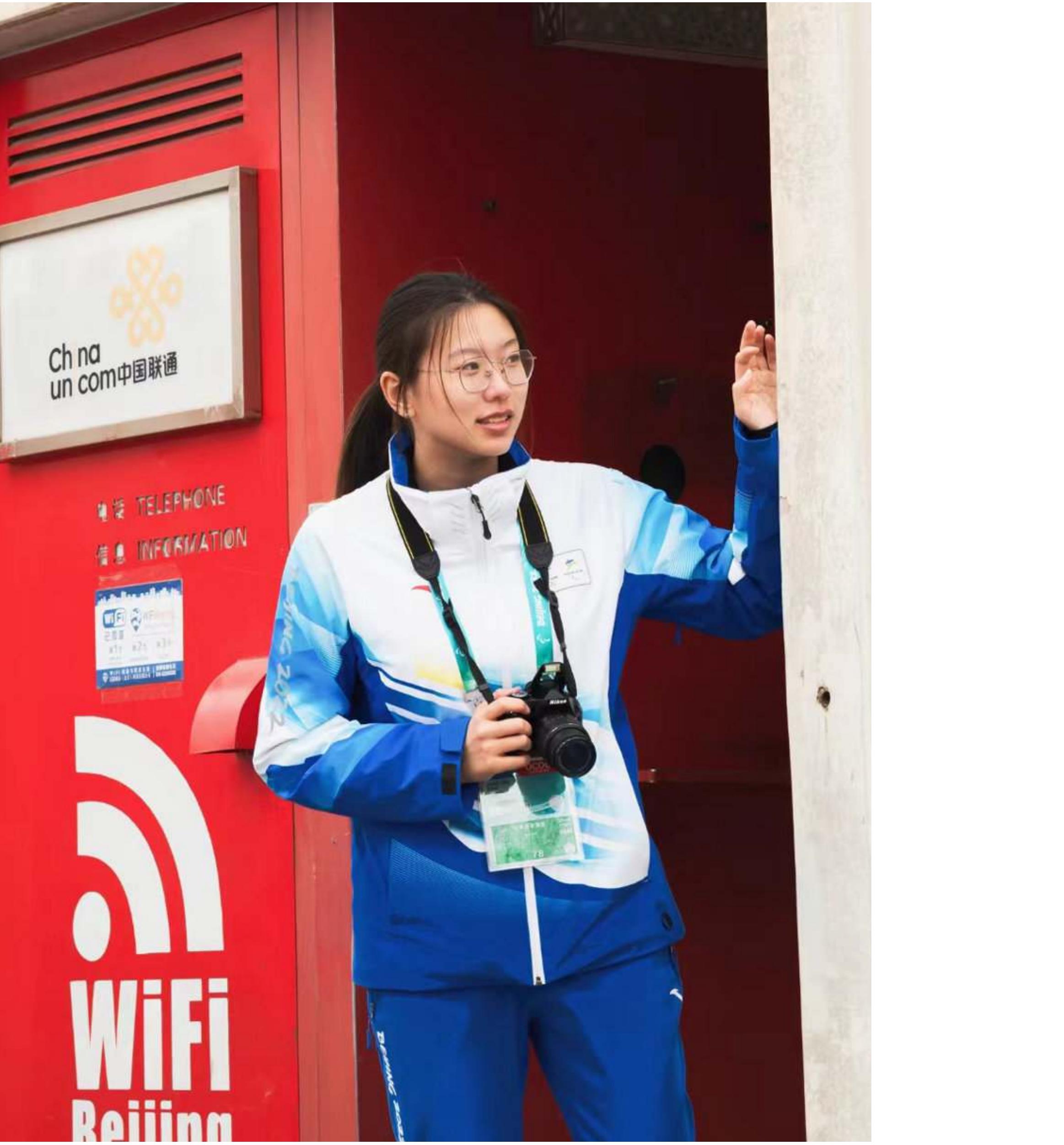


PORTFOLIO

Jiaqi Zhang

2023



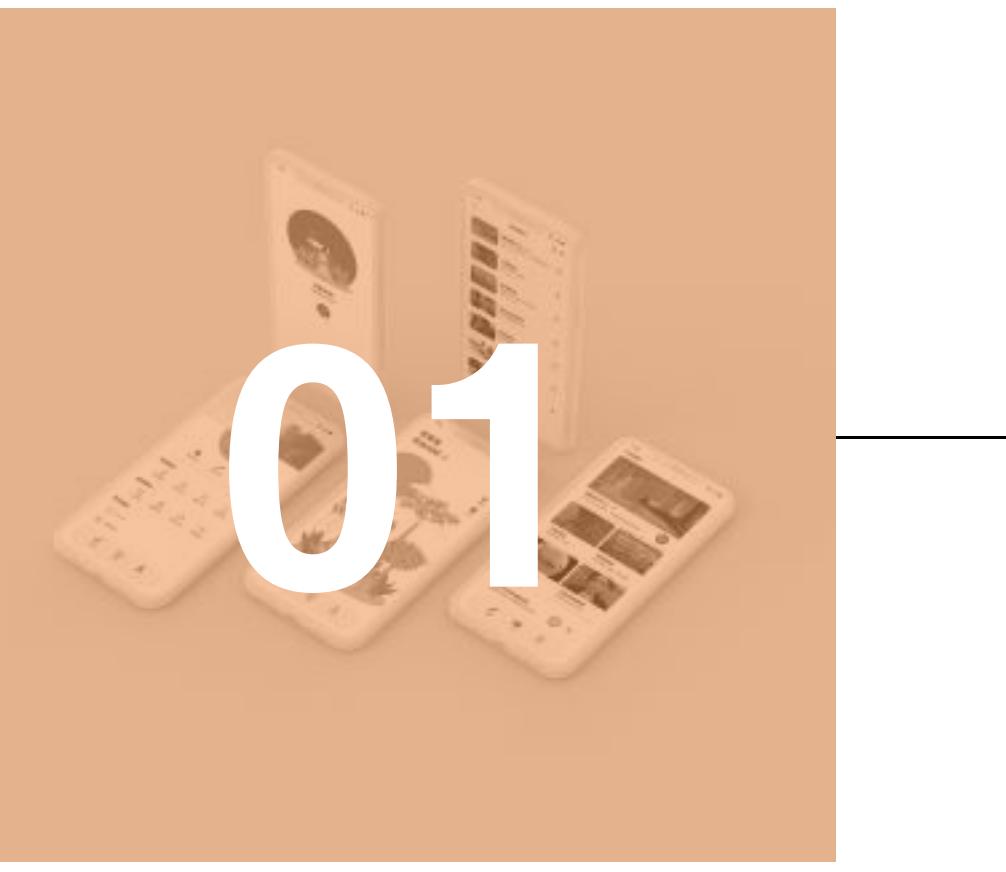
Hello! I am Jiaqi.

I am...

- a senior student
- a multifaced designer
- a passionate developer
- ENTP (in MBTI)
- Sagittarius
- an amateur astrologer

Some information about me

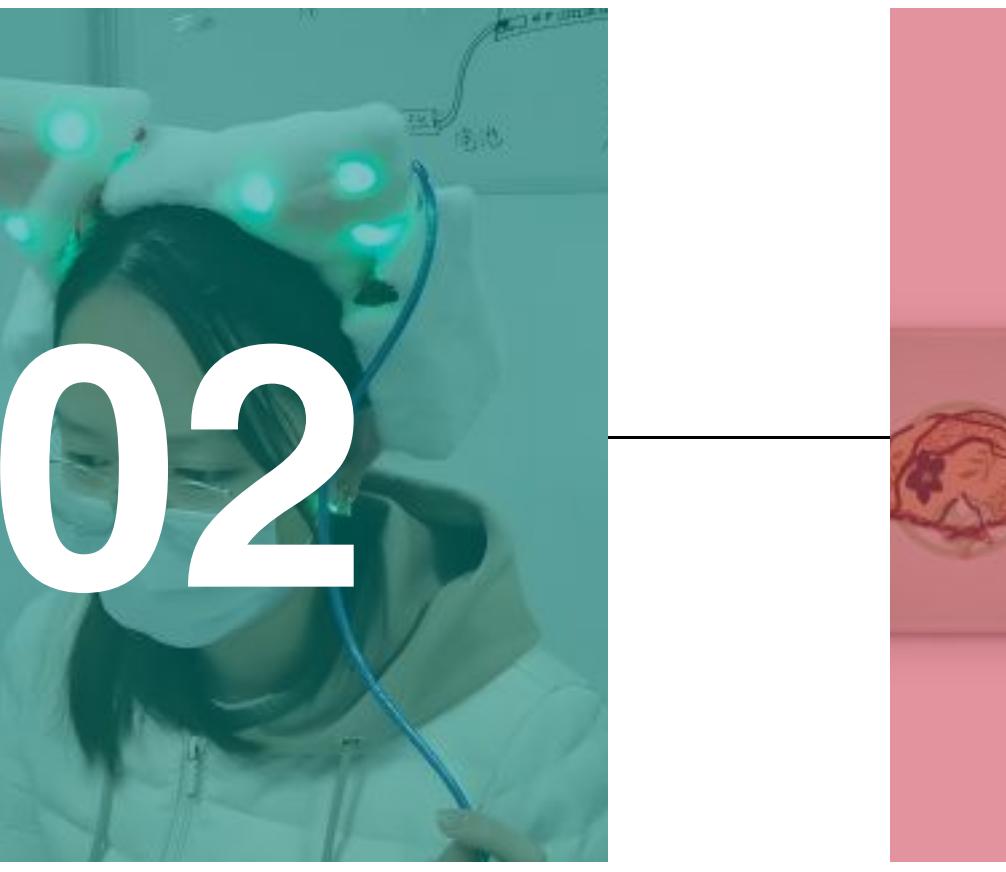
Website	hellojiaqi.com
Education	2020.09 - 2024.07 Beijing University of Posts and Telecommunications Bachelor of Engineering, Digital Media Technology
Internship Experience	2022.04 - 2022.10 Future Laboratory, Tsinghua University Intern at the Aging User Experience and Service System Design Research Center (AeX)
Skills	<ul style="list-style-type: none">• Coding (python, java, C++, C#)• Design (UI & UX design, branding, graphic design...)• Game development (Unity)• Machine learning (CV & NLP)• and more...
Software Skills	
Language	Chinese (Native) English (IELTS 7)



01

Tomorrow

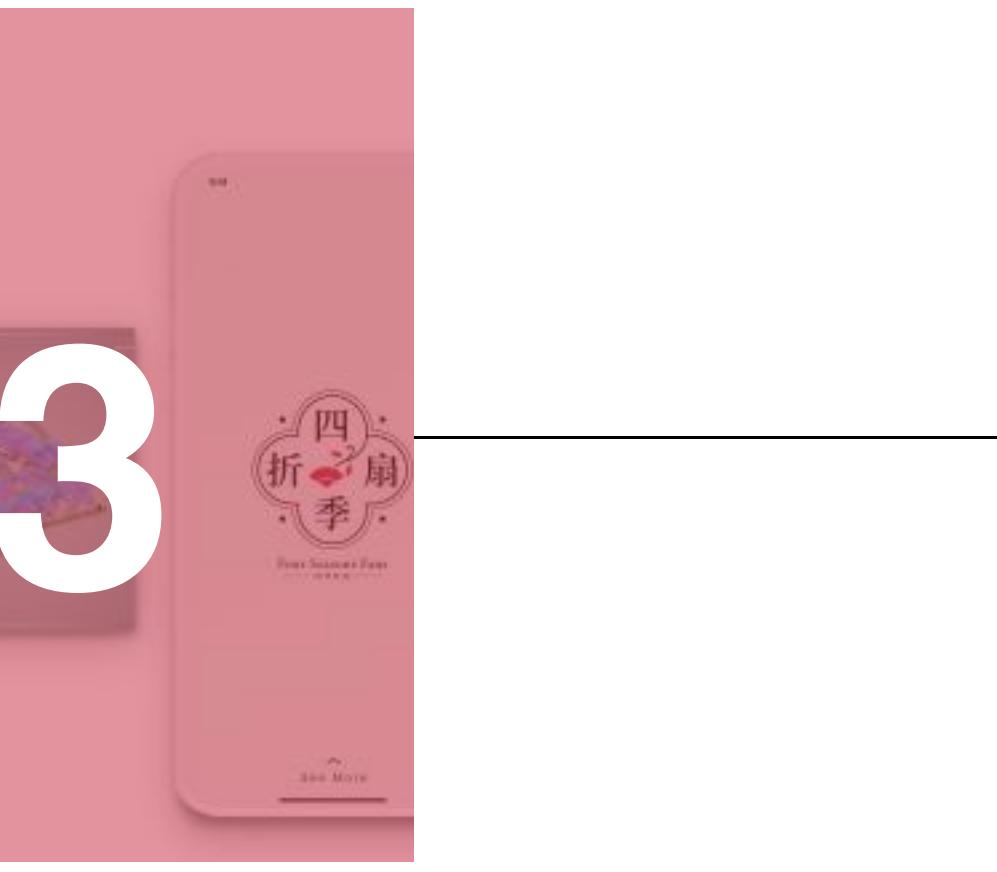
UI & UX Design
for a Mental Health App



02

EmoEar

Interactive Device
for Emotion Monitoring



03

Four Seasons Fans

AR APP
Development



04

Escape

First-Person
VR Game Development



05

Scene Sketch

to Image

Image Generation Model
Based on Scene Sketches

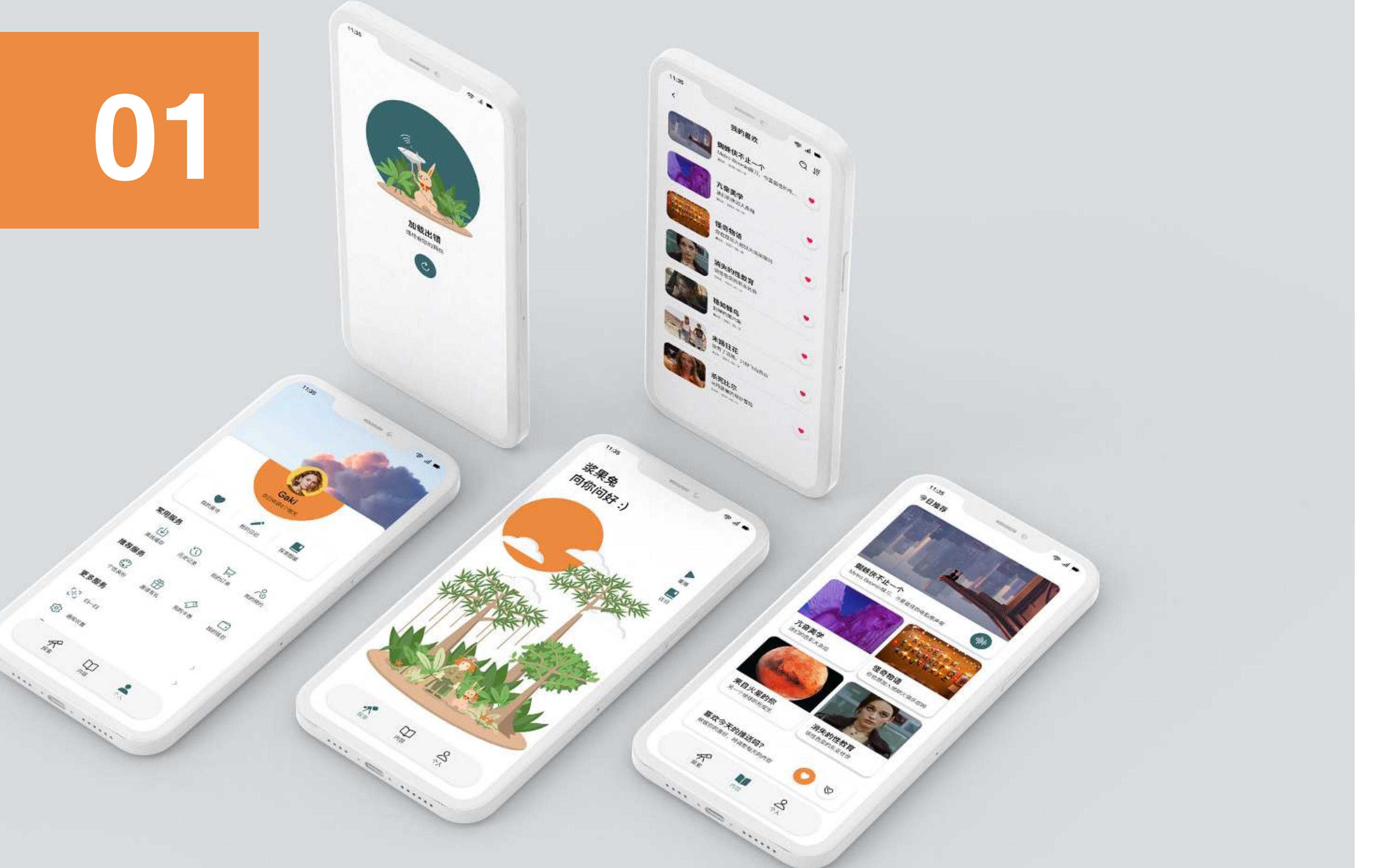


06

and More...

Personal Projects
Collections

01



Tomorrow

UI & UX Design for a Mental Health App

My Roles

User researcher, UX designer, UI designer, illustrator

Members

Jiaqi Zhang, Xinyue Yin, Liting Wen, Zimo Yang

Start and end

2021.05-2021.07

Introduction

"Tomorrow" is designed to address the psychological challenges that many people face in today's fast-paced world. The app's core mission is to provide motivation and inspire users to look forward to each new day with optimism and hope. This project won the third prize in the National College Digital Art&Design Awards in 2021.

PROPOSAL

After brainstorming, we decided to concentrate on the topic of mental health. Our goal was to develop a progressive mental health app that helps users become more positive day by day.

"I found tomorrow is not attractive to me anymore."

Many people today struggle with stress, anxiety, and the demands of daily life, often feeling like they're lost in a barren wilderness of their thoughts.



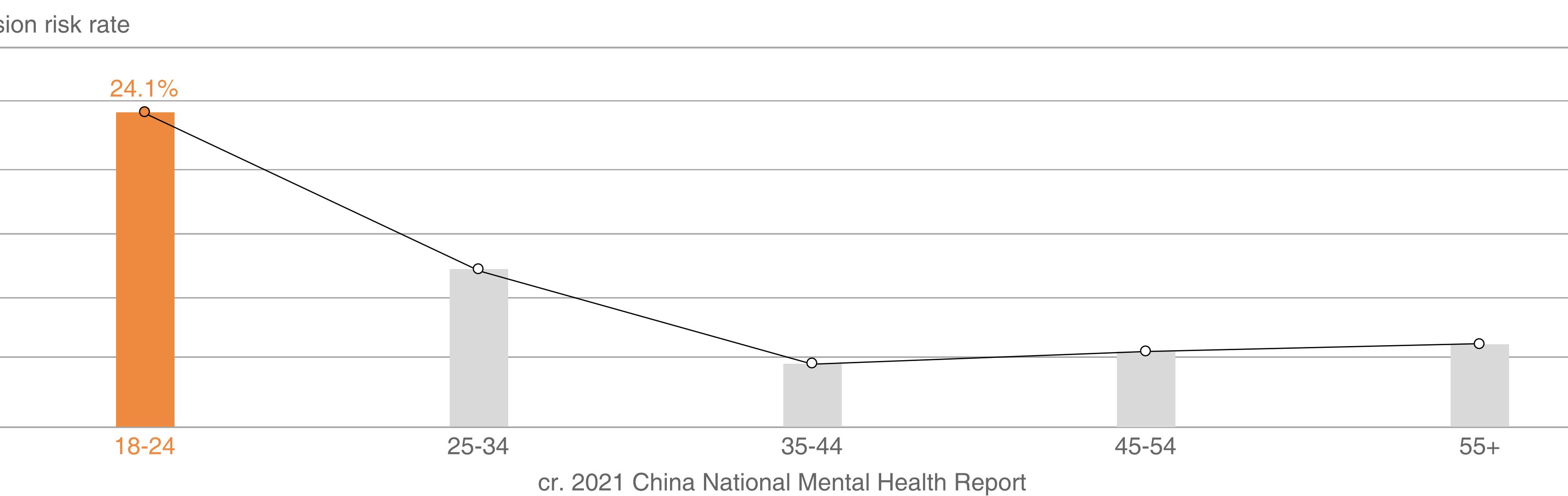
"What if we create an app that can cultivate inner growth?"

Introducing "Tomorrow" - your path to a healthier mind. Our app provides a daily sanctuary for your thoughts and emotions, letting you nurture your mental well-being. Write in your diary, find solace in inspirational reads, and watch as a vibrant forest of new life gradually emerges with each visit. Experience the transformation from within.



MARKET RESEARCH

Through market research, we identified a significant need and growth potential for mental health apps.



Youth anxiety is becoming increasingly common

According to the 2021 China National Mental Health Report, the level of mental health has significantly decreased in recent years, and in adulthood, the amount of depression shows a decreasing trend with age. Among them, the average level of anxiety in young people aged 18-24 is higher than other age groups. There is a need for apps that can regulate psychological stress.

Mental health apps have a huge market and development prospects

Statistics show that the global market size of behavioral/mental health software reached 11.2 billion yuan in 2019, and it is expected to reach 18.5 billion yuan in 2026, with an annual compound growth rate (CAGR) of 7.4%. This shows that society attaches great importance to mental health issues, and mental health apps have a huge market and development prospects.

PERSONA



Jun

"I feel overwhelmed by new environment."

Age 22
Occupation Intern
Location Beijing, China
Status Single

Bio

After graduating, Jun decided to remain in Beijing rather than returning to his hometown. His first professional experience came in the form of an internship at a technology company. This ambitious young man soon recognized the stark contrast between the corporate world and the academic environment.

Frustrations

- "Every day feels monotonous."
- "It is really lonely to live in a strange city, but I am afraid to make friends with my colleagues."
- "I often feel depressed and anxious but have no idea how to solve them."
- "I'm not finding fulfillment in my work."

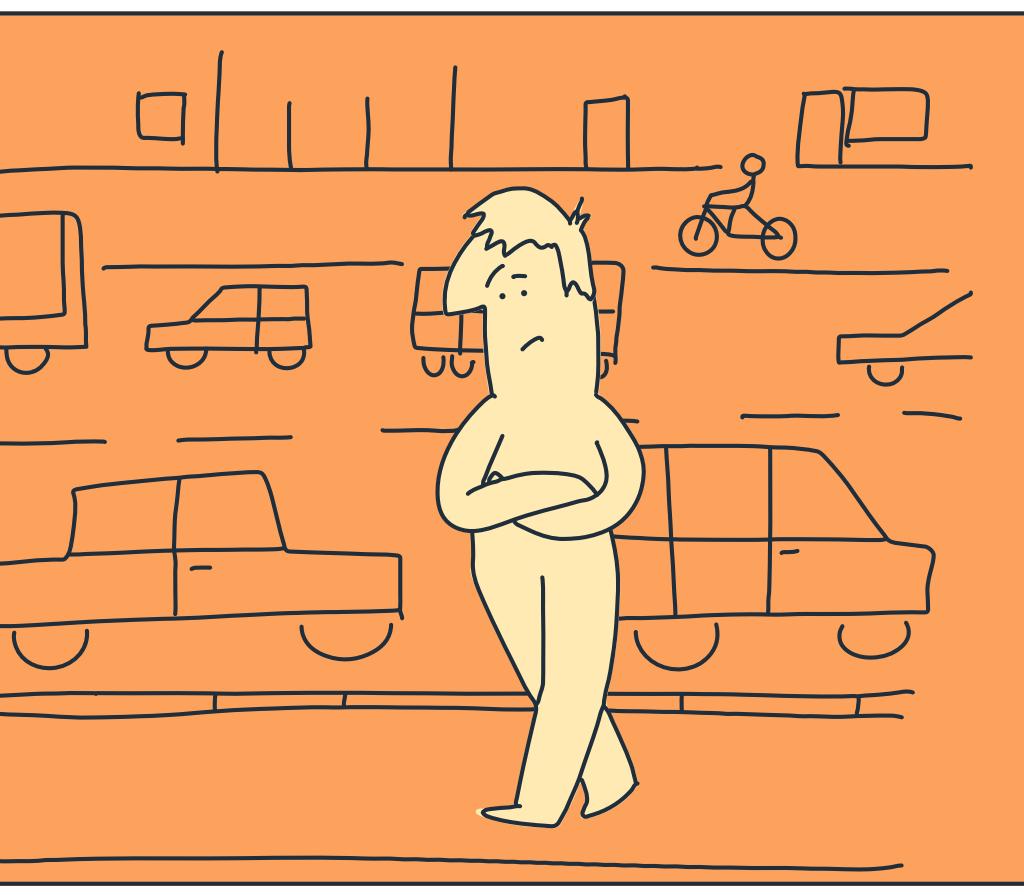
Goals

- Assist him in start documenting his daily life to uncover the hidden moments of joy within it
- Supply him with motives and suggestions to help him make friends
- Offer emotional support in various forms and help him find his sense of achievements

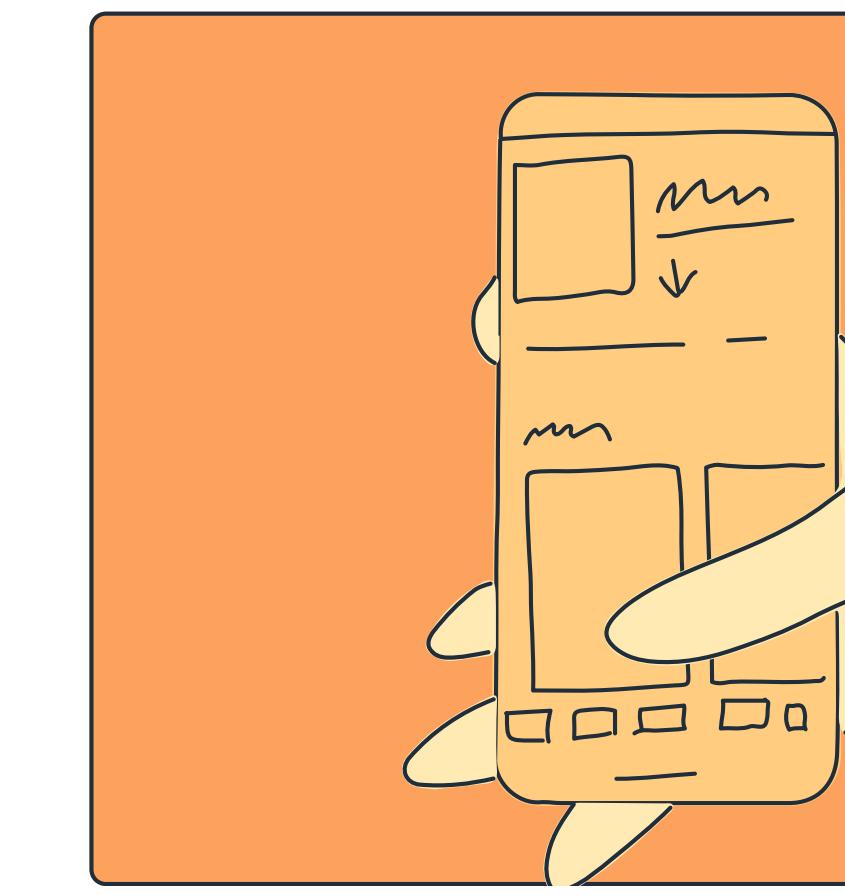
Motivations

- "I aspire to excel in my job, as I aim to increase my earnings."
- "I want friends. I often feel isolated in this unfamiliar city."
- "I strive to improve my emotional well-being."

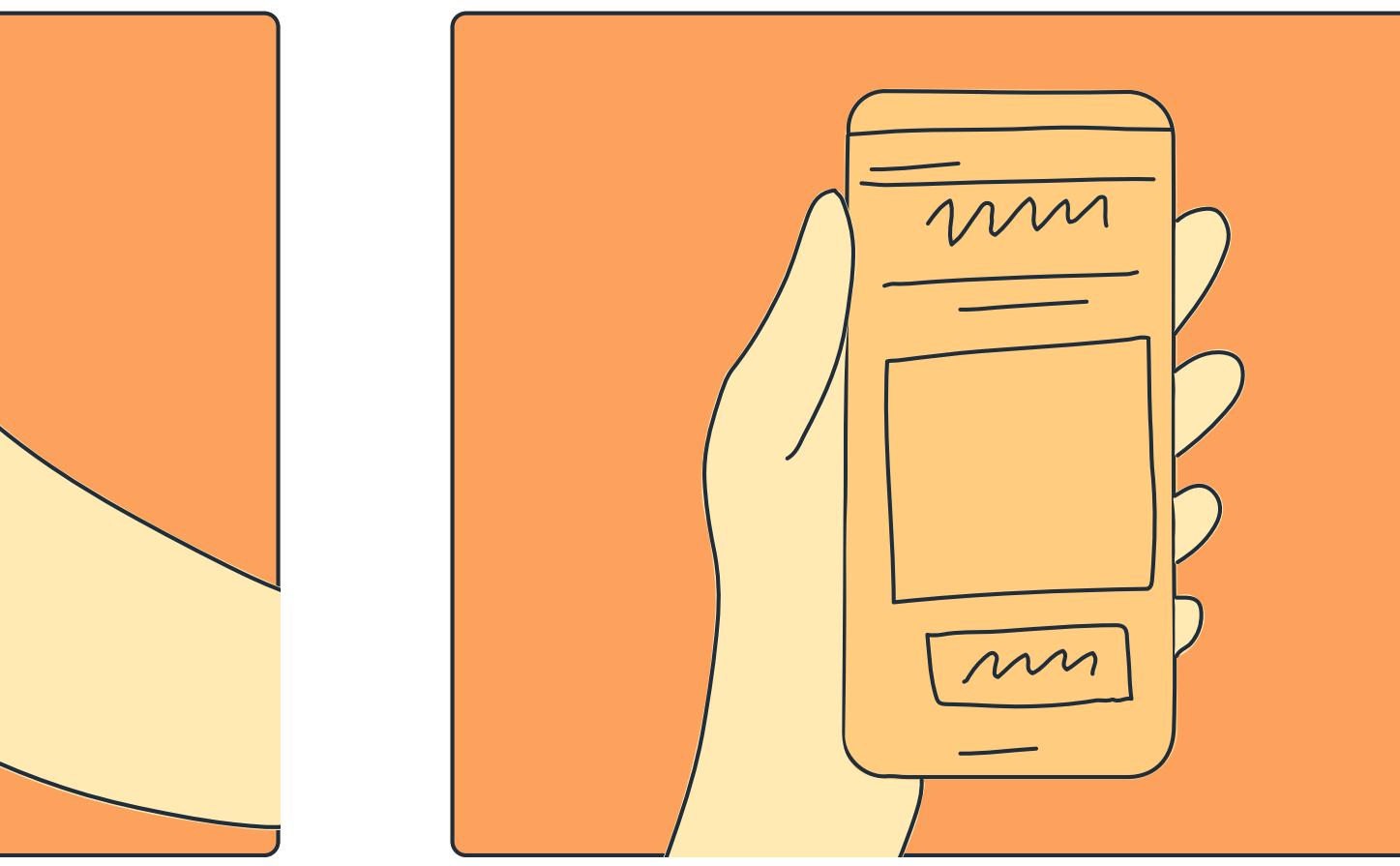
For UX research, I developed a persona and utilized storyboards, Customer Journey Maps (CJM), and the Kano Model to gain a deeper understanding of our potential users.



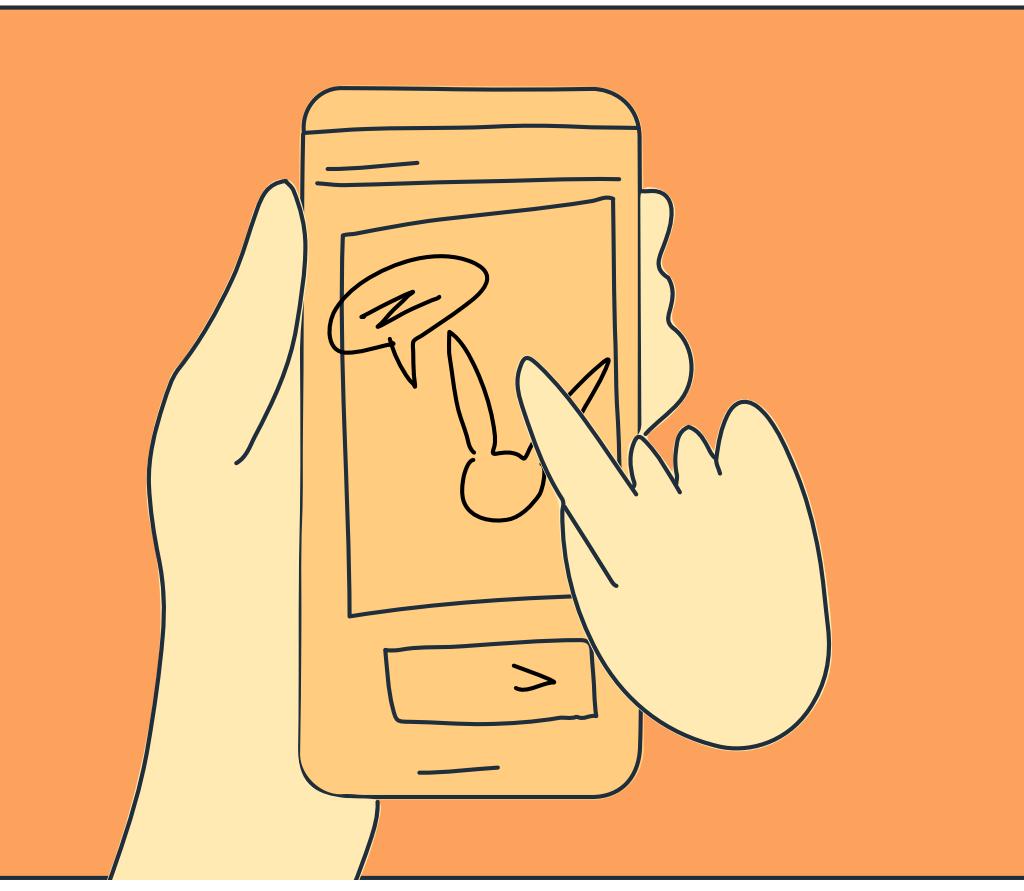
Jun is on his way to work this Monday, and he's feeling a bit reluctant to start the day at the office.



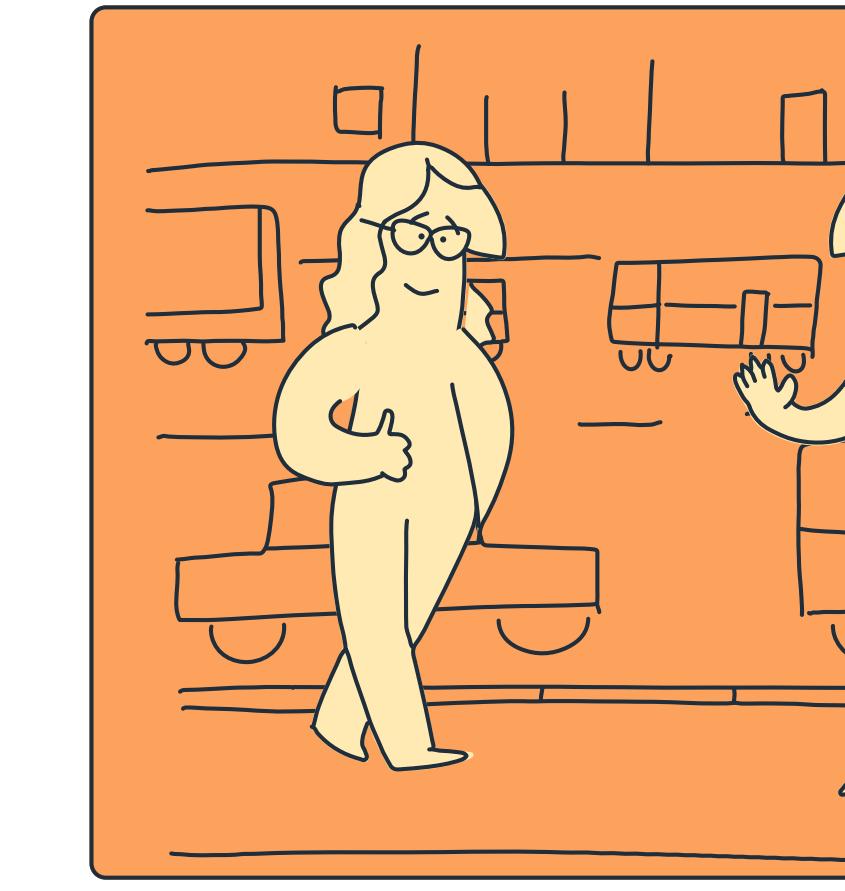
While casually browsing his phone, Jun stumbles upon an appealing app and decides to download it.



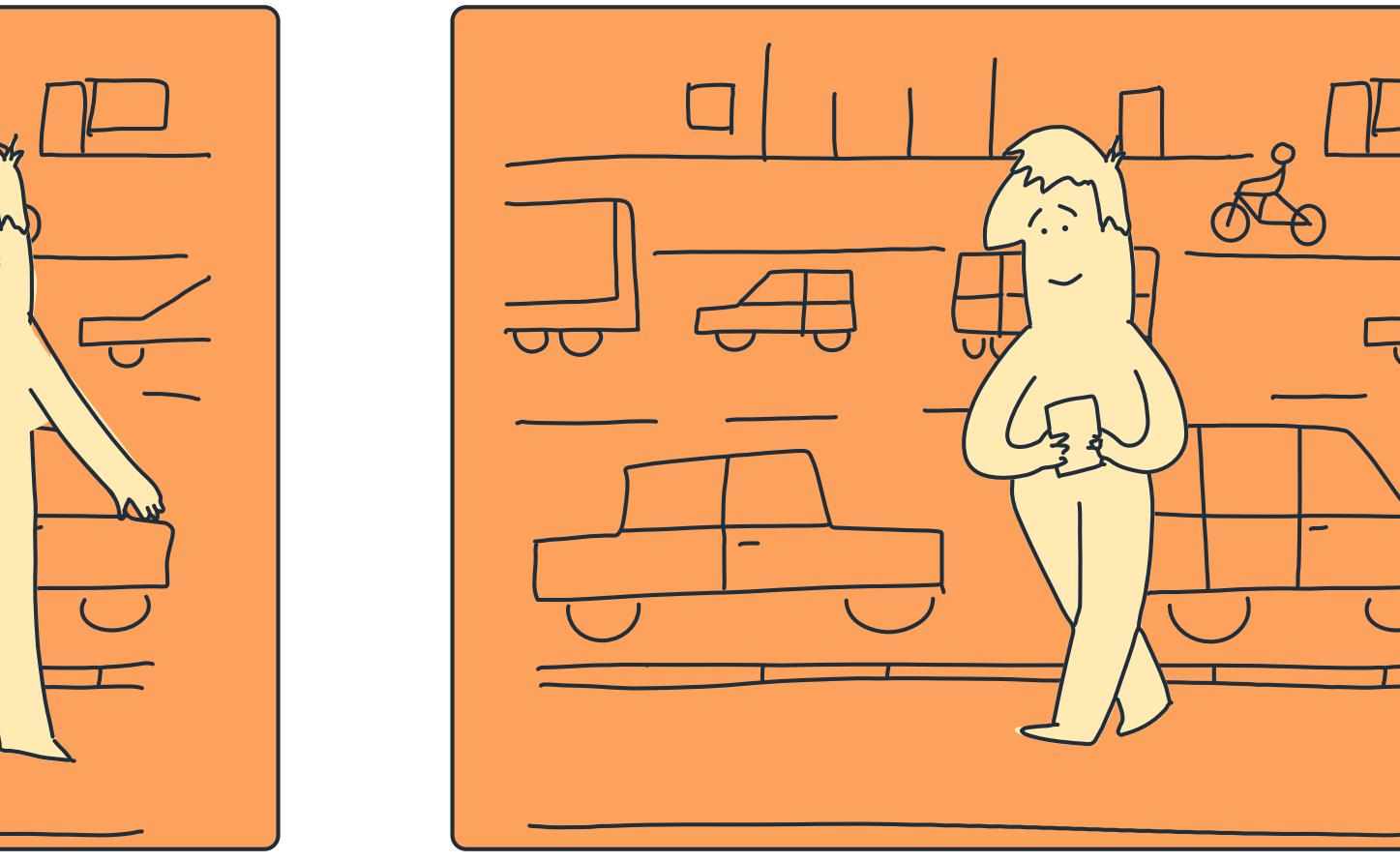
After downloading, this app asks Jun for a test, which is kind of annoying. But the interfaces look interesting so he accepts.



Upon completing the test, Jun arrives at the app's homepage and is captivated by a bunny that jumps out of the bushes.



The bunny suggests that Jun should greet a stranger, with some reasons why he should. Encouraged by this, Jun decides to give it a try.

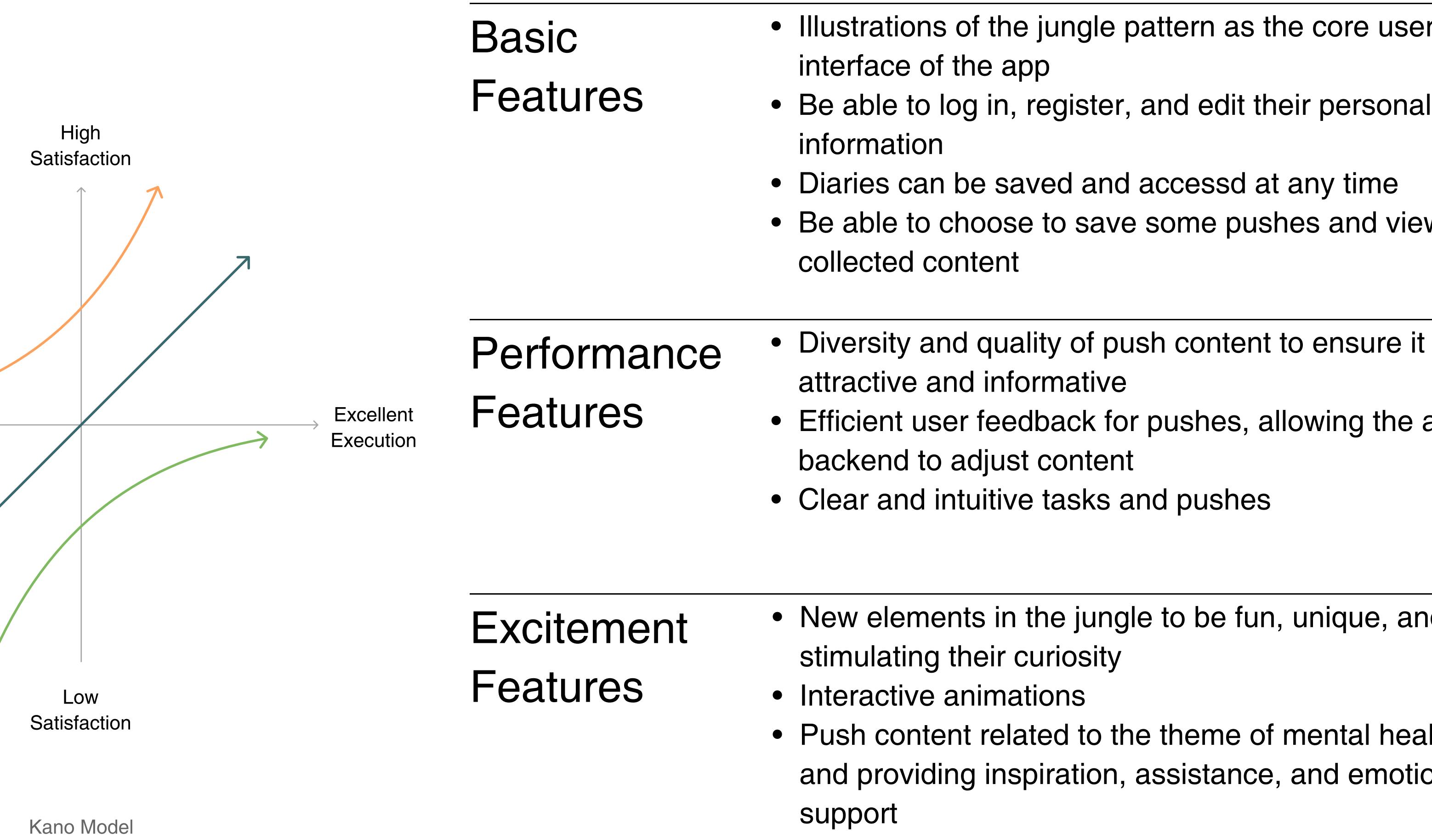


Jun completes it swiftly. Amazingly, it makes him happy. For the rest of his commute, he continues to use the software.

Action	Learn about and Install software	Take mental health test	Homepage	Content page	Feedback to pushes
Tasklist	<ul style="list-style-type: none"> • Feel depressed • Learn about the app • Install the app 	<ul style="list-style-type: none"> • Take test and discover the specific reason why I feel depressed 	<ul style="list-style-type: none"> • Explore the jungle at Homepage • Receive a task asked by the jungle resident 	<ul style="list-style-type: none"> • Finish the proposed task • Write diary • View pushes 	<ul style="list-style-type: none"> • Give feedback to today's pushes • Review liked contents
Customer experience					
	<p>I am unhappy</p>	<p>Why I need to test</p>	<p>Well... I don't like commands</p>	<p>What's that?</p>	<p>I can feedback!</p>
Painpoints					
	<ul style="list-style-type: none"> • Inadequate publicity • users unsure if the software meets their expectations 	<ul style="list-style-type: none"> • The test may not be professional and comprehensive enough • Users may not want to take any tests 	<ul style="list-style-type: none"> • The tasks proposed may give users a sense of compulsion • Homepage has low reusability, since it has no function except for the daily new resident 	<ul style="list-style-type: none"> • Users may be less interested in pushes • Users are not sure the type of this push(like articles, songs, etc.) 	<ul style="list-style-type: none"> • Users may have different levels of satisfaction with different pushes, so just one feedback button at the end of the page may confuse them.
Ideas					
	<ul style="list-style-type: none"> • More comprehensive promotion • Set incentives for existing users to invite new ones 	<ul style="list-style-type: none"> • Invite professional psychologists to design questions • Compared to button, use scale bar • Add skip button 	<ul style="list-style-type: none"> • Questions should be raised in a suggested tone • Design interactive animations among the jungle • Add functional buttons 	<ul style="list-style-type: none"> • Add feedback button, and contents can be changed according to user preferences • Add labels or icons to distinguish different types 	<ul style="list-style-type: none"> • Add feedback button for each push, and adjust the importance of the feedback button at the end of the page.

KANO MODEL

After identifying the requirements and listing all the features, I used kano model to determine the highest priority functions for users.



Basic Features

- Illustrations of the jungle pattern as the core user interface of the app
- Be able to log in, register, and edit their personal information
- Diaries can be saved and accessed at any time
- Be able to choose to save some pushes and view collected content

Performance Features

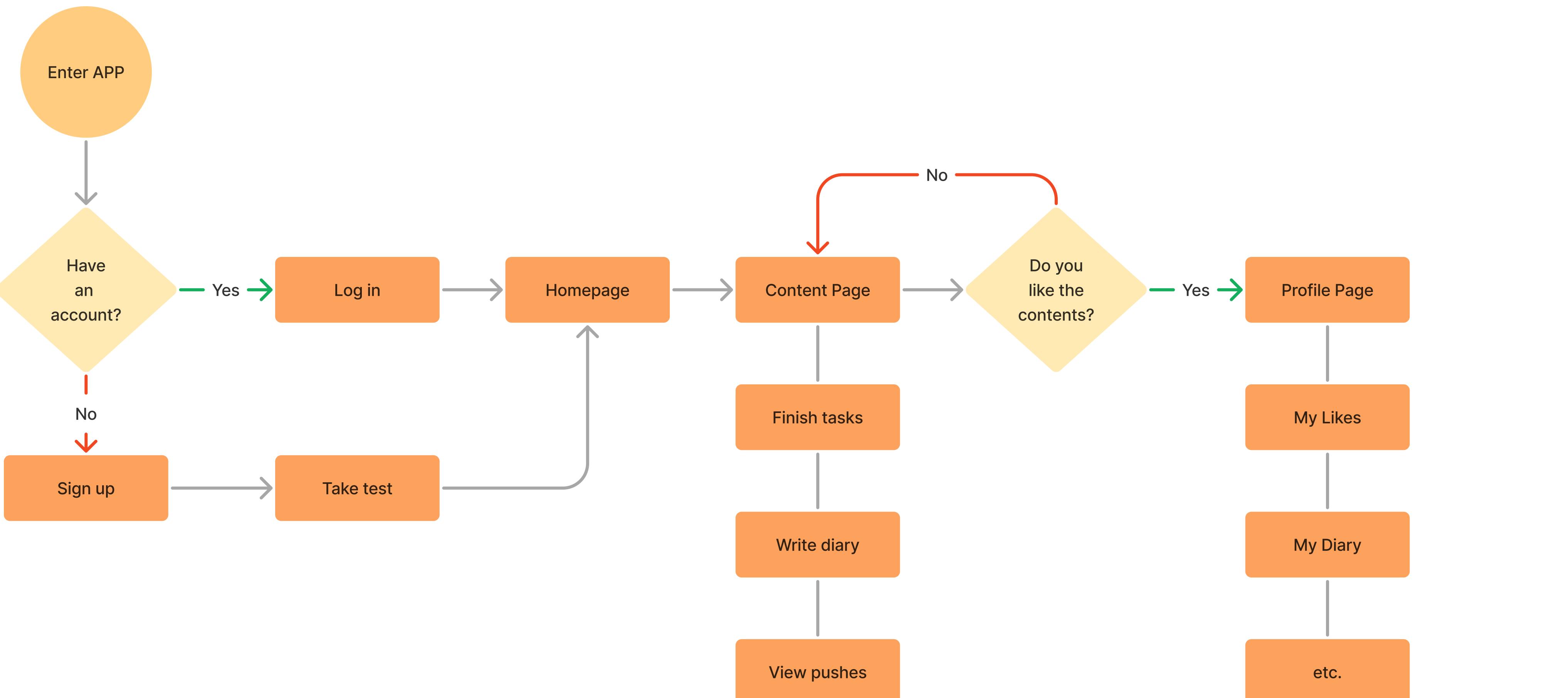
- Diversity and quality of push content to ensure it is attractive and informative
- Efficient user feedback for pushes, allowing the app backend to adjust content
- Clear and intuitive tasks and pushes

Excitement Features

- New elements in the jungle to be fun, unique, and stimulating their curiosity
- Interactive animations
- Push content related to the theme of mental health and providing inspiration, assistance, and emotional support
- The ability to customize the appearance of their personal page

USER FLOW

To outline all the necessary functionality, I created a simple flow diagrams of the main tasks the user can do. Based on user flow, I created wireframes.



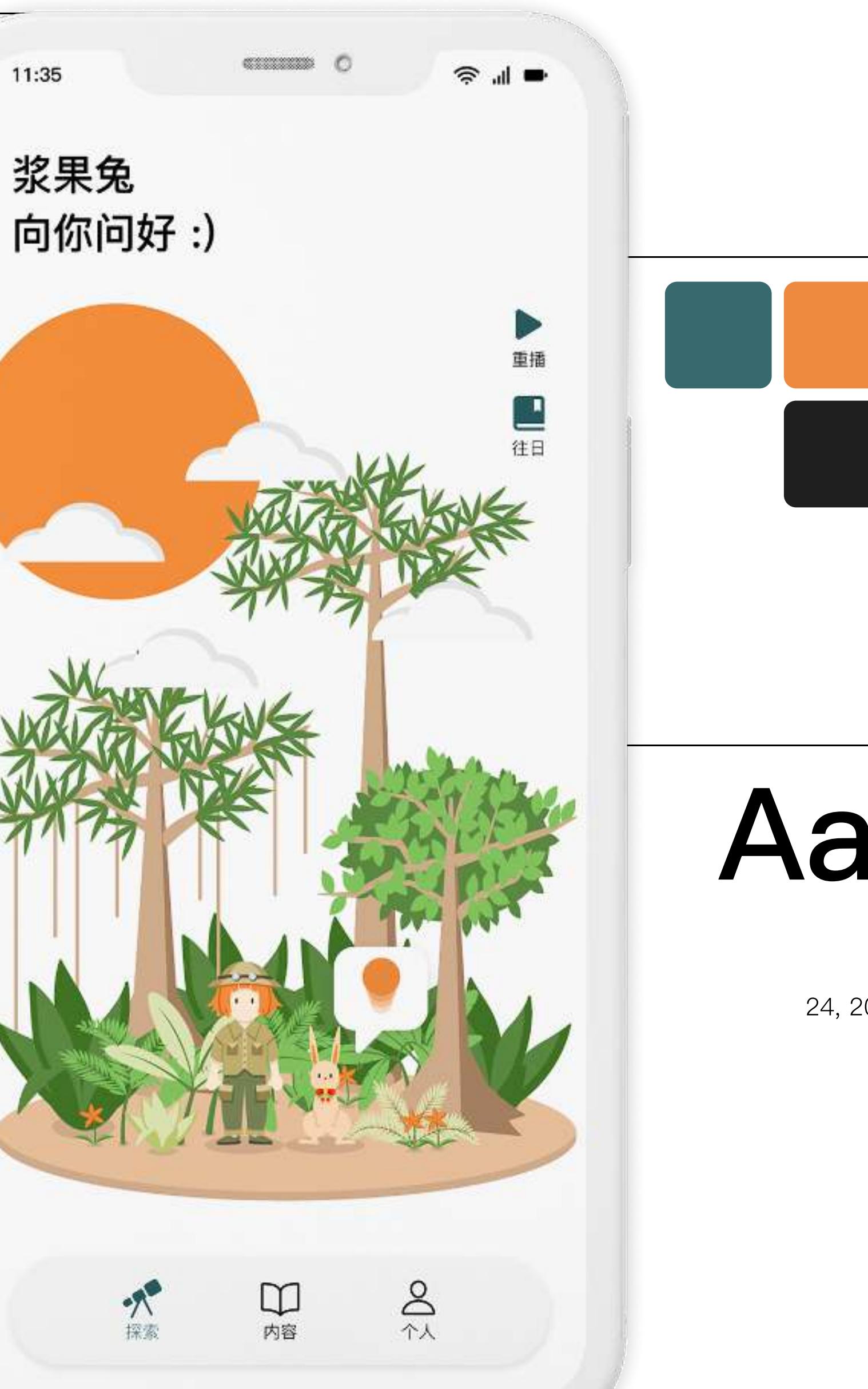
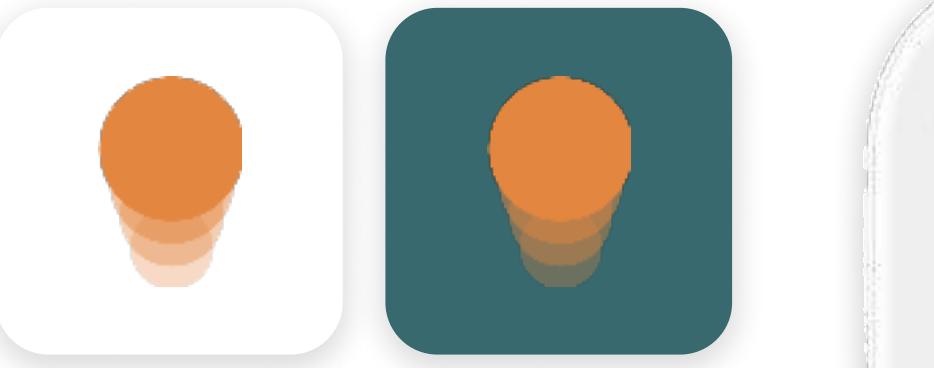
User Flow - Tomorrow



STYLE GUIDE

Once the wireframes were ready, I first created a UI style guide to maintain consistency in my further UI design. Also, I designed two IP characters for further illustrations.

Logo



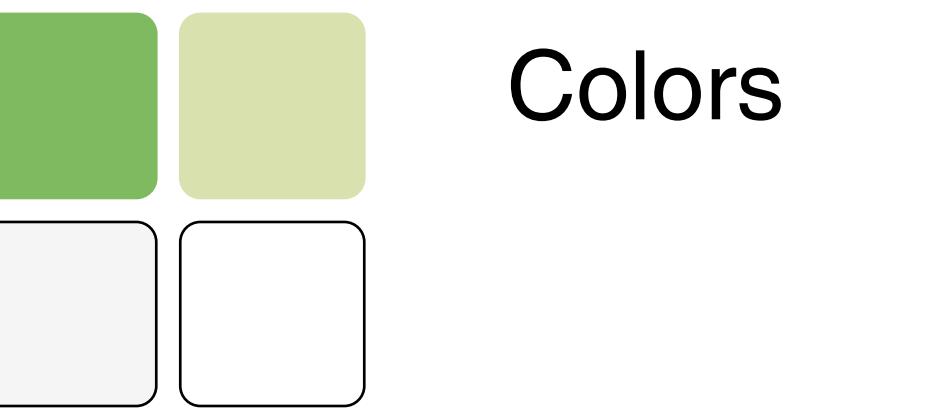
IP Characters



Jungle Bunny
symbolizing developers

Explorer
symbolizing users

Colors



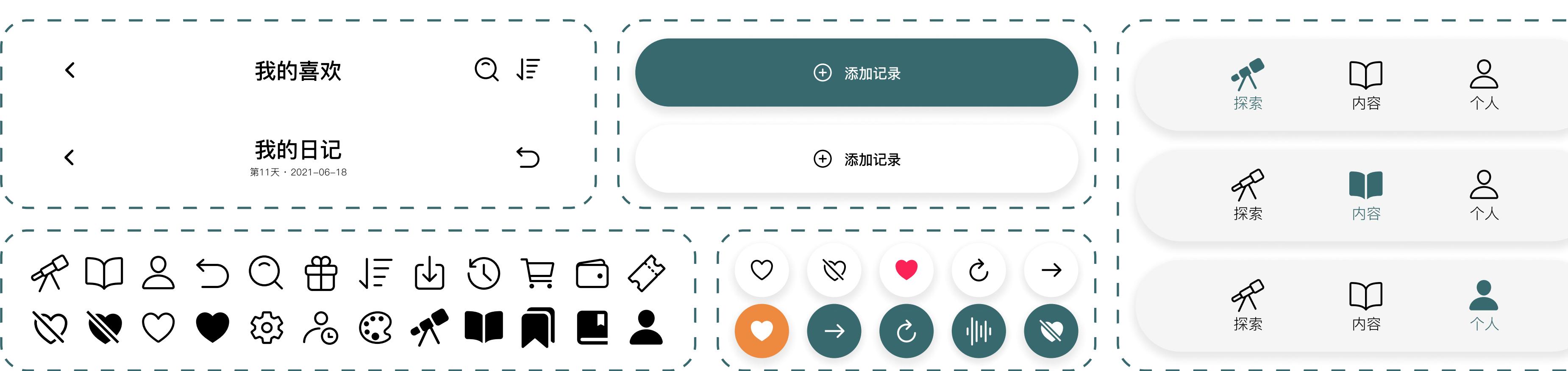
AaBb Typography

Pingfang

Bold · Regular

24, 20, 18, 14, 10, 6

Icons & Components



Illustrations



HOW TO USE

Test

After signing up, you are ought to take a quick and skippable mental health test, which is helpful for us to locate your issues.



Content

At Content page, you have various options. You can keep a diary, view pushes and so on.

Record your day

Tasks are optional, especially helpful if you're not used to journaling or need a starting point. You're not obligated to follow them; just record your day by your wish.

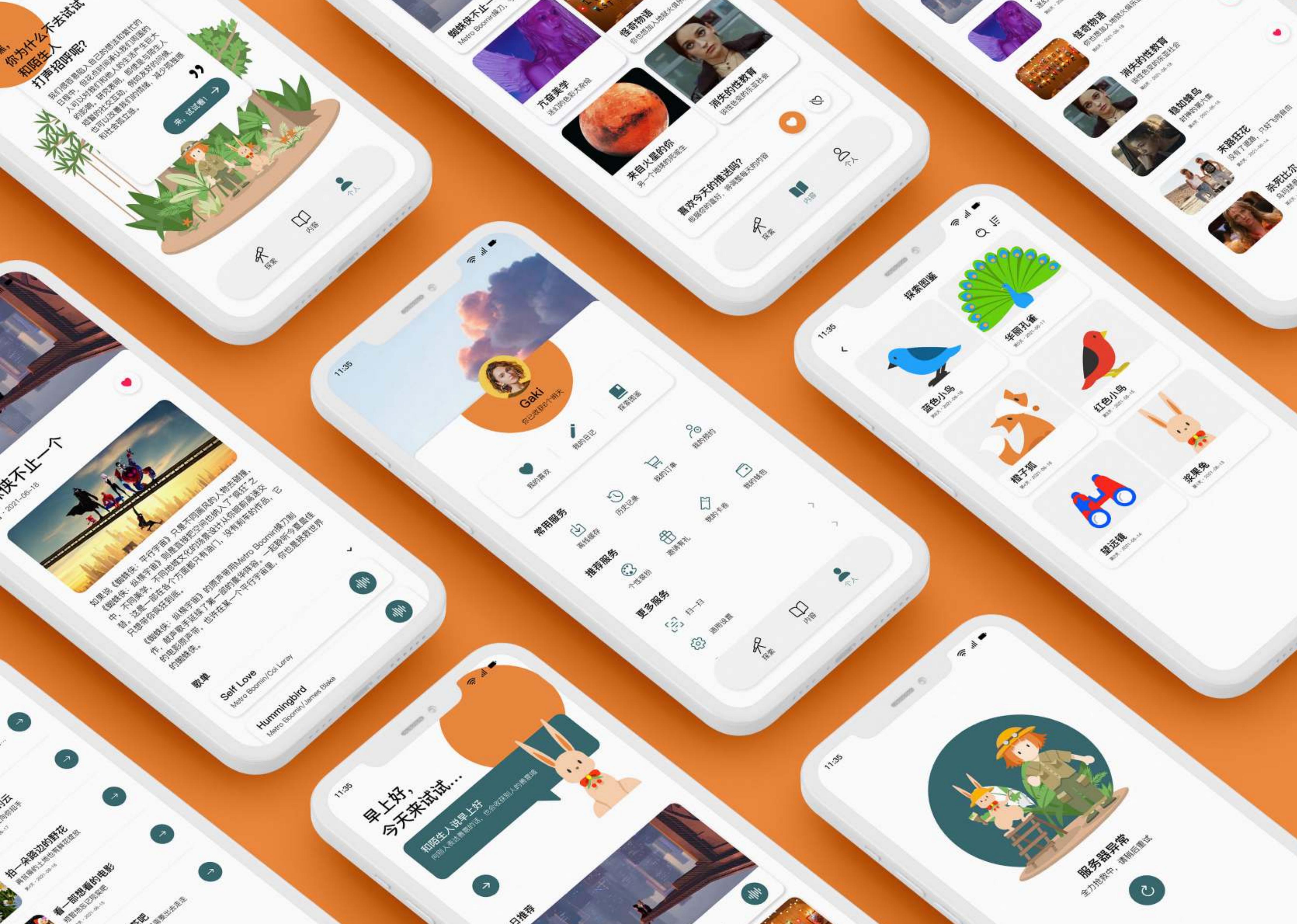
Daily updates

Check our everyday updates when you are bored. Everyday has a certain theme, and is mental health related.

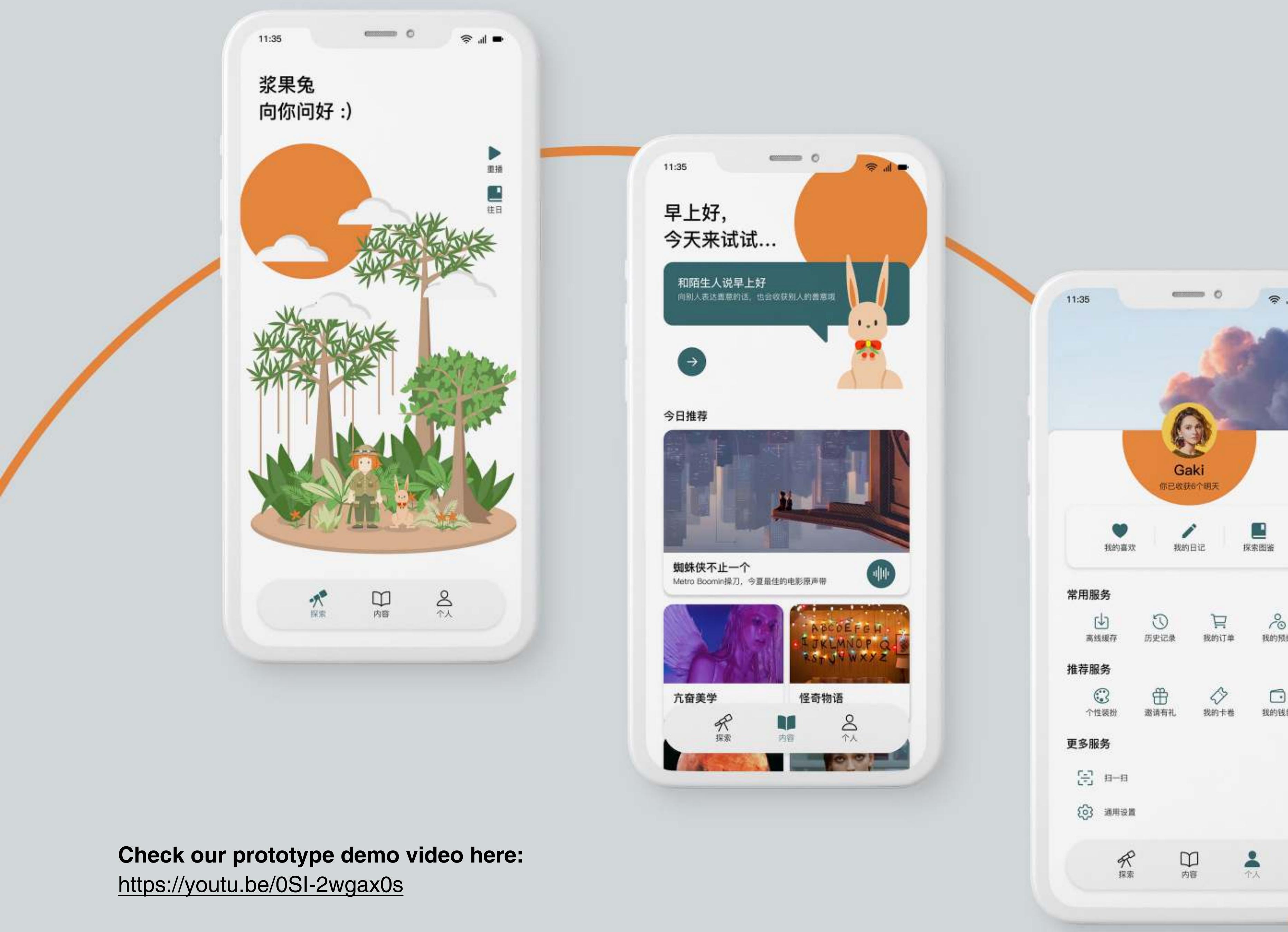
Profile

Edit your personal information and adjust settings at Profile page, where can also help you find your liked pushes and your diary.

How to Use - Tomorrow



Check our prototype demo video here:
<https://youtu.be/0SI-2wgax0s>



02



EmoEar

Interactive Device for Emotion Monitoring

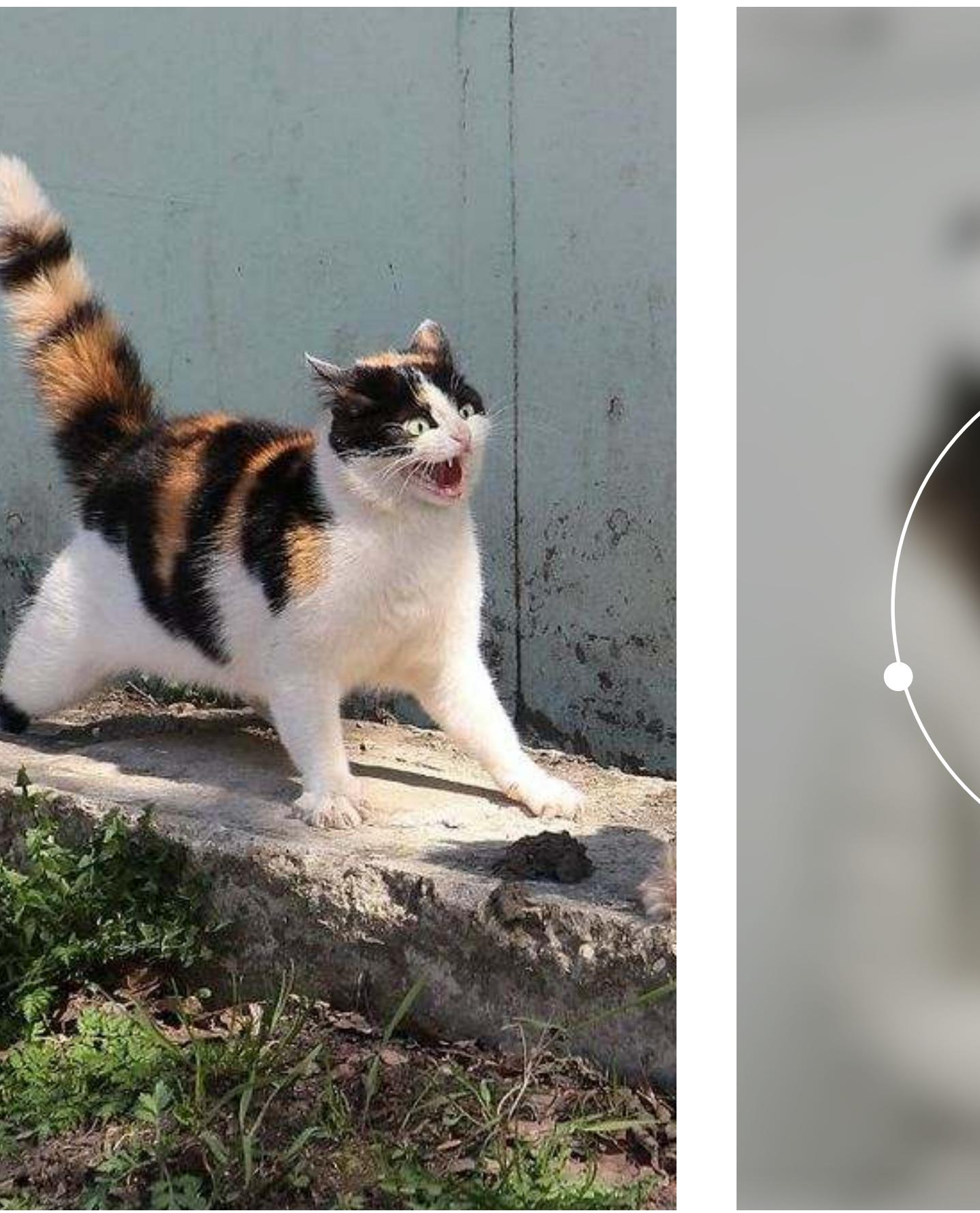
My Role	Coding, designing prototype, designing and soldering circuits
Members	Jiaqi Zhang, Zhiman Niu, Xinyue Yin, Ziyi Wang
Start and end	2021.10-2021.12
Introduction	"EmoEar" is a wearable interactive device based on Arduino. It is a cat ear headband that responds to the wearer's heart rate. It can detect the wearer's pulse and display it in real-time through the colors of LED lights and the movement of servos. This project won the third prize in the National College Students 3S IoT Competition in 2022.

PROPOSAL

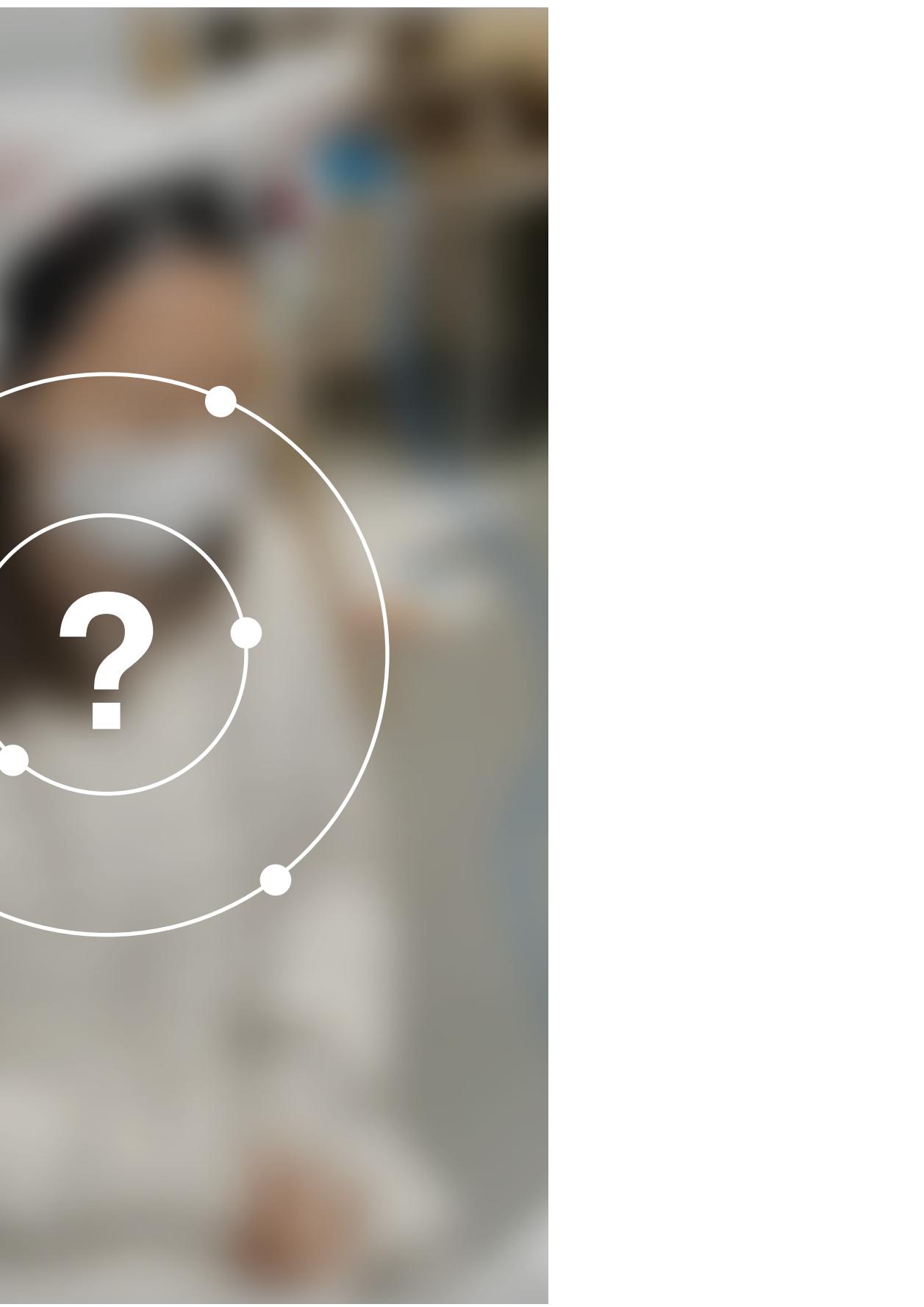
We went through brainstorming to generate creative ideas at the first meeting about our end-of-term project. We made our decision when discussing with our supervising teacher, who voted for a random idea mentioned by me.



Humans usually don't express their emotions naturally and directly.



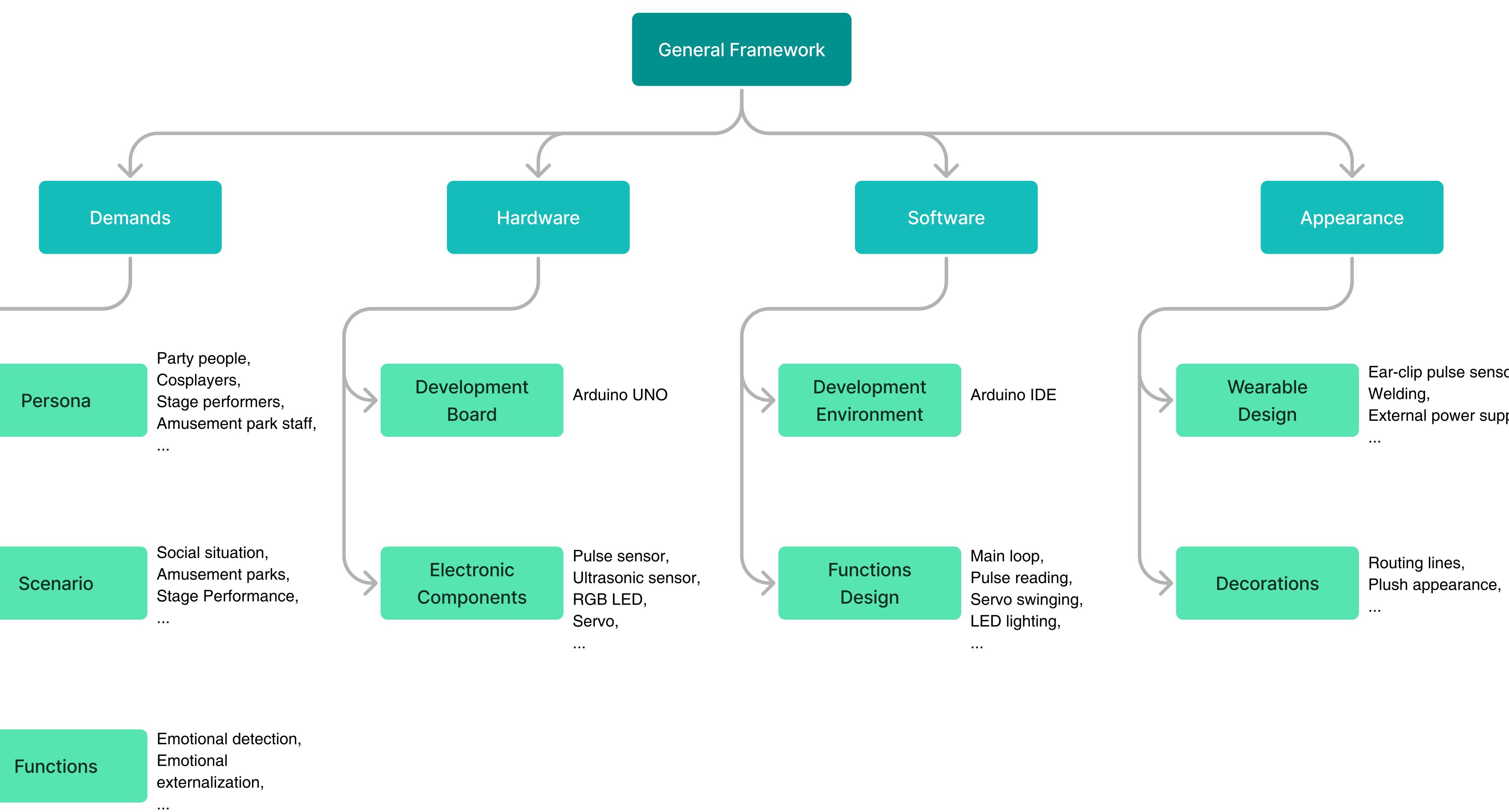
Animals, like cats, their feelings can be easily seen by their ears or tails.



What if humans have a pair of cat ears and it can react to their feelings?

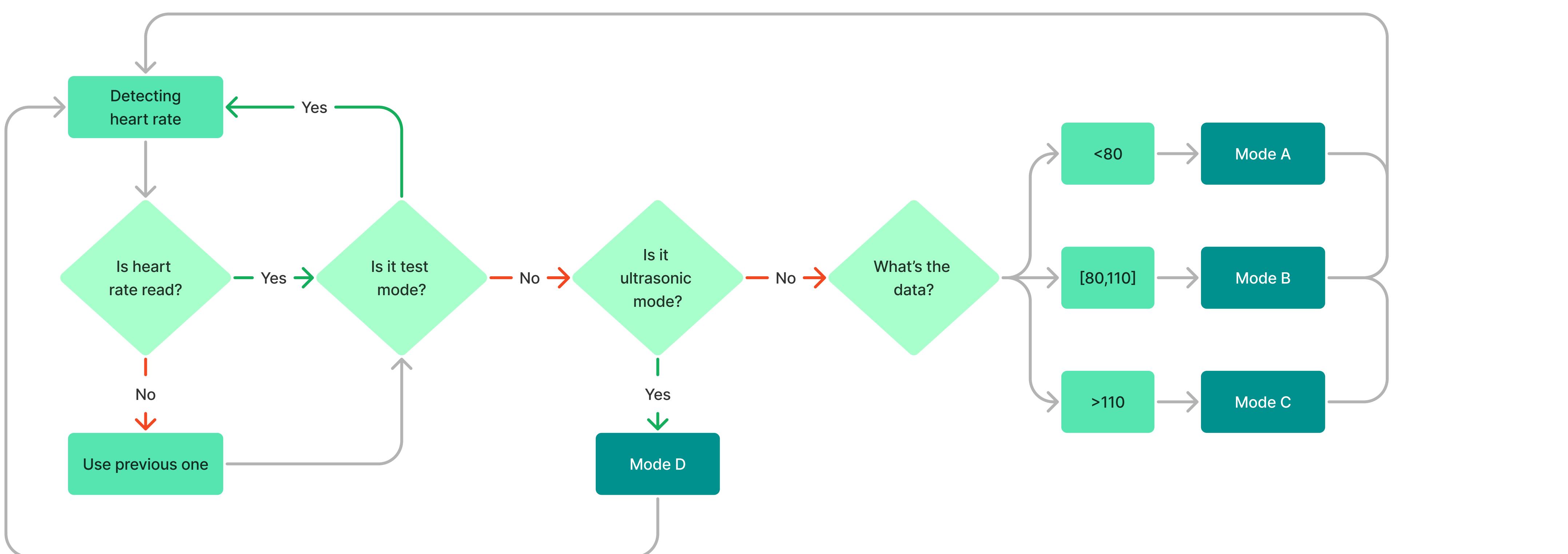
FRAMEWORK

As the end-of-term project of the course Fundamentals of Intelligent Open Source Hardware, this project focused more on technical parts. Before development, we built the general framework.



MAIN LOOP

From detecting the pulse to move the cat ears, several judgments are required, lead to four different modes, which are mode A, B, C, and D. The simplified main loop is as follows.



// Main Loop

```

74 ////////////// Main Loop ///////////
75
76 void loop() {
77
78     // Heartrate
79     BPM_current= AdjustPulseSensor();
80
81     if(BPM_current==0){
82         BPM_current=BPM_former;
83     }
84
85     if(count>10 && Ultrasonic()){
86         if(BPM_current<80){
87             sweep2();
88             show(0);
89         }else{
90             if(BPM_current<110){
91                 sweep1();
92                 show(1);
93             }else{
94                 swing();
95                 show(2);
96             }
97         }
98     }
99     BPM_former=BPM_current;
100
101 }

```

// Hearbeat Reading

```

104 // Heartrate
105 int AdjustPulseSensor(){
106
107     int BPM=pulseSensor.getBeatsPerMinute(); //PulseSensor
108
109     if(pulseSensor.sawStartOfBeat() && BPM<130 && BPM>50){
110         count+=1; //计数器
111         if(count<=5){
112             /*
113             * 经过多次试验观测得出，前5次测量数据(count 1~5)非常
114             */
115             Serial.print("Adjusting.....");
116             Serial.println(count);
117             Serial.println("-----");
118         }else{
119             if(count<=10){
120                 /*
121                 * 前5到前10次数据(count 06~10)作为测试数据，以得出
122                 */
123                 test_heartrate[count-6]=BPM;
124                 Serial.println("Testing.....");
125                 Serial.print("Test BPM:");
126                 Serial.println(BPM);
127                 Serial.println("-----");
128             }else{
129                 if(count==11){
130                     /*
131                     * 从第11次开始测量，数据可以正式使用
132                     */
133                     for(int i=0;i<5;i++){
134                         u+=test_heartrate[i];
135                     }
136                     u=u/5;
137                     Serial.print("Test finished!Your average hear");
138                     Serial.println(u);
139                     Serial.print("Your BPM:");
140                     Serial.println(BPM-u+IdealAverage);
141                     Serial.println("-----");
142                 }else{
143                     Serial.print("Your BPM:");
144                     Serial.println(BPM-u+IdealAverage);
145                     Serial.println("-----");
146                 }
147             }
148         }
149     }
150 }

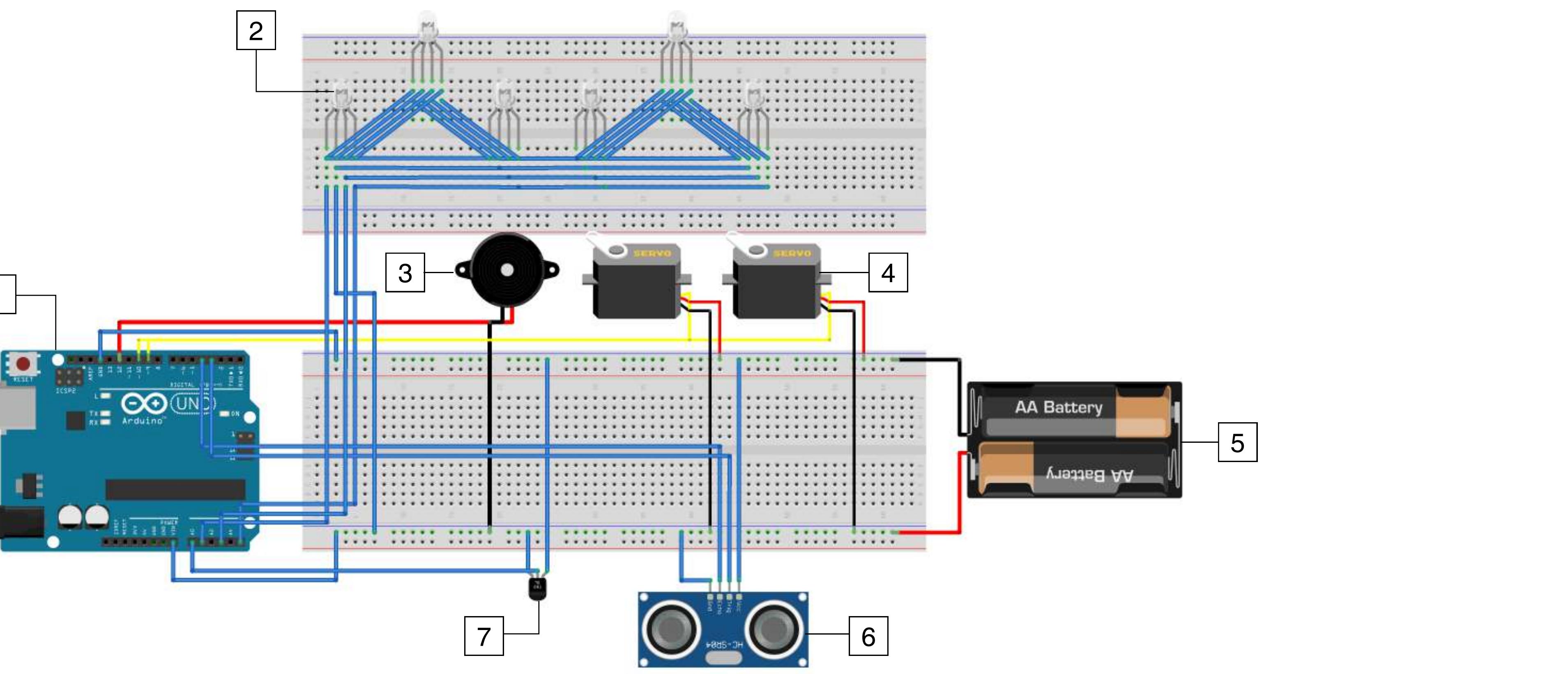
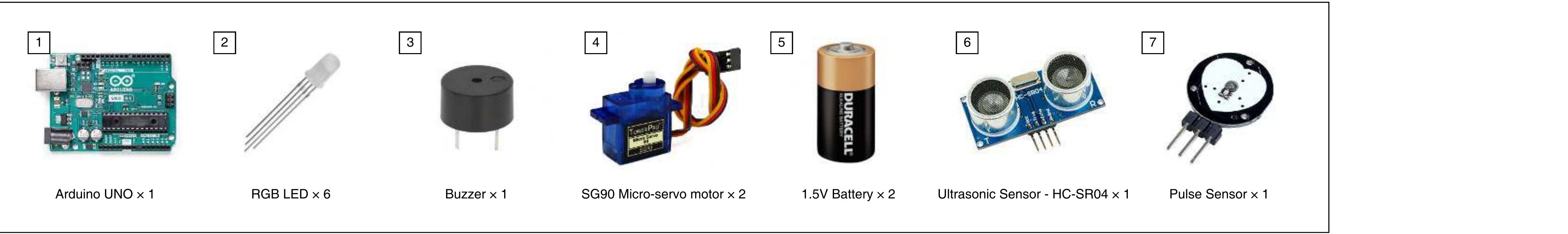
```

// Servo

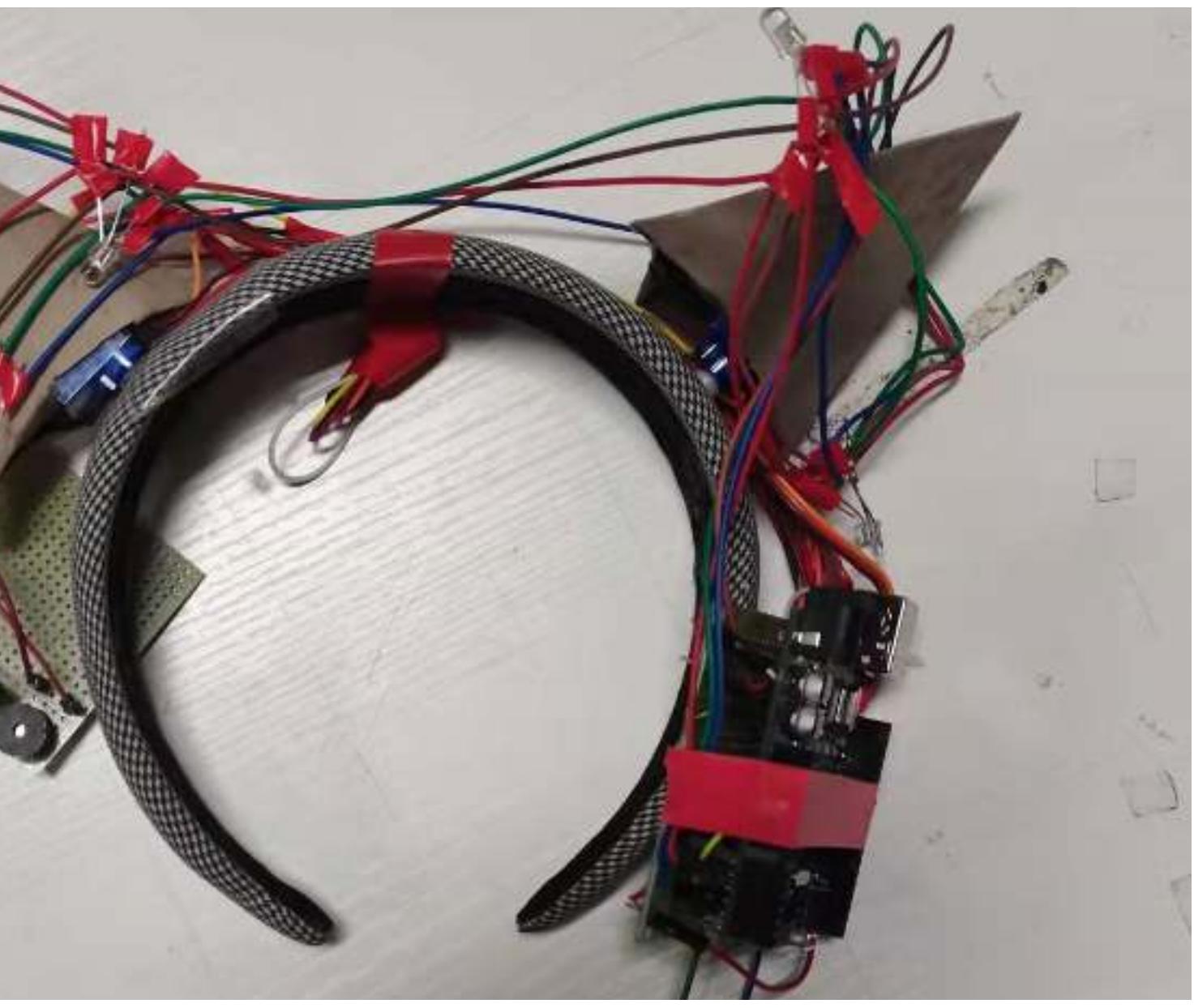
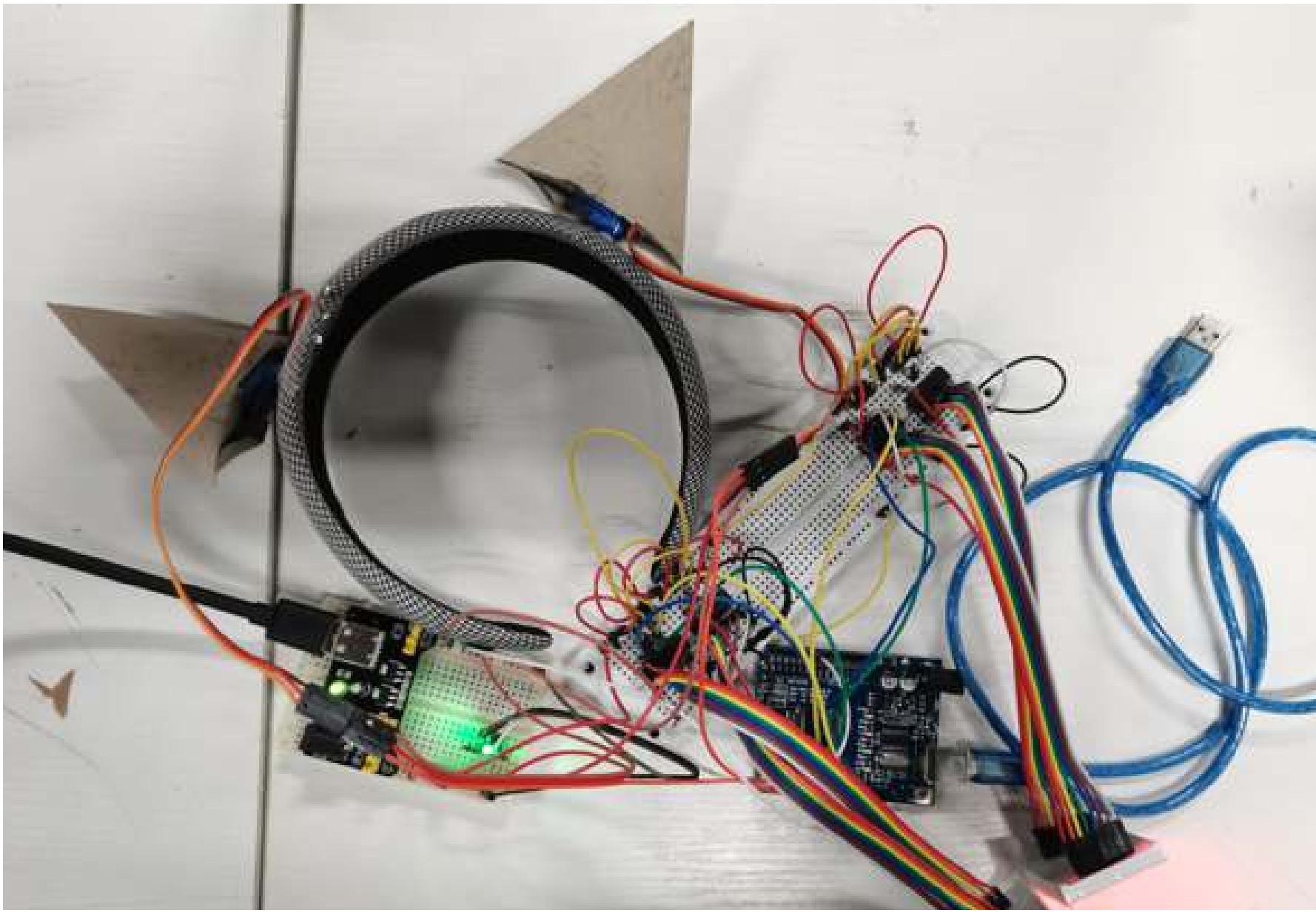
```

223 // Servo
224 void sweep2(){
225     for (pos = 0; pos <= 30; pos += 1) {
226         servo_10.write(pos);
227         servo_9.write(30-pos);
228         delay(15);
229     }
230     for (pos = 30; pos >= 0; pos -= 1) {
231         servo_10.write(pos);
232         servo_9.write(30-pos);
233         delay(15);
234     }
235 }
236
237 void sweep1(){
238     for (pos = 0; pos <= 30; pos += 3) {
239         servo_9.write(pos);
240         servo_10.write(30-pos);
241         if(pos==30){
242             ||| delay(1000);
243         }
244         delay(15);
245     }
246     servo_9.write(0);
247     servo_10.write(30);
248 }
249
250 void swing(){
251     for (pos = 30; pos <= 90; pos += 15) {
252         servo_10.write(pos);
253         delay(500);
254     }
255     for (pos = 90; pos >= 30; pos -= 15) {
256         servo_10.write(pos);
257         delay(500);
258     }
259 }

```



Hardwares & circuit - EmoEar



Process - EmoEar

INSTRUCTIONS

1 RGB LED

Three RGB LEDs for each ear. Each mode has its own color.

2 Frame of the Cat Ear

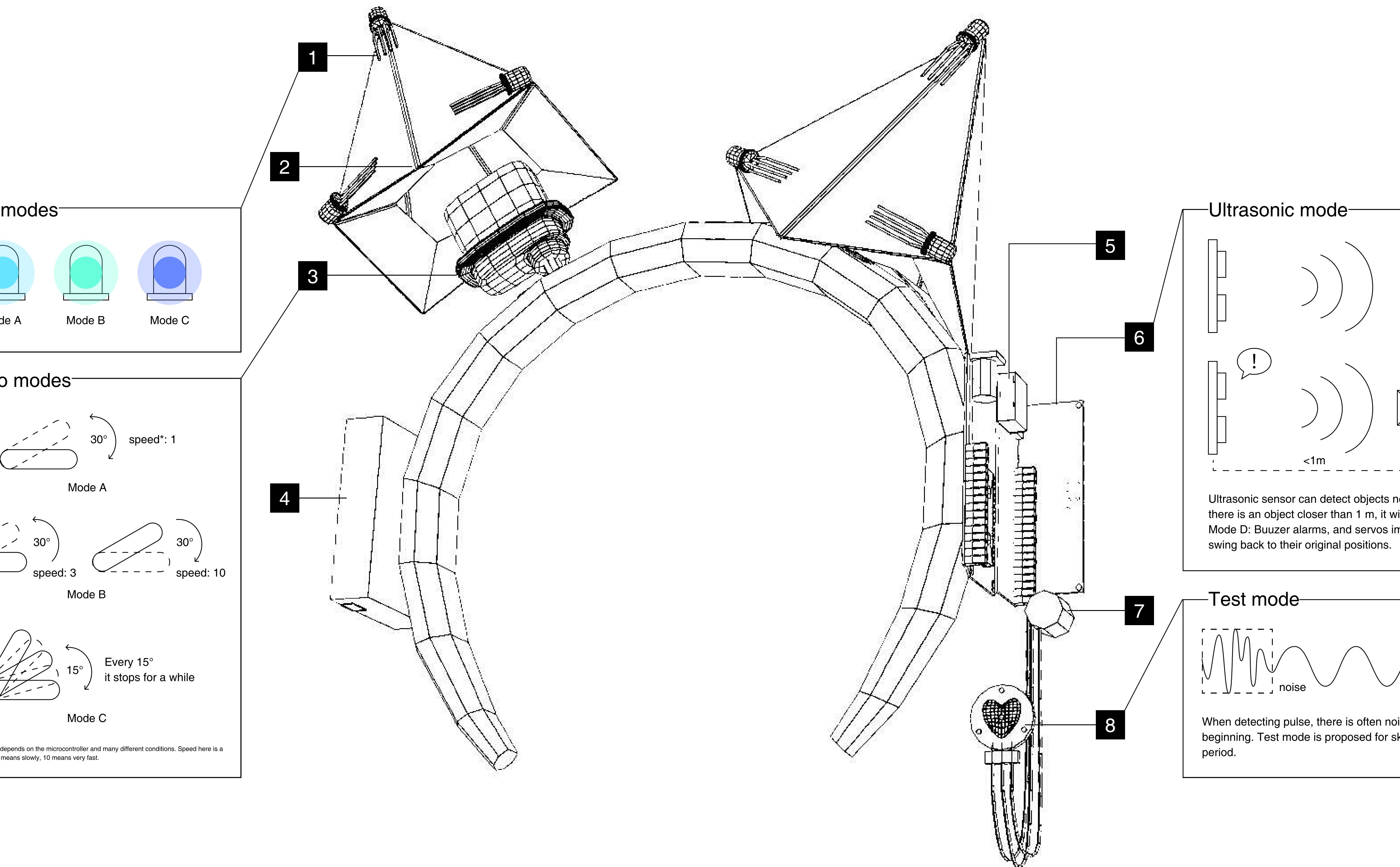
There are two layers. The first layer is made of cardboard with LED lights fixed on it. The second one is a plush decoration, which is not shown in this graph.

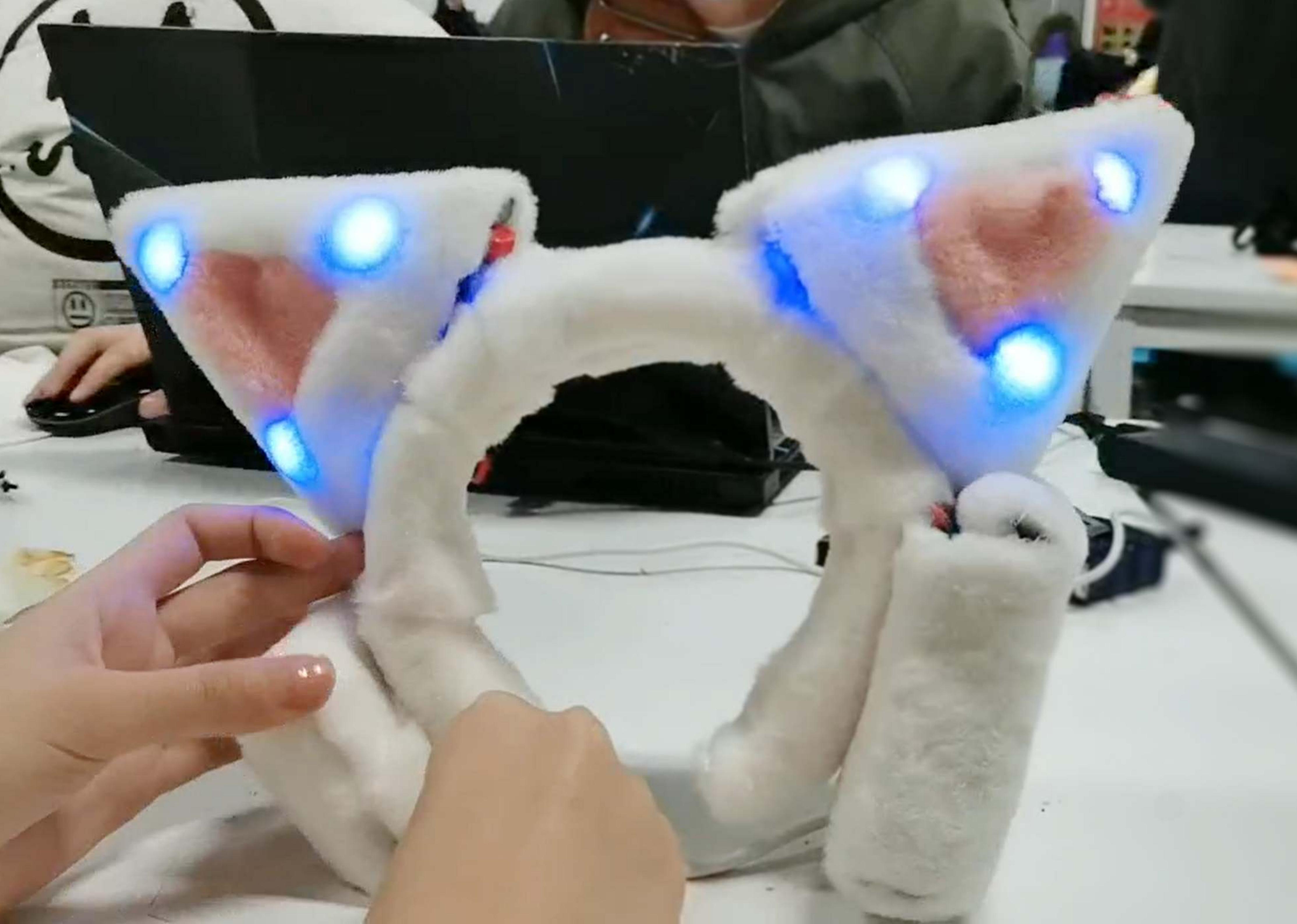
3 Servo

To swing the ears. Each mode has its own swinging mode.

4 Batteries

For power supply. Use two 1.5V batteries installed in the battery box.

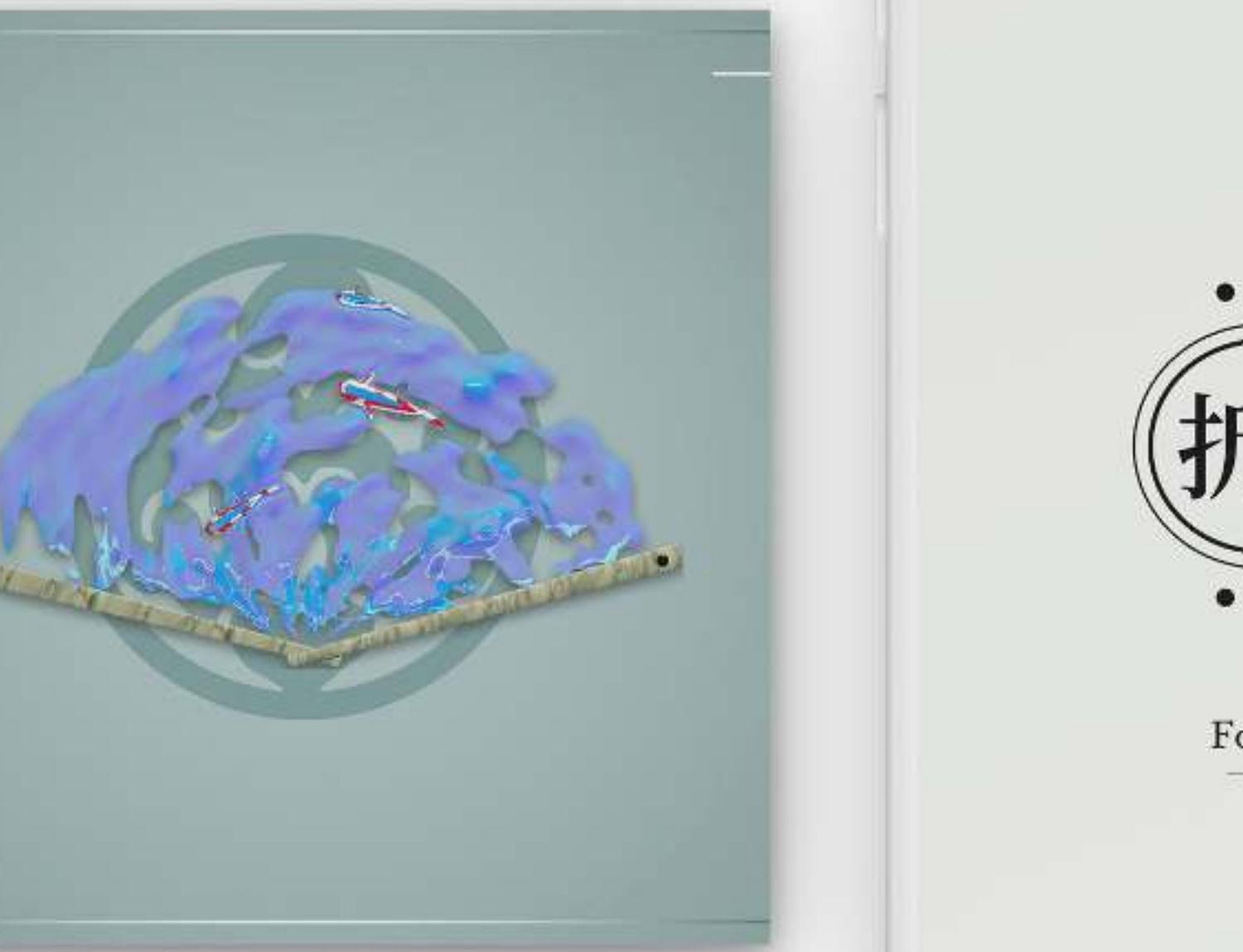




Check our demo video here:

<https://youtu.be/fKMHX68eHgI>

03



Four Seasons Fans

AR App Development

My Roles

Coding, modeling, UI designing

Members

Jiaqi Tan, Yunhua Tan, Jiaqi Zhang, Liwen Yi, Yi Deng

Start and end

2023.03-2023.04

Introduction

"Four Seasons Fans" is a Unity-based AR mobile app that lets users appreciate our meticulously designed folding fan models, each representing the beauty of a different season. Through innovative use of augmented reality (AR) technology, you can view and interact with these models in the real world.

PROPOSAL

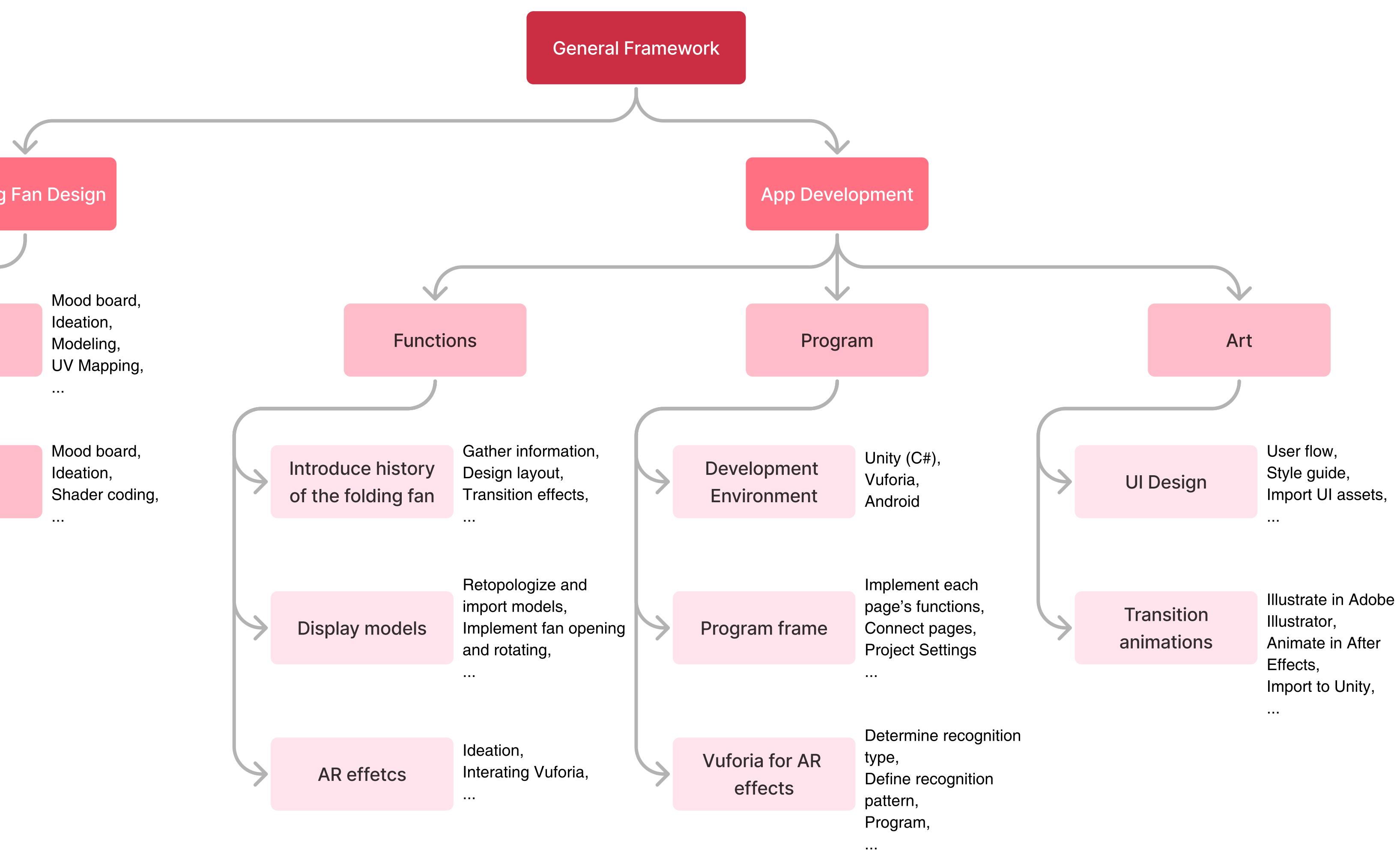
We wanted to merge traditional Chinese culture with cutting-edge technology, so after brainstorming, we had the idea of creating an AR folding fan project to showcase the beauty of the seasons.



The folding fan, an essential part of Chinese traditional culture, carries rich cultural and historical value. Beyond its utilitarian function as a cooling device, it also served as a canvas for artistic expressions in ancient China. Furthermore, the four seasons have held a pivotal role in Chinese art for centuries. This has ignited our curiosity: What if we were to harness modern technologies, such as shaders, to craft contemporary fan art and bring it to life through the immersive medium of AR?

FRAMEWORK

Before diving into design and development, we laid the foundation by constructing the overall framework. This framework outlined the specific techniques and tools we would be employing in the project.

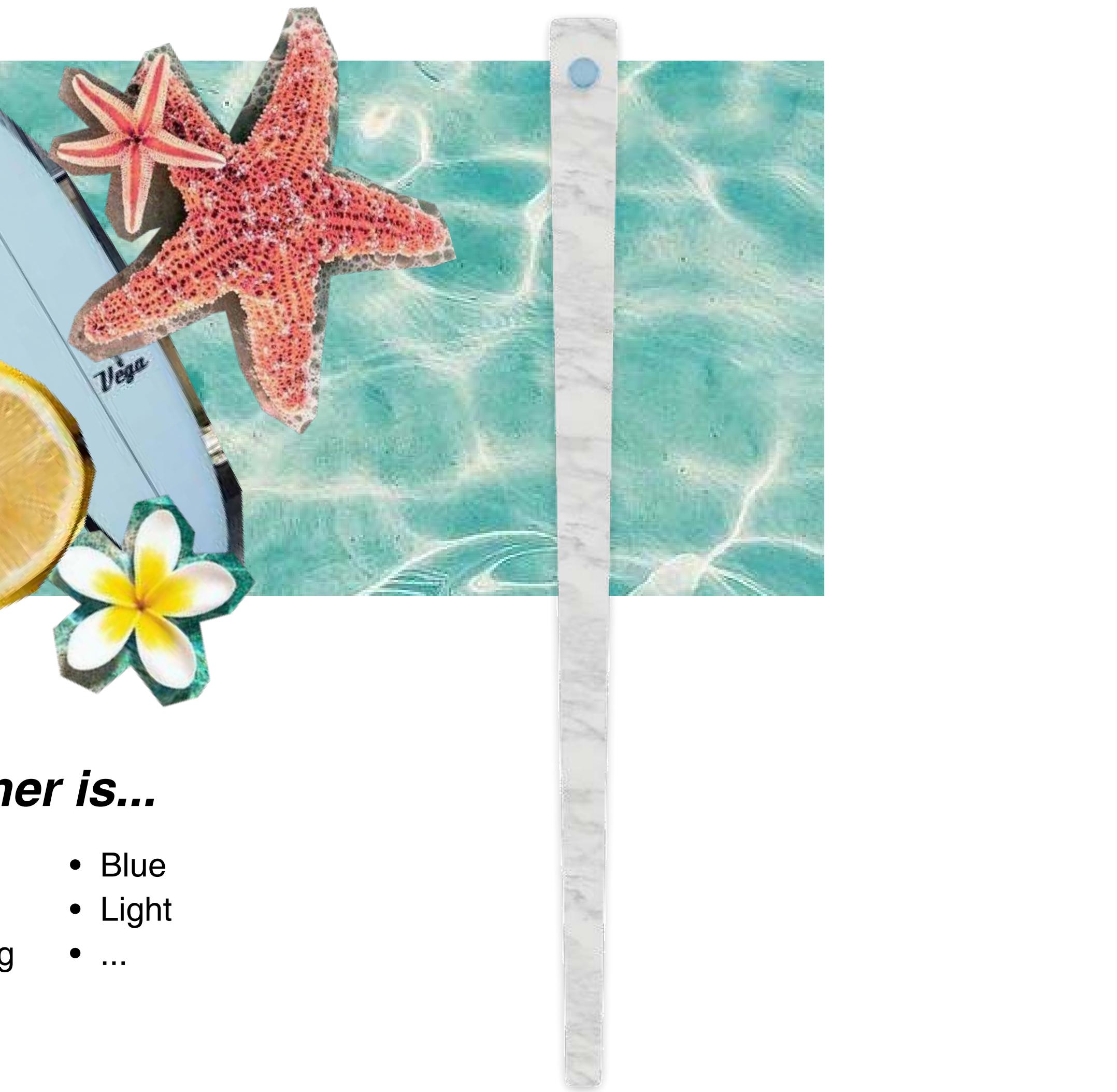


FAN HANDLE DESIGN



Spring is...

- New life
- Vines
- Bud
- Pink
- Flowers
- ...



Summer is...

- Sea
- Blue
- Water
- Light
- Surfing
- ...



Autumn is...

- Maple
- Pumpkin
- Warm
- Red
- Cozy
- ...

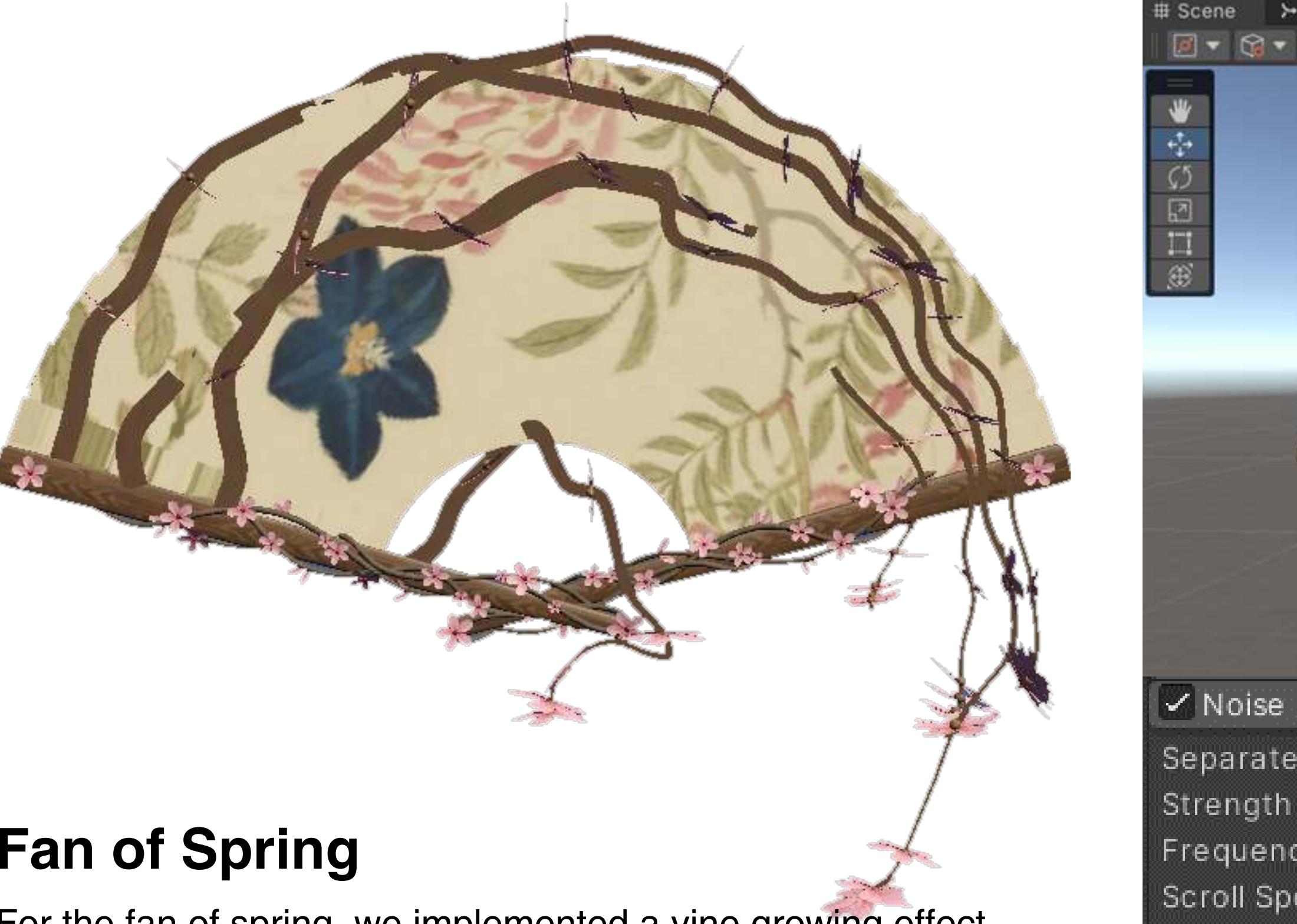


Winter is...

- Snowy
- Lifeless
- Icy
- Grey
- Cold
- ...

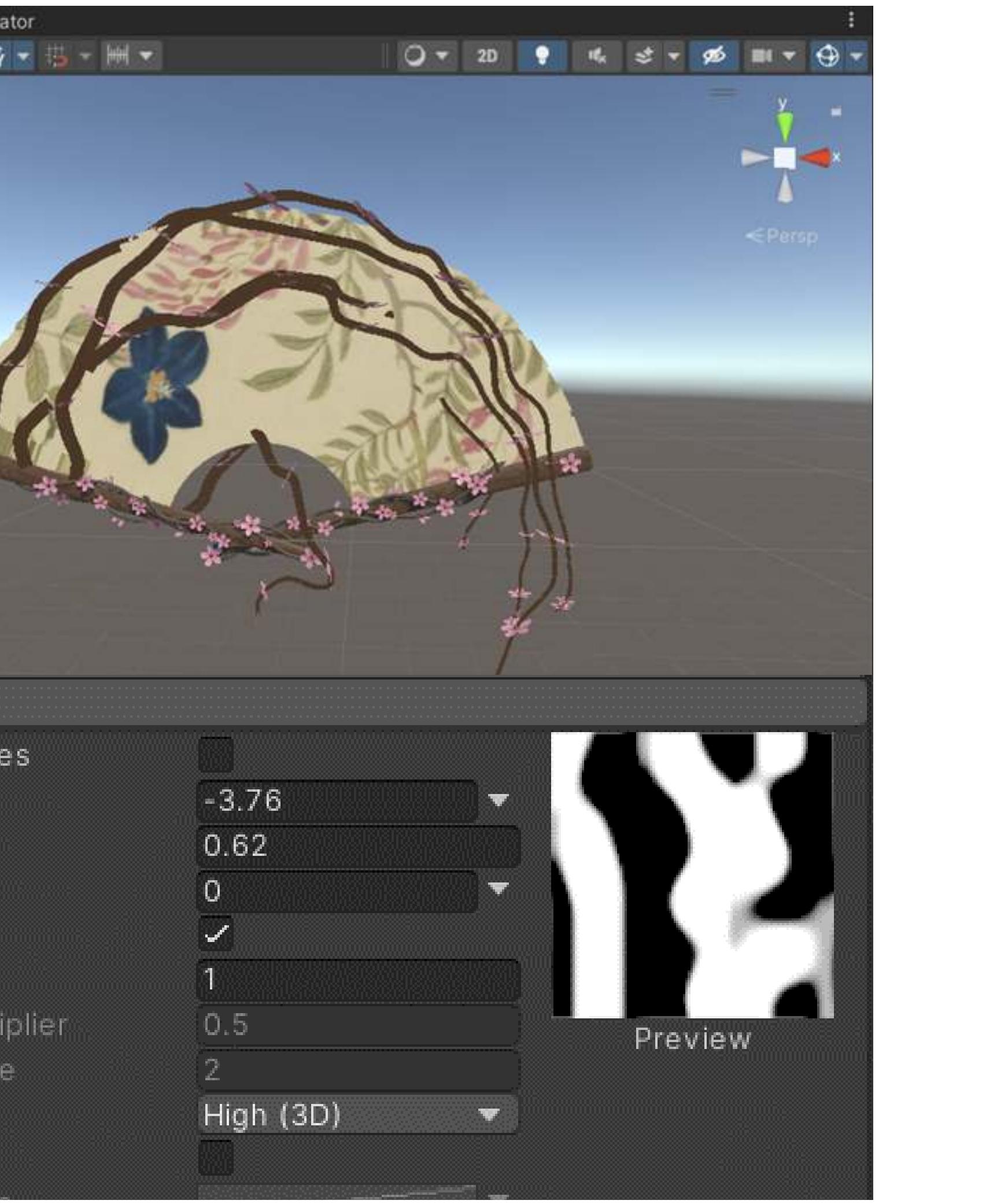
The folding fan can be roughly divided into two parts: the handle and the fan face. For the handles, I created mood boards for each season and then used Blender to model them.

FAN FACE DESIGN



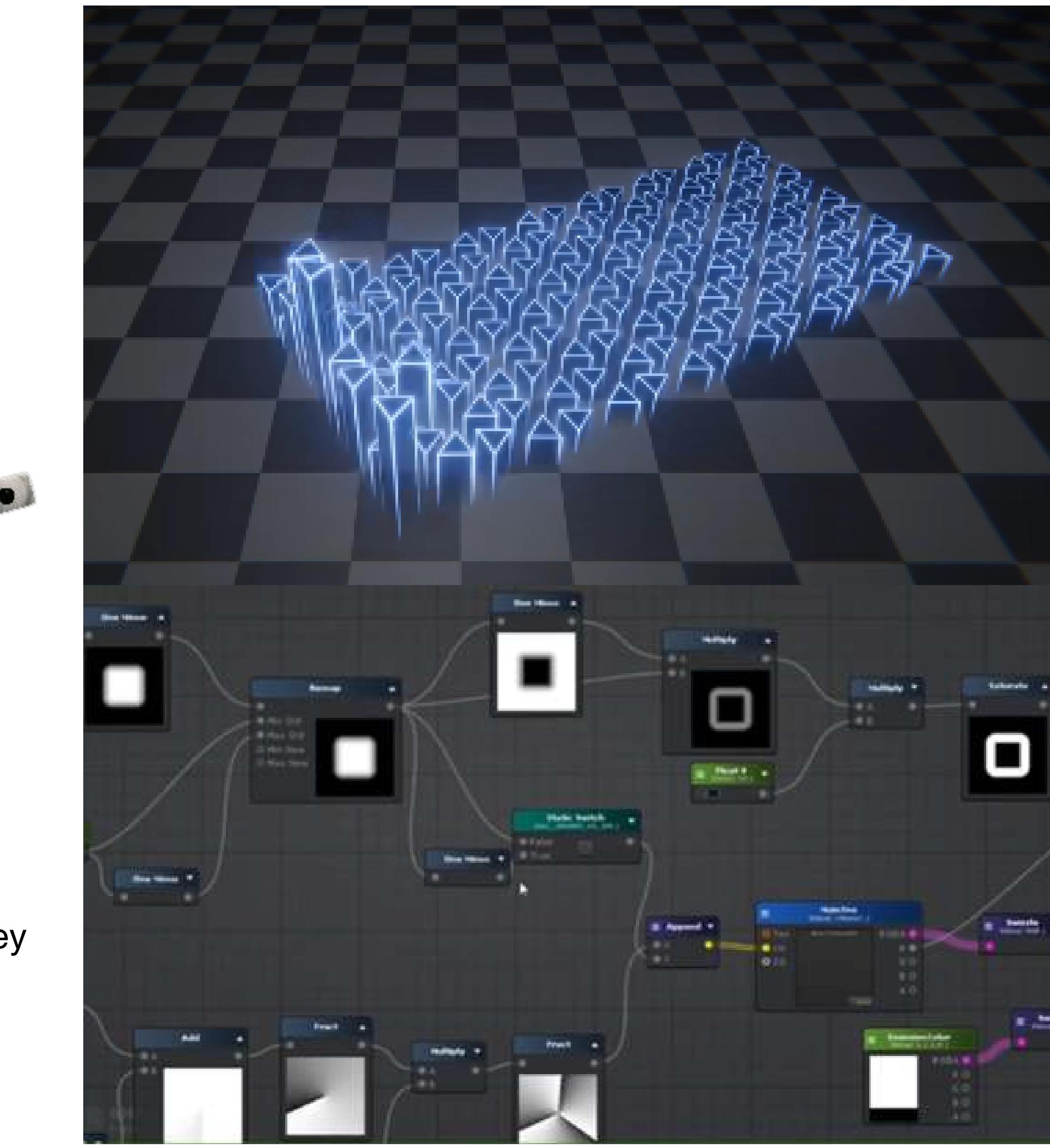
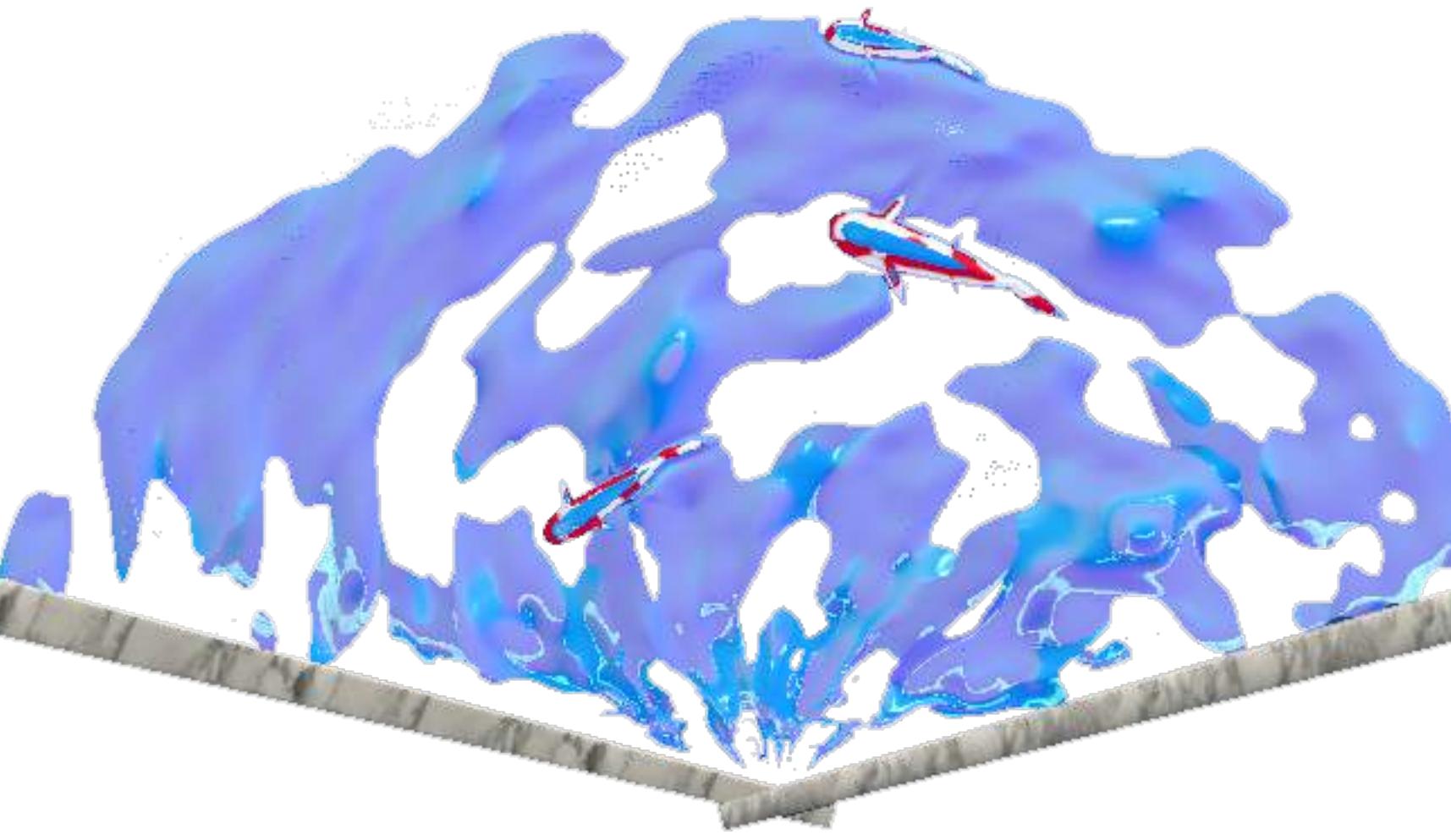
Fan of Spring

For the fan of spring, we implemented a vine growing effect, using particle system. Through adjusting parameters, we could define vine's shape, material, growing speed and so on. The top-right image shows our testing process, and the bottom-right image is one of the parameters called "Noise", which defines the degree of distortion of vines.



Fan of Summer

For our summer-themed fan, we envisioned a water-based design. Crafting this water fan involves complex processes like UV flow, mask testing, polar coordinate rotation, and more. A key element is the time-controlled UV flow, which enables us to simulate water flow. The top-right image illustrates this UV flow, while the bottom-right image displays polar coordinate shader connections created with a mask for the fan shape.



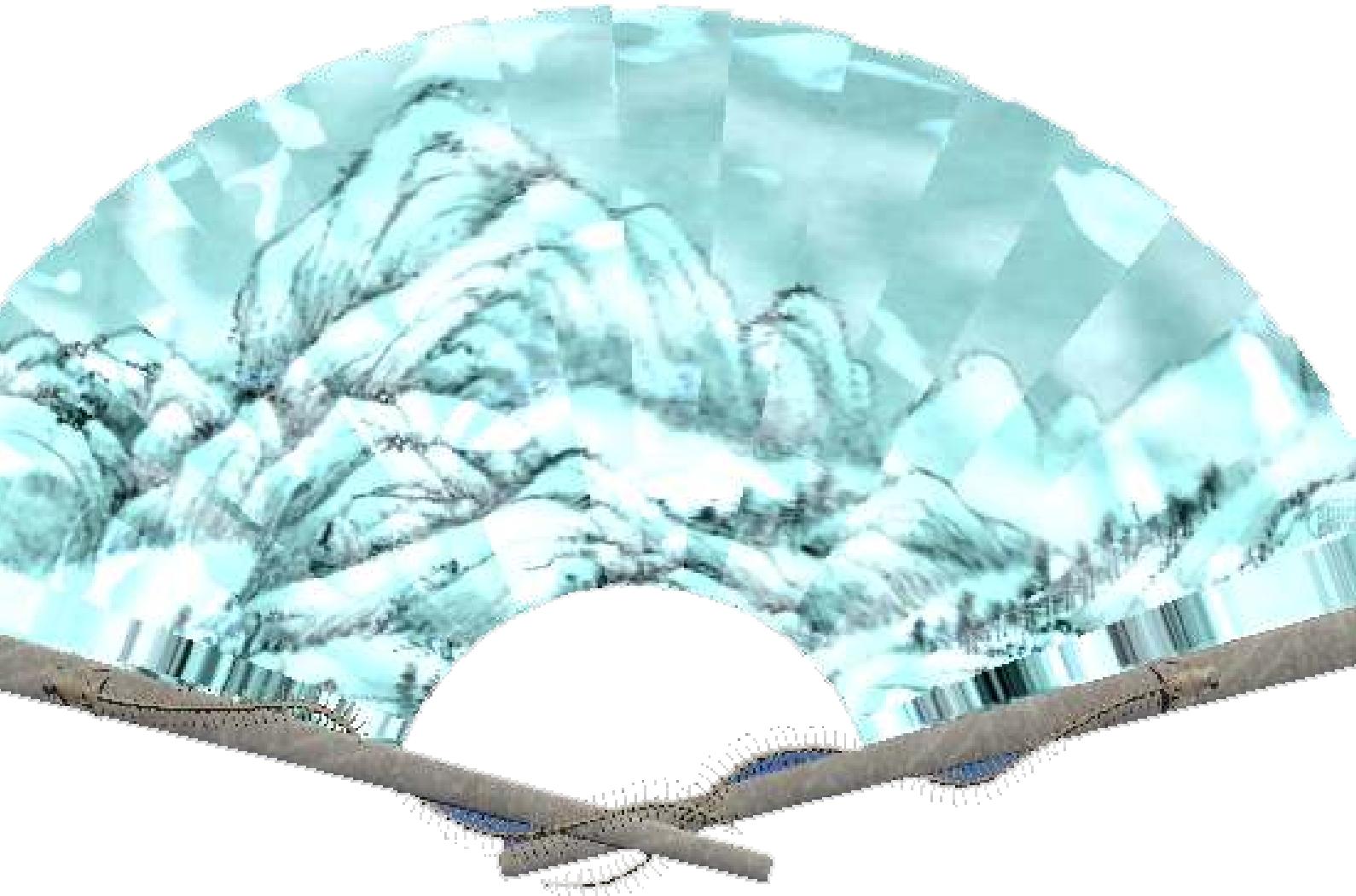
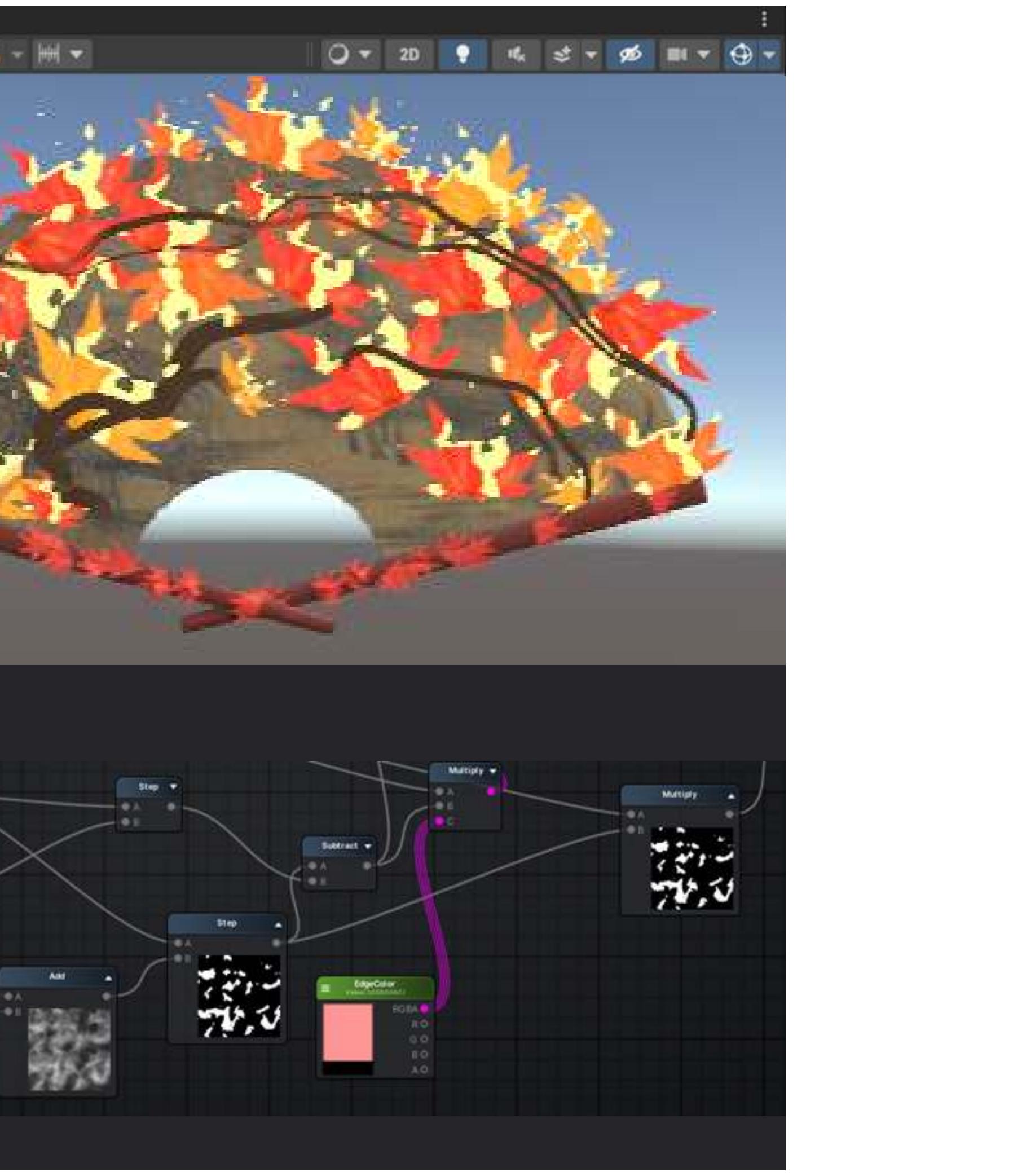
Spring & Summer

FAN FACE DESIGN



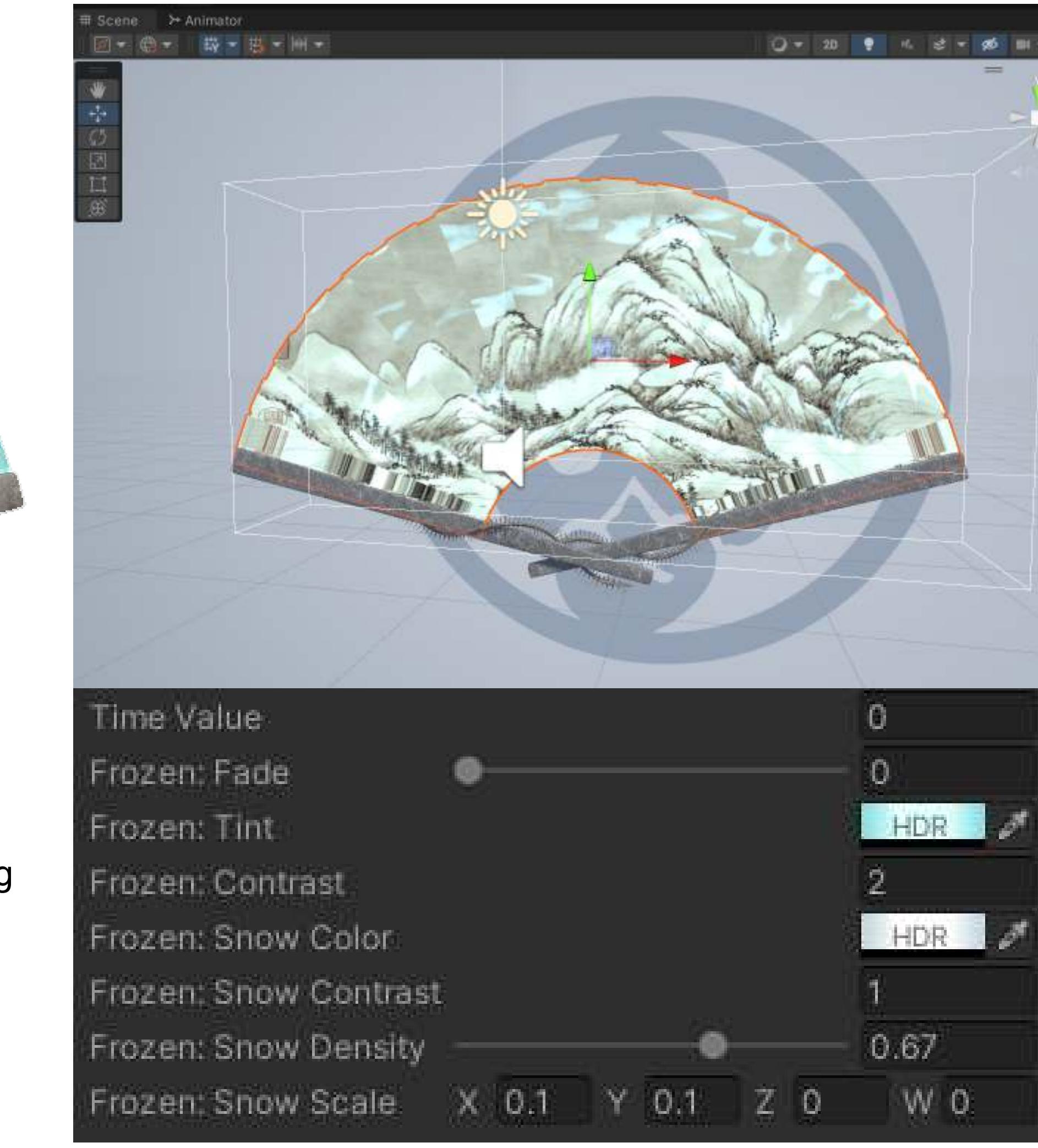
Fan of Autumn

Thinking of the Autumn Fan brings to mind one adorned with maple leaves. Its creation has two parts: growing the maple leaves, similar to the Spring Fan using a particle system, and the falling and withering of leaves. We employed a shader script to achieve a rim dissolve material, simulating leaf burn. The top-right image displays the rim dissolve effect, while the bottom-right image presents shader connections.



Fan of Winter

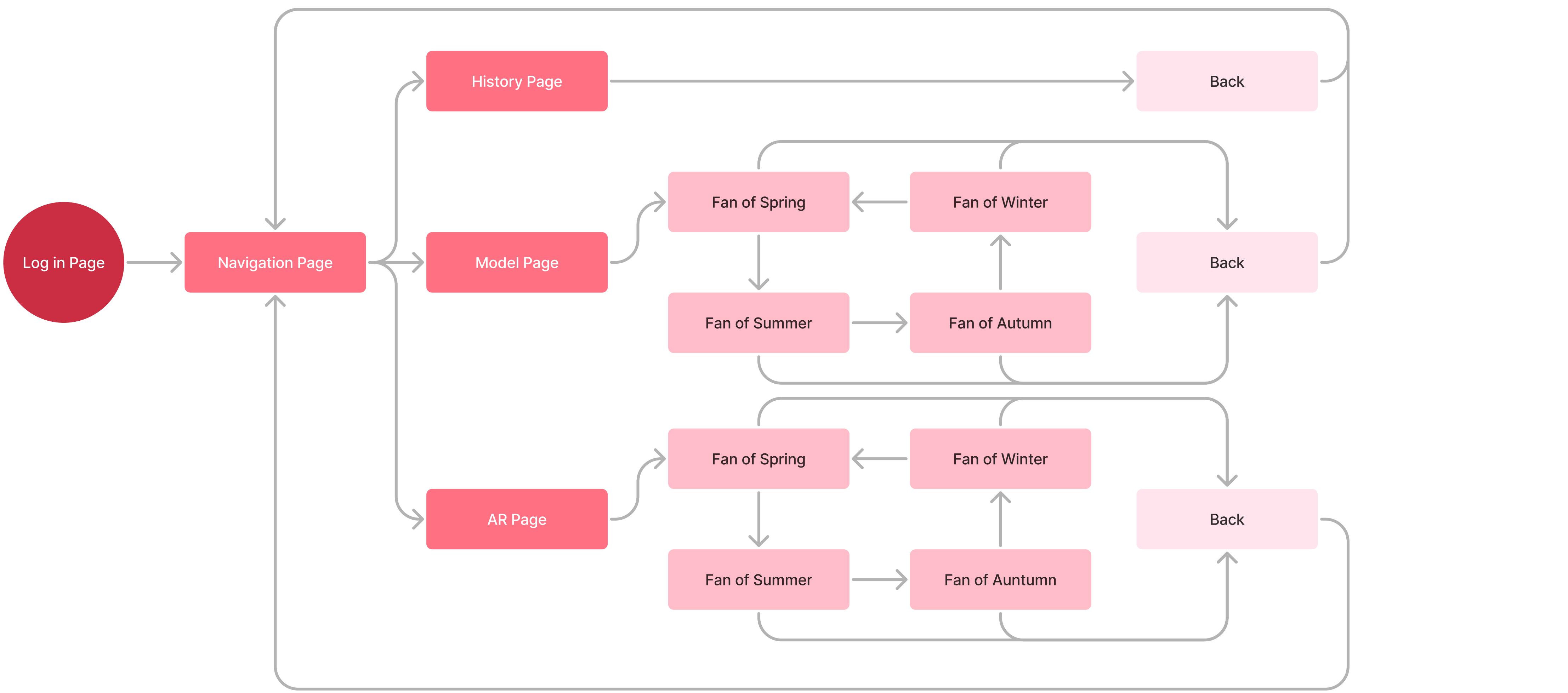
The Winter Fan concept is simple: we wanted to make a freezing fan. To achieve this, we added an ice material over the original fan surface. By adjusting the material's opacity, we created a gradual freezing effect. The top-right image shows a partially frozen fan, and the bottom-right image provides details on the parameters involved.



Fan Face Design - Four Seasons Fans

USER FLOW

Building upon the established framework, we conceptualized the user flow for our application. This guided our construction of pages.



UI ASSETS

For UI design, we first created a UI style guide, which defined the logo, colors, and typography. Based on the style guide, we produced UI assets, illustrations, and animations, some of which are incompletely displayed due to page constraints.

logo



Buttons



Background



Colors



Typography

思源宋体

粗体 · 半粗 · 常规



AR EFFECTS

Live Demostration



1.Detect

Open camera, point it at the target object. Vuforia will automatically recognize the target object, and once recognized, it will proceed to execute the following program.

2.Display

In our scripts, the model is displayed over the target object, maintaining a consistent spatial alignment, creating the illusion of it being present in the real world.

3.Interact

You can open and close the fan with the "Open/Close" button, and switch between models using the left and right arrow buttons.

We employed the Unity library Vuforia for AR effects. Vuforia simplifies AR implementation by selecting recognition types, uploading images, and downloading Unity packages from its official website.

Demostration Screenshots

Check our demo video here:
<https://youtu.be/k5dn5lYgzTl>





04

Escape

First-Person VR Game Development

My Roles	Game designer, story writer, artist, programmer
Members	Jiaqi Tan, Yunhua Tan, Jiaqi Zhang, Liwen Yi, Yi Deng
Start and end	2023.04-2023.06
Introduction	Escape narrates the journey of the protagonist as he confronts his inner fears and, ultimately, finds reconciliation with himself. We conducted a series of experiments with various technologies to craft a non-Euclidean world within this game. Escape is built using Unity, and VR is supported by PICO 4.

GAME STORY

This is a tale of redemption born from tragedy

Two brothers served as sailors aboard an ocean freight ship, but tragedy struck when a shipwreck claimed the life of the younger sibling. From that moment onward, the elder brother was burdened by remorse, haunted by the decision to prioritize his own survival over that of his brother.

The shipwreck left him grappling with severe Post-Traumatic Stress Disorder(PTSD), plunging him into recurrent nightmares. In these dreams, he continually tried to escape the sinking vessel, dashing through successive doors, yet he remained ensnared. His psyche was ensnared by the events of that fateful night. With the unwavering support of friends and family, he embarked on a journey of psychological healing and, guided by the psychotherapist, he once more delved into the realm of dreams. This time, he was determined to find a path towards redemption.

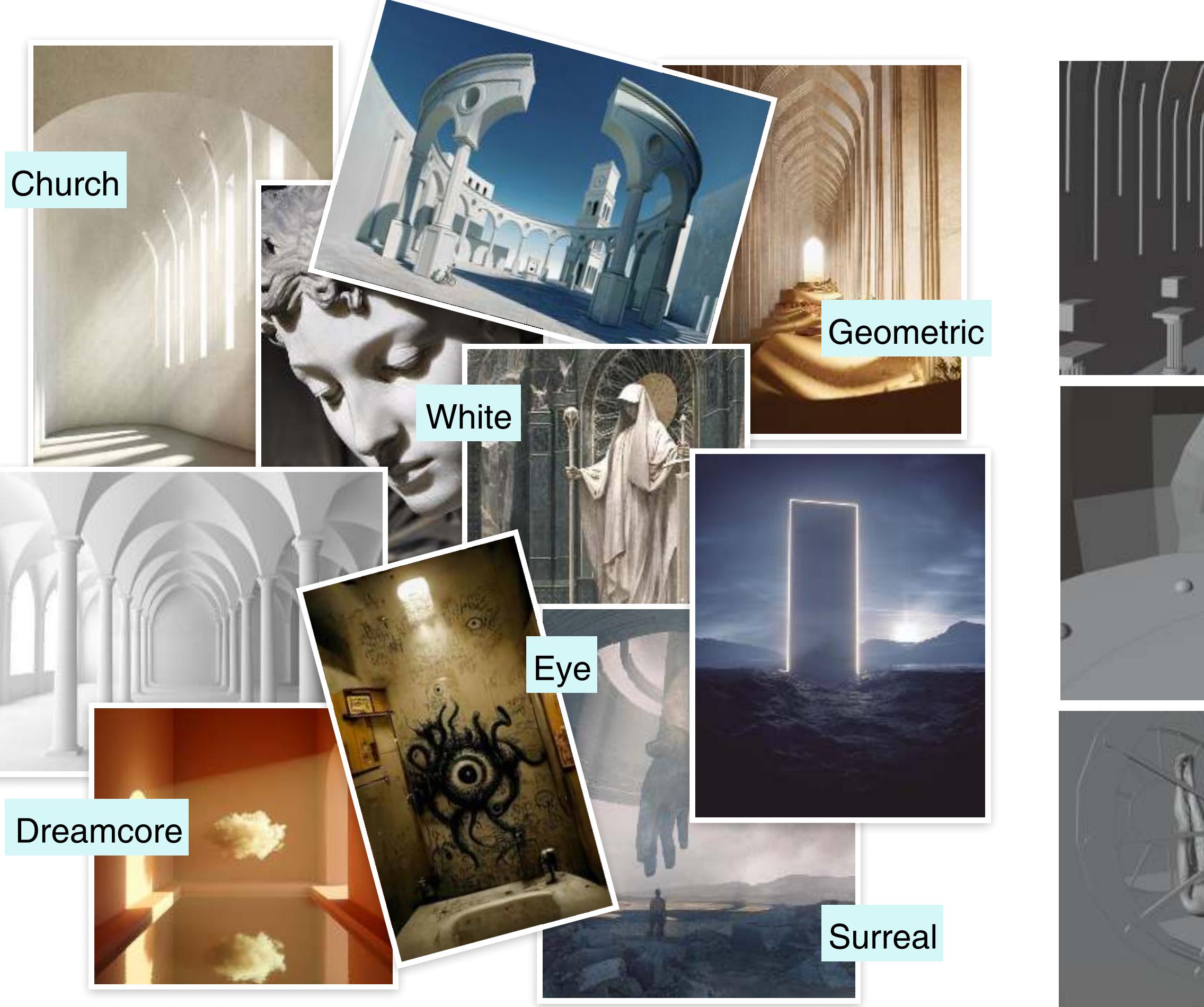
Escaping through successive doors

The core of the game lies the concept of "escaping through doors." In this dreamlike realm, we break free from the confines of traditional spatial rules, introducing a range of non-Euclidean spaces and gameplay mechanics. Players are tasked with employing their creativity and intelligence to uncover clues while gradually delving into the depths of the protagonist's inner world. Originally conceived as a course assignment, this project is still in development.

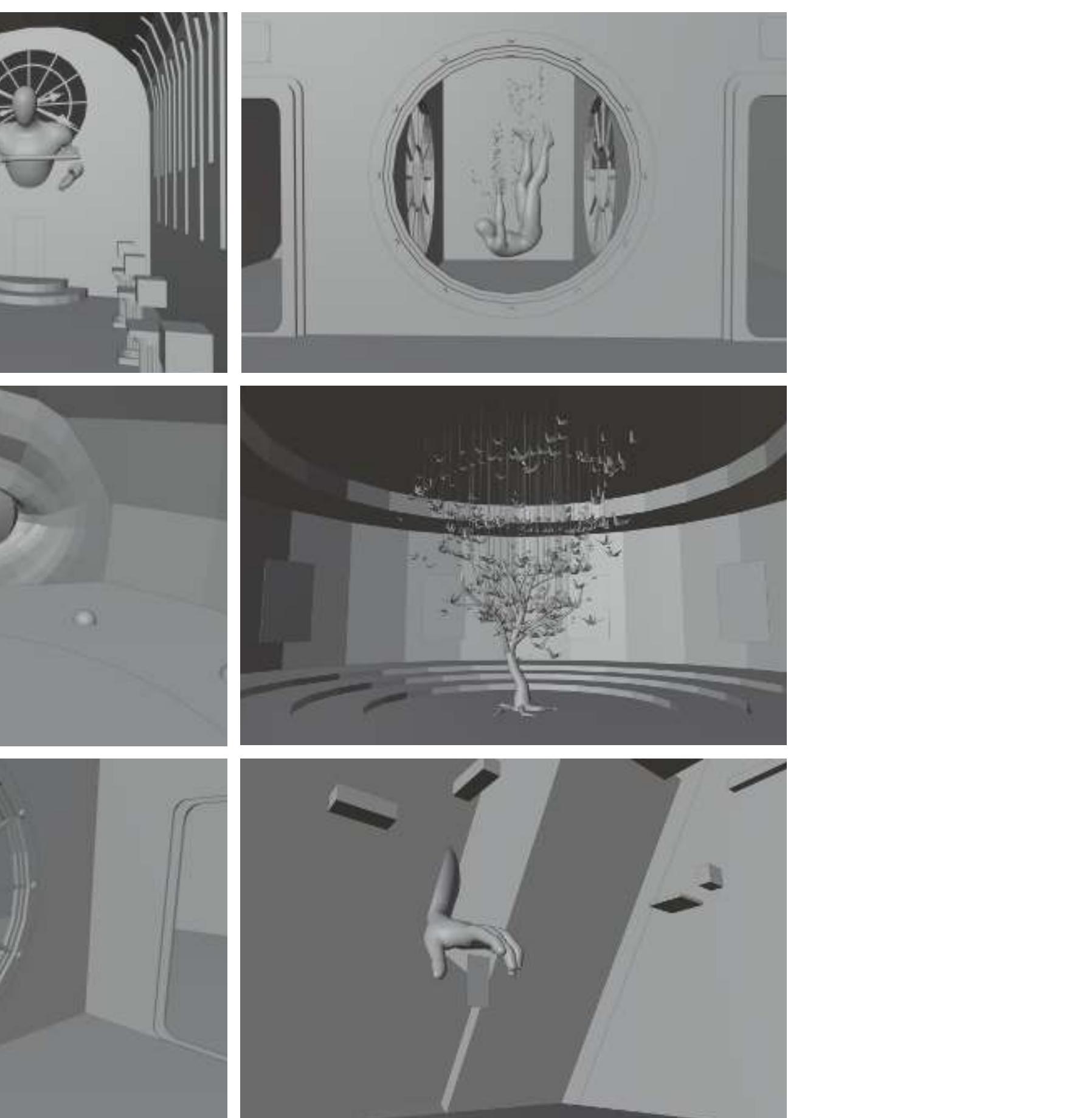
“Salvation lies within.”
—The Shawshank Redemption (1994)

GAME ART

Concept

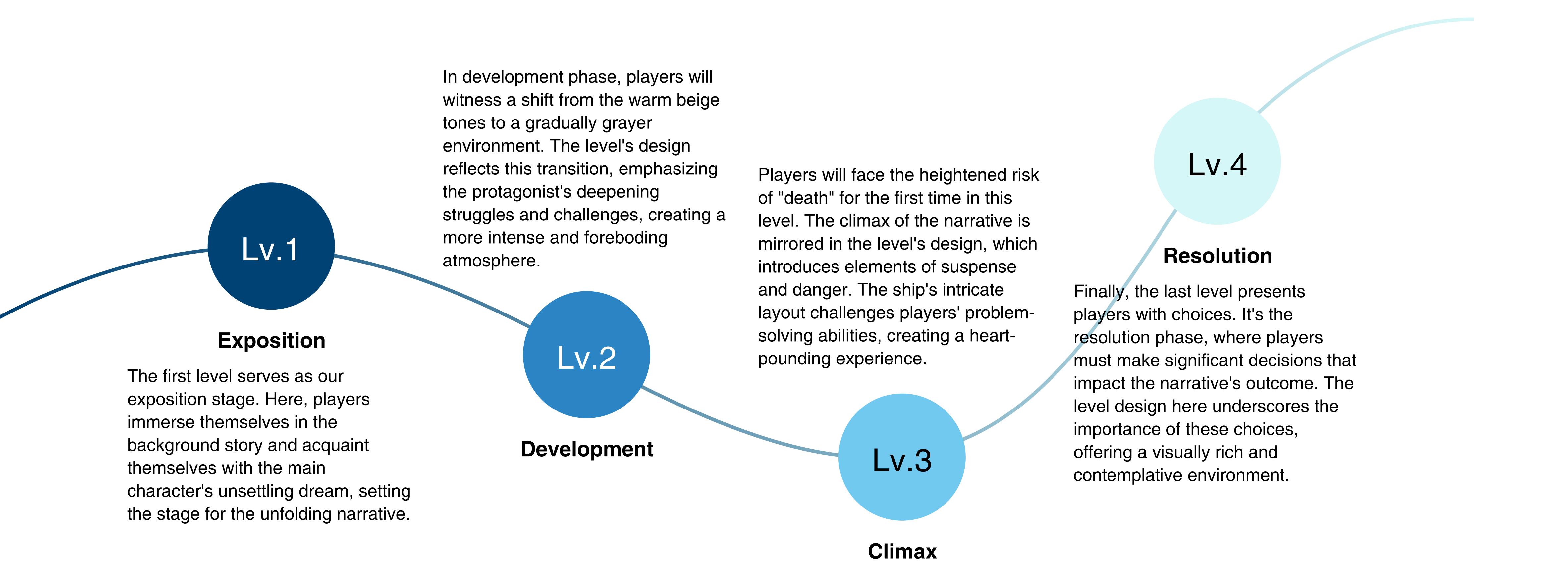


Grayboxing



LEVEL DESIGN

We have meticulously crafted a four-level journey, each serving a distinct role in the narrative pacing, reflecting the structure of exposition, development, climax, and resolution.

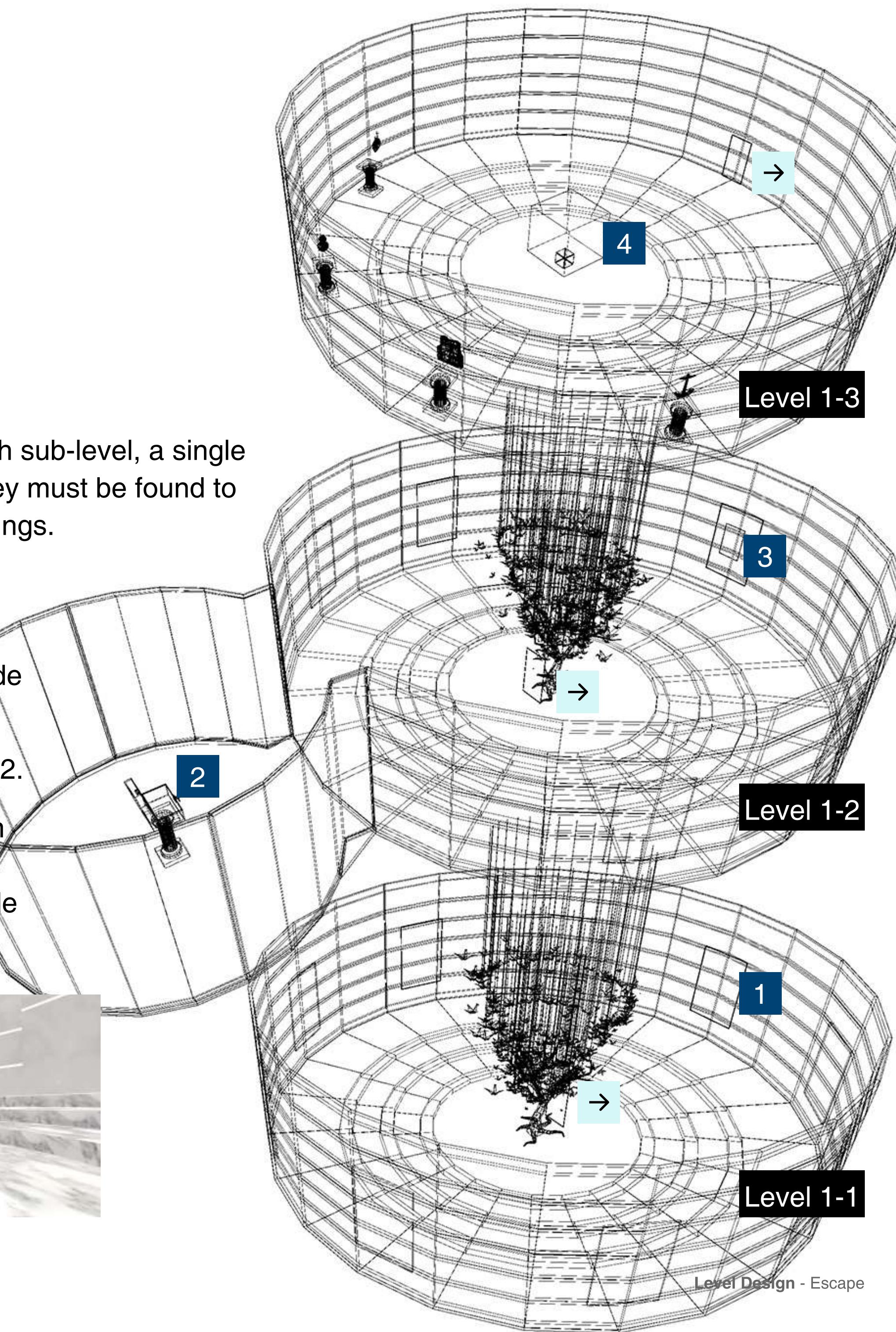


LEVEL 1

Gallery: The Key Inside Paintings

The first level is set in an art gallery, with three sub-levels. In each sub-level, a single door serves as both an entrance and exit, but upon entering, a key must be found to reopen it. The main gameplay involves retrieving keys from paintings.

- 1 Players need to extract the key from the painting to open the door of level 1-1.
- 2 The painting which had the key in level 1-1 can be found inside this box.
- 3 Put the painting back to its position and you can pass level 1-2.
- 4 This is an empty box that appears different when viewed from each of its four sides. By placing objects from the four pillars into the box and using deduction, you can obtain the passcode to clear the level.

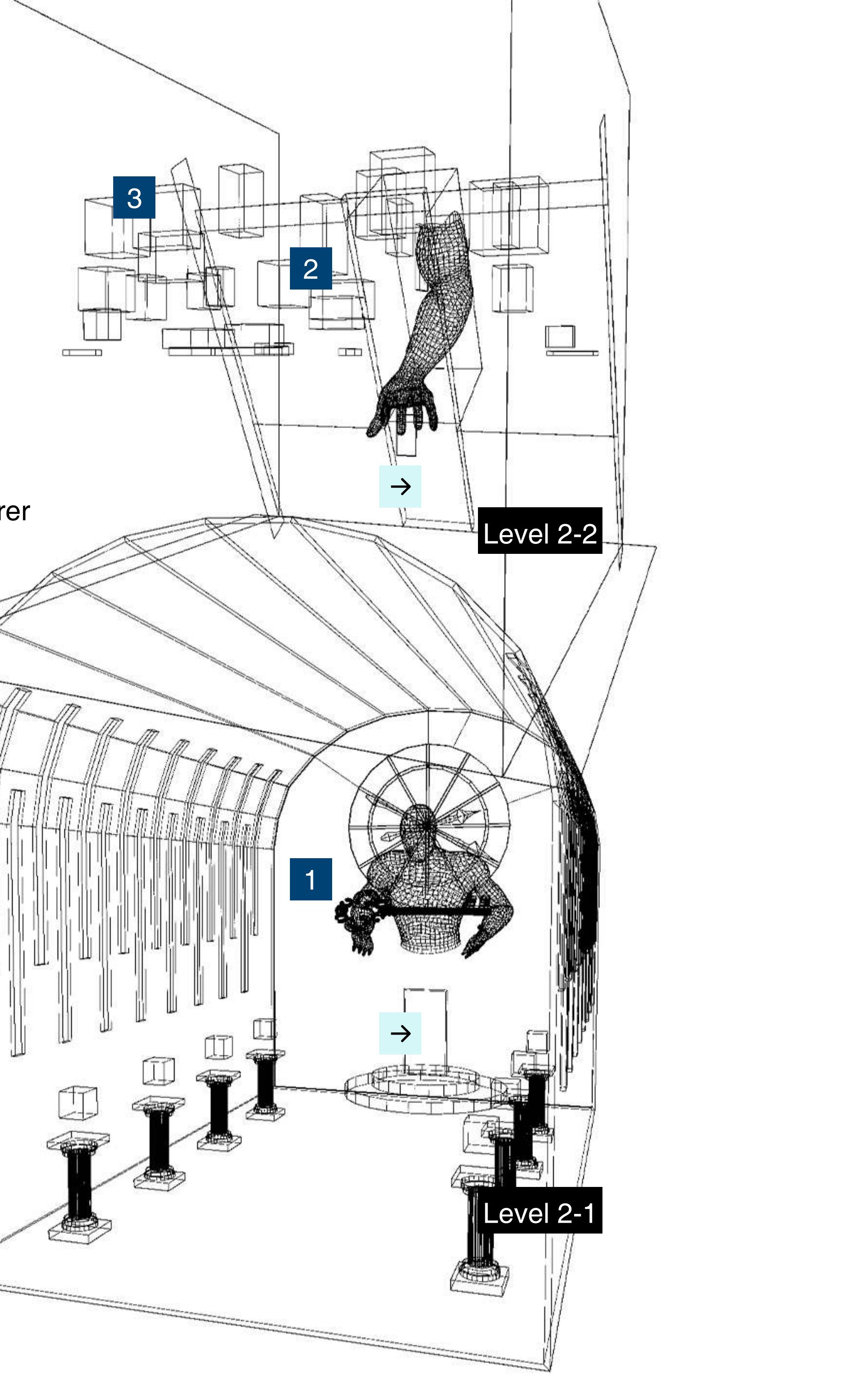
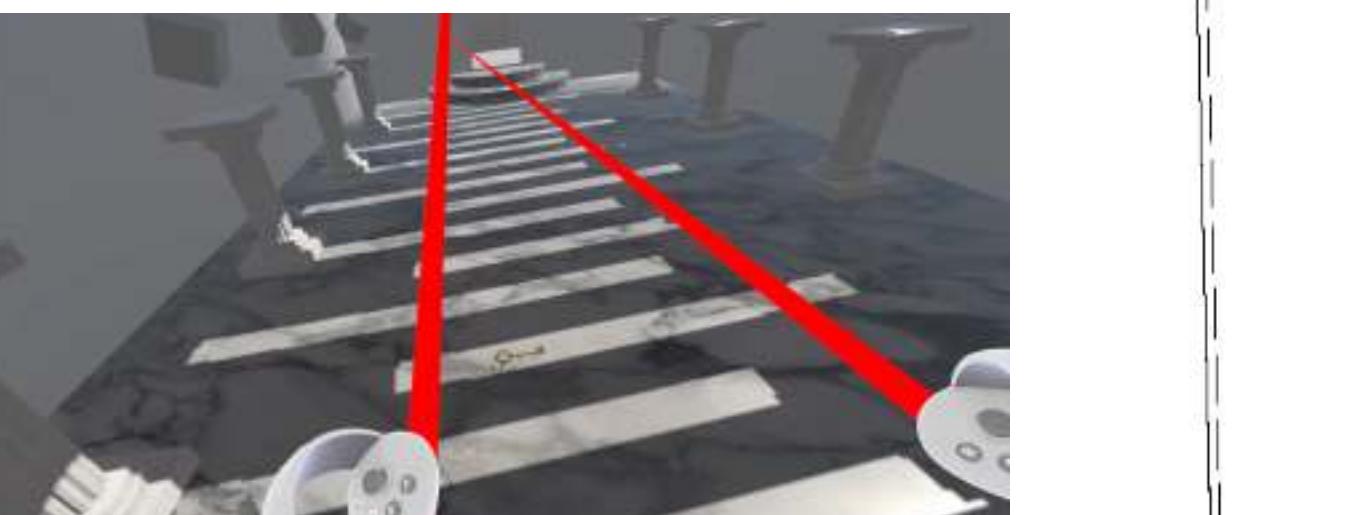
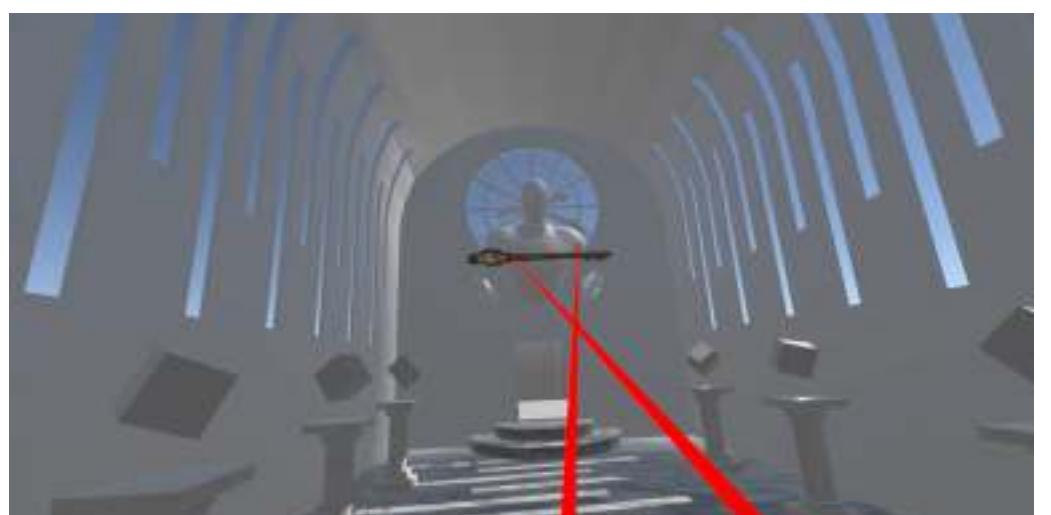


LEVEL 2

Church: Illusions of Depth and Perspective

In the second level, we drew inspiration from the game "Superliminal" and created a space that defies the rules of perspective. The gameplay can be summarized as "nearer makes it smaller, farther makes it larger."

- 1 This is a key that is excessively large compared to the door. Players need to attempt to make it smaller in order to open the door and pass level 2-1.
- 2 This space features floating blocks and a door suspended in mid-air. It is easy to think that we can take down these blocks and arrange them into steps to advance.
- 3 Another way to clear level 2-2 is for players to find the key concealed within. Once the key is reached, the space will flip 180 degrees, and at this point, the path to the door becomes straightforward.



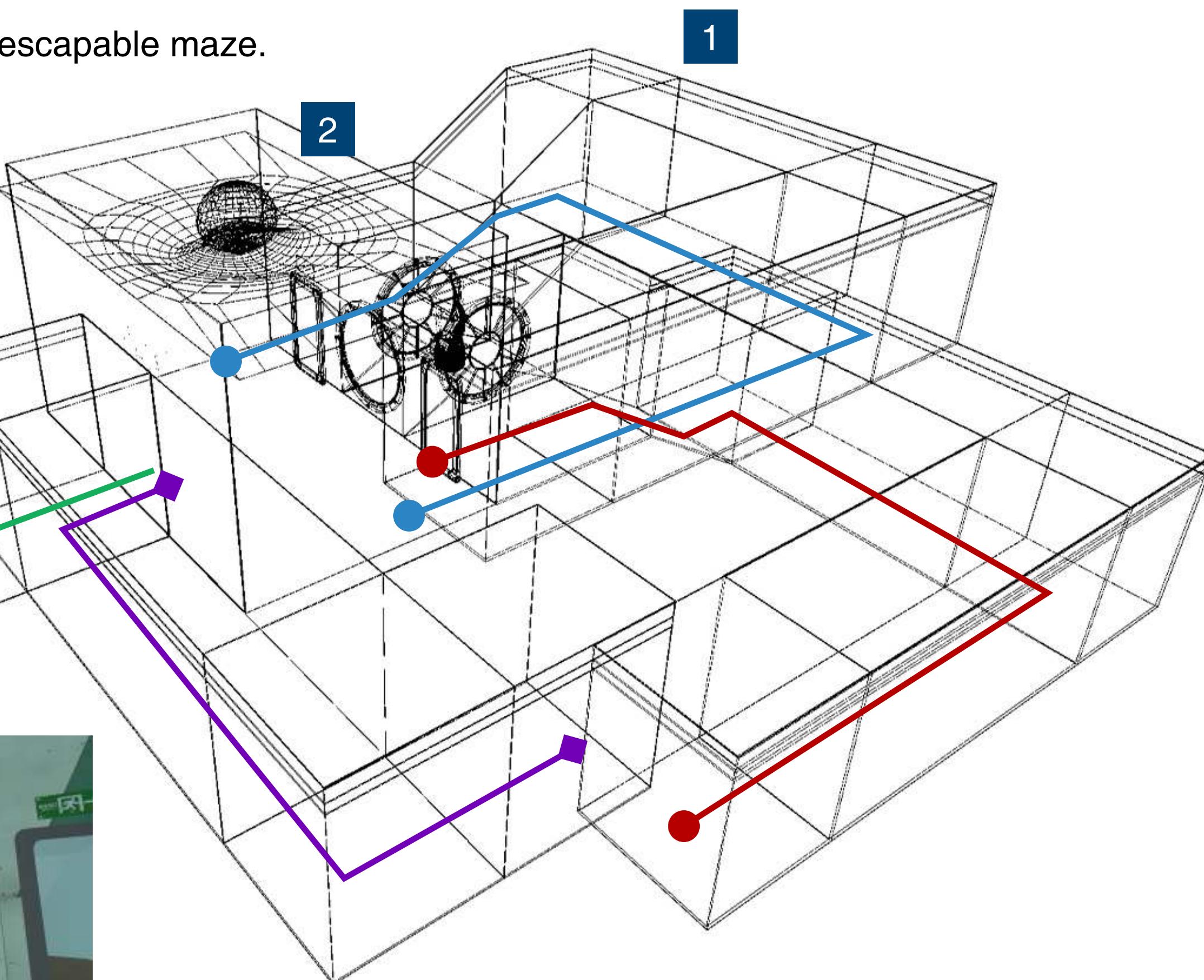
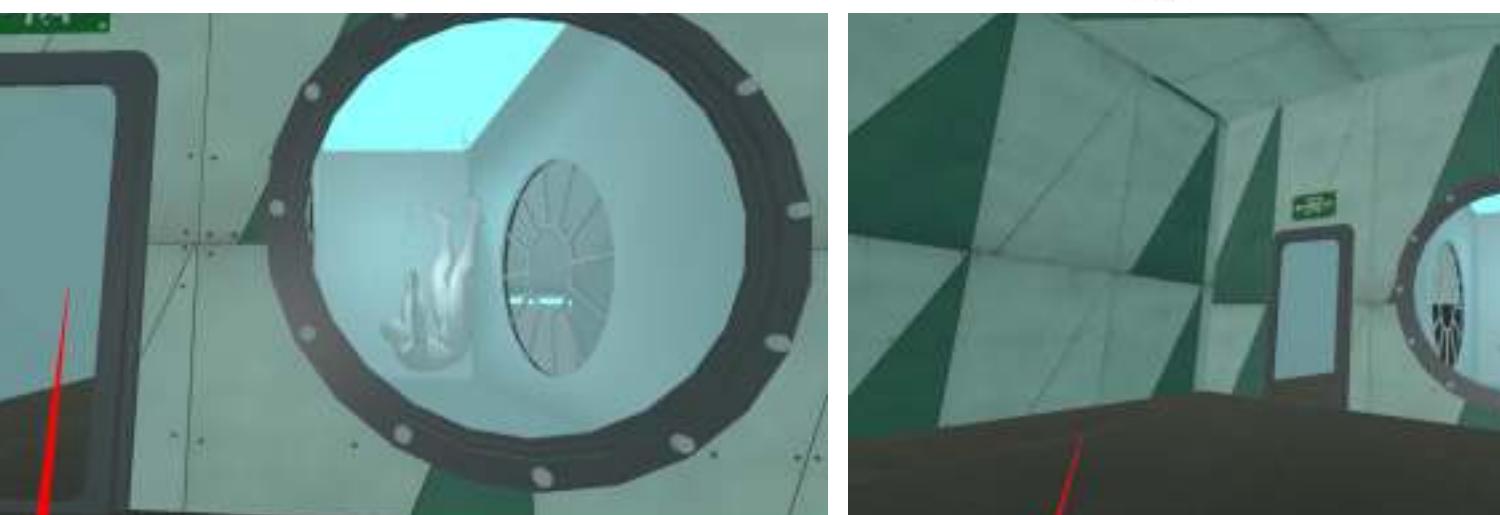
Level Design - Escape

LEVEL 3

Ship: A Maze with No Exits

In the third level, we implemented a portal effect, constructing an inescapable maze.

- 1 In the maze, players initially choose between red and blue paths, but both lead to the purple path due to a portal, ultimately returning to the starting point. The only escape is by walking backward into what appears as a dead-end. This leads to a hidden door that allows access to the green path, marking the successful level completion.
- 2 In this time-limited maze, the ceiling gradually descends, and players must escape frantically to avoid being caught by the eye.



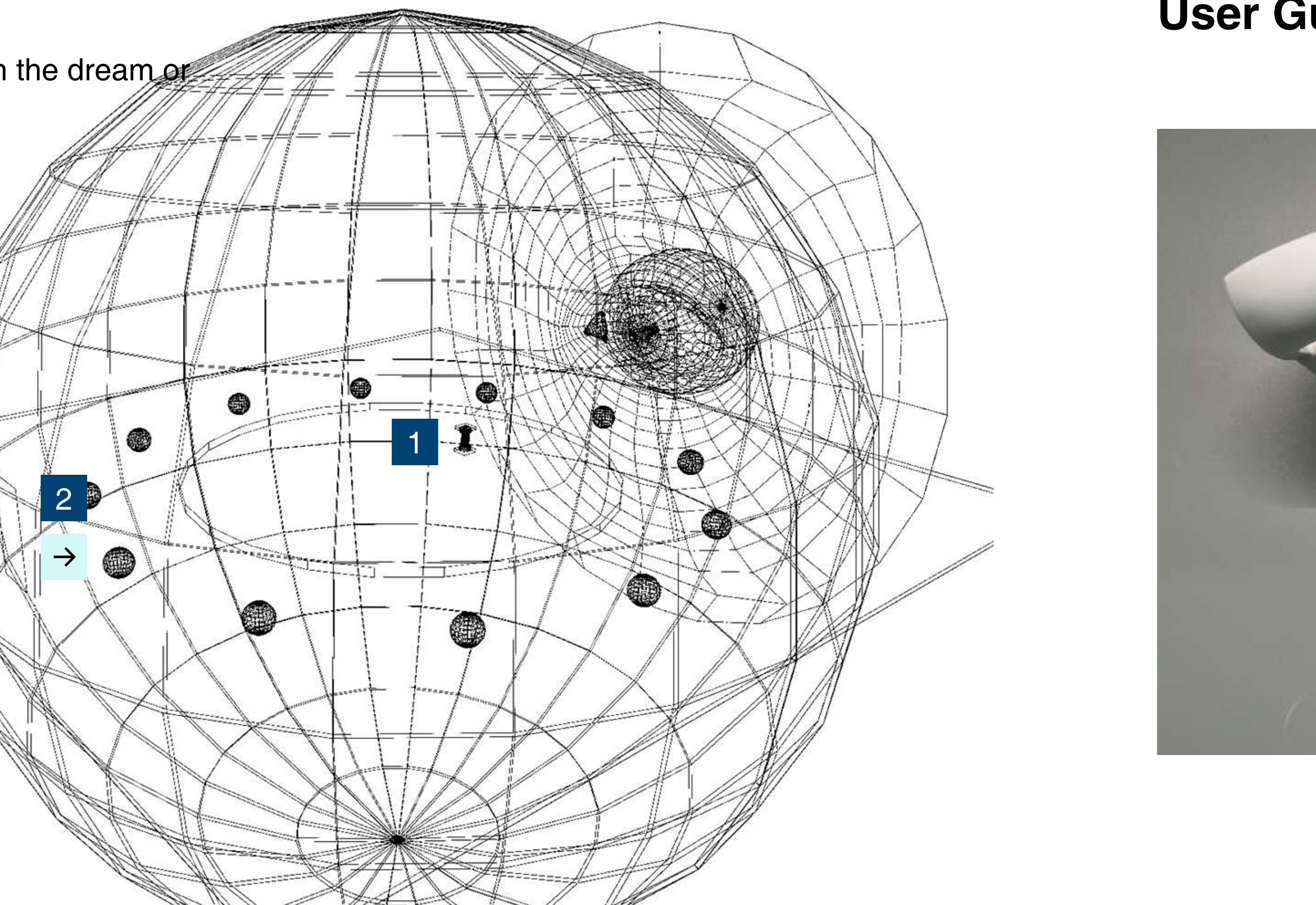
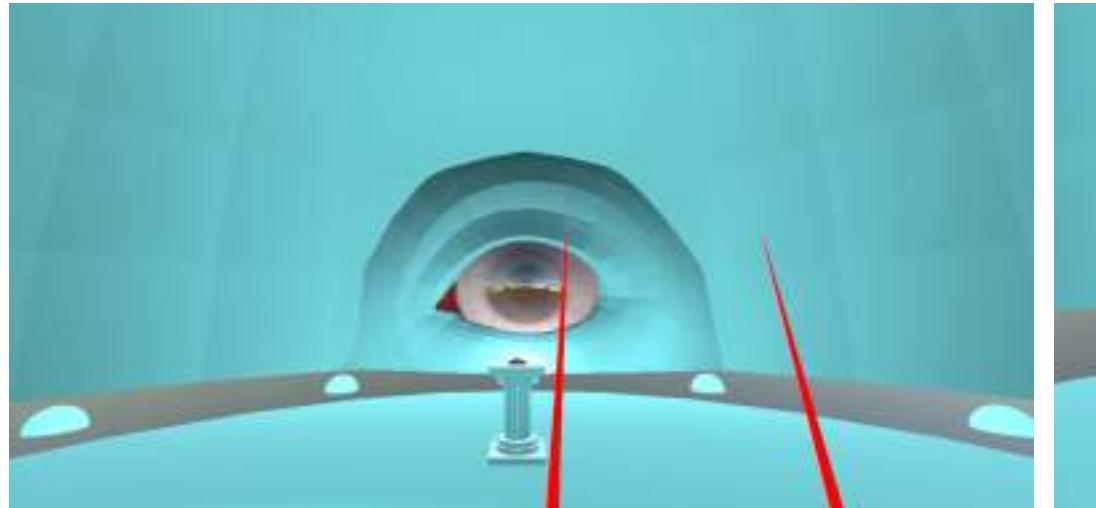
Level Design - Escape

LEVEL 4

Aquarium: The Final Choice

In the last level, players will face the ultimate choice: to stay forever within the dream or to walk out of the nightmare.

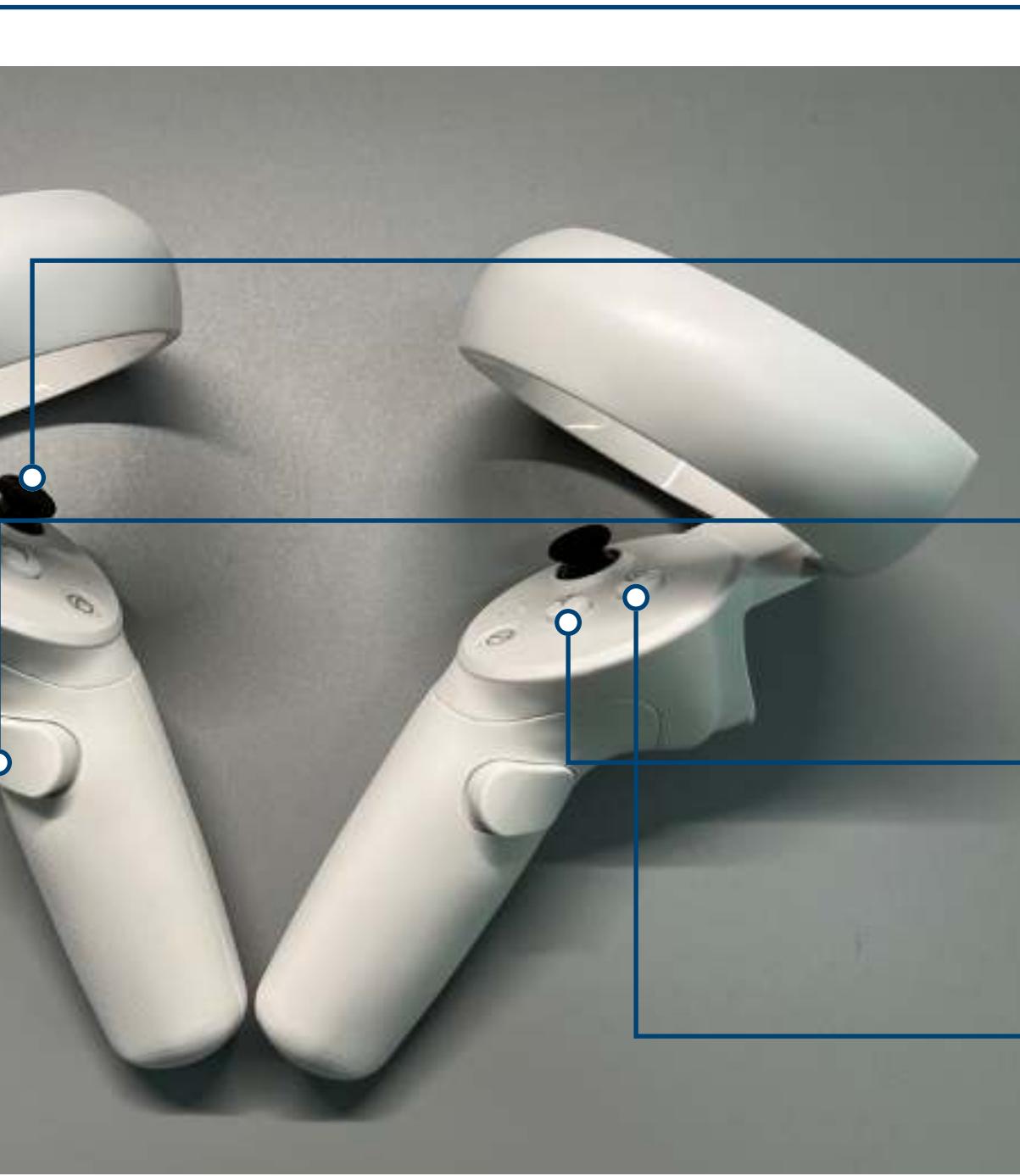
- 1 Here, players will be asked if they want to stay, and their different choices will lead to different outcomes.
- 2 When you face the door, it closes, but it opens when you turn your back to it. Therefore, the ultimate way to clear this level is to confront the eye, then walk backward toward the door.



VR GAME

In the VR operation section, we developed based on UnityEngine.XR and the PICO SDK, summarizing the required actions and assigning key functions.

VR Controller User Guide

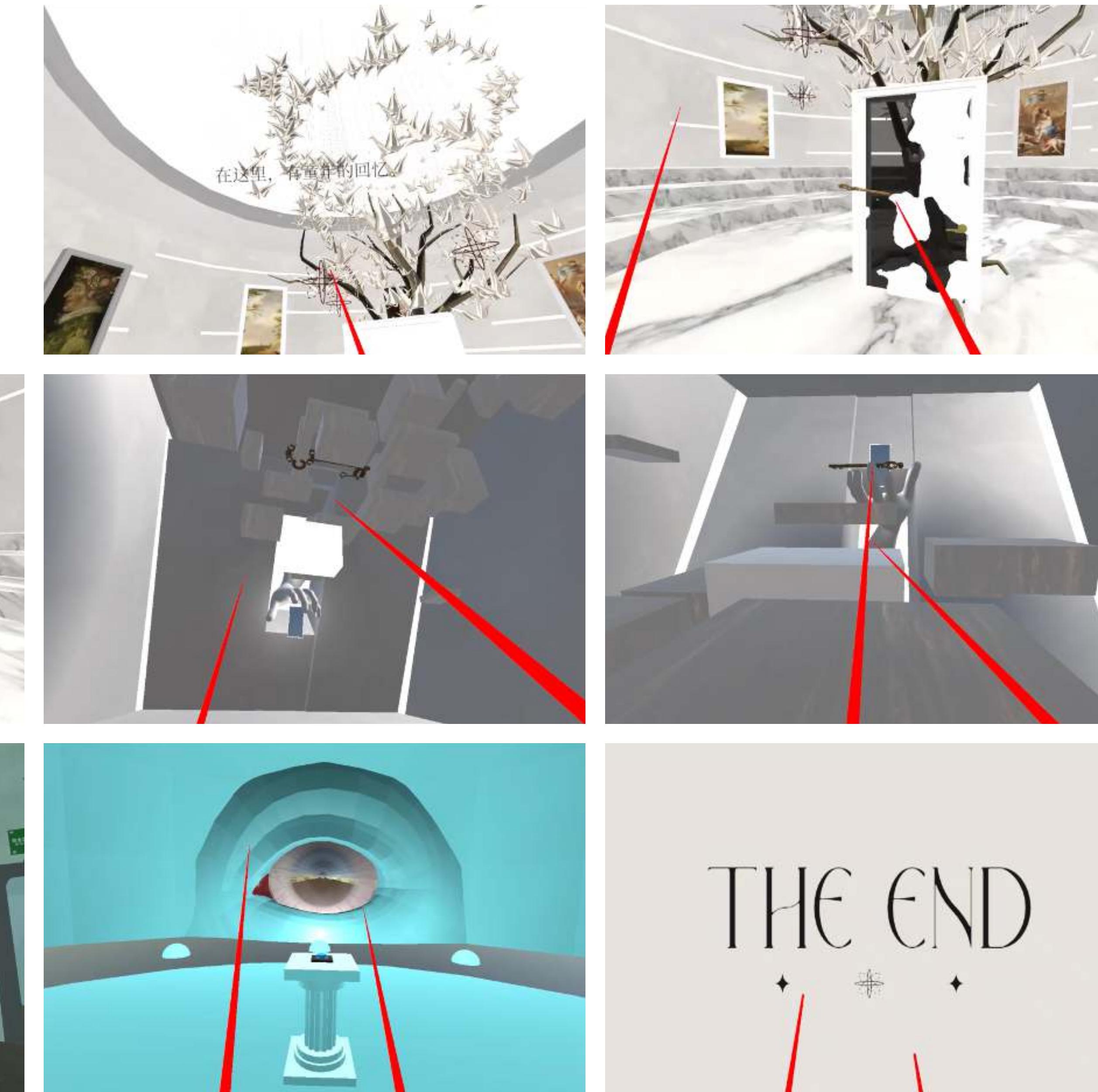


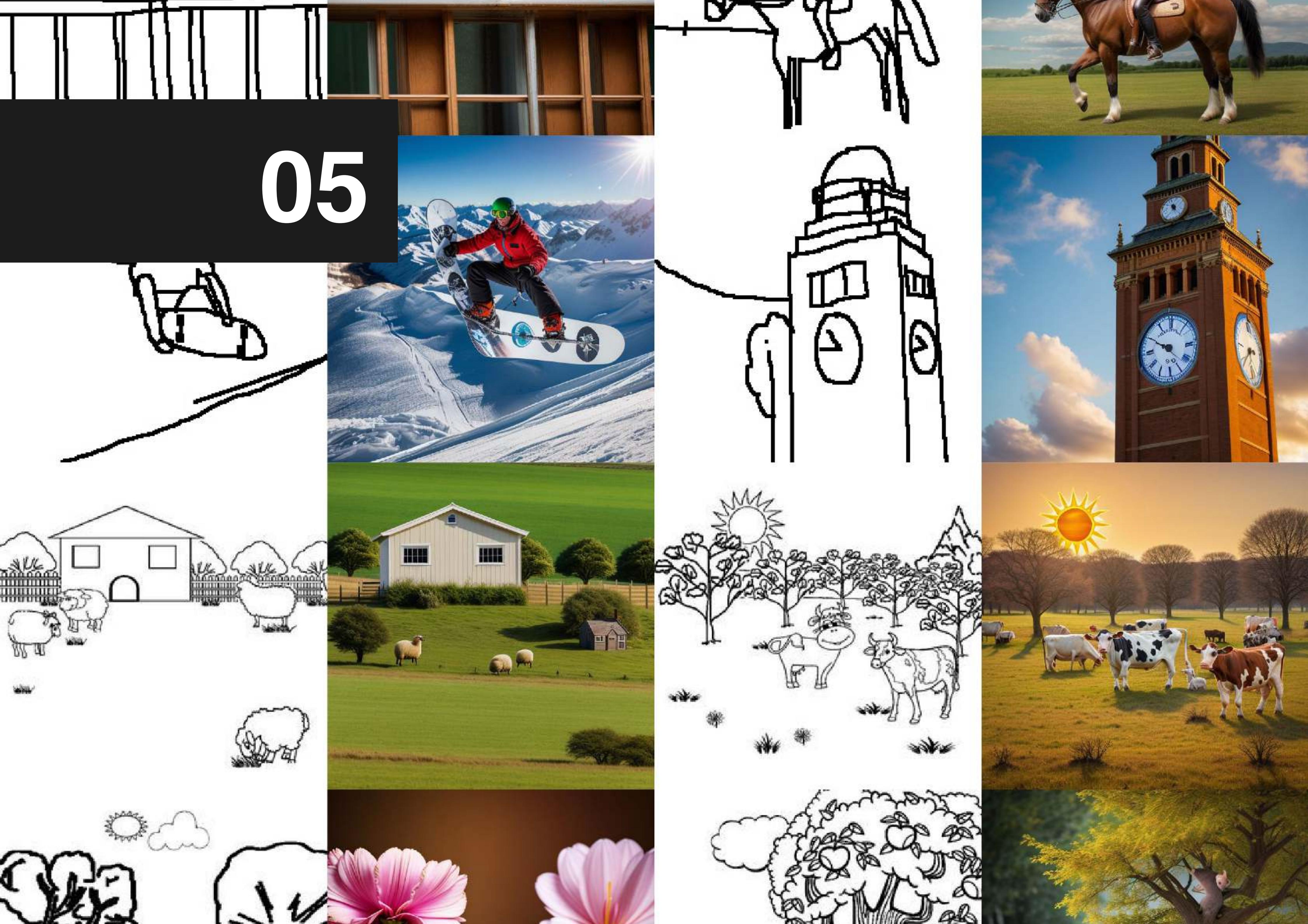
- Left Trigger:**
Interact, such as grabbing objects.
- Left Thumbstick:**
Control forward, backward, left, and right movement.
- Left Grip Button:**
Control jumping
- Right A Button:**
Pull objects closer
- Right B Button:**
Push objects farther



Demostration Screenshots

Check our demo video here:
<https://youtu.be/mhrExDgRpAA>





05

Scene Sketch to Image

Image Generation Model Based on Scene Sketches

My Roles

Background research, coding, experimental application of YOLO for object recognition

Members

Liwen Yi, Jiaqi Zhang, Meiyu Hu

Start and end

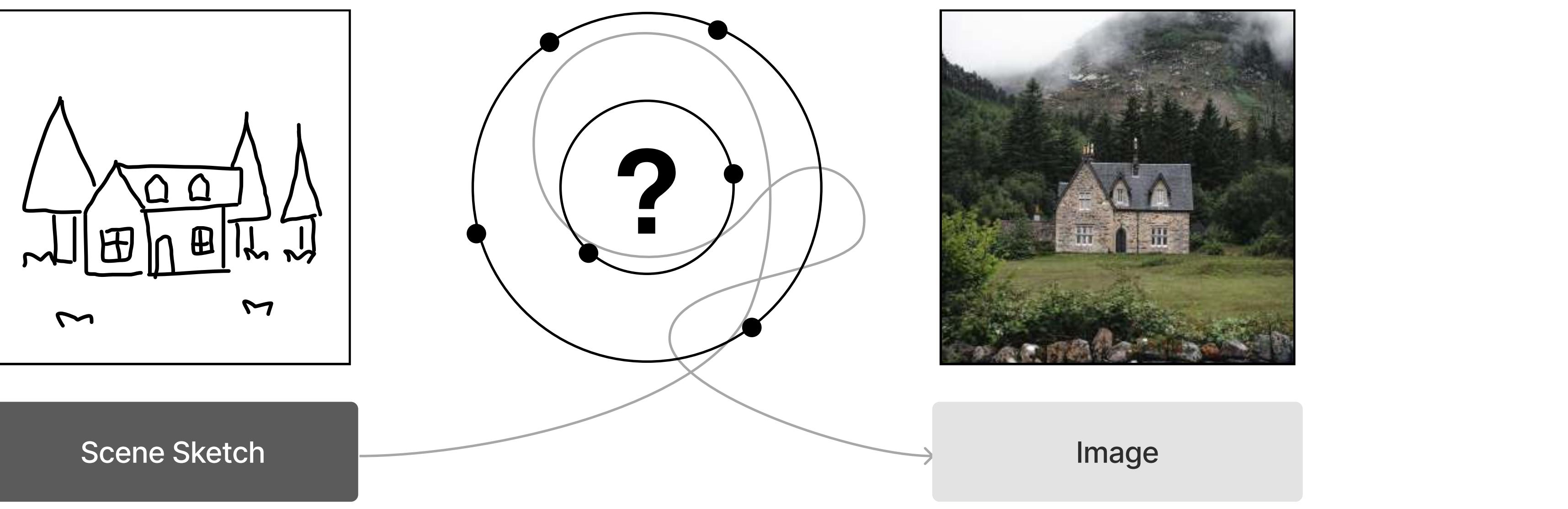
2023.07 - 2023.09

Introduction

In this project, we successfully designed and implemented an end-to-end model for transforming scene sketches into natural images. The generated images exhibit high resolution, basic completeness, and include some level of detail. We also developed an interactive frontend interface.

PROPOSAL

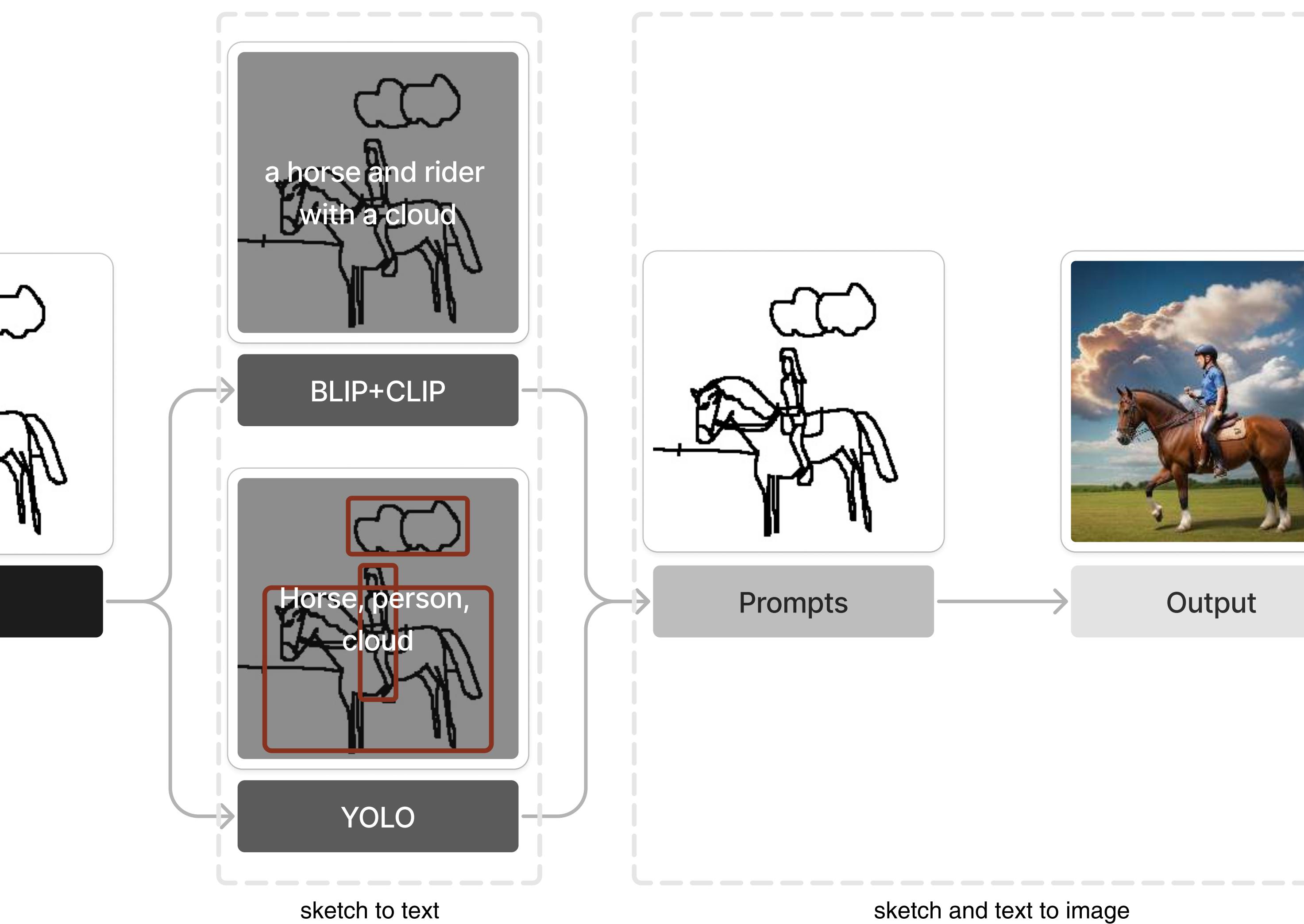
Freehand sketches offer a unique advantage by intuitively expressing user ideas, but they may lack precision and realistic details. Reconstructing natural images from scene sketches is a challenging yet promising task.



Sketch-to-image generation, a classic cross-modal topic in computer vision, has seen extensive research, especially with generative models like Generative Adversarial Networks (GANs). However, current approaches often focus on single-object targets, while scene sketches involve multiple objects. This limitation makes generating complex scenes more challenging. The rise of large-scale language-image models has disrupted GANs' dominance. Inspired by this, we propose an end-to-end system leveraging two powerful models for sketch-to-image generation.

FRAMEWORK

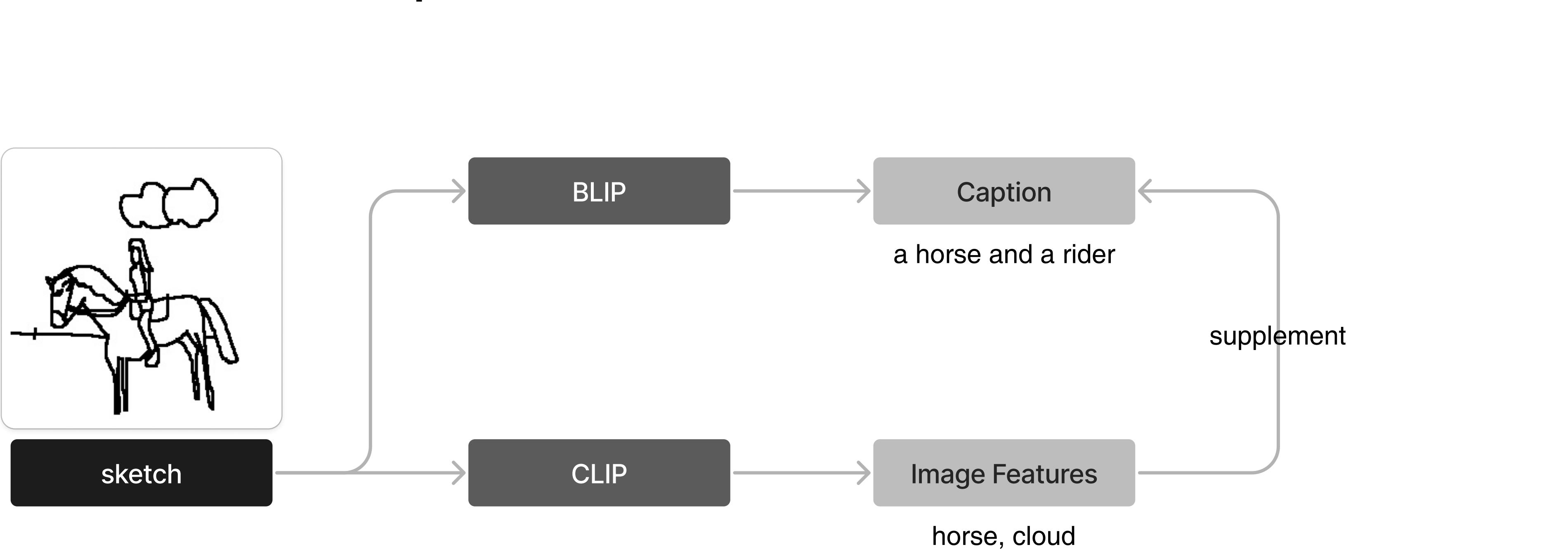
In summary, our implementation approach consists of two parts: translating sketches into text and using both text and sketches as prompts to generate images.



METHOD

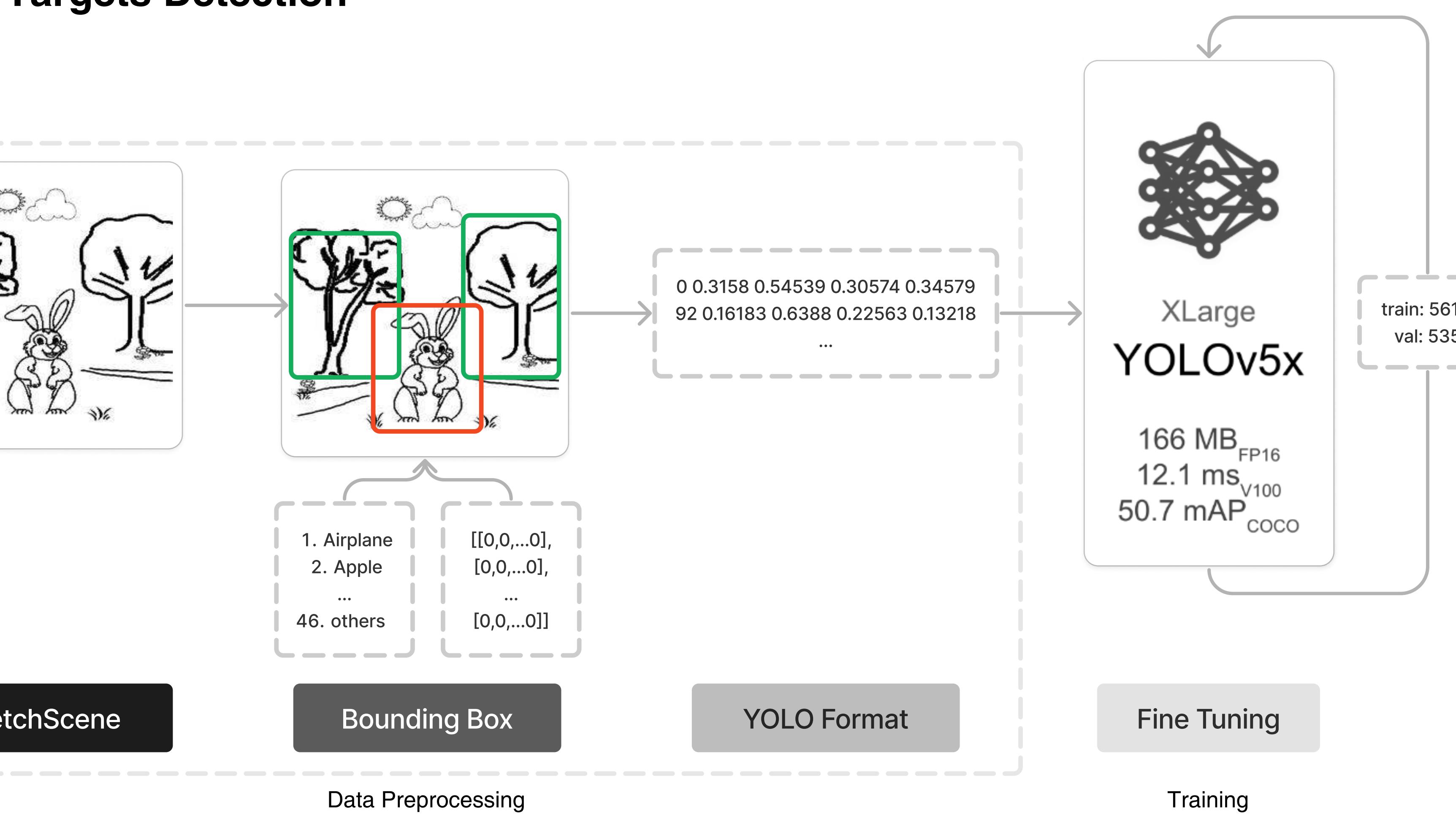
Our end-to-end model incorporates three major components: BLIP, YOLO, and StableDiffusion. In this section, we will briefly introduce BLIP and YOLO.

BLIP + CLIP Generate Prompts



BLIP-2 is an efficient vision-language pretraining method using frozen pretrained image encoders and large language models. It excels in various tasks, including sketch description for natural image generation. CLIP, based on contrastive text-image pairs, extracts features from sketches using the CLIP model's image encoder and matches images with similar text, enhancing the image generation prompt.

YOLO Targets Detection

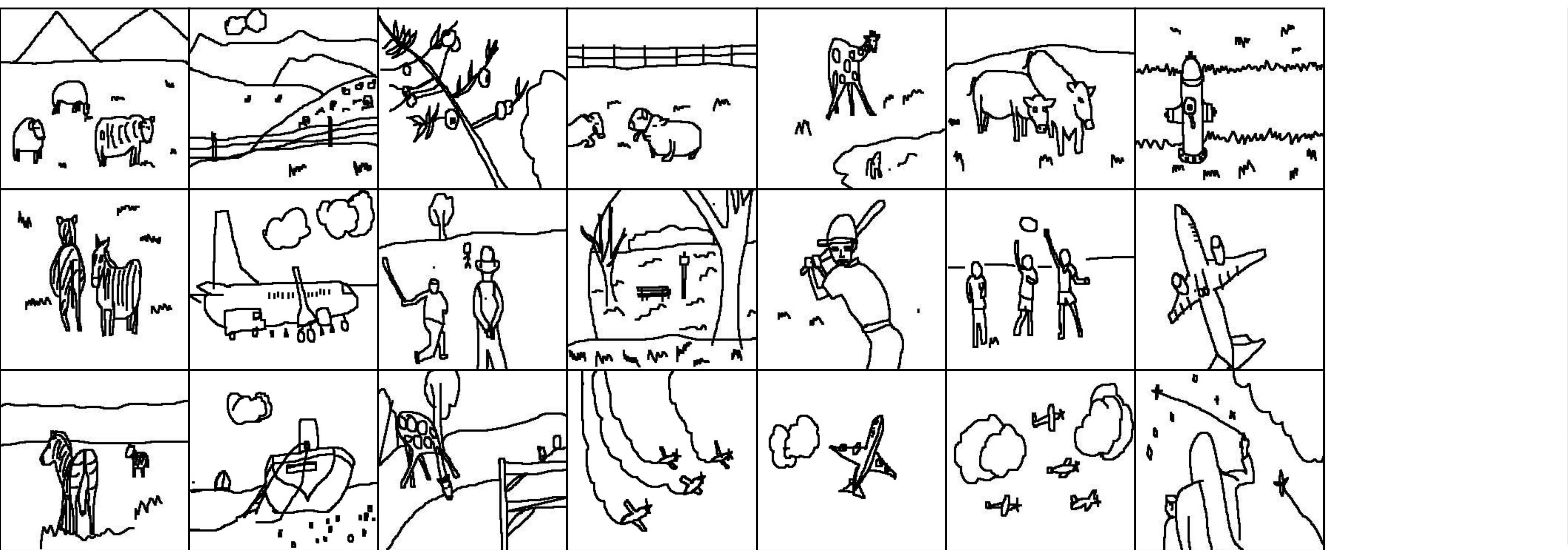


YOLO is a powerful computer vision pretraining model capable of performing multiple tasks such as object detection, image segmentation, and image classification. We fine-tuned the YOLOv5x pretraining model using the SketchyScene dataset. SketchyScene comprises over 5600 images in the training set, with a validation set that is 1/10 of its size. Through fine-tuning, we obtained a multi-class model capable of recognizing 31 categories with an average accuracy of 75%.

EXPERIMENTS

In Experiments section, we will showcase our model's capabilities through three segments: experimental preparation, results evaluation, and result presentation. According to the evaluation metrics, our method demonstrates a certain level of competitiveness.

Dataset - FS-COCO



The FS-COCO dataset is a large hand-drawn dataset consisting of approximately 10,000 sketches across 92 categories, all drawn by ordinary individuals, making it representative. In this experiment, we utilized over 3,000 test sketches from the FS-COCO dataset along with their corresponding ground truth images for predictions, thereby obtaining experimental metrics.

Evaluation Metrics

	FID ↓	LPIPS ↓	IS ↑
DiSS	216.1	0.77	4.1
USPS	236.8	0.76	4.2
MUNIT	519.9	0.75	7.5
Ours	56.2	0.72	10.3

*Performance on the FSCOCO test set (3000 images)

1. FID (Fréchet Inception Distance): Evaluates the similarity between generated images and ground truth. A smaller FID indicates higher similarity.
2. LPIPS (Learned Perceptual Image Patch Similarity): Similar to the FID evaluation criterion.
3. IS (Inception Score): Assesses the entropy of the distribution of generated images. A higher IS corresponds to better image quality and better generalization.

Result Presentation - Generated Images and Text



a clock tower with a sky background



a couple of birds sitting on a railing next to a window

a horse and rider with a cloud

Result Presentation - Gradio Interface

The interface consists of four main sections: 1. Upload Sketch (showing a sketch of a rabbit and trees), 2. Choose a method (listing BLIP and YOLO), 3. Adjust ControlNet weight (with a slider set at 0.7), and 4. Pick a seed (with a text input field containing "12345"). To the right of the interface is the generated image, which is a detailed photograph of a brown and white rabbit sitting on a wooden surface surrounded by large pink flowers. Labels "Image Generated" and "Text Generated" are placed near the image.

Check our demo video here:
<https://youtu.be/AsQ2AivfqJY>

06



and More...

Personal Projects Collections

Types	Generative art, VI design, Graphic design, 3D art
Tools	Adobe Illustrator, Photoshop, Blender, TouchDesigner, etc.
Start and end	2022 - 2023
Introduction	I'm genuinely interested in a variety of design fields, and I've ventured into numerous creative experiments. From these trials, I've curated a few to present here. I hope these examples demonstrate my ability to execute effectively, my eagerness to learn, and my deep passion for design.

Deep Neural Network

Image Classification Task on the IP102 dataset using ResNet50 model

I have a certain level of understanding of machine learning and have completed two final assignments for the courses 'Natural Language Understanding' and 'Computer Vision.' These assignments involved 'Fake News Detection Task Based on BERT and Text Information' and 'Image Classification Task on the IP102 dataset using the pre-trained ResNet50 model' respectively. I will briefly introduce the latter task.

Pests present a significant menace to human well-being and overall quality of life. Consequently, I leveraged the Tensorflow framework, primarily utilizing the pre-trained ResNet50 model for transfer learning, to tackle the challenge of classifying insect images within the IP102 dataset. This dataset encompasses a staggering 102 distinct insect species, where mere random guessing yields an accuracy rate of less than 1%. Employing a trained AI for insect recognition, I ultimately achieved an accuracy rate of approximately 53%.

Check my code on Colab notebook:

<https://colab.research.google.com/drive/1ewRze-YD6Bpntt05GRaJoZi8ae8pRp89>

Cosmic Rhythm - and More...



Cosmic Rhythm

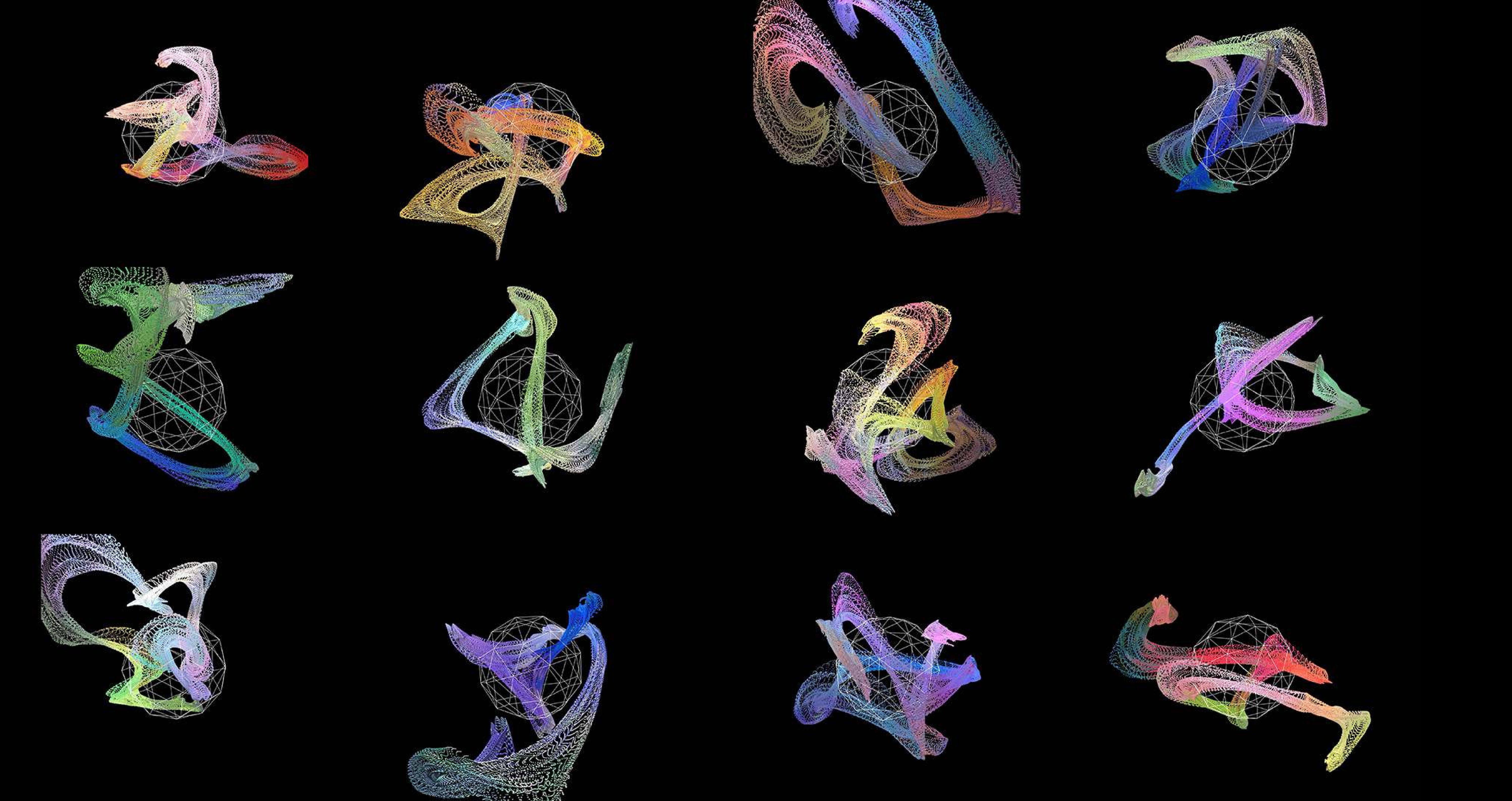
The rhythmic heartbeat of celestial entity

In my junior year, I tried TouchDesigner. Despite my relatively short exposure, I've become deeply enamored with it.

"Cosmic Rhythm" is an exploration of the meditative experience, where the central white sphere serves as a symbolic representation of a celestial body. Encircling this sphere, a mesmerizing dance of irregularly swirling particles mirrors the rhythmic heartbeat of this celestial entity, inviting viewers to immerse themselves in a harmonious cosmic meditation.

Check demo video here:
<https://youtu.be/pdeRuCOr8TU>

Cosmic Rhythm - and More...



VI Design - LCB

I created for the esports event hosted by the esports club I belong to

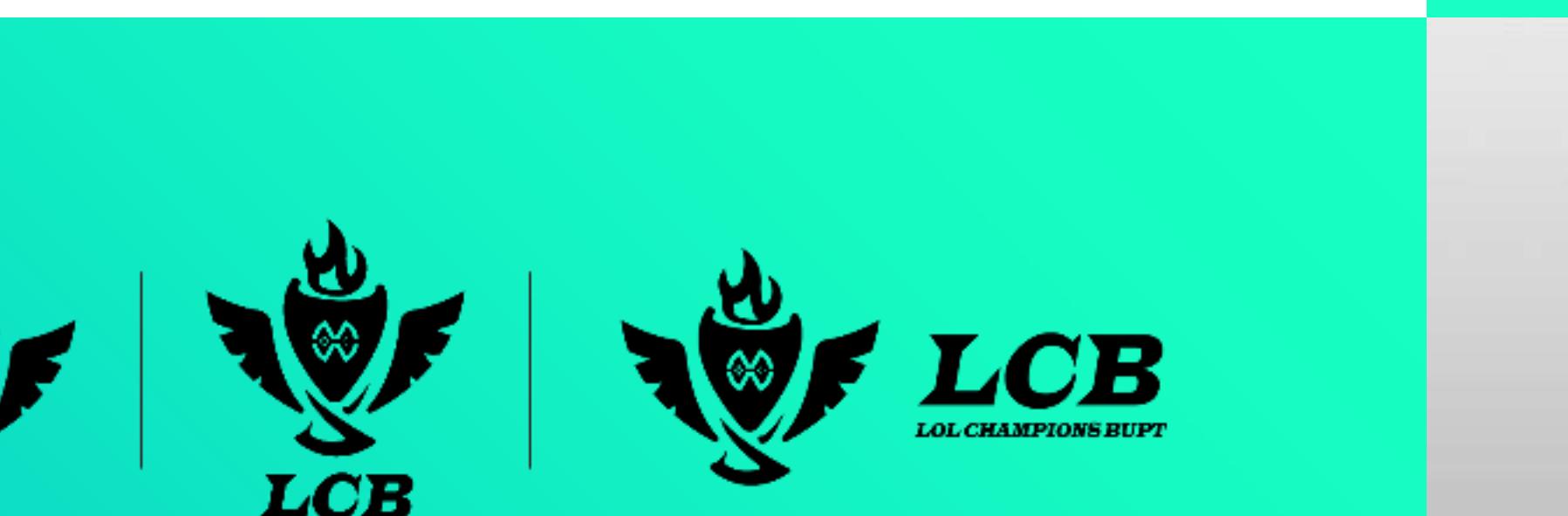
I have a strong passion for esports, particularly League of Legends. This year marks my fifth year following the LPL (League of Legends Pro League) in mainland China. I joined my school's esports club and served as the head of the promotional department for the 2021-2022 academic year. During my tenure, we organized LCB (League of Legends Champions BUPT), an intercollegiate League of Legends event that attracted nearly 40 teams and over 200 participants. After two months of meticulous planning, it received widespread praise from both the audience and players.

I crafted the event's VIS (Visual Identity System), encompassing not just the event's logo, primary colors, and fonts, but also extending to the design of the live interface, posters, banners, and more.

Check the match recording on our channel:

[【LCB】北邮英雄联盟冠军赛 5月4日 老年人vs中年人 第三场...](#)

VI Design - and More...



Graphic Design

Graphic design has always been my passion

Although I haven't formally studied design as my major, my passion for graphic design has been a consistent thread throughout my academic journey. Starting from my freshman year, I eagerly dabbled in various aspects of graphic design during my free time. On the right, you can explore a collection of some of my works, a testament to my ongoing exploration and commitment to this creative field.

Graphic Design - and More...



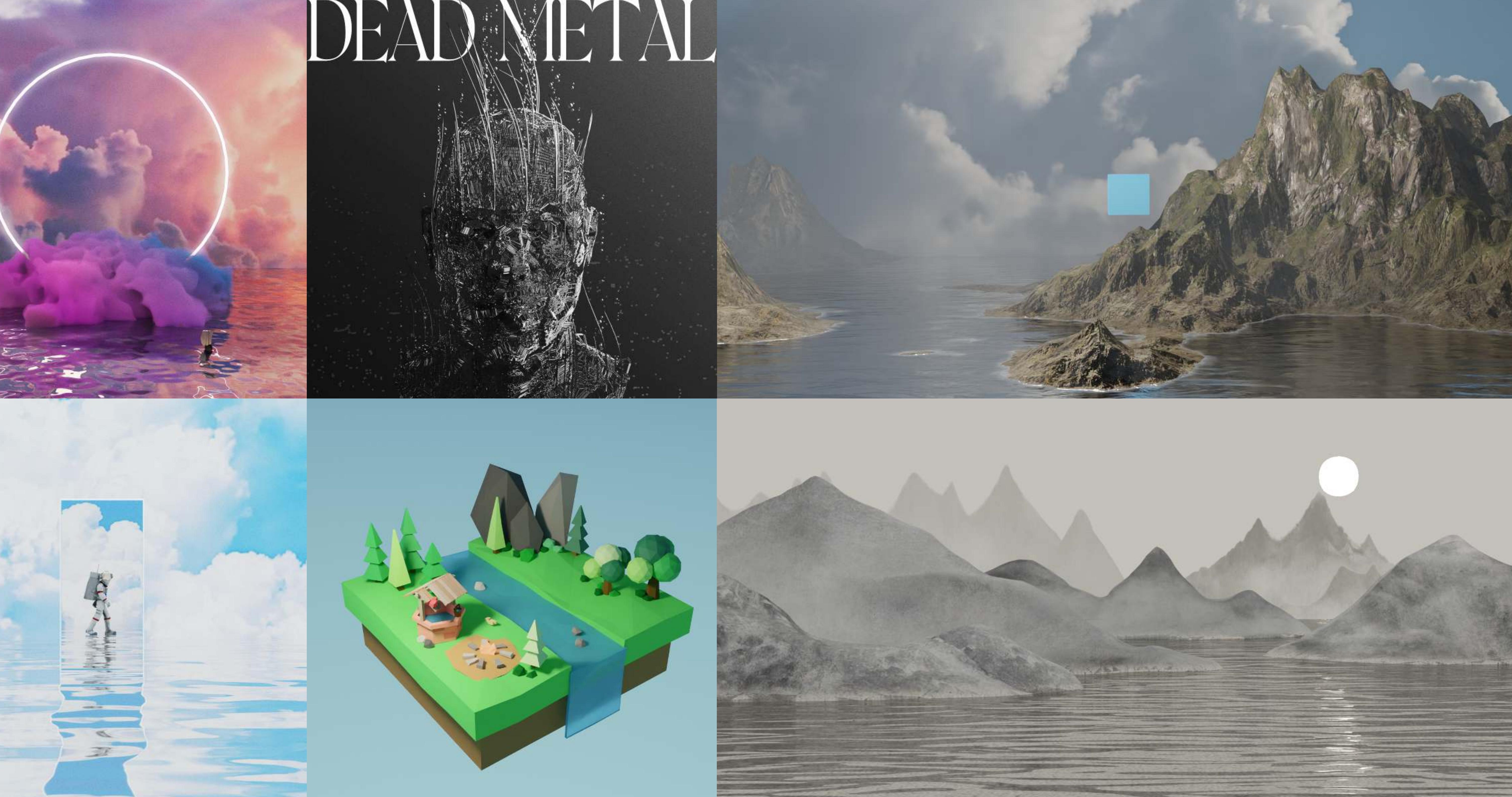
► Designed by Mary Zhang

3D Art

I have a strong interest in 3D modeling

From the moment I first laid hands on 3D modeling software, I fell in love with this art form immediately. I started my journey with C4D during my freshman year, and by my sophomore year, I transitioned to Blender due to the curriculum at my school. It eventually became my primary modeling software, and I use it to handle the entire workflow, including modeling, UV unwrapping, texturing, shading, and rendering.

I believe that 3D design is not only a standalone design discipline but also a powerful supplementary tool for various other design fields. I often use it to enhance elements in graphic design posters, adding depth and dimension. When I can't find the right mockup, I will create 3D models of the product myself. In game development, I also employ modeling software to create more aesthetically pleasing and intricate models.



THANK YOU

Jiaqi Zhang

2023
