PORTFOLIO

Runming (Eva) Fan

DESIGN

| Runming Fan's Portfolio | http://eva.fan faneva2023@outlook.com

About me

I'm a cross-disciplinary designer with a strong focus on human-computer interaction (HCI). By integrating tangible interaction, music interfaces, artificial intelligence (AI), and interactive systems, I create innovative projects bridging art, technology, and creativity, exploring their dynamic interplay. I am working on my undergraduate studies in Smart Design major at ShanghaiTech University, developing groundbreaking projects. During my time as an exchange scholar at the Massachusetts Institute of Technology (MIT), I further excelled in cutting-edge interactive systems, AI-enhanced tangible design, and forward-thinking product designs. My multidisciplinary approach pushes the boundaries of design and technology.

Awards

- **Shanghai Scholarship, 11/2024**
- Merit Student, ShanghaiTech University, 2023 & 2024
- Special Scholarship for the Undergraduate 3+1 Overseas Exchange Program, 06/2024
- **Gold Winner, Muse Creative Awards, 09/2024**
- Silver Winner, Muse Design Awards, 09/2024
- Third Prize, 11th Chinese Colleges & Universities Design Competition, 09/2024
- Excellent Design Award, 7th Global Competition on Design for Future Education, 07/2024
- **Isola Design Awards Nominee, Milan Design Week 2024, 06/2024**
- Design Innovation Excellence Award, Shanghai Design Innovation Competition, 09/2023

Skills

CAD | Solidworks / Fushion 360 / Rhino / Keyshot	●●●●●
UI Design | Figma / Photoshop / Illustrator	●●●●●
IoT | Arduino IDE	●●●●●
Programming language | Python	●●●●○
Audio & Sound Design | PureData & Automatonism	●●●●○
Others | Blender / Indesign / JavaScript / HTML / Matlab	●●●○○

Education

Massachusetts Institute of Technology (MIT) 2024.02–2024.05

Architecture Department · Undergraduate Special Student | GPA: 5.0/5.0

Courses of Study
- Interaction Intelligence — A
- Digital Instrument Design — A+
- Advanced Product Design — A

ShanghaiTech University [Double First Class] 2021.09–2025.06

School of Creativity and Art · Industrial Design · Bachelor | GPA: 3.86/4.0 (top 2)

Campus Roles

Teaching Assistant | Score: 4.99/5.00 2023.06–2023.07

Design Thinking: Innovative Solutions in Product and Interactive Design

Assisted throughout 48 course hours over 4 weeks, helping 35 students complete 7 in-class design projects. Purchased materials, wrote tool usage instructions; provided professional suggestions, assisted in making course models; answered questions, and graded projects.

Assistant Manager 2022.09–2024.03

Design Workshop

Assisted in establishing regulations and equipment instructions; helped students across the university with model making, and maintained regular shifts to ensure equipment functioned properly; served as the online host during the campus open day, comprehensively showcasing the school.

Work/Internship Experience

ShanghaiTech · Motor and Motion-Control Lab 2023.09–2024.01

Designer

Assisted in designing and creating the skeleton and facial skin for a humanoid robot project aimed at emotional interaction, and suggested positioning strategies for future market development of the project.

Deemos Technologies Inc. 2023.08–2023.10

UI Designer

Designed the web and mobile UI for ChatAvatar (3D model generator), investigated the interaction framework of competing products, and produced an optimized set of wireframes and two sets of interactive prototypes.

Feisheng (Shanghai) Electronic Technology Co., Ltd. 2023.07–2023.09

Industrial Designer

Designed a concept for an ultra-thin, foldable monitor for AOC. Researched on the appearance of display products from various brands, and understood the product structure, component composition, materials, textures, and safety regulations by disassembling actual devices; producing an innovative design.

ShanghaiTech · Lab for Experiential and Affective Design 2023.02–2023.05

Designer, Design Researcher

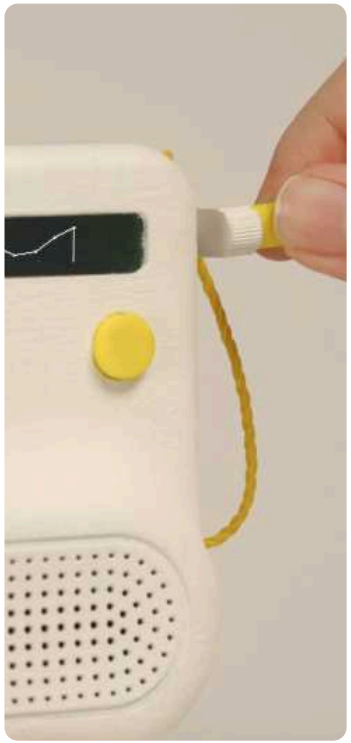
Participated in a smart cockpit design project in collaboration with Apollo Company. Combined online research and brainstorming to produce personas for target users and a seven-stage user journey map, proposed possible future design directions, and built a 1:1 prototype model.

Content

01
BREATHINGS
Interactive Installation

2023.9 - 2024.1

02
HUMOMENT
AI music composer & diary



2024.3 - 2024.5

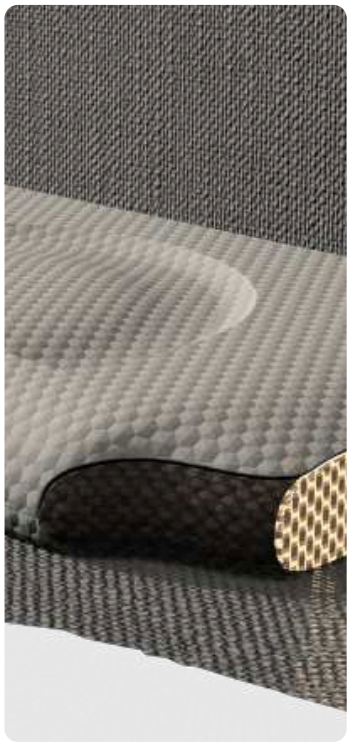
03
PlugiYoga
Modular yoga game toolkit

2024.2 - 2024.5

04
CLEANIGENT
Smart bathroom cleaning system

2022.9 - 2023.1

05
SLEEPi
Anti sleep apnea pillow



2023.2 - 2023.5

isola design awards 2024

MUSE CREATIVE AWARDS

01

風 | Breathings

Project website: feng-breathings (isola.design)

Exhibited at the Milan Design Week 2024 Isola Design Festival
Nominated for the Isola Design Awards 2024
Journaled in the Isola online magazine

Team Members | Runming Fan Yutong Liu Shenhuan Lu
Personal Contrib. | Case Research Logical Analysis Hardware & Interaction Design
Instructor | Shulin Liao Yue Zou
Affiliated Institution | ShanghaiTech University
Creation Date | September 2023 - January 2024

Contemporary society is filled with artificial creations, and in the life of 'minimalism,' people have forgotten the emotional connection with nature. This installation examines the wind as a concrete life connotation beyond a meteorological symbol, using the wind as a medium to empathize with nature.

Milan Design Week 2024

Isola Design Festival, 15 — 21 April

Isola

Via Valtellina 5

BREATHINGS

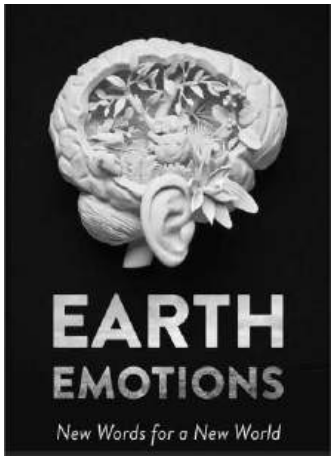
Lu Shenhuan, Fan Runming & Liu Yutong

Is One Life Enough?

Preliminary Research | How to Build an "Emotional Connection" between Humans and Nature

Social & Literature Research What is the "significance" of nature to humans?

"We often speak of loneliness as a result of overlooking our omnipresent connection with nature. The connection with nature is actually a kind of 'root' for us, like a creature full of tentacles tightly grasping the ground, hardly losing itself no matter the wind and grass movements."
— Liu Yuxi, Assistant Professor at the School of Humanities and Social Science, ShanghaiTech University.



Good earth feeling. A positive and good feeling of oneness with the Earth and its life forces where the boundaries between self and the rest of nature are obliterated and a deep sense of peace and connectedness pervades consciousness. The obliteration of the boundary between the knower and the known, of inside and outside, and the disappearance of time. I would later call this state of mind "eutierria"or a good Earth feeling.

—— Glenn A Albrecht, Earth Emotions: New Words for a New World

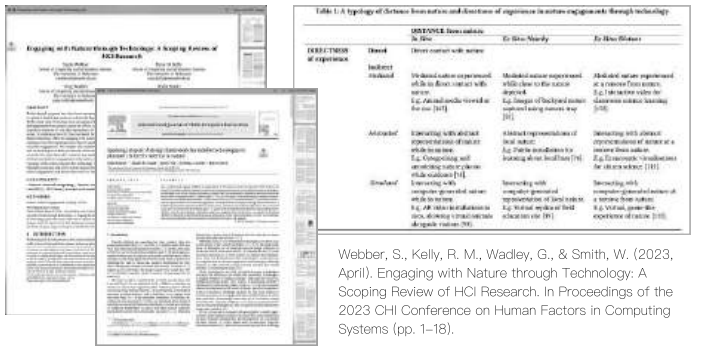
The 'significance' of nature to humans lies in the 'roots' of the human connection with nature. This 'root' is due to the 'empathy' between humans and 'other life forms' in nature, a phenomenon known as 'Eutierria'."

Empathy

"Eutierria"

Theoretical & Case Analysis How to "empathize" with other lives in nature?

Through extensive analysis and comparison of design cases related to "Humans and Nature," we have summarized three mutually inclusive design directions:
- Freeze time, enjoy the present moment
- Create poetry, slow down
- Forge connections, achieve harmony between heaven and human



Webber, S., Kelly, R. M., Wadley, G., & Smith, W. (2023, April). Engaging with Nature through Technology: A Scoping Review of HCI Research. In Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems (pp. 1–18).

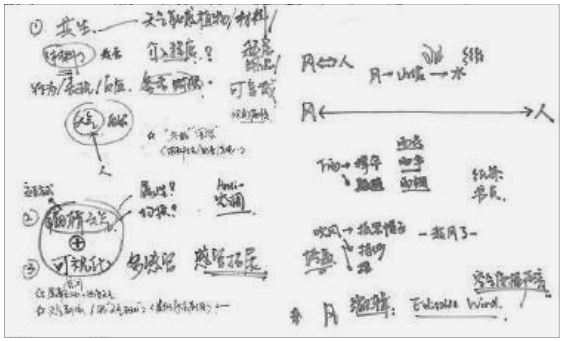
After studying this human-computer interaction paper, we found a way for humans to empathize with other life forms:

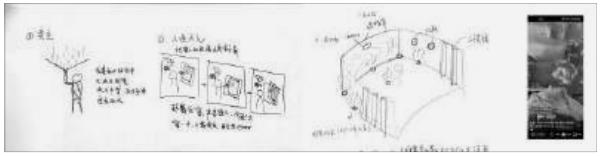
"Human interaction with 'abstract representatives' of natural life in nature."

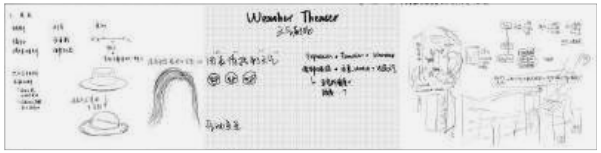
"Nature Therapy" Related Case Analysis

Direction Exploration | How to Explore the "Abstract Representatives" of Natural Life

Medium Search How to "Abstract" Nature







Through field observations and divergent thinking, combined with previous research results, we propose three feasible directions:

Symbiotic Design | Harmonious unity between humans and nature / Sensory enhancement
Artificial Weather | Humans creating their own weather / Weather modification
Visualization Design | Translating the language of nature / Sensory expansion

For these three directions, we explored more solutions:

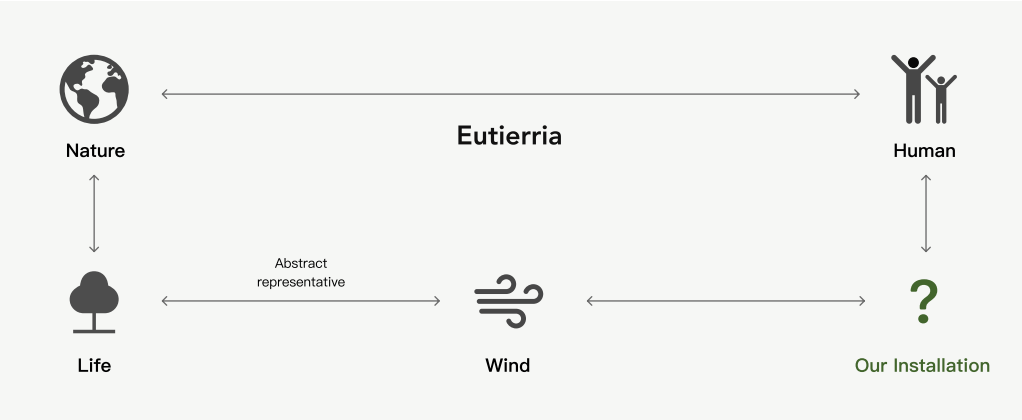
- Using environmentally sensitive plants/ materials to extend human senses;
- Creating weather through different interactive methods such as expressions and sounds;
- Creating an immersive space that amplifies weather elements...

We chose **'wind'** as the medium of our abstract representation.

It is close to human life, within reach; it is the breath of nature, omnipresent; it nurtures life, carrying **messages invisible to us**—spores, dust mites, microbes, organic molecules…
We exist amidst the wind, yet we cannot directly perceive the existence of the life information it carries. Is it possible to design an **interactive installation** that **visualizes the life messages carried by the wind** and allows people to interact with it?

Direction Exploration | How to Explore the "Abstract Representatives" of Natural Life

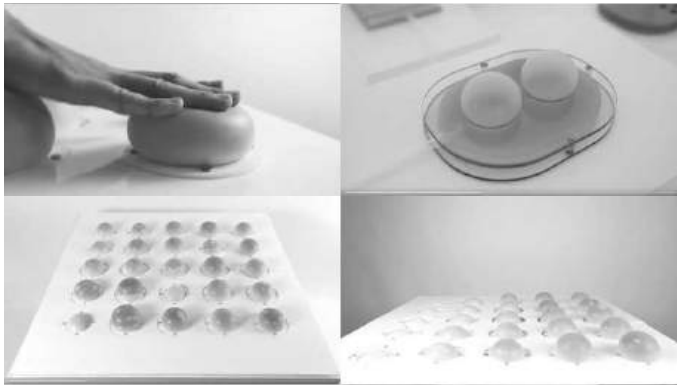
Representational Deduction How to Represent "Nature"



After deciding to use "wind" as the medium, our initial focus is on the surface form of the device.

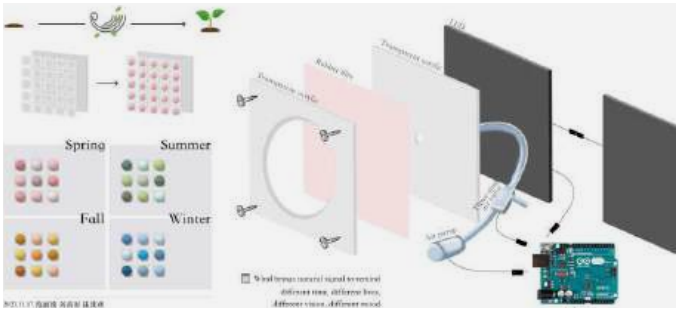
What kind of surface form can be both visually appealing and associated with the "life" within the "wind"?

Through interviews, questionnaires, and other methods, we gathered the visual impressions of CMF experts and the public regarding the imagery of "nature," "wind," and "life." We found that undulating and continuous forms are the most effective in conveying the concept of **"life within the wind."**



Sources of Inspiration

Our surface form inspiration comes from this matrix-style interactive device. It consists of neatly arranged airbags that can regularly protrude and change surface color. We believe this device closely aligns with concepts such as "life," "diversity," "plants," "spores," and "growth."



Preliminary Concept

Design an undulating surface to show the life messages carried by the wind in a given area. The undulations are created by the collective variations of multiple wave units, whose number and amplitude are influenced by the amount of biological information present in the wind.

Form Testing

Based on the results of the questionnaire survey, we designed wave units of various sizes, densities, heights, and protrusion shapes, and created physical models for testing and evaluation.
Finally, we found that the surface effect created by moderately dense "coral-like" protruding units best fits our concept.

Model Making | How to Present the "Life Information" in the "Wind"

Hardware Testing and Iteration

Unit layout

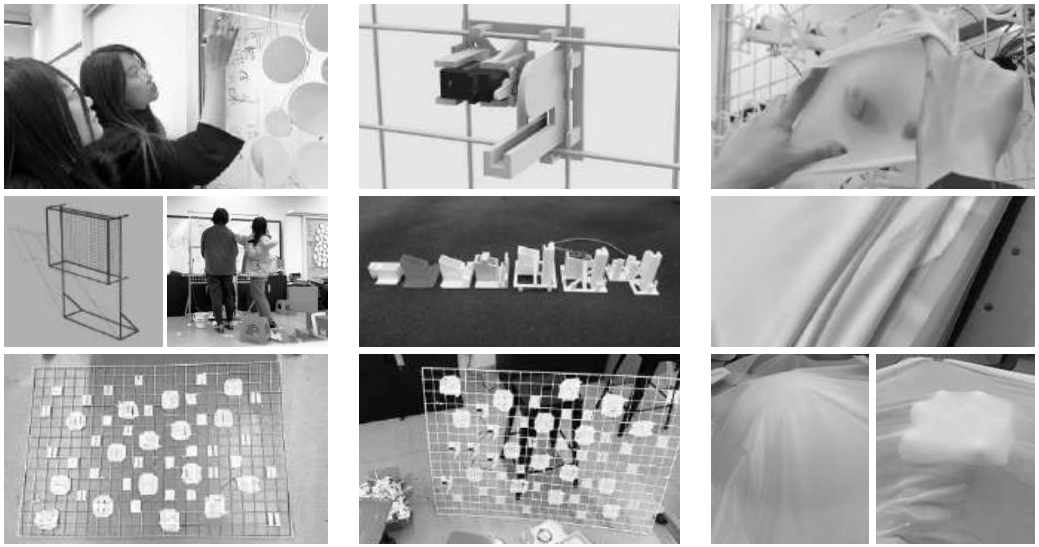
According to the size of human body, combined with the density and beauty of the organic form, the arrangement and size of the units were determined.

Trabsmission Structure

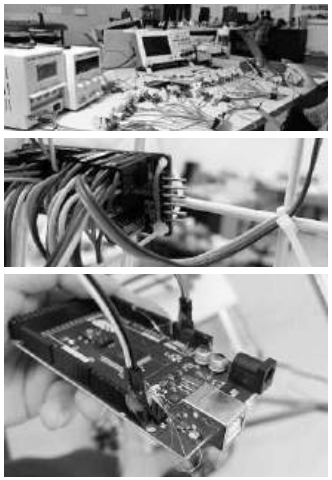
For stability, convenience, and aesthetics, we designed the aluminum profile bracket and servo motor base after seven iterations.

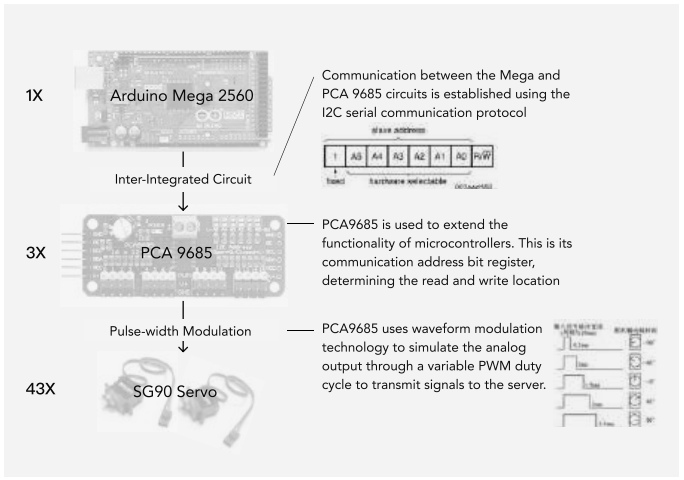
Surface Effect

In terms of surface texture, flexibility, transparency, and color, we tested materials such as latex films, sponge, PET plastics, and textile meshes.



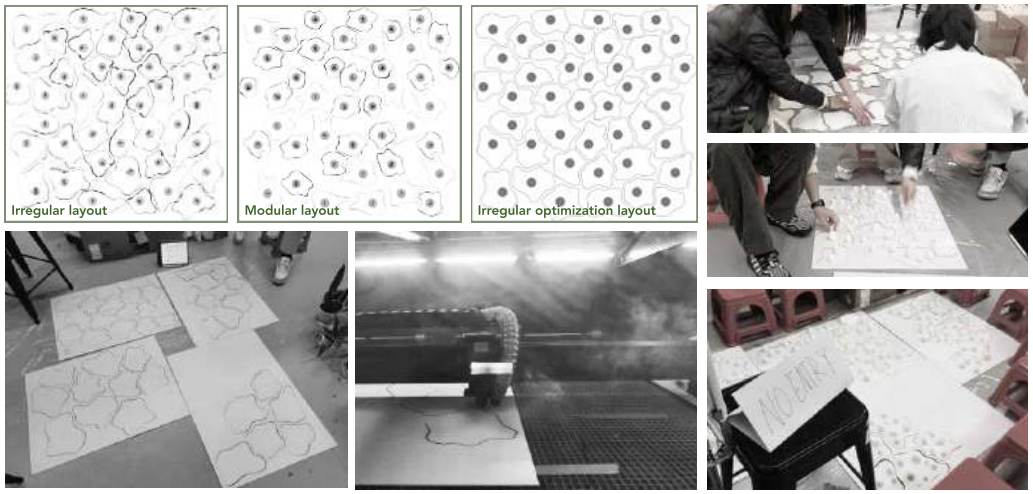
Circuit control





Final Model Making

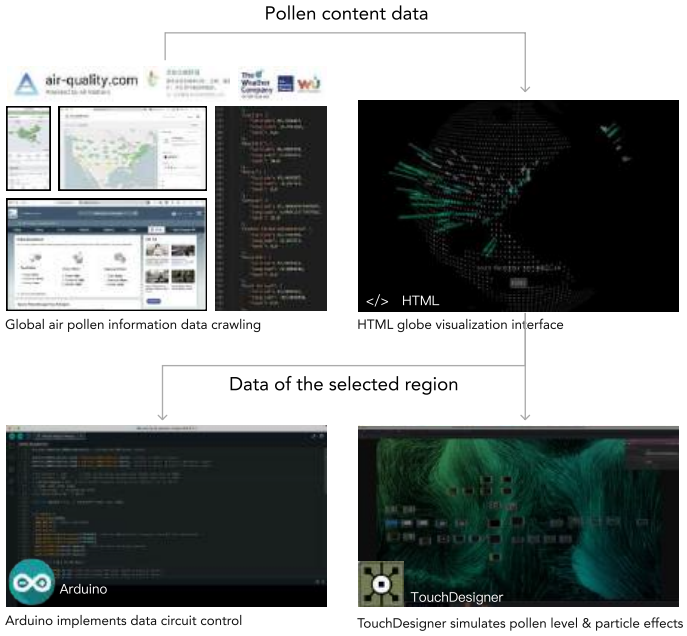
Unit form design & manufacture



Laser-cutting & ultra-light clay simulating surface bulges

Web Interface Design

To enable people to more vividly perceive the information conveyed by the device, we have designed an interactive web interface. We use real-time data on pollen content in the air from around the world to represent the current level of biological activity in different regions. Users can rotate the globe and click on areas of interest to view details.



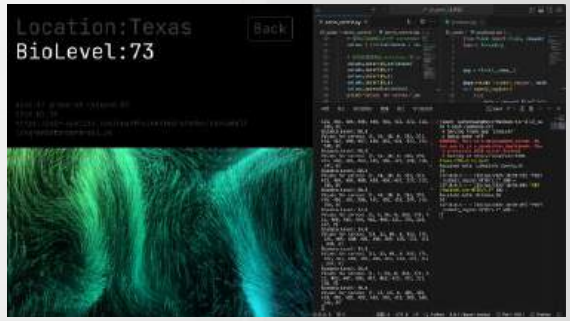
Global air pollen information data crawling

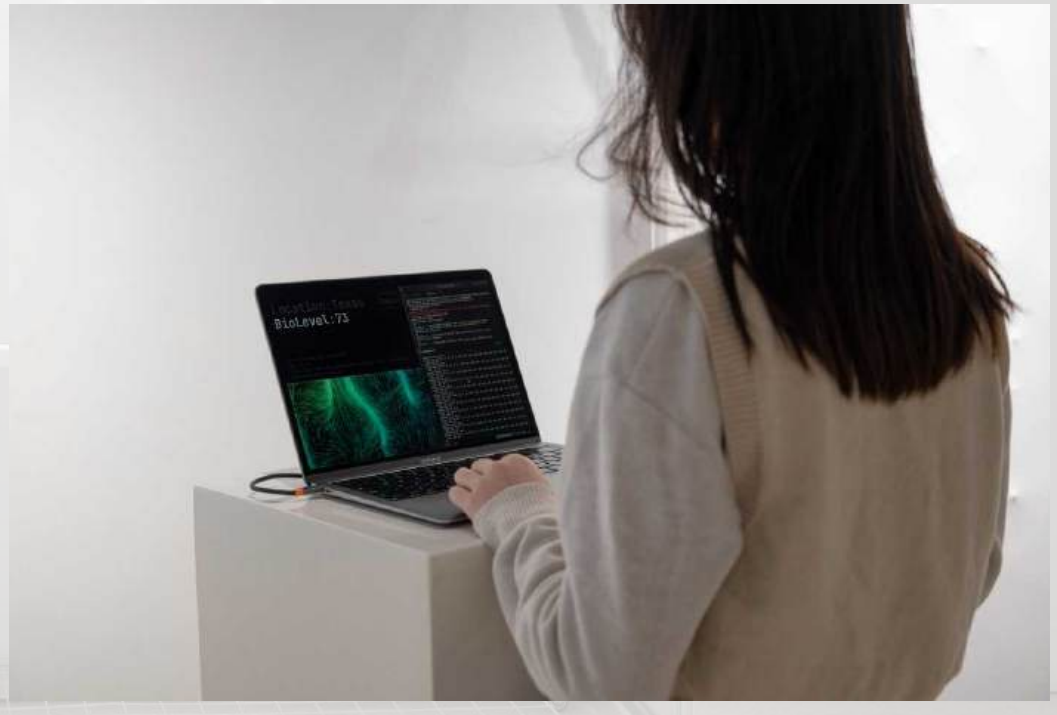
HTML globe visualization interface

Arduino implements data circuit control

TouchDesigner simulates pollen level & particle effects

Exhibition mode | Indoor exhibition scenario





Our exhibition contains an interactive interface for better understanding by the audience. The start page showcases a 3D globe that allows viewers to rotate and see global pollen levels.

Clicking on the data bar will show the name of the place and today's pollen level, and further clicking will take you to a detailed page showing a dynamic visualization of the area's biological activity and life in the wind. Real-time data acquisition and surface fluctuation control are displayed on the right side by scrolling the code.

Exhibition mode | Indoor exhibition scenario

As soon as the user enters the details page, our installation comes alive: a hidden fan starts blowing to characterize the natural wind in the selected area, and the control unit fluctuates with the activity level of the life information in the selected area. The number and intensity of the fluctuations are related to the pollen level.

The viewer can feel the breeze and observe the movement of the surface of the installation, thus establishing a connection between the wind and the visualization of invisible life information. Viewers can touch undulating surfaces and experience the breath and vitality of life intimately.

In-nature mode | Outdoor exhibition scenario

Visual Effects | Based on the Bio-level in the Wind

When the bio-level in the wind is high,
the number of "protrusions" on the device's surface increases,
and the amplitude of the undulations becomes larger.

When the bio-level in the wind is low,
the number of "protrusions" on the device's surface decreases,
and the amplitude of the undulations becomes smaller.

For more info, please refer to the video.: 風 Breathings —— Studio4_哔哩哔哩_bilibili

Derivative product design | Interactive weather sensing screens

Weather Sense

A Weather Forecast That Senses the Nature

In our quest for efficiency and progress, weather has become a series of precise, industrial numbers. But does weather forecasting need to be so precise and cold? Can it be emotional? Introducing WeatherSense, a product that communicates weather information in an emotional way.

Problem

In the contemporary world, especially for urban citizens, weather seems to be just a factor affecting commuting. The pursuit of efficiency has simplified and overlooked the richness of weather's inherent meaning.

To address the increasingly prevalent Nature Deficit Disorder, we believe that improving people's perception of the rich essence of weather is crucial. Thus, we seize the medium of weather forecasts, removing excessive precision and transforming it into a vague yet direct, emotionally evocative display, offering a daily natural healing experience to alleviate stress.

Design

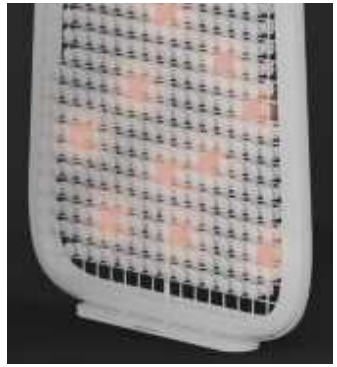
This product seamlessly fits into the user's living space through a screen, suitable for locations like the entrance foyer or living room. Internally, it features luminous undulating structures, each moving independently to display weather information with varying light and surface.

Surface Undulation Effect

Overall fluctuation levels (amplitude and number of fluctuations) reflect information on pollen concentrations, plant and tree allergen levels.

The overall color temperature of the light reflects the temperature information.

The overall brightness of the light reflects the air quality information. The dim light creates a hazy visual effect that is consistent with the visual perception of poor air quality.



Luminous Undulating Structures

02

Humoment

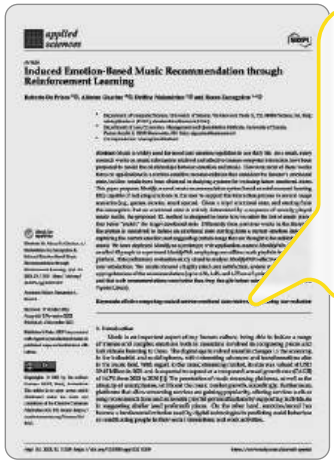
Team Members | Runming Fan (MIT/ShanghaiTech) Arya Wu (Wellesley/MIT)
Personal Contrib. | Design & Fabrication (Concept Design, Interaction Design, Appearance Design, Material Procurement, Circuit Control, Model Making)
Instructor | Marcelo Coelho
Affiliated Institution | Massachusetts Institute of Technology
Creation Date | March 2024 - May 2024

Humoment aims to provide a way to record life through music. It is an AI composer that creates music based on your humming and conversations with it, reflecting your current feelings, emotions, and surroundings. It can store music from the past seven days, serving as a musical diary box for you to document and revisit.

Background & Market Positioning

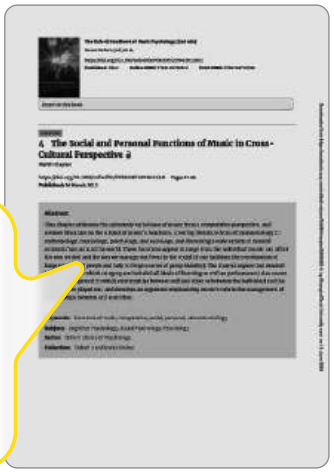
Music Storytelling

Background Research


Induced Emotion-Based Music Recommendation through Reinforcement Learning

"Music is an important aspect of any human culture, being able to induce a range of intense and complex emotions both in musicians involved in composing pieces and individuals listening to them."

De Prisco, R.; Guarino, A.; Malandrino, D.; Zaccagnino, R. Induced Emotion-Based Music Recommendation through Reinforcement Learning. Appl. Sci. 2022, 12, 11209.


4 The Social and Personal Functions of Music in Cross-Cultural Perspective

Symbolic representation of music: "...musical sound and action can specify aspects both of affect and of movement more precisely than words."

Clayton, Martin, 'The Social and Personal Functions of Music in Cross-Cultural Perspective', in Susan Hallam, Ian Cross, and Michael H. Thaut (eds), The Oxford Handbook of Music Psychology, 2nd edn.

We aim to explore the relationship between "music" and "everyday narrative." Relevant literature indicates that music expresses emotions and feelings more **delicately and precisely** than words, and **music created with personal involvement** reflects an individual's state more accurately than music directly recommended/generated by a system.

Therefore, we encourage people to reflect and document their daily lives by creating music. We also prefer to **materialize** the design, making the generation and recording of music more ceremonial.

The Composition Method of Music

Literature Review

[1] Hum to Music

Y. Qiu, J. Zhang, H. Ren, Y. Shan, and J. Zhou, "Humming2Music: Being A Composer As Long As You Can Humming"

[2] AI Conversational Music Recommendation

E. Frid, C. Gomes, and Z. Jin, "Music Creation by Example,"

[3]

[4]

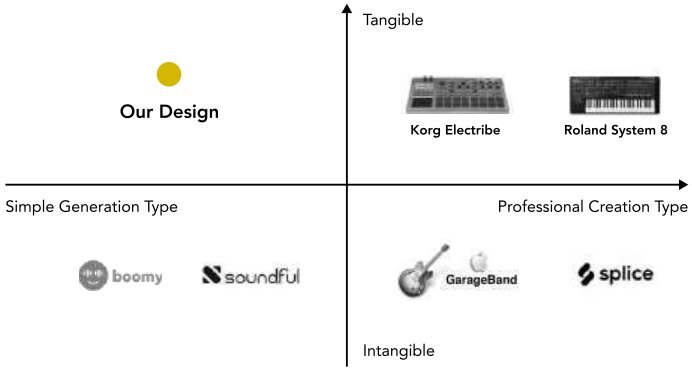
[5]

The above research provided rich inspiration for Humoment, including the integration of **AI-generated music, conversational AI, and emotional reflection**.

[1] **Humming + Composition**: Creates music based on the user's hummed melody, with synthesis modules layered for various musical elements; [2] **AI Composition**: Mix an input reference song with elements generated by AI to collaboratively co-create a song; [3] Emotional Music Recommendation: Generate Spotify playlists based on the emotions detected by the chatbot; [4] Design of a reflective process supporting music as a digital narrative medium in music education; [5] Uses generative AI systems to provide interfaces for collaborative music creation for beginners.

Market positioning

In current music creation and generation products, common ones include online platforms for generative music creation that combine AI models, professional online electronic synthesizer software, and physical synthesizers. However, there are almost no **tangible music creation products available for non-professionals**.



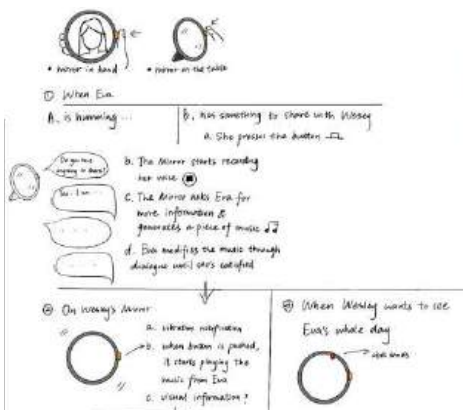
User Persona

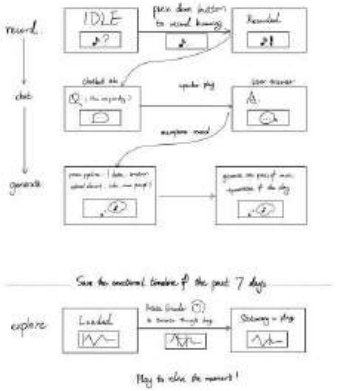
Name: Zixuan Fan
Occupation: University Student
Interests: Listening to music (enjoys daily recommended playlists), humming, writing diaries
Frustrations: Although the playlists are good, they often **don't match her mood**; sometimes she hums a nice melody but **can't record it or develop it into a full composition**; it is **difficult to express** nuanced emotions and psychological states **in words** when writing a diary
Wishes: To create music that records her daily life by combining her humming and personal state in a simple way, allowing her to reflect on the small moments in her life

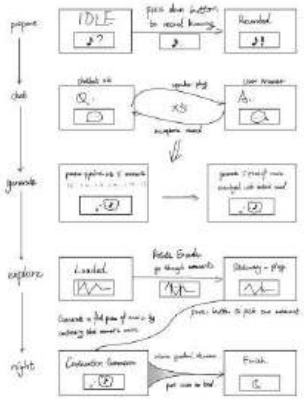
Interaction Flow Design

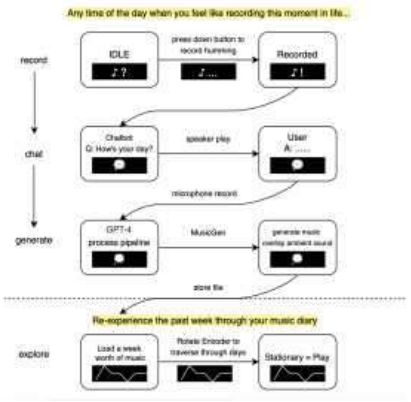
Deduction Process

Based on the chosen market positioning, our product will generally include interaction processes such as user humming, input of the user's current state, AI processing of information, AI composing music, and user reviewing recent music. Therefore, we have conducted multiple iterations and improvements to the interaction flow.









Finalized Interaction

When the user wants to record their current state or a specific moment...

1. Record

Default Display

Press and hold the button to record humming

Release the button to end the recording

2. Conversation

Robot: How was your day today?

User: .....

3. Music Generation

GPT-4 processing...

Generate prompt

MusicGen composes music, and AudioGen generates ambient sound based on the prompt

Overlay the music and the ambient sound

GPT–4 decodes the user's response into emotional values, natural elements of ambient sound, color, and music prompts.

Store the music to files

4. Review

Display the mood trend chart for the past week

Rotate the handle to select a day

Play the selected music

Users can revisit a specific day to re-experience it, allowing them to reflect on their emotional journey, triggers, and precious moments through this process.

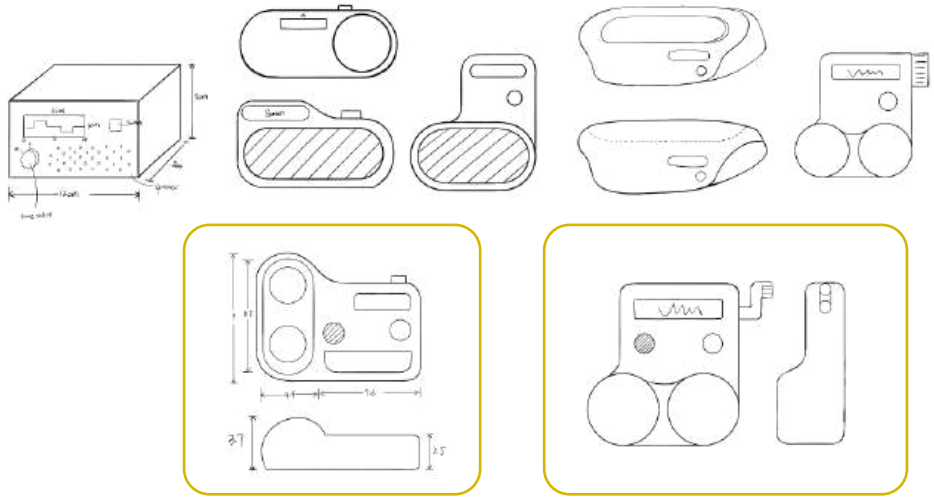
The LED color corresponds to the emotion of that day.

Form Refinement & Prototype Testing

Form References

Because our design includes many different concepts and functions (recording, conversation, memory storage, music creation, music playback, memory review, etc.), I gathered a lot of references for the appearance design. Some resemble traditional radio styles, some are more elegant, and others are cute and lively.

Finalized Form



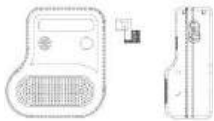
After a series of explorations, I finally chose two **casual and compact** forms for prototype testing. On one hand, our design concept aims for users to **feel relaxed** while using it; it shouldn't appear too prestigious to make users feel tense when interacting with it. You don't need to be a music expert to use it. On the other hand, because moments in our lives are fleeting, I want it to be portable so users can **record their daily lives with music anytime, anywhere**.

Prototype Comparison Testing

The first version combined the forms of a camera and a radio, using the appearance as a metaphor to suggest that it can be used to record daily life. However, this similarity could easily cause **misunderstanding**, and the concept of "sound" was not highlighted in this interface (the speaker is hidden at the back), leading to a **mismatch between form and concept**. Additionally, the interface was not simple and intuitive enough for user experience.

In the second version, I **simplified the interface** and highlighted the speaker's mesh to **emphasize its music functionality**.

Isometric View



Three-view Drawing

Considering **ergonomics**, I designed it to be **easy to hold**—a protruding curve on the left side facilitates gripping with the left hand, making users feel **stable and comfortable** when rotating the handle with the right hand.

Technical Details

Software Components

The system utilizes a software stack consisting of GPT-4, Microsoft's MusicGen, and AudioGen, with a code pipeline implemented in Python.

GPT-4 Voice Interaction Code

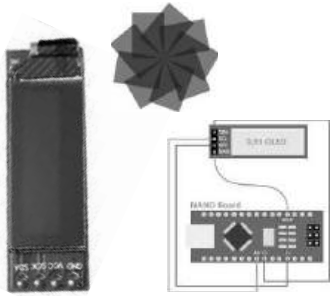
Visualization & Physical Interaction Code

Arduino Data Input and Pointer Drawing Code

Arduino Code for Controlling LED Light Colors

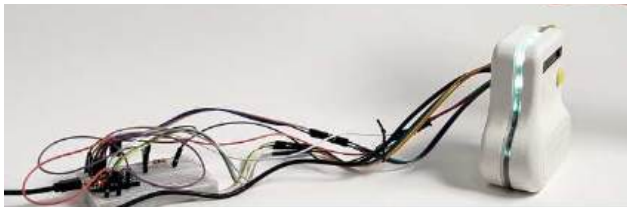
Hardware Components

Visualization Screen
I2C OLED Display
Covered with black translucent PVC plastic sheet



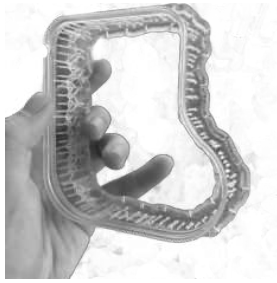
External Microphone
External Speaker

Front and Rear Casings
Fabrication: Powder 3D Printing
Surface Treatment: White Spray Paint



Rotary Handle
Internal: Potentiometer
Casing: Powder 3D Printing + Yellow PLA 3D Printing

Middle Translucent Layer
Manufacturing: Resin 3D Printing



Internal Lighting
LED RGB Pixel Light Strip

PlugiYoga

Designer | Runming Fan
Personal Contrib. | All - Developed the whole toolkit, integrating ergonomic studies and material testing. Managed the full design process, ensuring usability and engagement.
Instructor | Prof. Xavi Laida Aguirre
Affiliated Institution | Massachusetts Institute of Technology
Creation Date | Feb 2024 - May 2024

PlugiYoga is a modular yoga game toolkit designed for early childhood education and also serves as an icebreaker game for teenagers and adults. It helps develop memory skills, imagination, eye-brain-hand coordination, and more through simple yoga movements.

Motivation & Inspiration

Motivation: Comfort, Fun, Accuracy

Why Design Modular Tools for Yoga?

Yoga Mat
Often times we use a yoga mat and some yoga blocks when doing yoga. However, as a yoga lover myself, I always find it uncomfortable to do certains poses with these tools. The friction between my skin and the mat often causes pain.

Yoga Blocks
Yoga blocks are mostly rectangular, which does not conform to the body's curves. When I press my hands, knees, or feet on them, I feel pain in my skin and joints.

Why Gamify Yoga?

Practicing yoga alone often requires strong self-discipline. On one hand, doing yoga alone can be quite boring; on the other hand, I cannot observe whether my posture is correct, nor can I receive real-time positive feedback during the exercise. This further makes it difficult for me to stick to the practice.

Inspiration – Game Mechanism & Social Interaction

Twister Game – Physical Game

Game Mechanism
Twister is a physical game where players place their hands and feet on colored circles on a mat based on the instructions of a spinner.

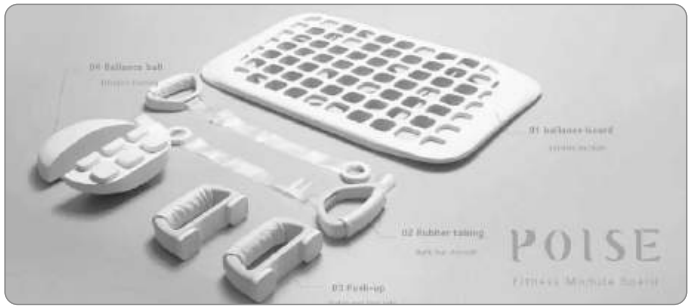
User Experience and Goals
Twister encourages social interaction, improves physical coordination, and fosters a sense of participation among players.

Simplicity and Accessibility
The success of Twister lies in its simple rules and intuitive gameplay, making it accessible to players of all ages.

Impact and Inspiration
As a classic and widely recognized game, Twister demonstrates the universal appeal of physical interaction games.

Inspiration – Physical Interaction

Fitness Module Board & Ergonomic Blocks



The modular holder and slotted baseboard design gave me a lot of inspiration: yoga involves contact between different parts of the body and the yoga mat.
Could I design modular yoga blocks that can be inserted into different positions on the baseboard for various body parts, making yoga more physically interactive?

Comfortable

Ergonomic Modular Design

PlugiYoga will include ergonomic modular yoga blocks that can be inserted into different positions on the baseboard for various body parts, making yoga more physically comfortable.

Fun

Physical & Social Engagement

PlugiYoga will enhance memory, imagination, and eye-brain-hand coordination through yoga-based movements, serving as both an educational tool and an icebreaker game for all ages.

Accurate

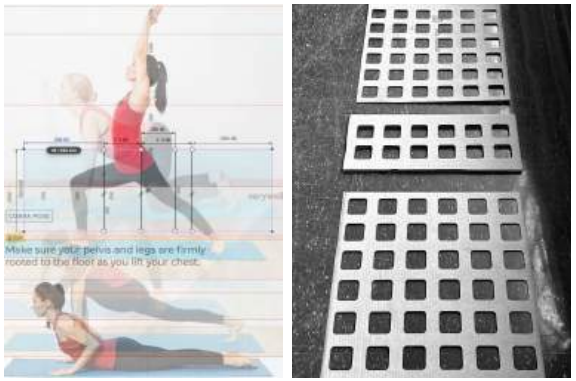
Game Mechanism Design

PlugiYoga will include game mechanisms to ensure the users are doing the right poses, by setting a player to monitor whether the yoga poses are correct.

Ergonomic Studies

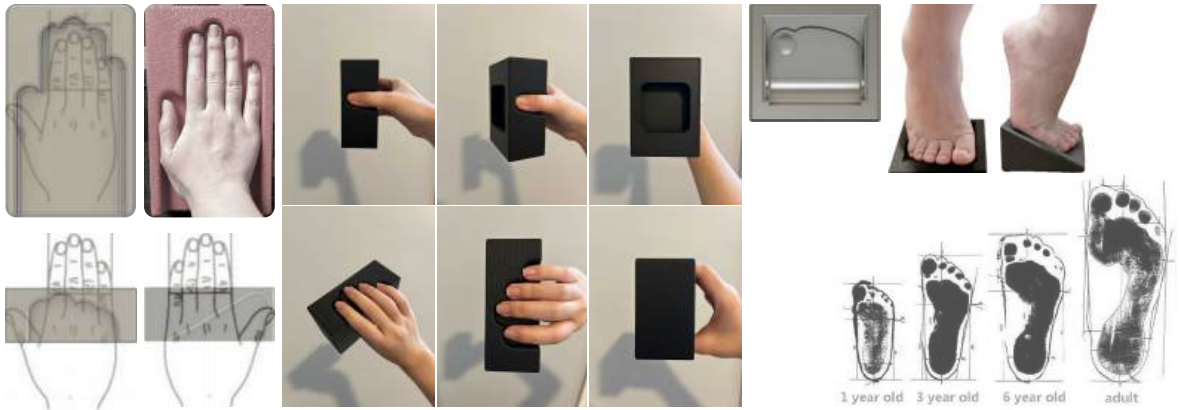
Design and Testing of the Baseboard

Transforming yoga practice into a baseboard + holder format relies on the fact that many yoga poses require only specific body parts (such as palms, knees, or soles) to make contact with the baseboard. Based on this concept, I conducted extensive testing and measurements of various yoga poses, combined with statistical human body data, to estimate the most suitable baseboard dimensions while minimizing material costs.



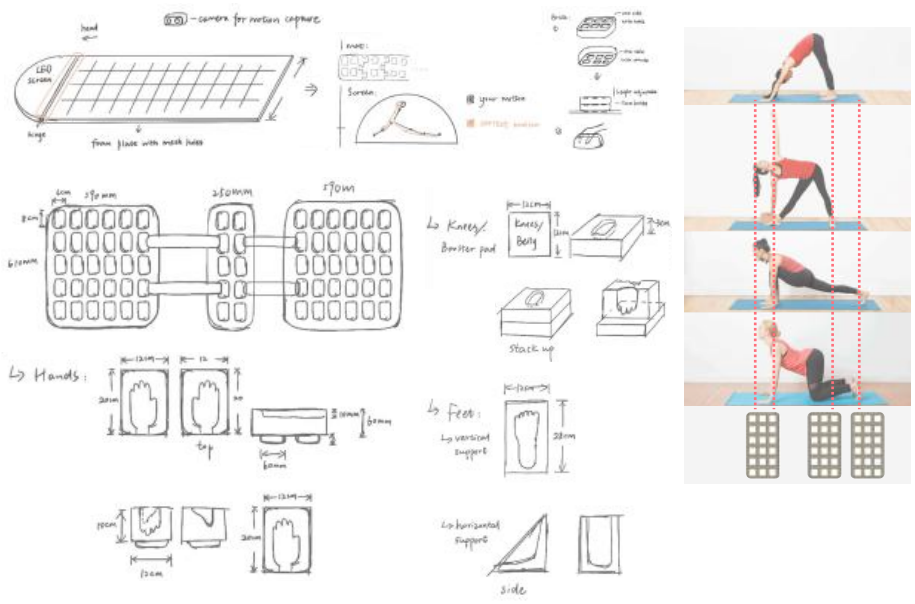
Estimating the size of yoga baseboards by measuring various yoga poses (e.g. young women)

Design and Testing of Modular Blocks



Determine the overall size and the shape of the indentations of the yoga blocks based on the standard dimensions and proportions of body parts such as palms and soles.
3D print 1:1 mock-ups to test the user experience.

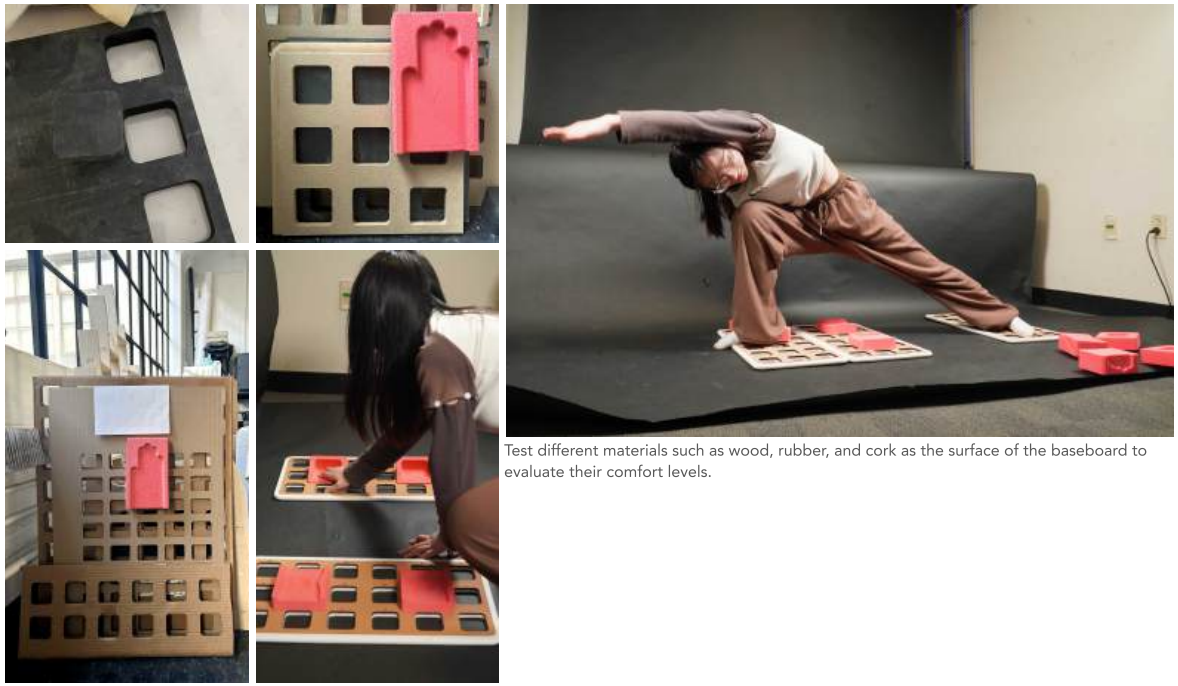
My Very First Drafts



Drafts for baseboards and modular yoga blocks, designed for various yoga poses

Considering production feasibility, product portability, and ease of storage, I divided the required baseboard into three equally sized and dimensioned sections.

Materials & Mock-up Testing

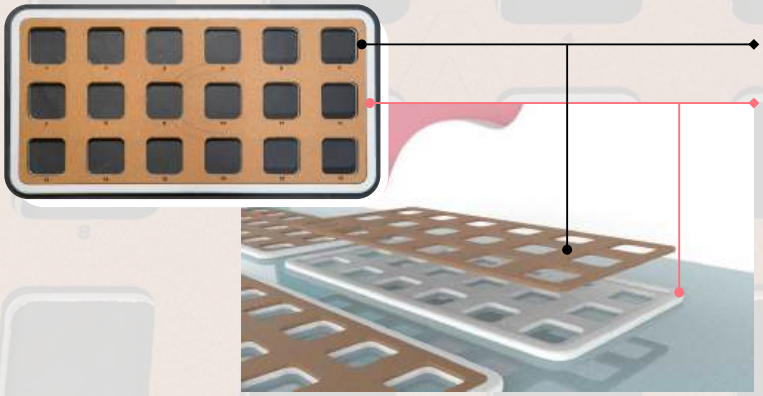


Test different materials such as wood, rubber, and cork as the surface of the baseboard to evaluate their comfort levels.

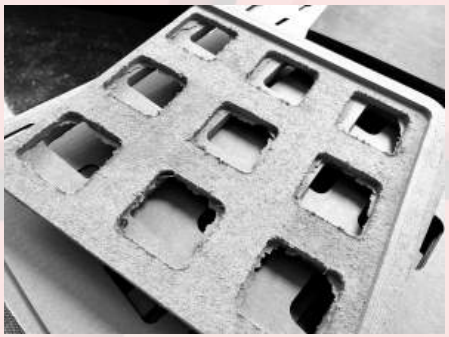
Prototyping

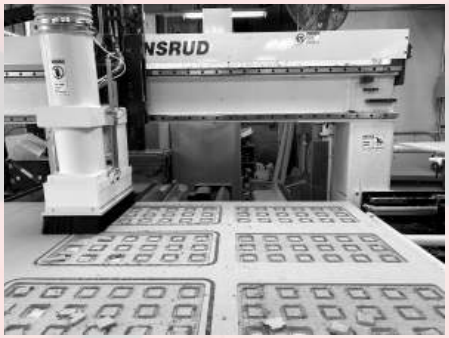
Yoga Blocks – Foam CNC

Yoga Baseboard Surface – Cork Mat

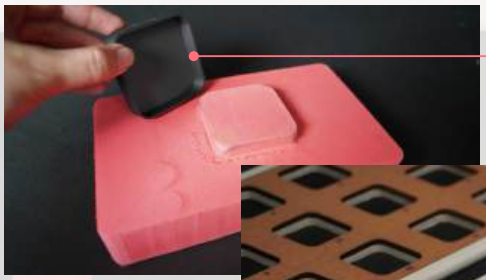


Yoga Baseboards – MDF Wood CNC



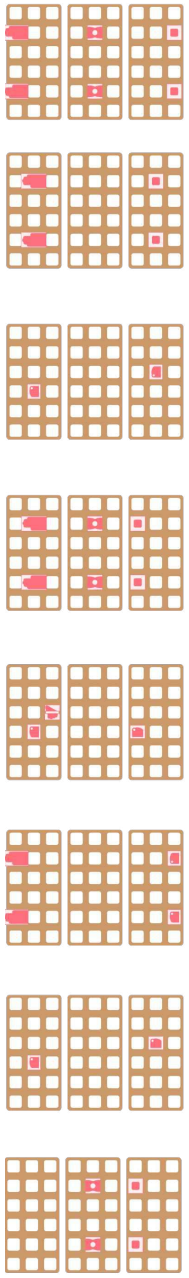


Details



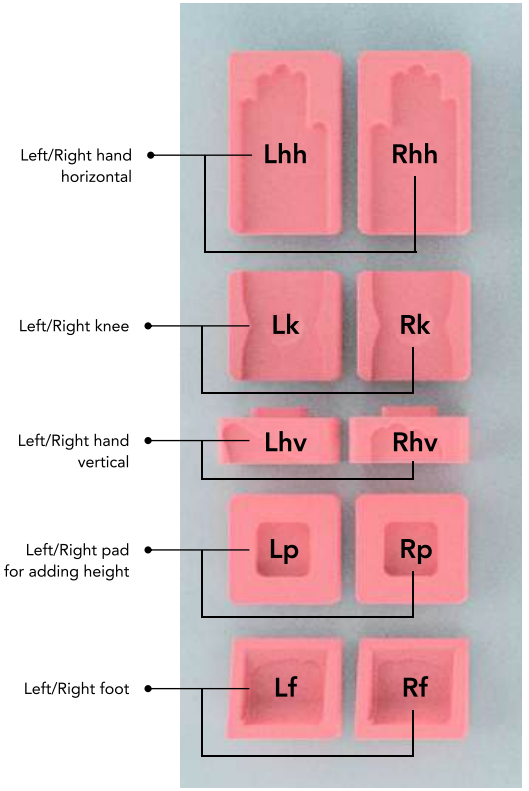
Game Dictionary – Pluglish

	English	Pluglish
	Child's Pose	**Lhh: A2 Rhh: A5 Lk: B8 Rk: B11 Lp: C14 Rp: C17**
	Upward Facing Dog	**Lhh: A8 Rhh: A11 Lp: C8 Rp: C11**
	Warrior I	**Lf: A9 Rf: C10**
	Cat-Cow	**Lhh: A8 Rhh: A11 Lk: B8 Rk: B11 Lp: C2 Rp: C5**
	Triangle Pose	**Lf: A9 Lfv: A16 Rf: C3**
	Downward Facing Dog	**Lhh: A2 Rhh: A5 Lf: C14 Rf: C17**
	Warrior II	**Lf: A9 Rf: C10**
	Camel Pose	**Lk: B8 Rk: B11 Lp: C2 Rp: C5**



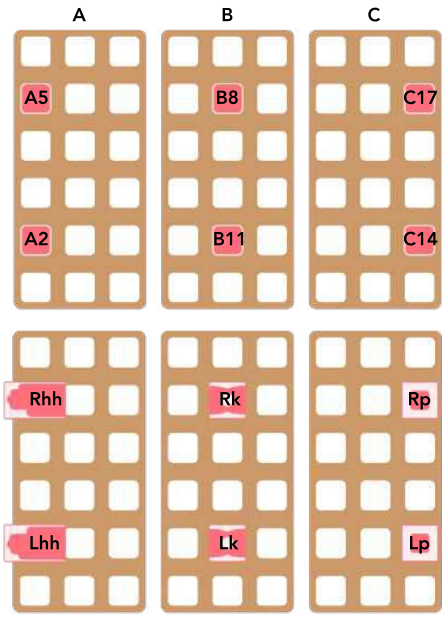
Pluglish is the for labeling the yoga bricks and the grids they need to be plugged in to complete certain poses. This language works like the key-value pairs in a Python dictionary. Before the colons are the names of yoga blocks; after them are the label of the grid on the yoga boards to plug the blocks in.

In this design, I developed 5 pairs of yoga blocks, each named using an abbreviated label derived from their function. For example, the block used when positioning the left hand horizontally to the ground is called "Left Hand Horizontal," abbreviated as Lhh. The naming convention for all other yoga blocks follows the same logical and intuitive format, ensuring clarity and consistency in their use.



The label of grids begins with the letter of each board. We have A, B, or C. Followed by its number, each board has 18 grids

e.g. Pluglish of Child's Pose
Lhh: A2 Rhh: A5
Lk: B8 Rk:B11
Lp: C14 Rp: C17



Game Dictionary – Sidelish

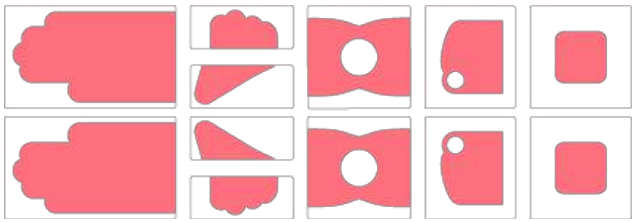
English	Sidelish
Child's Pose	
Upward Facing Dog	
Warrior I	
Cat-Cow	
Triangle Pose	
Downward Facing Dog	
Warrior II	
Camel Pose	

Sidelish lets you see the side view of each yoga brick.

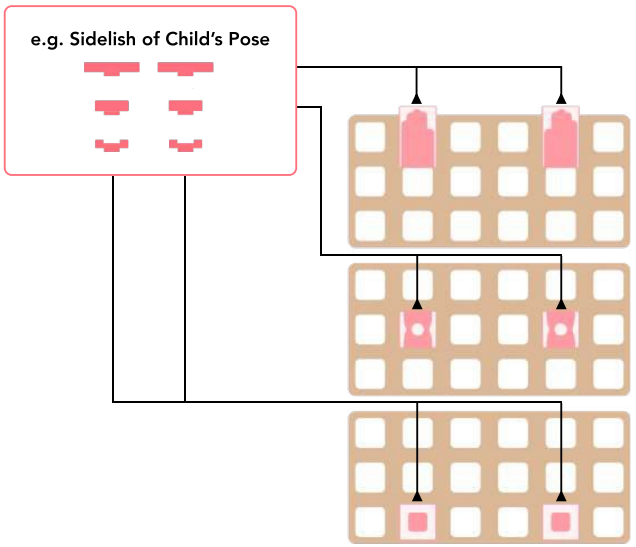
Some are easy to tell, you can definitely tell a triangle from a rectangle, but others are a bit difficult. They are all rectangles with slight differences in their width and height.

All sidelish elements

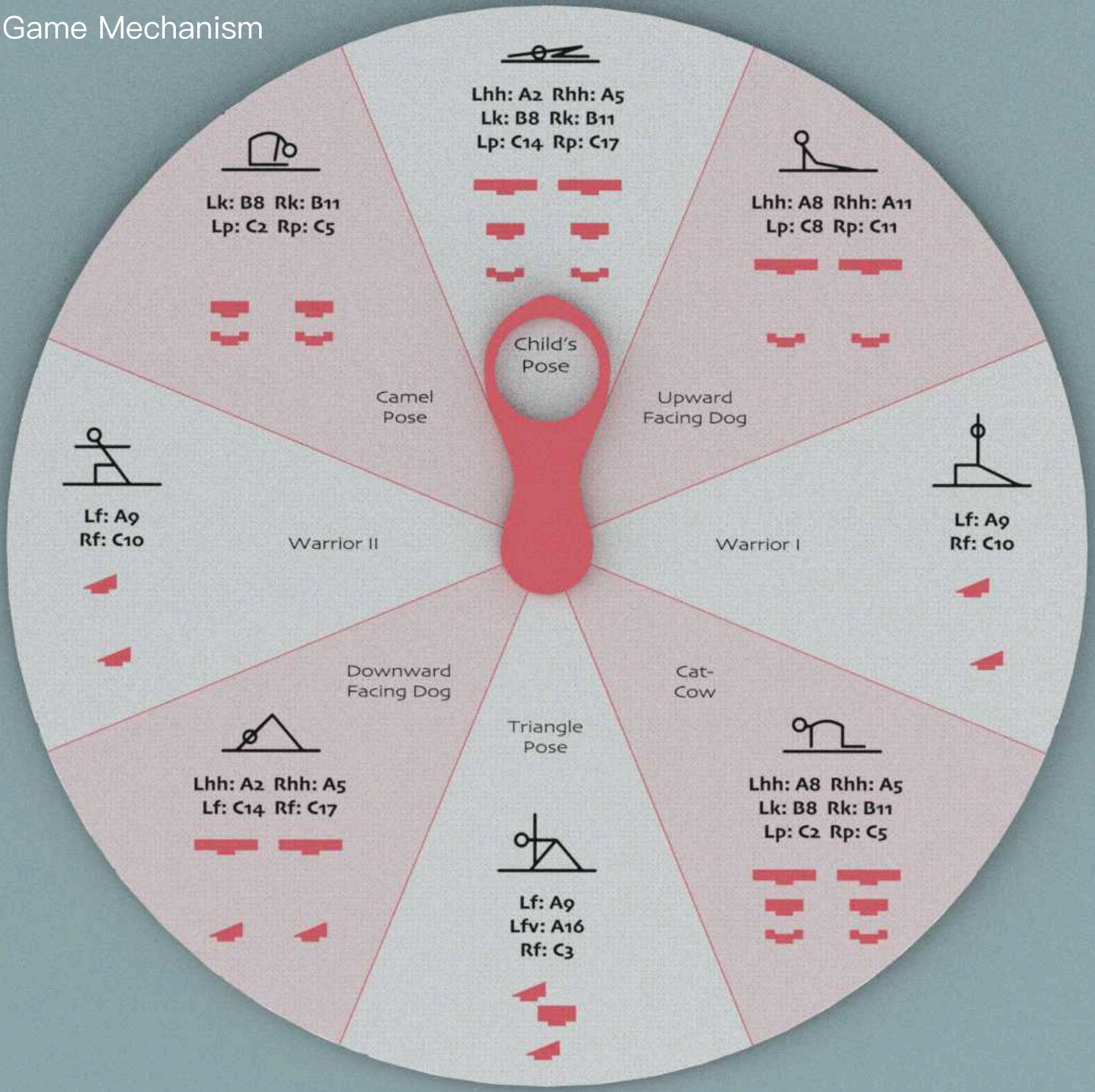
Corresponding side view of the yoga blocks



Corresponding top view



Game Mechanism



Player 1

- Turn the spinner, and speak out the English name of the selected pose

Player 2

- Pronounce the corresponding Plugish name of the pose
- Insert the corresponding yoga blocks into the correct holes
- Make the pose

Player1

- Determine if Player 2 is doing the right thing
  - If right, they switch their place
  - if wrong, Player 2 needs to keep doing it until he/she gets it right

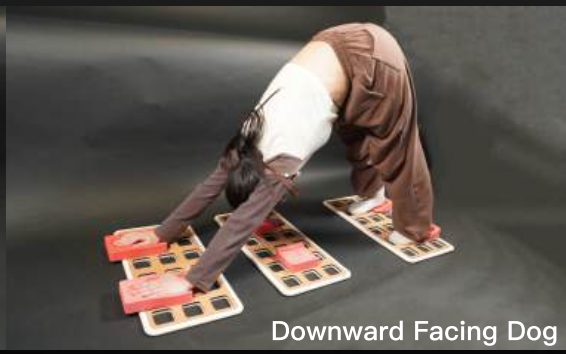
- If a person fails to make the right move more than three times, he/she loses

Practicing Yoga with PlugiYoga

Child's Pose

Upward Facing Dog

Cat–Cow


Downward Facing Dog

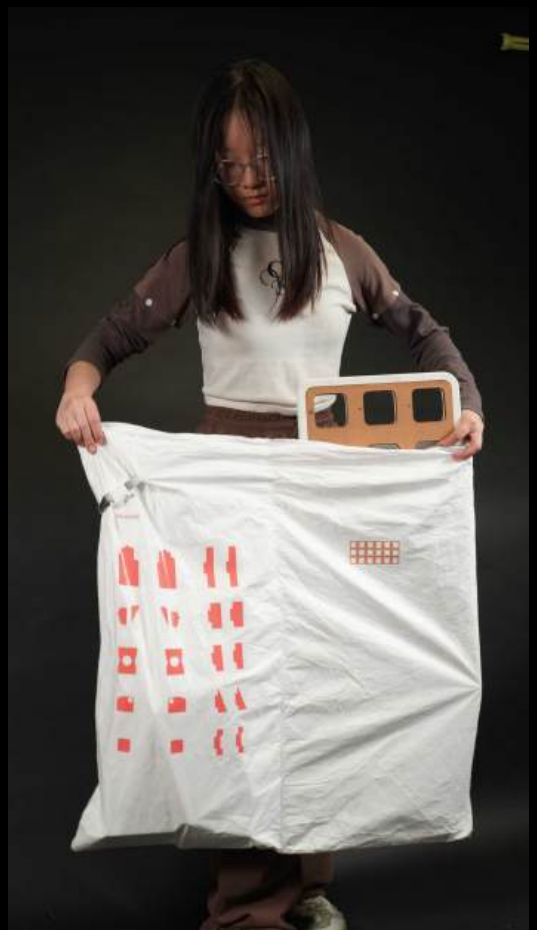
Camel Pose

Triangle Pose

Warrior I

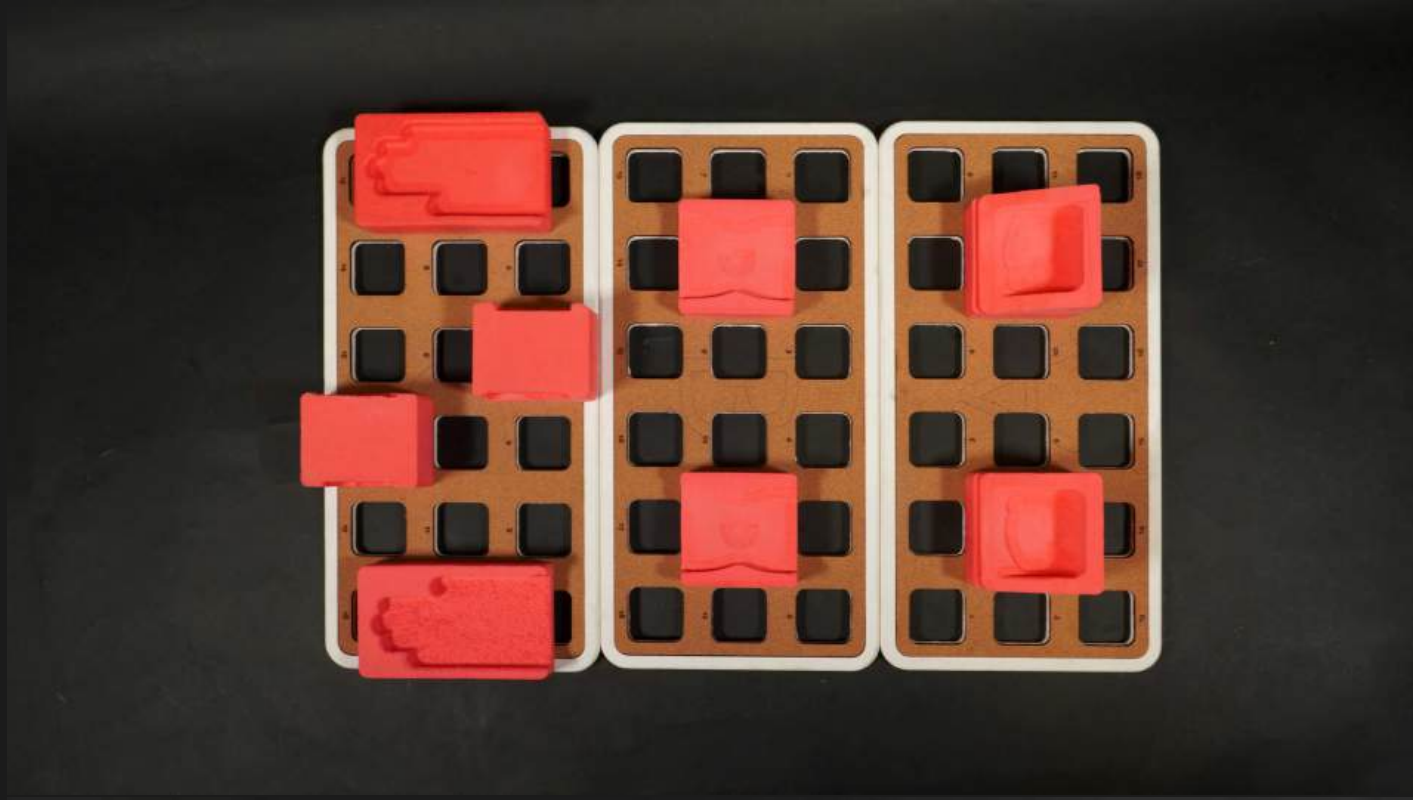
Warrior II

Branding & Package Design



Final Model

Final Model



04

Cleanigent

Intelligent Bathroom Cleaning Solution

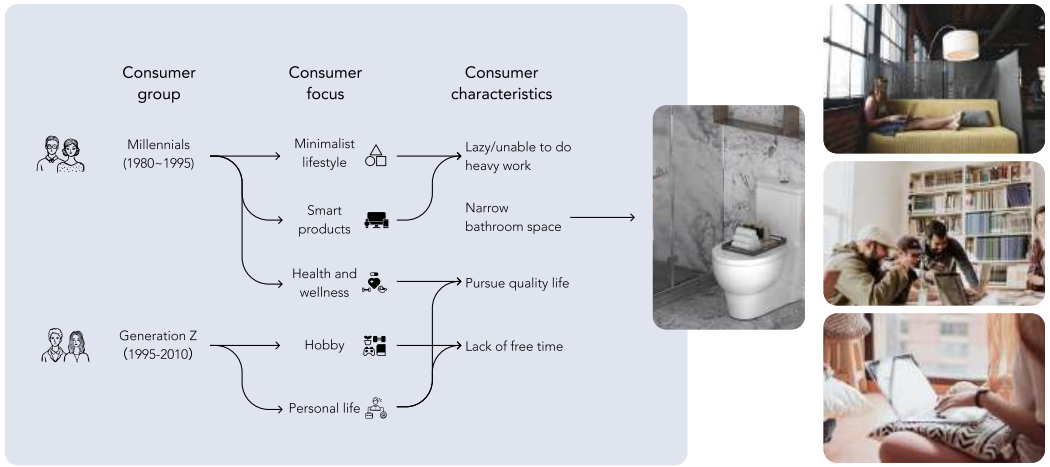
Designer | Runming Fan
Contribution | All
Instructor | Shimon Shmueli
Affiliated Institution | ShanghaiTech
Creation Period | 2022.9 - 2023.1

Included in the "2023 Selected Works of Design from Chinese Colleges & Universities"
Won Third Prize in the 10th Chinese Colleges & Universities Design Competition
Won the Design Innovation Award at the Enjoy Design Award 2023 Competition
Won the Excellent Creative Design Prize at the Creative China—First Jing-Jin-Ji-Hu-Guang-Shen-Gan Design Exhibition

This project aims to propose a new solution for bathroom cleaning for small families in first- and second-tier cities. There are three major problems in the current cleaning: large proportion of labor, small bathroom space(difficult to accommodate large-sized products), and people are reluctant to wet and dirty hands in bathroom areas.

Market Research & Positioning

Market Analysis



Competitor Analysis

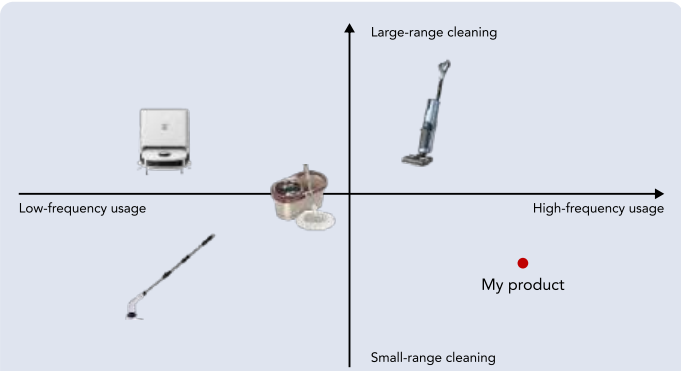
Product	Floor scrubber	Vacuum cleaner	Sweeping robot
Form			
Adv.	Water-absorbing	Some are water-absorbing	Capable of autonomous navigation
Disadv.	Large, difficult to clean the corners in bathroom	Most cannot suck water; water-absorption ones are too large	Most cannot suck water; obstacles need to be removed before use

Objectives

Simplify manual labor	Product replace manual labor	Based on the market research: 1. In first- and second-tier cities, small families (mainly millennials and Gen Z.) focus on lightweight, high-quality, and efficient bathroom cleaning solutions. 2. They also strive for a clean, healthy, and orderly living space and have a high acceptance of smart products.
Simplify process	Complete multi-processes at once	
Reduce product size	Intensification and miniaturization	

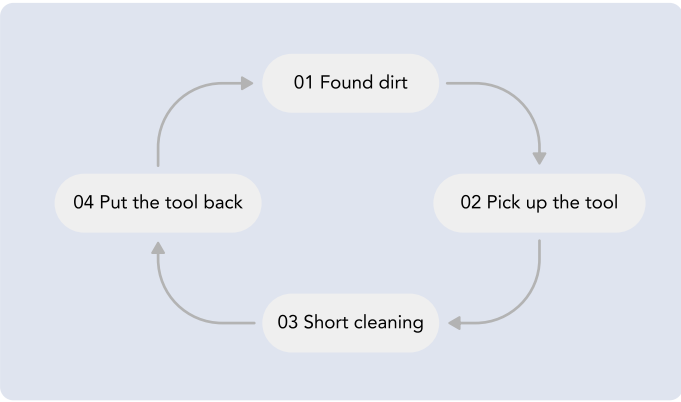
Positioning

Higher usage frequency: "use and store" mode
Smaller cleaning range: designed for "bathroom spaces"



User Journey

I simplified the user journey to achieve "use and store," maximizing the convenience of short-term cleaning.



Form & Function

Function → Form requirements

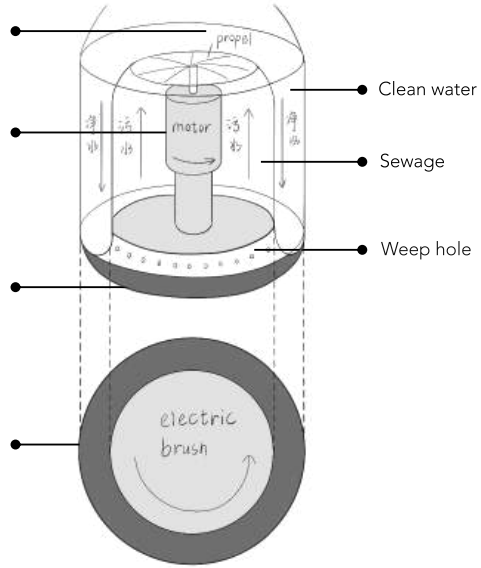
Absorbs water and dirt	Non-directional cleaning	Round in appearance
Instantly dry the floor →	Prone to stubborn stains →	Stiff brush instead of soft brush
Adapt to small spaces	Need to clean tight corners	Small footprint

Principle of water cycle

Reference: Floor scrubber

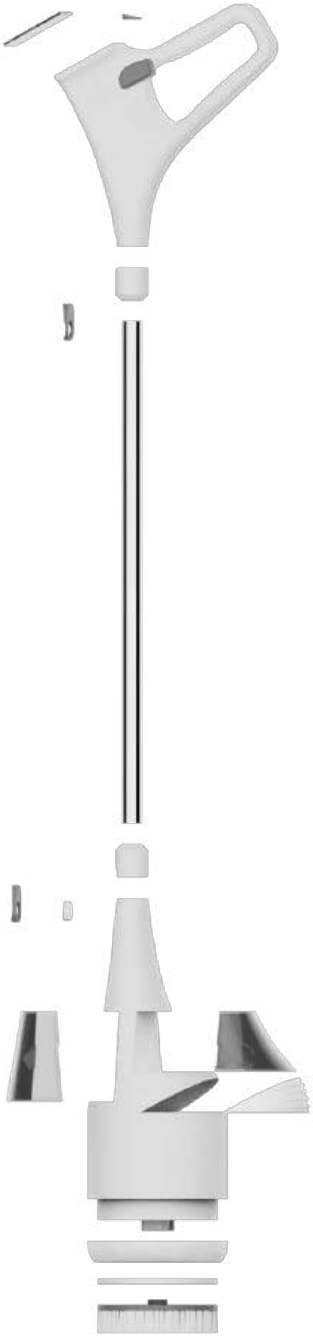
The water in the clean water tank flows down due to gravity and soaks the roller brush; the sewage generated after the roller brush cleans the dirt is collected into the sewage tank

Princile application

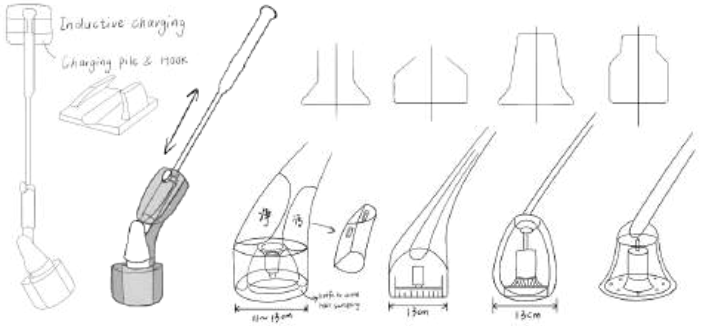


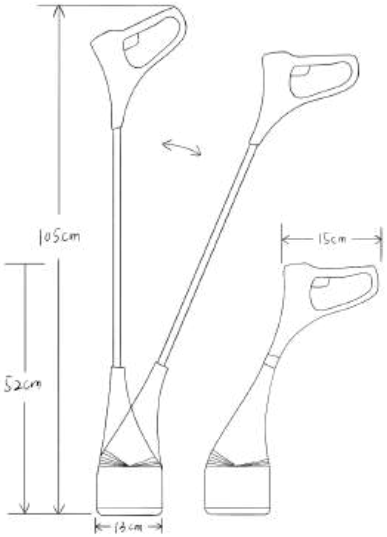
Water tank capacity estimate

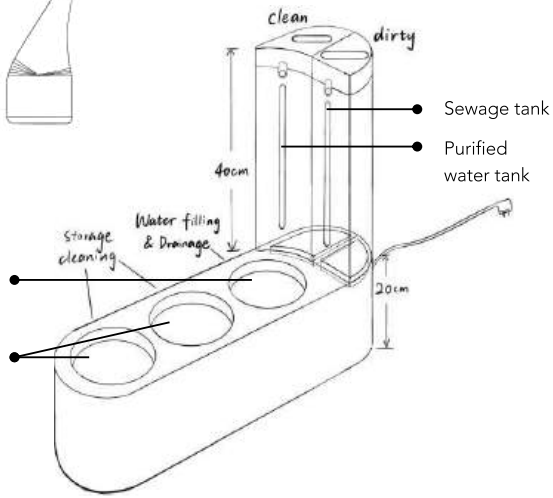
	Cleaning area	Water change frequency	Tank capacity
Data reference	100 m^2	every use	0.55 L
Data estimation	10 m^2	every 1 or 2 uses	0.1-0.2 L



Form iteration → Overall appearance structure

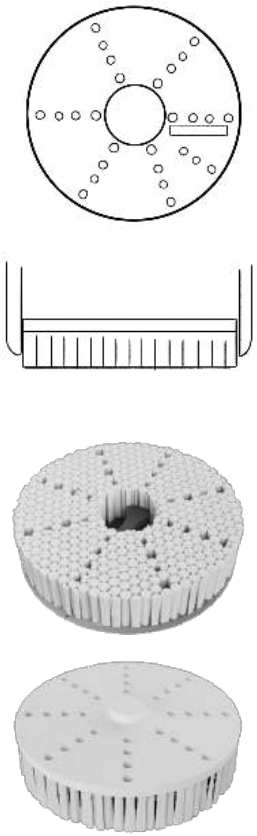




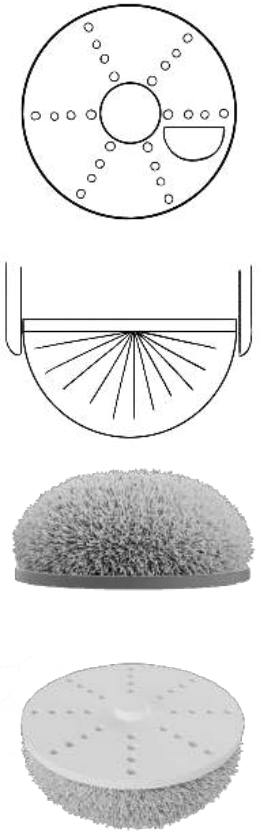


Two types of brush heads

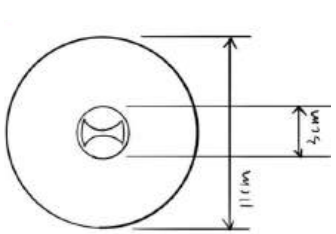
Flat Brush - Floor cleaning

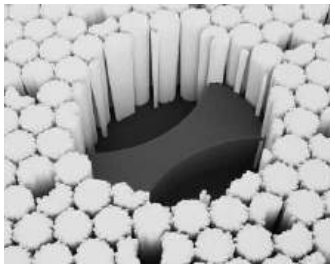


Ball Brush - Sink & Bath cleaning



Gripper - The brush head can be manually removed

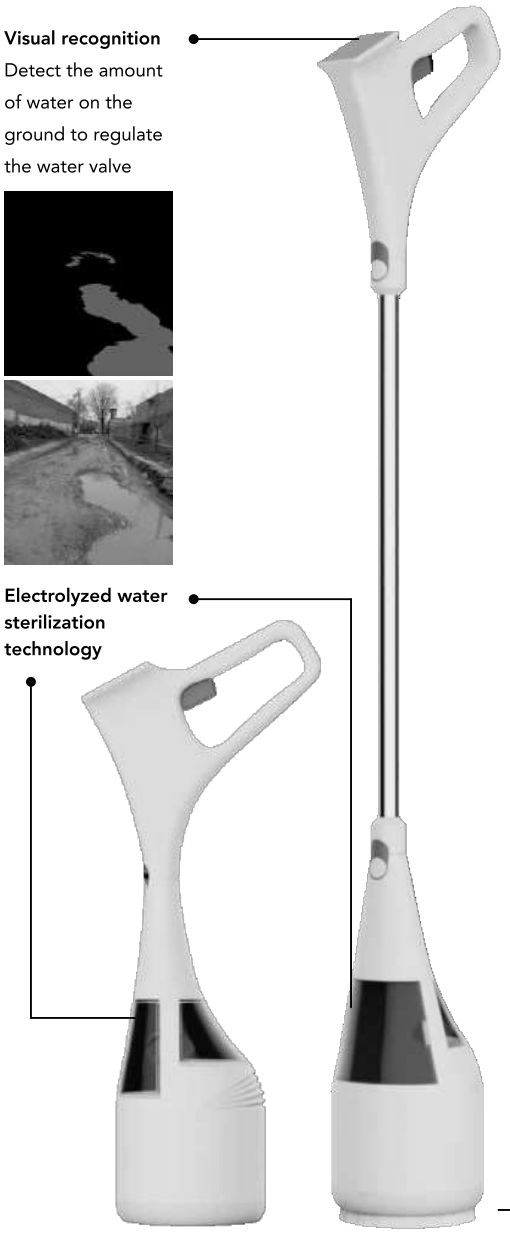




Technology & Sensors

Visual recognition
Detect the amount of water on the ground to regulate the water valve

Electrolyzed water sterilization technology



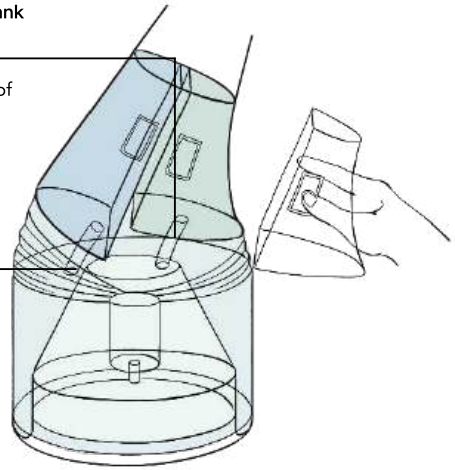
Microbial Concentration Detection & Fluorescent Nanosensing

- Real-time monitoring
- Visual navigation: Visualize bacterial concentration distribution
- Voice prompts: Alerts areas that need deep cleaning

Internal structure of water circulation & disassembly of water tank

Infrared sensor
Monitor the concentration of dirt in the sewer pipes and adjust the amount of water produced and absorbed

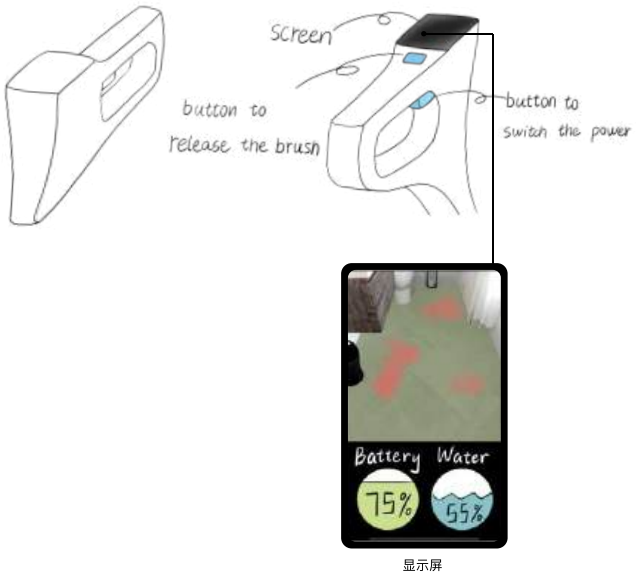
Inlet valve



Sensor | Original photo | Partial display | Global display

Interaction

Handle with smart screen



显示屏

Intelligent sensor base station

- **Structural composition**

Brush head storage and cleaning tank × 2 + main water exchange and charging tank × 1 + clean water tank + sewage tank

- **Sensing technology**

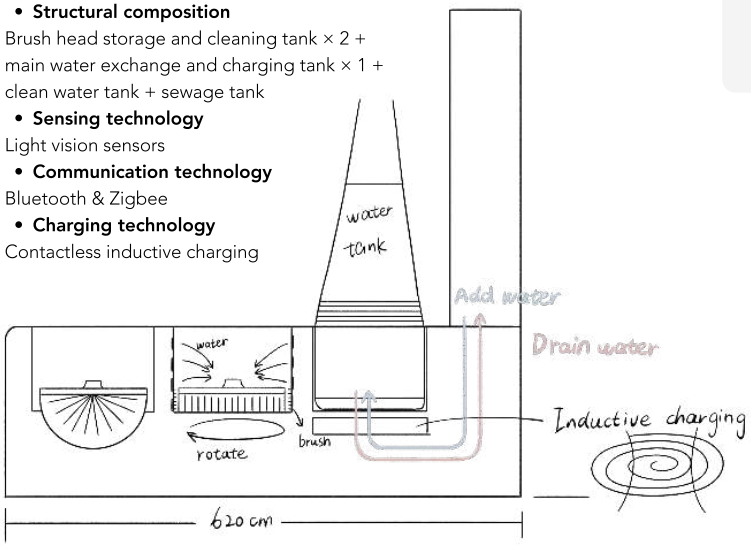
Light vision sensors

- **Communication technology**

Bluetooth & Zigbee

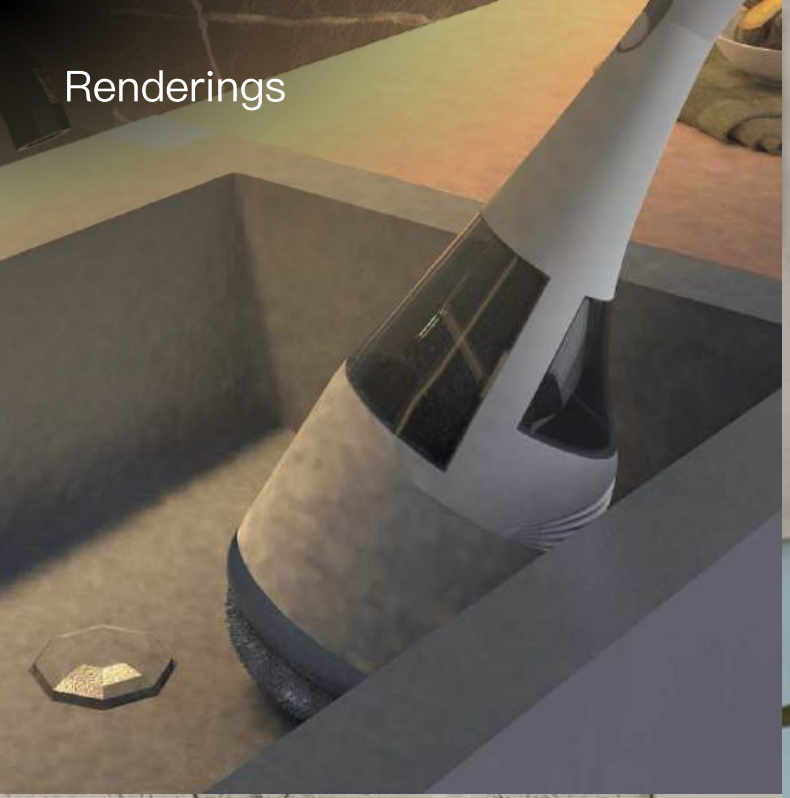
- **Charging technology**

Contactless inductive charging

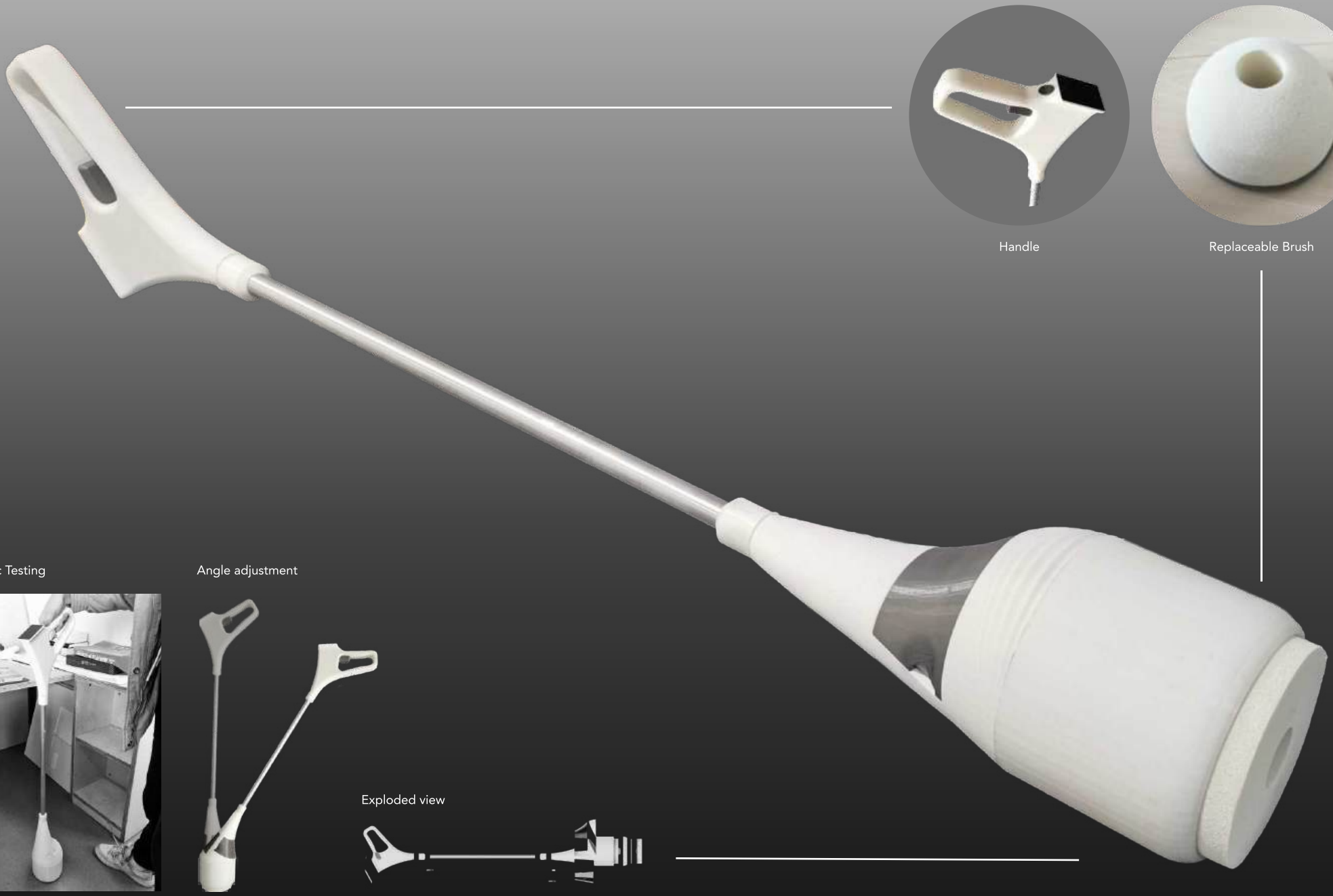


Base station interaction flow chart

Renderings



Model Making & Rendering



Handle

Replaceable Brush

Ergonomic Testing

Angle adjustment

Exploded view

Not in use

Comparison of two transformable forms

Top view

SLEEPi

Smart Anti-Snoring Pillow for Children

Designer | Runming Fan
Personal Contrib. | All
Instructor | Mingde Gu
Affiliated Institution | ShanghaiTech University
Creation Period | February 2023 - May 2023

Obstructive Sleep Apnea (OSA), often characterized by snoring, can severely impact the brain development of school-age children but has not received widespread attention. This project aims to provide an intelligent solution to assist children with OSA symptoms that do not require medical intervention, helping to alleviate symptoms, monitor sleep, and offer advice.

Principle research

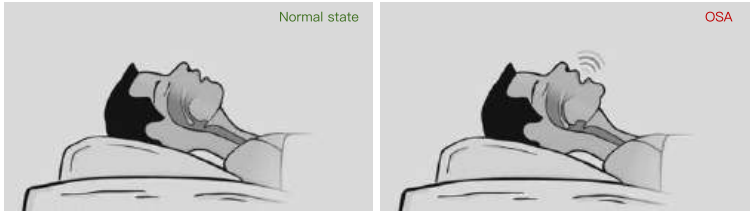
01 Obstructive Sleep Apnea (OSA)

While in sleep, the throat muscles may intermittently relax and block the airways, causing obstructive apnea. Snoring is a telltale sign of obstructive sleep apnea.

From 2015 to 2019, the number of OSA patients in China increased from 180 million to 190 million. The number of OSA cases in China is expected to increase to about 210 million by 2024

02 Dangers of OSA

Cardiovascular health issues: hypertension, heart disease, coronary artery disease
Mental health issues: anxiety, depression, memory impairment, lack of concentration
Decreased blood oxygen levels: Low oxygen levels can damage the brain and heart
Daytime fatigue: Poor sleep quality can lead to daytime fatigue and lack of vitality



03 OSA is more harmful to children

OSA can have a significant negative impact on the cognitive development of school-age children. Children are in a stage of brain development where OSA may cause irreversible effects.

Comparison of Children's Behavioral Cognitive Abilities

Group	Long-term Memory	IQ Level	Mistakes in Tests
OSA(Sleep Apnea)	**7.1**	**94.2**	**21.9**
Control	9.6	103.7	11.5

04 Sleep posture research

When in sleep, the airway needs to be straight and in line with the spine, which is healthy for breathing.

05 Competitor analysis

Medical correction: overly medicalized, low public acceptance

Restrict sleeping positions: Children are restless and find it difficult to maintain specific postures

Non-adjustable: Children's bodies grow quickly, requiring changes in size

06 Product positioning

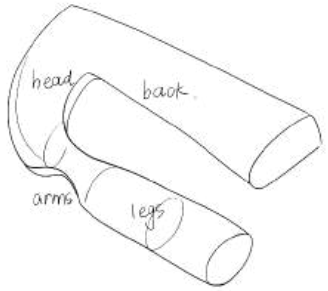
User

- 6~14-year-old school-age children
- Status: Aware of snoring / OSA, no medical intervention is required

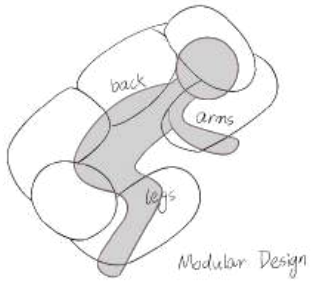
Target

- Reduce OSA impact on children
- Improves overall sleep quality

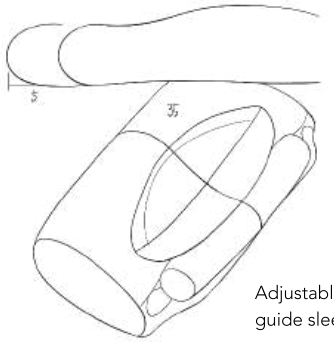
07 Preliminary sketching



Pillow + throw pillow + cushion



Modular design



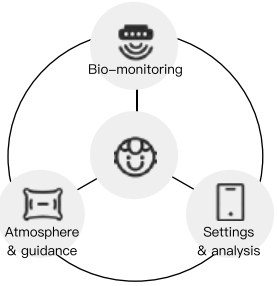
Adjustable pillow to guide sleeping position

Interaction

Four stages

- 01 Before asleep
- 02 Sleeping
- 03 Wake up
- 04 After waking up

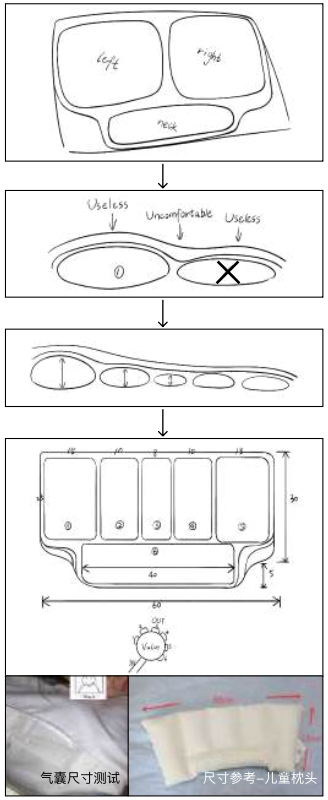
Four-side interaction

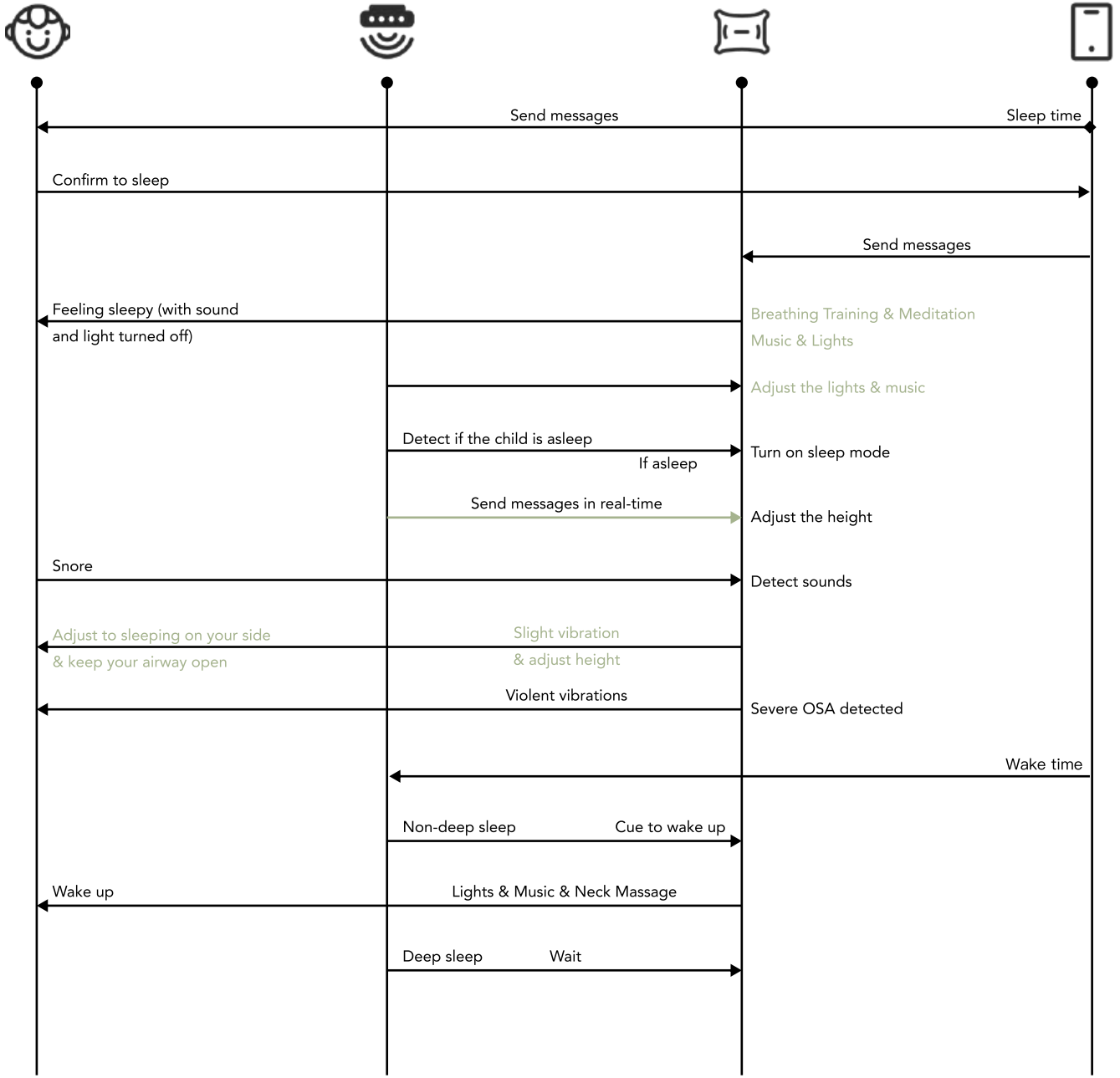


Human Factors

Three types of subliminal interactions

Dimensional estimation test





User journey & CMF

User Journey

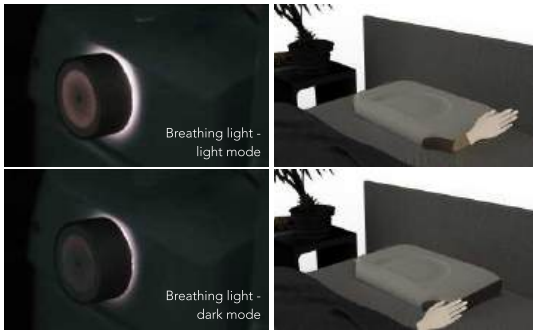
01 Before sleep

Create a sleeping environment

Assist with sleep training

Sleep mode setting

Confirm sleep



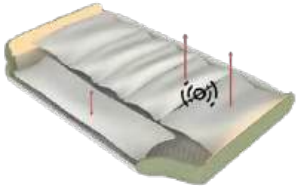
Gesture interaction turns off sound and light - a large area is swiped on the occipital side

02 Sleeping

Pillow height is adjusted locally to make breathing smooth

Predict the occurrence of OSA - Guide to side sleep

- OSA is severe: shaken to wake up



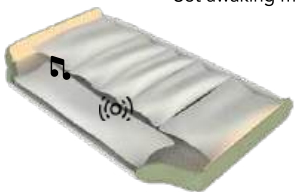
03 Wake up

Music / White noise

+ Lighting (optional)

+ Massage (optional)

Set awaking mode



04 After waking up

Sleep diary

Recording how you feel when you wake up can help you develop proper sleep habits

Avoid preconceived notions of sleep scores that affect somatosensory assessments

Sensory Evaluation

Good sensory experience

Generate Report

Sleep analysis

- Respiratory fraction was included in the primary data
- When the score is too low, show more details

Suggestions & Feedback

According to the data of the Internet Hospital, the causes are analyzed and measures are suggested

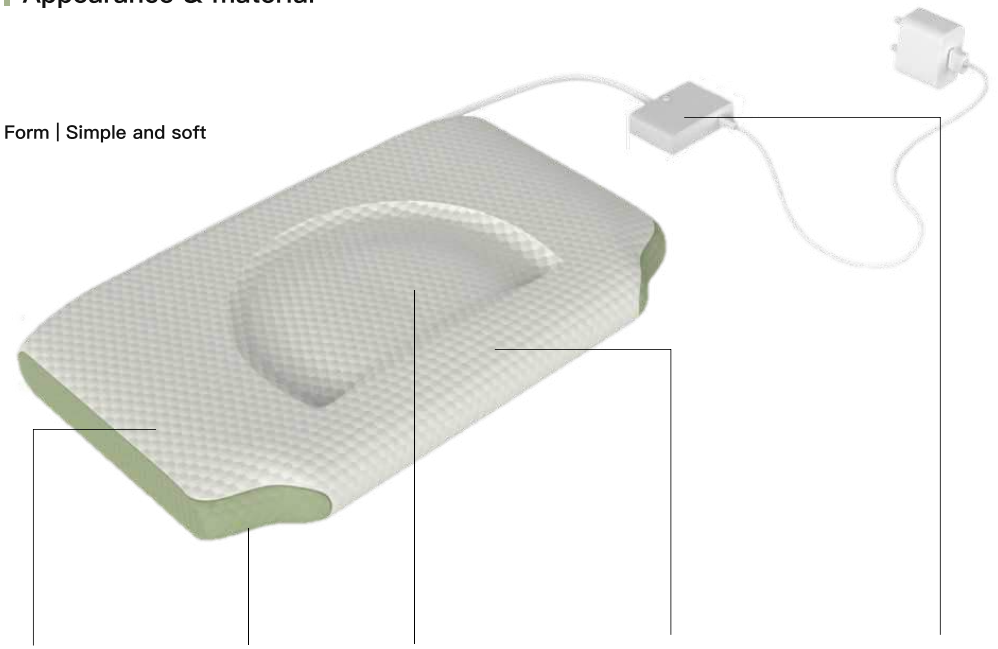
Feel a headache

Generate Report

Detailed Data

Appearance & material

Form | Simple and soft



Material

Memory foam

Keep the surface flat

Concavity

Aesthetic

Place your hands

Convex

Head support is suitable for sleeping on the side

Heighten

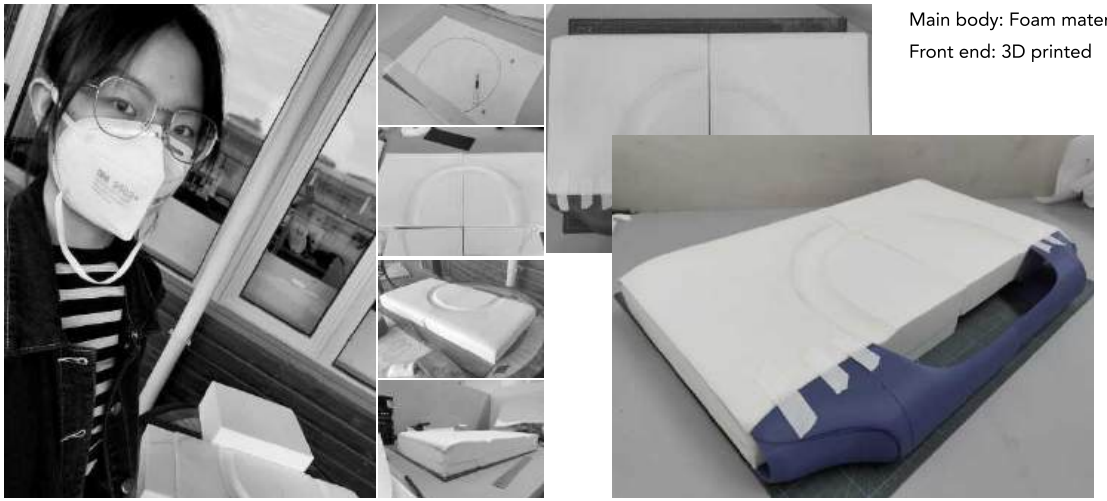
Neck support is suitable for sleeping on your side

Silent air pump

Color | Soft and calming

Hardware and Software Model Making

1:1 Prototype



Main body: Foam material
Front end: 3D printed

Arduino Code Writing

Function One: Airbag Inflation & deflation

```
int qbpin-3; //定义传感器 DO 接口
int jdq1 = 7;
int jdq2 = 8;
int val = 0;

void setup(){
  pinMode(jdq1,OUTPUT);
  pinMode(jdq2,OUTPUT);
  pinMode(qbpin,INPUT);//定义传感器 DO 为输出接口
  Serial.begin(115200);
}

void loop(){
  val=analogRead(qbpin);//将数字接口 3 的值读取赋给 val
  Serial.println(val);
  if(val > 210)
  {
    digitalWrite(jdq1,HIGH);
    digitalWrite(jdq2,LOW);
  }
  else
  {
    digitalWrite(jdq1,LOW);
    digitalWrite(jdq2,HIGH);
  }
  delay(100);
}
```

Function Two: Vibration Wake-up

```
int vib1=0;//定义 vib 接口
int vib2=10;
int vib3=1;
int vibpin-3; //定义传感器 DO 接口
int val=0;//定义数字变量 val

void setup()
  {
  pinMode(vib1,OUTPUT);//定义 vib1 为输出接口
  pinMode(vib2,OUTPUT);
  pinMode(vib3,OUTPUT);
  pinMode(vibpin,INPUT);//定义传感器 DO 为输出接口
  Serial.begin(115200);
  }

void loop()
  {
  val=analogRead(vibpin);//将数字接口 3 的值读取赋给 val
  Serial.println(val);
  if(val > 200)//当声音检测模块检测有信号时，振动
    {
    //digitalWrite(vib1,HIGH);
    digitalWrite(vib2,HIGH);
    //digitalWrite(vib3,HIGH);
    delay(1000);
    //digitalWrite(vib1,LOW);
    digitalWrite(vib2,LOW);
    //digitalWrite(vib3,LOW);
    delay(1000);
    }
  else
    {
    //digitalWrite(vib1,LOW);
    digitalWrite(vib2,LOW);
    //digitalWrite(vib3,LOW);
    }
  delay(100);
  }
```

Function Demo

Demo1: Airbag Inflation and Deflation

Initial state:
The airbag contains a small amount of gas (set height)

Snoring detected

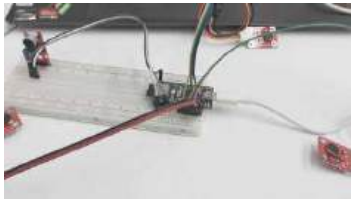
Smart adjustment of local height based on physiological data such as snoring through the demonstration of the neck airbag
The airbag is inflated and puffed up to adjust the neck height

Snoring disappears

The balloon deflation is lowered until the appropriate height is appropriate

Demo2: Vibration wake-up

Scenario 1: Persistent and intense snoring is detected - urgent situation
Scenario 2: Normal wake-up



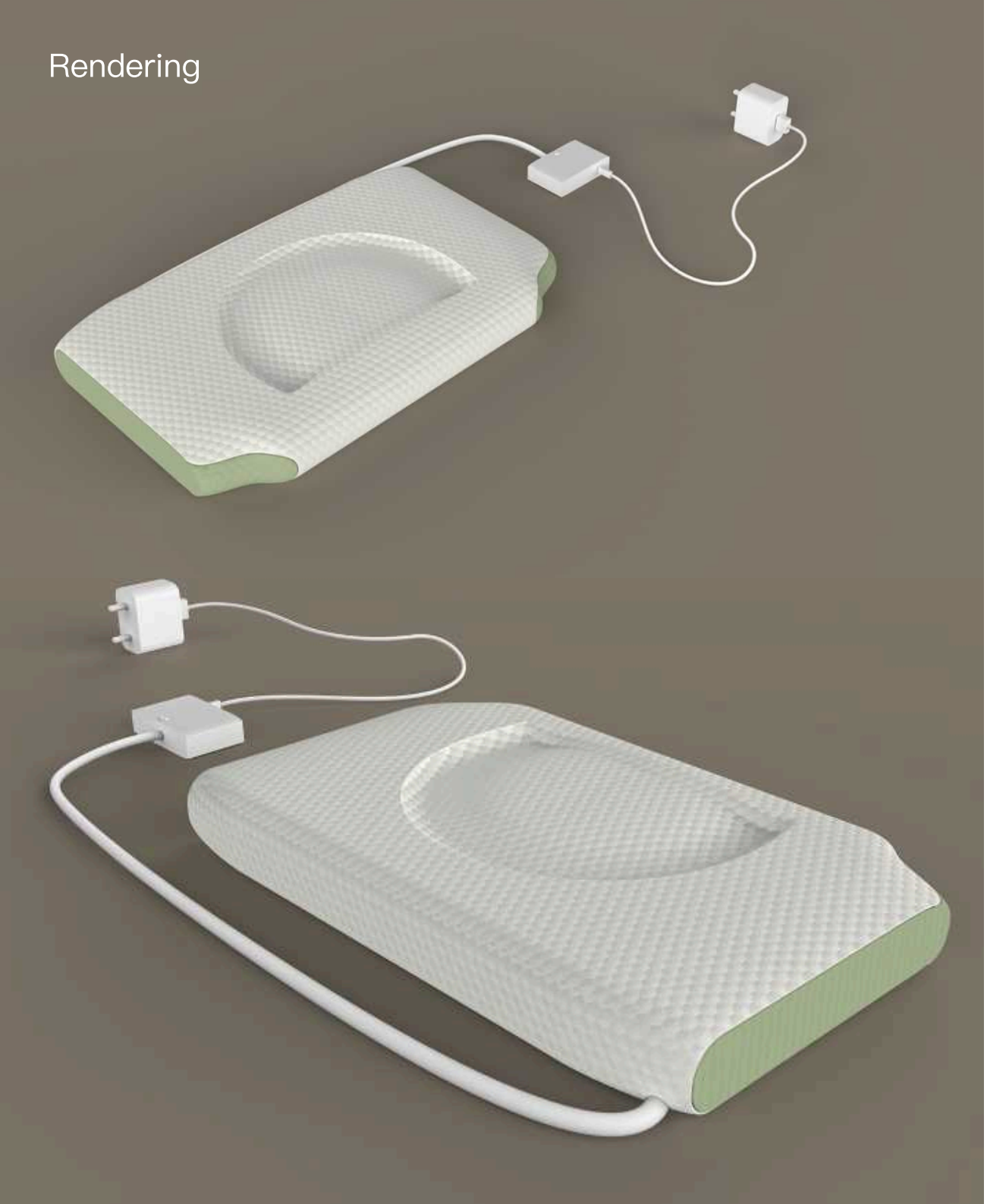
Microphone & Vibration module

Rendering

Day mode

Dark mode

Rendering



2021-2024 PERSONAL WORK COLLECTION

DESIGN

Runming (Eva) Fan | School of Creativity and Art - ShanghaiTech University | Industrial Design - Smart Design | http://eva.fan