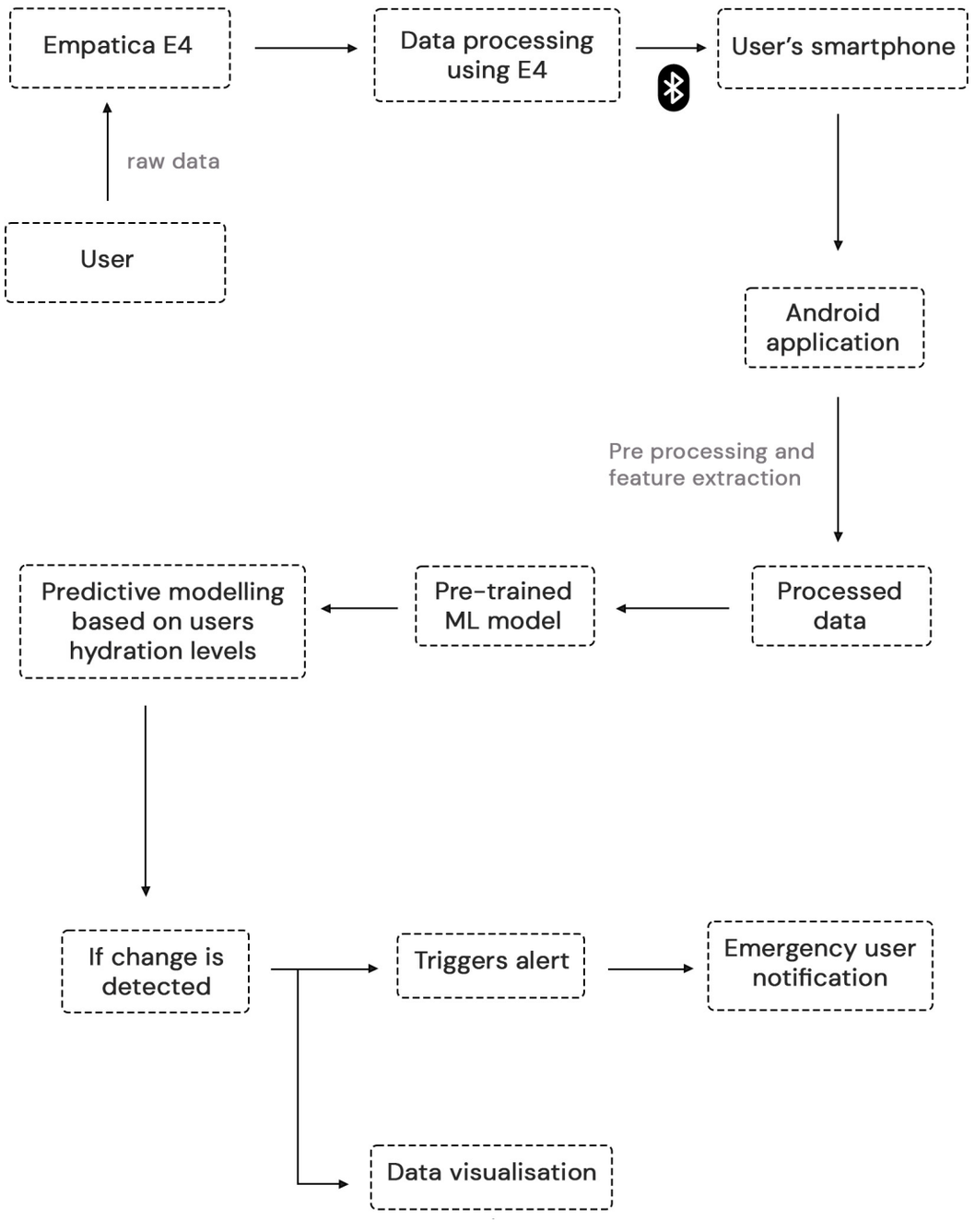
Storyboarding

Data Collection and Machine Learning

The methodology was centered around an integrative approach combining wearable technology and machine learning. Data collection involved using the Empatica E4 sensor to gather physiological responses from individuals with profound autism and neurotypical counterparts. This data was then processed using the FLIRT toolkit, focusing on feature extraction for machine learning analysis. The key objective was to identify patterns correlating physiological changes with specific needs and emotions. Subsequently, a machine learning model was developed to interpret these patterns, translating them into actionable insights. The culmination of this methodological approach was the design of a user-friendly AAC platform, tailored to facilitate real-time communication assistance for caregivers, and enhance the autonomy and care for individuals with profound autism.



Process Map


Empatica E4
Data processing using E4
User's smartphone
raw data
User
Android application
Pre processing and feature extraction
Predictive modelling based on users hydration levels
Pre-trained ML model
Processed data
If change is detected
Triggers alert
Emergency user notification
Data visualisation

Final Design

The final product is a seamless AAC platform that:

- Integrates physiological data analysis with real-time communication aids.
- Provides caregivers with actionable insights into the needs of individuals with profound autism.
- Employs an intuitive interface for ease of use.
- Demonstrates potential for broader application in other communication-challenged populations.