



Project 01

FloraAura

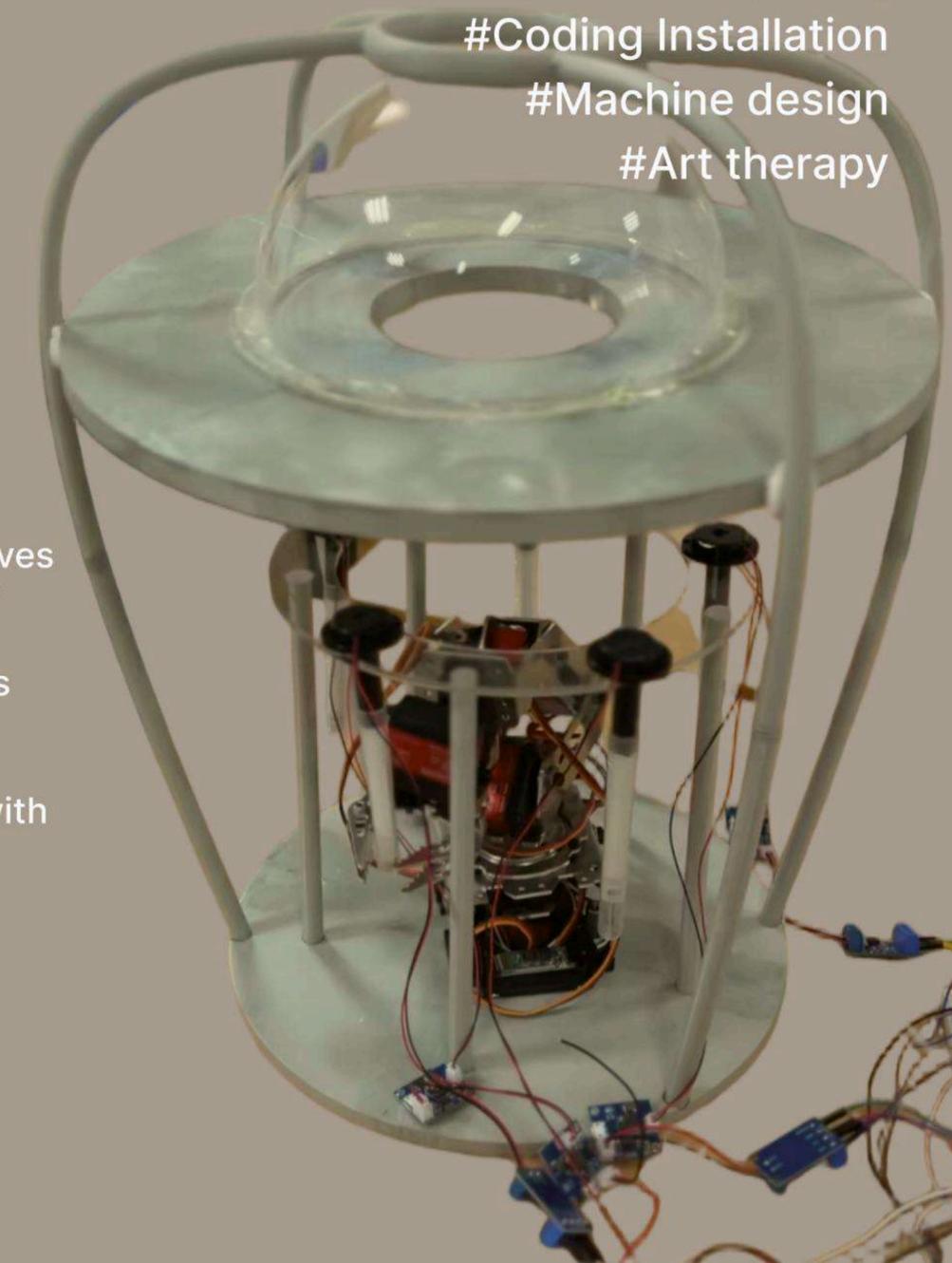
about this project

In the future, with the development of the concept of harmonious coexistence between humans and nature, plants and people's daily lives will become increasingly inseparable. People have noticed the role of plants in relieving stress and healing emotions. Therefore, I designed FloraAura. It can sense human emotions and spray plant essential oils that can regulate emotions.

Through this installation, people can contemplate their relationship with nature and reflect on whether humans have drifted away from the healing power of nature in modern life.

 **YouTube** <https://youtu.be/oWSPYVEPmSE>

#Physical Computing
#Coding Installation
#Machine design
#Art therapy



Inspiration

* The role of plants in urbanization

In Levi, a small town in Finnish Lapland, a **tree-hugging competition** called "Halipuu" is organized every year. The locals believe it provides an opportunity to connect with nature."

they Calling
"Plants are
living beings,
full of energy,
and hugging a
tree is good
for people.

With the spread of the netizens,
the activity of getting close to
plants has gradually evolved
into a kind of **"natural therapy"**

Background

*01 The role of plants in urbanization :

Plants provide a good living environment by **purifying the air**, and reducing the urban heat island effect



clean the air

*02 The evolution of architecture in urbanization :

buildings have begun to evolve towards higher densities and verticality. Green building design such as plant walls have been emphasized to realize the **integration of architecture and nature**

*03 Human factors in urbanization :

green buildings helps to improve the **mental health of residents**. At the same time, human beings are also a major factor in balancing the relationship between people, nature and architecture.



Development Timeline

primitive stage



At this time, the relationship between man and nature was at a more **primitive stage**, with plants providing materials for construction and **supporting human life**

industrialization stage



The process of **industrialization** has alienated humans from nature, and their destruction of the natural environment is increasing. Urbanization has brought about the problem of the **climate crisis**, which reminds people of the need to **respect nature**

ecological stage



With the development of the concept of **ecological architecture**, the relationship between plants and buildings has become closer. Building design takes more account of ecological factors and utilizes plants to improve the ecological performance of buildings

future stage



In the future, nature will become a **perceptible and interactive partner** through intelligent carriers. Technology will hide behind nature, becoming a bridge that extends our perception of the natural world and enables nature to actively care for humans.

Conclusion

In the future living space, plants will become an indispensable part. Plants will not only be elements for decorating spaces, but also have various functions such as purifying the air, improving emotions, and saving energy. This trend reflects the value orientation of **sustainable** development and **harmonious** coexistence between humans and nature

Classical Period

The Modern Period

Future Period

RESEARCH

*The relationship between the environment and people

The environment has a significant and multifaceted impact on people's mood.



Nature scene

Scenery

A forest with bright sunshine and dense vegetation

Light

Adequate natural light

Smell

Trees and Grass and soil

Sound

Wind and insect chirping



Indoor scene

Scenery

A room filled with furniture in the city

Light

Adequate artificial light

Smell

Smell of decoration materials

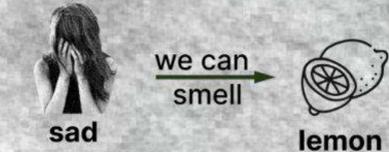
Sound

Traffic honking and conversation sounds

The role of odor actually plays an important role in perception, but it is often overlooked

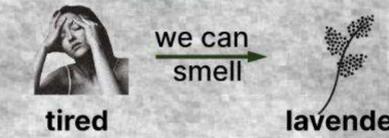
*mood & odour

when we feel.....



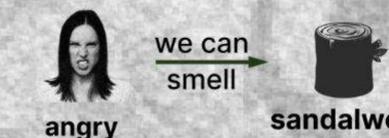
sad

lemon



tired

lavender



angry

sandalwood

Factors such as plants, light, noise, spatial layout, and color can all affect an individual's emotional and psychological state

Mood regulation

- Field, T. (2005) has shown that lavender aroma can significantly **reduce anxiety levels** in pregnant women

Stress management

- The scent of rosemary can stimulate the parasympathetic nervous system, and **alleviate tension** caused by stress

Emotional memory

- Odor activates the **hippocampus regions** of the brain that process emotions and memories

*Environmental test

Purpose of the test

After viewing all the pictures, the five dimensions of **plant, lighting, noise, space, and color** are scored according to the feeling of the pictures

Test method

Pictures of different scenes were shown in a small, dark environment, and after everyone's research was completed, the average was calculated based on the scores of each of the five people

Process of the test



stage01

Pictures of different scenes are displayed in the darkroom for the subjects to look at carefully



stage02

Subjects scored five dimensions in the chart based on their feelings about the photo



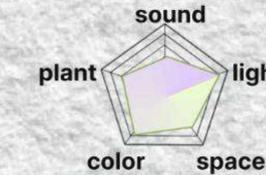
stage03

Finally, the average value of each picture was obtained according to the scores given by all subjects

Summary of the test

The higher the values of color, space, nature and light, the more likely it is to bring people a more pleasant and exciting emotional experience. Noise is a factor that can help people relax to a certain extent, but beyond this level can cause discomfort

simulated environment of the orchard



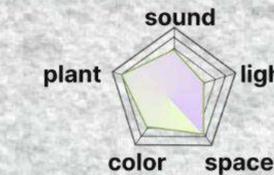
rich colors, abundant light, open space, close to nature and some white noise

It tends to bring the participants a **pleasant and euphoric** emotional experience

Space & Urban Green Space:

Window views that contain natural elements are associated with superior memory, inhibition of attention and impulsivity, and greater subjective well-being. Nature experiences, often in urban green spaces, can improve memory and concentration and increase positive emotions. (Jack Halpern 2015)

simulated environment of the forest on rainy days



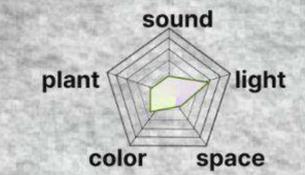
open space, close to nature, obvious white noise, insufficient light, and relatively single color

It prefers to bring the participants a **soothing and peaceful** emotional experience

Space & Plant:

Nature's healing power lies in unconscious voluntary responses to the elements of nature. Certain natural environments, especially those visible along water's edges and horizons, may be seen as safe havens. (Gregory N. Bratman, J. Paul Hamilton, Gretchen C. Daily, 2012)

simulated environment of home



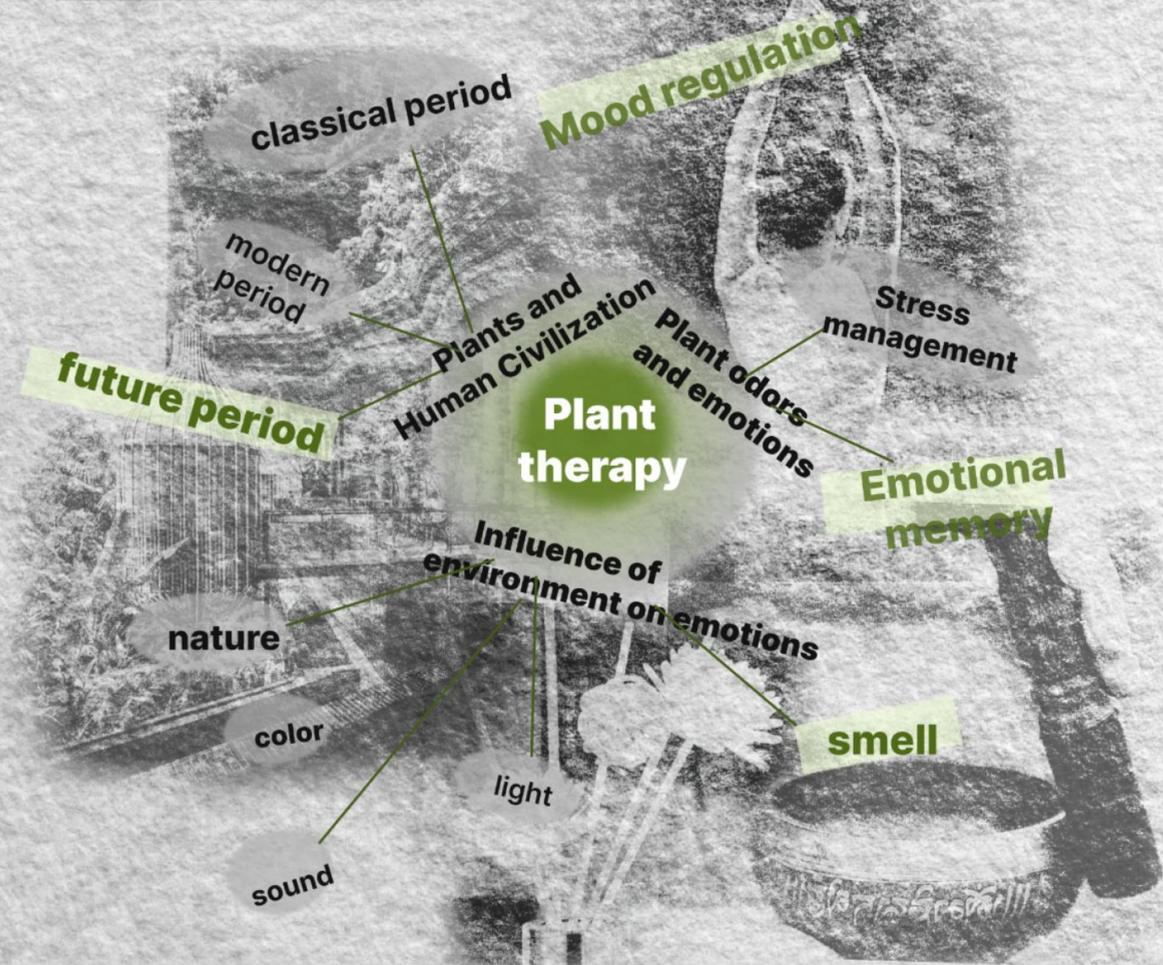
a particularly single color, far away from nature, narrow space, quiet, and suitable and sufficient artificial light

It tends to bring slightly **nervous** emotional experience to the participants

Space & Noise:

Recent evidence suggests that individuals living in urban areas are at increased risk of depression. Mechanistic pathways include increased exposure to noise, light, and air pollution, physical inactivity, economic stress, and reduced social networking. (Hoare, Erina; Jack, Felice; Berk, Michael 2019)

Mind map



summary

I have listed the various impacts of the natural environment on humans, with a focus on the development of the relationship between humans and nature in the future. Among the many factors, I thought of **scents**, which is often overlooked but actually very important, and considered its **important role in regulating emotions**, ultimately leading to the direction of **plant therapy**

Concept

WHY?

A dulled sensitivity and difficulty in accessing natural regulatory abilities due to prolonged exposure to artificial environments.

WHO?

People working in the core areas of high-density cities and in high-stress jobs

WHEN?

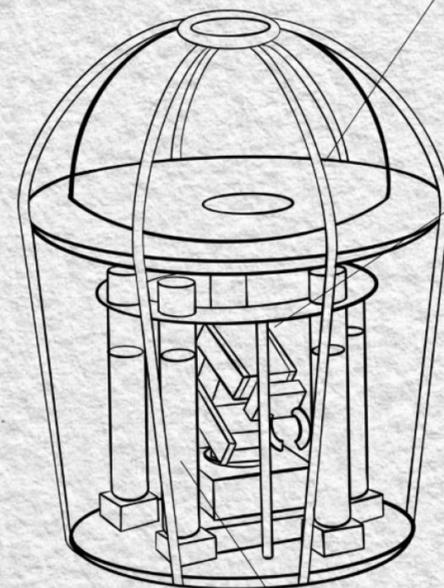
During brief breaks between work, it is designed for instant adjustment.

WHERE?

Mainly placed in personal workspaces or rest areas as an alternative supplement for missing natural elements.

This device sprays essential oils that regulate different emotions and displays projections of related plants, achieving the goal of **using plants to heal the soul**

*Sketch



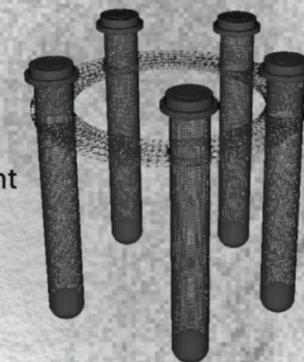
01 Glass cover

A glass cover for projection imaging, with a hollow top for easy discharge of essential oils



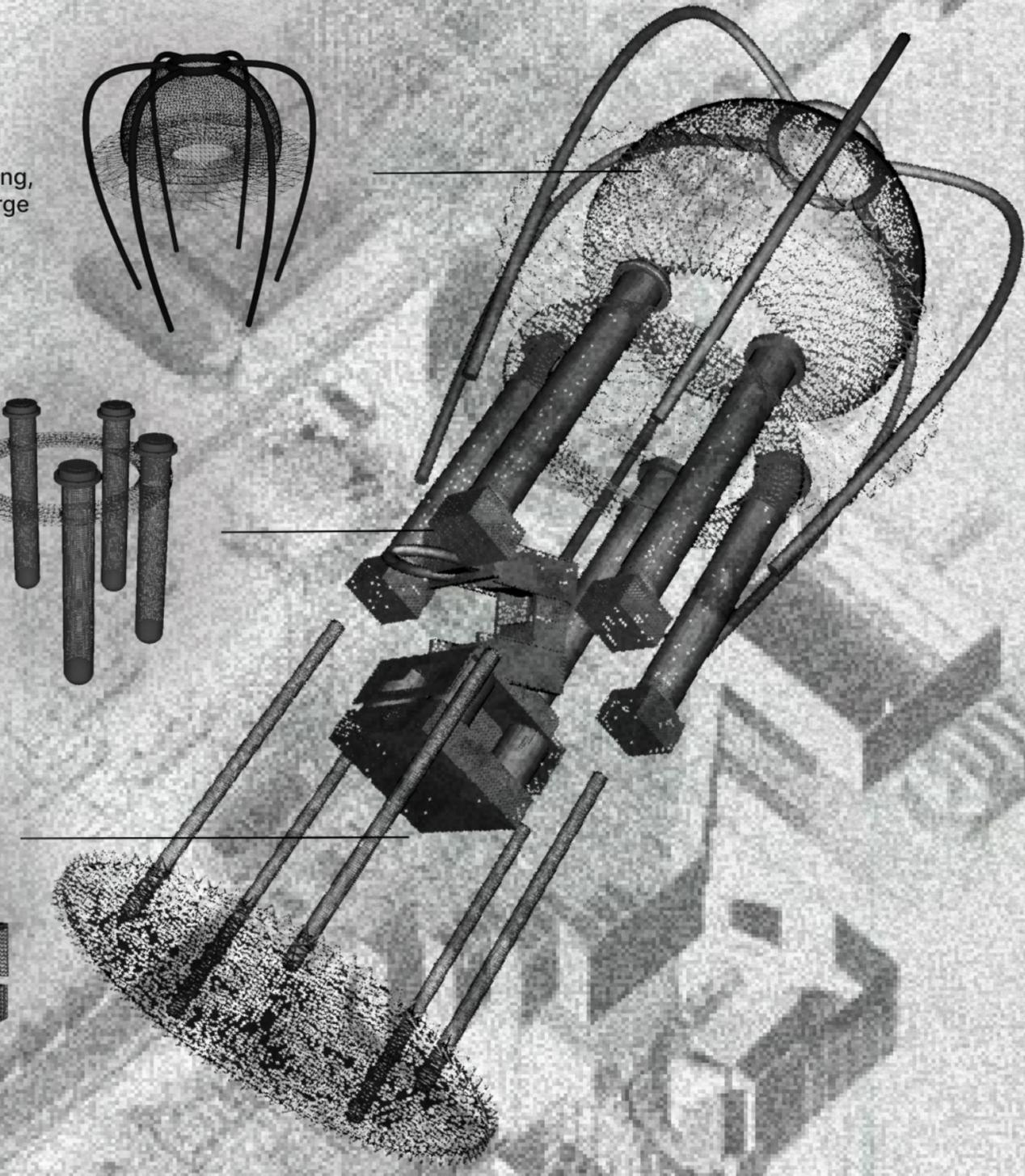
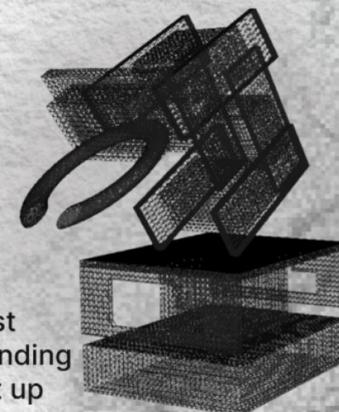
02 Glass test tube

Glass test tubes containing different essential oils, with an atomization module placed above to spray the essential oils



03 steering engine

The servo that can move the test tube will transport the corresponding test tube to the middle and lift it up



Technical Test

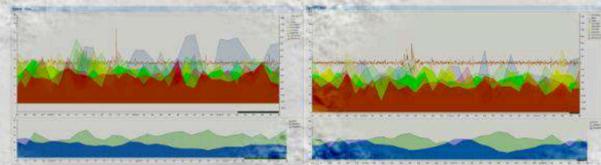
*User research

By immersing users in image sets, it simulates the extraction of users' reactions within the same scene under different plant density.

modern buildings scenes



difference :
the quantity of plants
the weather



The first image shows a relatively stable state of brain activity dominated by meditation and relaxation. The brain activity status shown in the second image suggests that individuals may have experienced efficient cognitive processing in the face of tasks.

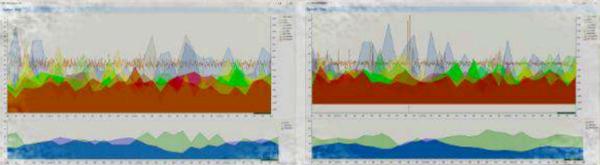
Theta



living room scenes

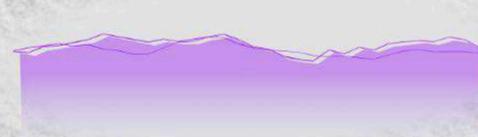


difference :
the quantity of plants
the amount of light



The first image shows smoother fluctuations, indicating that individuals may be in a state of meditation or deep thinking. The second image reflects significant fluctuations, indicating that the brain is engaged in cognitive processing and responding to challenges.

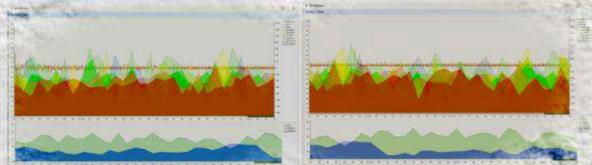
Meditation



balcony scenes

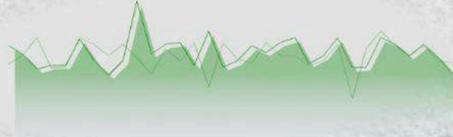


difference :
the quantity of plants
the amount of light



The high proportion of low-frequency waves in the first image may indicate a more stable state of attention and relaxation. The brain in the second image is in a state of task processing or stress, which may reflect higher cognitive load.

Beta



research process



stage01

stage02

stage03

stage04

The equipment is debugged and the initial data of the participants is recorded

Participants are shown pictures and their brainwave data is recorded

Change the picture shown and record the changes in the participants' brain waves

At the end of the test, the resulting brainwave data was analyzed



When I see more plants on the balcony, I feel more **calm**. More sunlight shining on plants makes the environment vibrant and lively

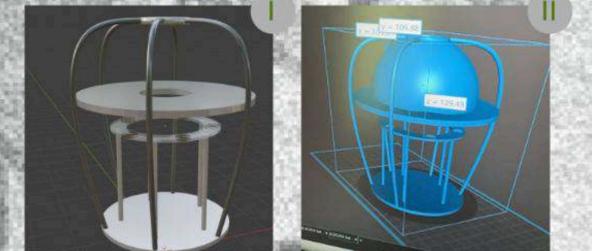
There are more plants in the living room, which makes me **think less about trouble**. The photosynthesis of plants makes me feel refreshed and invigorated



More pictures of plants outside the building make people feel **more relaxed**. More plants make the sky look bluer and clearer

1 3D modeling

- I Machine design
- II 3D printing



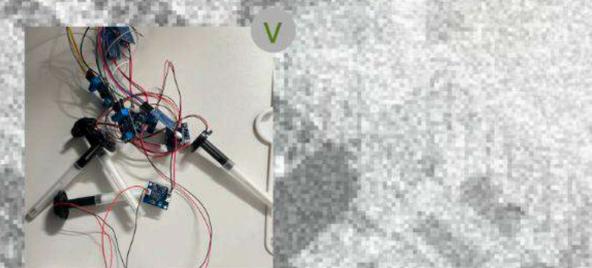
2 making process

- III Stick on components
- IV Perforating
- V Assemble components
- VI Physical computing test



3 come into reality

- VII Coding&Product test



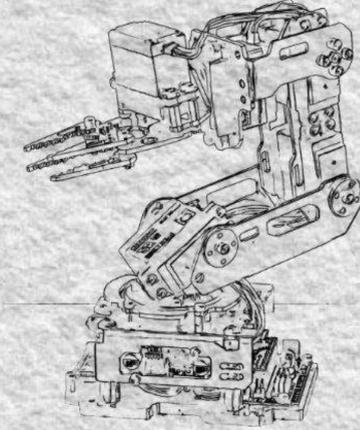
Coding Test

Arduino

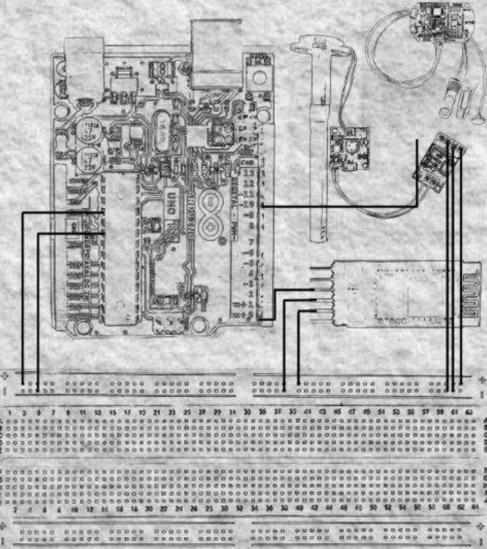
```

1 const int atomizerPins[5] = {10, 11, 12, 13, 9}; // 雾化器引脚
2 const int buttonPins[5] = {3, 4, 5, 6, 7}; // 按钮引脚
3
4 void setup() {
5   Serial.begin(9600);
6
7   for (int i = 0; i < 5; i++) {
8     pinMode(atomizerPins[i], OUTPUT);
9     digitalWrite(atomizerPins[i], LOW);
10
11    pinMode(buttonPins[i], INPUT_PULLUP);
12  }
13
14 }
15
16 void loop() {
17   for (int i = 0; i < 5; i++) {
18     int buttonState = digitalRead(buttonPins[i]);
19
20     Serial.print("Button ");
21     Serial.print(i);
22     Serial.print(" State: ");
23     Serial.println(buttonState);
24
25     if (buttonState == LOW) {
26       digitalWrite(atomizerPins[i], HIGH);
27     } else {
28       digitalWrite(atomizerPins[i], LOW);
29     }
30
31   }
32   delay(50);
33 }

```



*Coding test



servo operation test



atomiser spraying

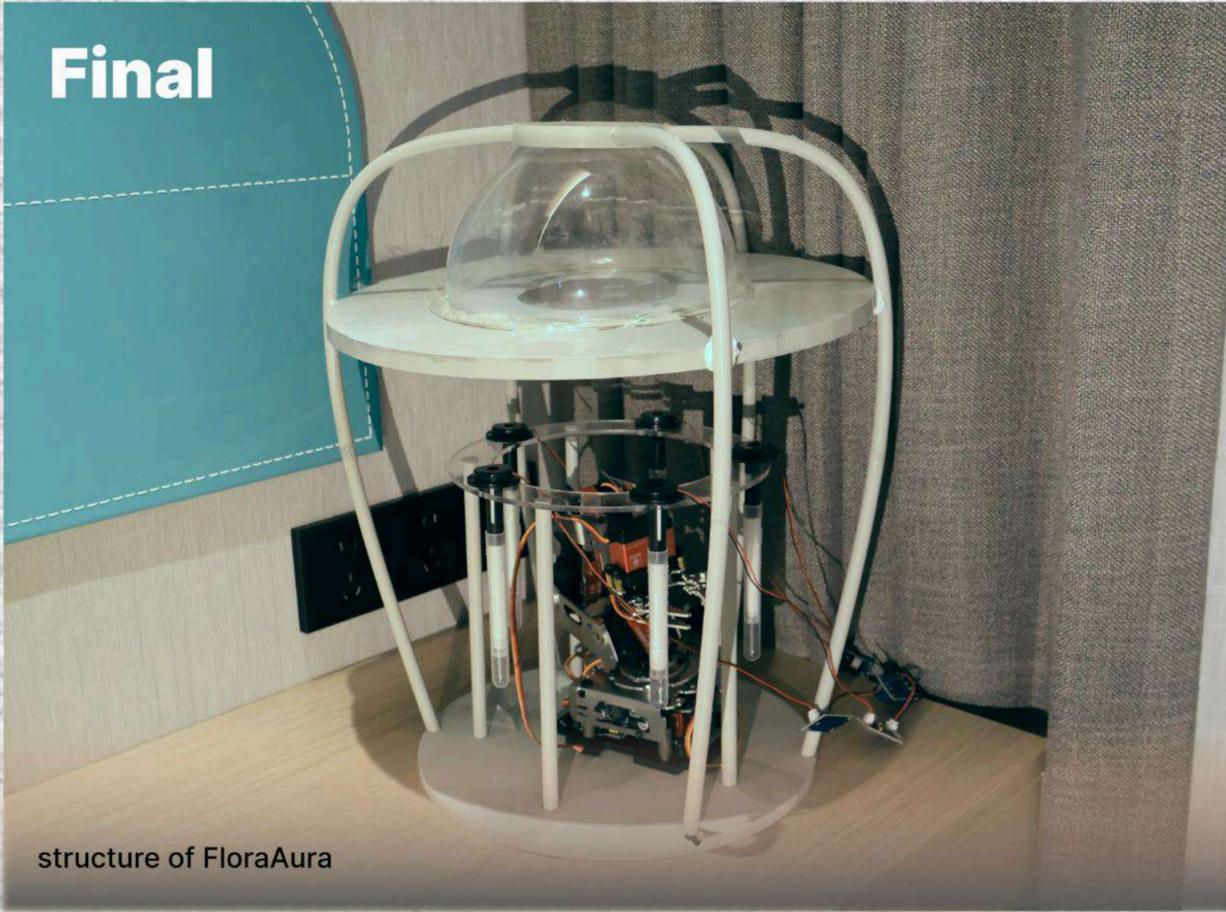


EEG device testing

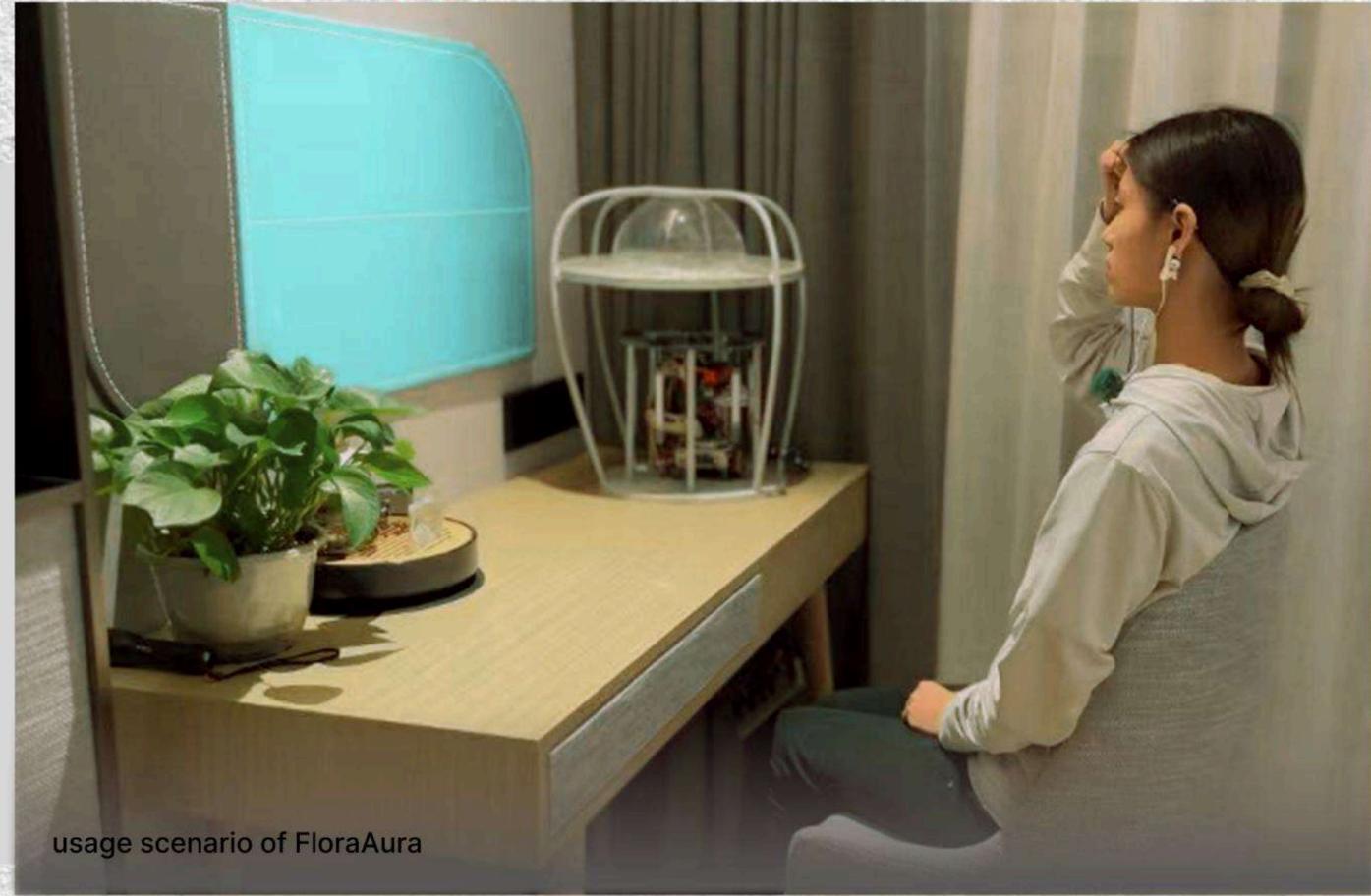
EEG device senses user emotions, program analyzes them

The servo is controlled to lift the bottle of fragrance corresponding to the emotion

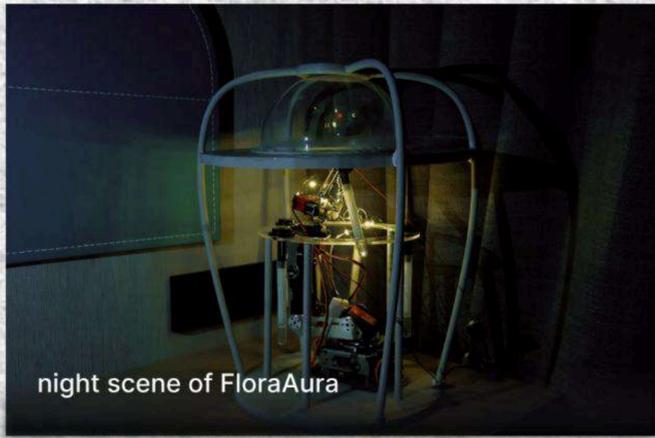
atomiser sprays essential oil to regulate user emotions



structure of FloraAura



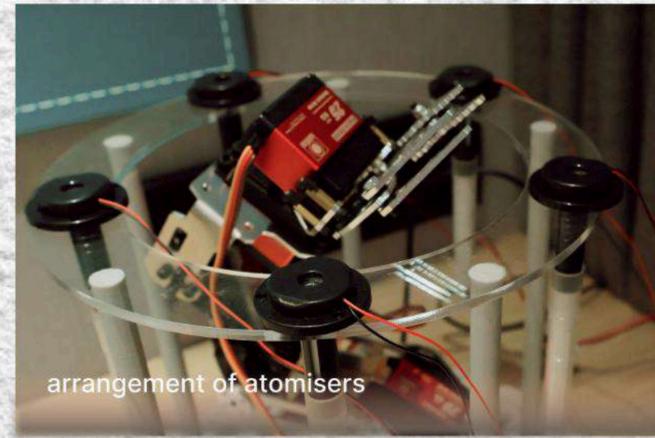
usage scenario of FloraAura



night scene of FloraAura



Position of servo motor



arrangement of atomisers



the atomizer is lifted up

Service Flow



awake
lift spirit
Wake up scenario
vitality

In the morning bedroom, the user has just woken up and has not yet eliminated drowsiness, so they need to be energized to awaken. The device emits lemon scented essential oil, which refreshes the mind and brings vitality and excitement to the day



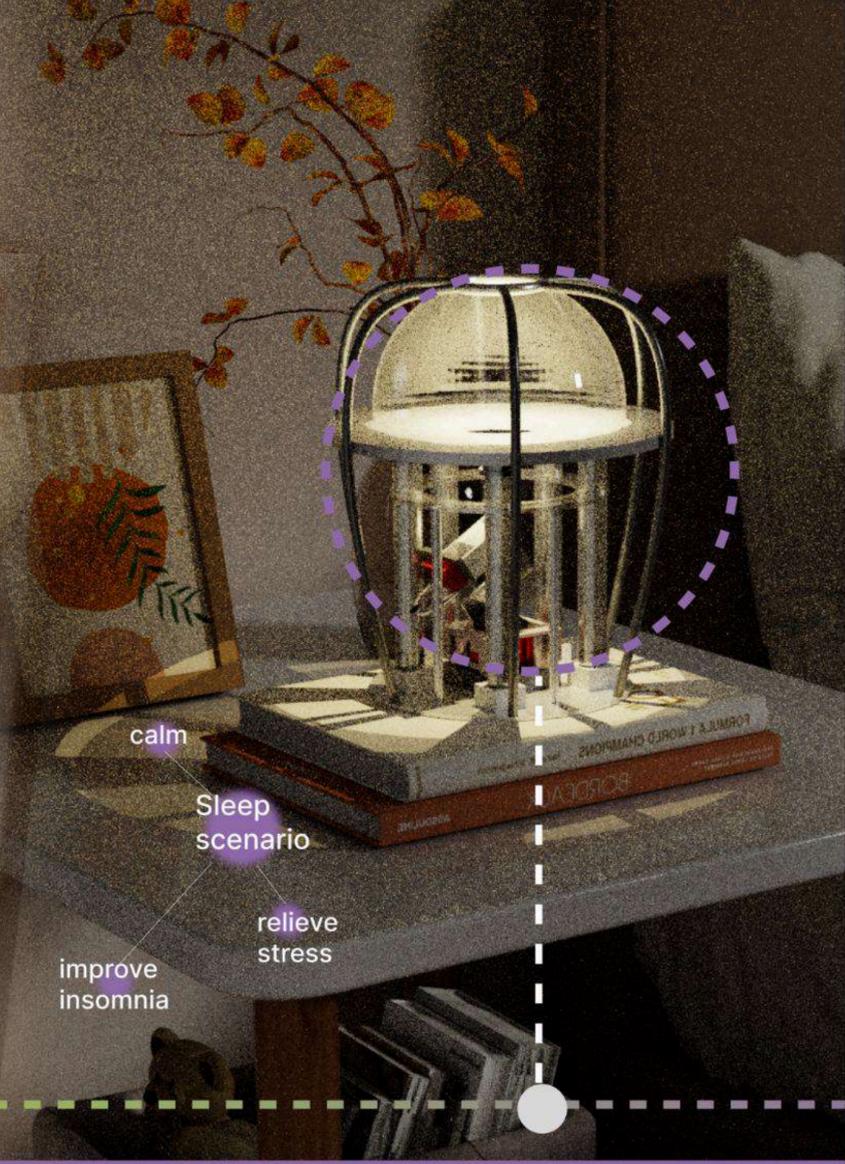
relieve tension
Leisure scenario
relax
relief

At noon in the living room, the user finished their busy morning schedule and needed a short moment of leisure and relaxation. The device emits sweet orange scented essential oil, soothing tense nerves and bringing warm and pleasant emotions



enhance attention
Work scenario
Improve stuffiness
enhance memory

In the afternoon study, users need to engage in prolonged learning or work, making it difficult to concentrate and prone to mental fatigue. The device emits essential oil with a rosemary fragrance, making people more focused on studying or working



calm
Sleep scenario
relieve stress
improve insomnia

In the bedroom at night, users may have difficulty falling asleep due to the accumulation of fatigue. The device emits lavender scented essential oil, which eliminates tension and stress and restores peace of mind

Reflection

What I have done well

- By utilizing physical computing technology and sensors to build human-computer interaction, or achieving intelligent control of physical systems
- A lot of detailed user testing was did

Future development

If I continue to work on this project, I will refine the details and create more personalized and refined installations

Areas for improvement

- More refined device structure
- Suitable for more frequent emotions
- Can allow users to personalize and customize