A PIECE OF SPACE

2017/ Physical
#Installation #Weather #realtime #atmosphere #spacetranfer
Individual Project

INTRODUCTION

A piece of space is an installation that achieve "space transfer" by altering the state of liquid in it.By designating any cities on the earth, this installation will alter the state of the liquid within it to transform the state of itself, to be a “part” of the corresponding city, to convey the real-time state of the atmosphere to you.

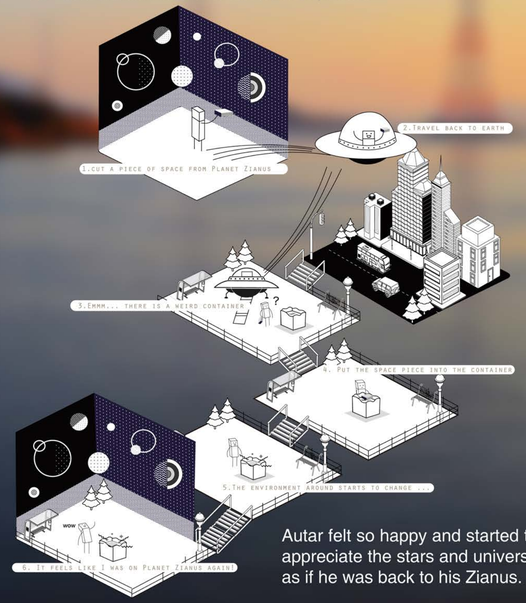
BACKGROUND

This installation enables us to acquire this: the liquid within it feels cold by hands though it is windless and warm outside. It lifts great wave layer upon layer as if it was driven by the wind from another space. By hiding the details of mechanical parts, it enables people to shift between places so that they can achieve a mimic sense of another space in real time.

There are times when we miss a city, missing its details and people living there. Whenever weather changes, anchoring effect sometimes lingers on me obviously——recalling what I was doing this time last year, the missing sense to that city life and friends enhances.
“Does it become cold there now?”, Sometimes I would check the weather of that city on my cellphone, but it does not relieve the sentiment of missing. The distance itself is still something that cannot be ignored.
The real feeling of being in that city at the same moment is quite precious for me even though it fleets quickly.

AULTAR'S STORY WITH A PIECE OF SPACE

Aultar was going to visit the earth. Before his leaving, he took away a piece of place away from his planet. Days after his landing, he stumbled across a mysterious container. As Aultar poured what he brought from his planet into the container, he felt amazed that the surrounding in earth gradually began to change, which shifted into the environment similar to his mother planet.



Autar felt so happy and started to appreciate the stars and universe as if he was back to his Zianus.

* Background : Beilun Port

TECHNICAL ANALYSIS AND CUSTOM DESIGN

Choose your favorite place and a unique shape that belongs only to you will be generated .

The edge curves of the installation is generated from tidal data of Beilun Port (Zhejiang province, China), which is the nearest tidal port from my hometown. Each wavy line comes from a weekly data of tide from Beilun Port,layers of wavy lines ultimately run together. The final curve certifies the passing of time on the spot. Also, each port has its one and only curve, a randomly chose port can be finalized as the installation. People can have their unique model by choosing his/her favourate port.

10950 *Original Data*

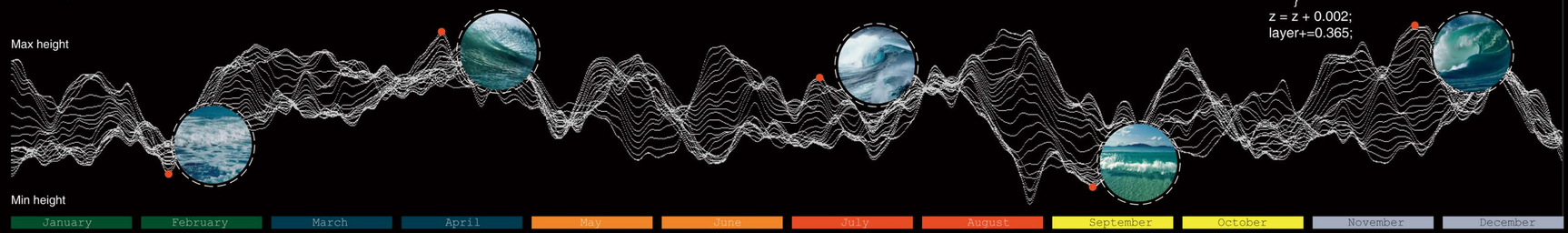
In my case, I chose Beilun Port as my favorite which contain a lot of stories about my emmories.

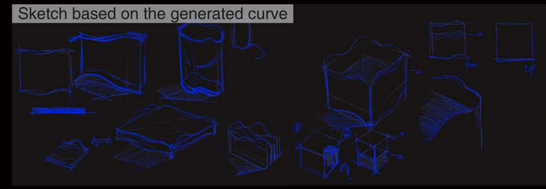
I collected **10,950** raw data(Beilun Port) from China maritime service network.
Based on the results of the calculation, various forms of waves are simulated in Processing.

20+ *Simulation Times*

Generate different curves based on data from different cities.The difference between the wave crest and the wave valley forms a very unique shape, providing a different meaning for each product.

```
maxheight = max(values);
minheight = min(values);
for (float y =height; y >0; y = y - layer) {
    for (float x = 0; x < width; x = x+1) {
        stroke(230);
        strokeWeight(1);
        //myColor += 0.01;
        point(x, y + map(noise(x/100, y/100, z),
0, 1, minheight, maxheight));
        if (myColor > 255) {
            myColor = 0;
            }
        }
    }
z = z + 0.002;
layer+=0.365;
```





Materials that have been experimented with: Aluminum plate | Acrylic plate | PVC | ABS

Materials that have been adopted finally: Aluminum plate | High-temperature resistant ABS | Silver paint spraying

Reasons:
01 aluminum plate High Conductivity
02 ABS is easier to cut, polish and weld

GETTING REAL TIME DATA

I have tried two methods to get real-time weather data on the Internet.

01 Getting real-time weather data by labview
02 Getting real-time weather data by from Xinzhi Weather Github api demos

Both the two methods work. I adopted the latter one since the it parses data all in arduino.

Analysis, judgement and control: Extract data from Webpage, parse data and extract data from JSON :

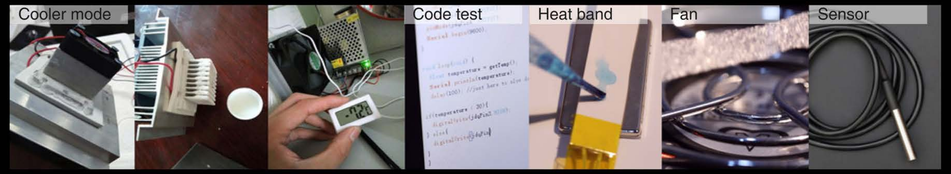
```
bool parseUserData(char* content, struct UserData* userData) {
  DynamicJsonBuffer jsonBuffer;
  JsonObject& root = jsonBuffer.parseObject(content);
  if (!root.success()) {
    Serial.println("JSON parsing failed!");
    return false;
  }
  const char* x = root["results"][0]["location"]["name"];//
  Serial.println(x);
  strcpy(userData->city, root["results"][0]["location"]["name"]);
  strcpy(userData->cnty, root["results"][0]["location"]["country"]);
  strcpy(userData->weather, root["results"][0]["now"]["text"]);
  strcpy(userData->temp, root["results"][0]["now"]["temperature"]);
  strcpy(userData->feel, root["results"][0]["now"]["feels_like"]);
  strcpy(userData->hum, root["results"][0]["now"]["humidity"]);
  strcpy(userData->visi, root["results"][0]["now"]["visibility"]);
  strcpy(userData->wind, root["results"][0]["now"]["wind"]);
  strcpy(userData->windScale, root["results"][0]["now"]["windScale"]);
  strcpy(userData->udate, root["results"][0]["last_update"]);

  return true;
```

* Background : Cities supported

REALIZING AND PROTOTYPING

Testing Process



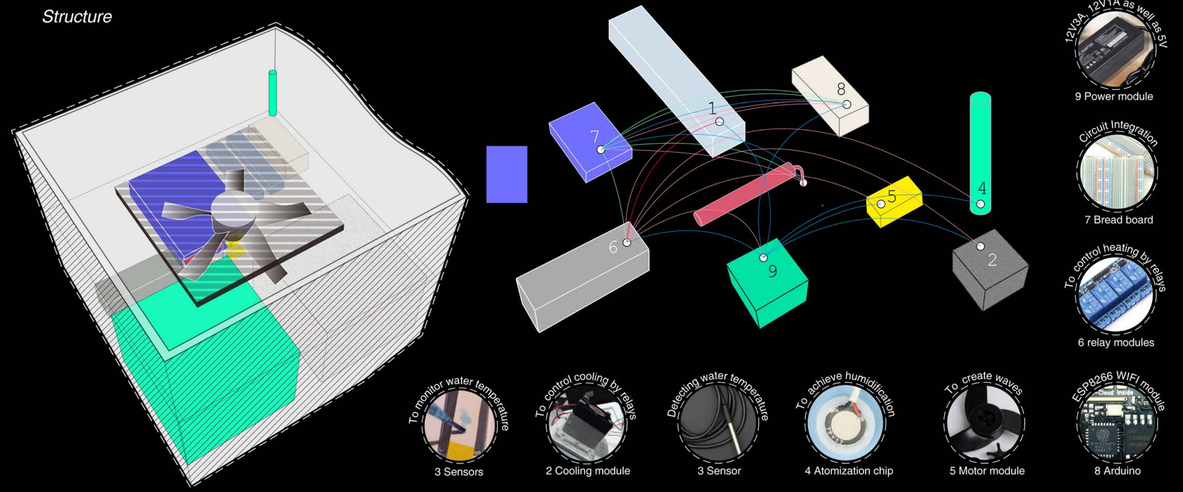
Technical testing

01 Test of getting weather data
02 The installation and test of cooler
03 Heater band testing
04 Humidifier testing
05 Thermometer testing
06 Water wave testing

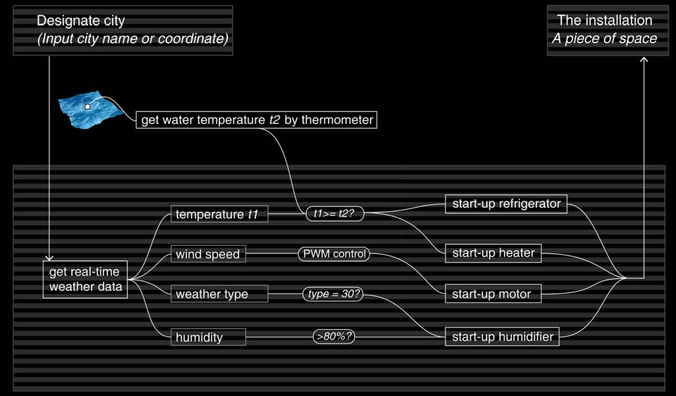
Testing results

01 The capacity required for cooler is pretty large. Normal capacity doesn't work.
02 Whether the heat can be dissipated will also play a decisive role in the speed of cooling, so I left thermovent at the bottom of the installation.
03 Add water block and use water plus fan to lower the temperature together would improve efficiency.
04 The judgment of relationship between water waves and speed of wind has two solutions:
- Control motor speed by PWM
- Control motor speed through switching powers by relays

Structure



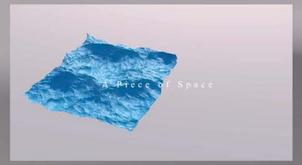
Logic theory



FINAL WORK

Dynamic Logo

The dynamic logo is a piece of sea with waves in motion.
It also looks like the surface of liquid in installation when you choose a windy city.
It could be recognized from different angles by its blue color and realistic waves.



Giclée print

The photo is a close-up of the installation, which looks like vast expanses of ice. The Giclée print is for sale at 798 art zone.

Width x Height (mm): 297 x 420 mm

Final work video: https://vimeo.com/238345539

Process video: https://vimeo.com/238626380

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