PORTFOLIO

YANG DAZHEN

2018-2019

Personal Information

Undergraduate School

2016-2020
Harbin Institute of Technology
Digital Media Technology

Intern Experience

2018.6-2019.1
CCTV-Securities News Channel
Assistant Director

Awards

Second prize of the People's scholarship in China in 2017

Provincial third prize in Computer Design Competition for College Students in China

Skills

Computer Language: Java, C++, html, CSS, JavaScript

PS, AI, ID, PR, AE, Flash
Autodesk Maya, 3D Studio Max, Sketchup
Unity 3D

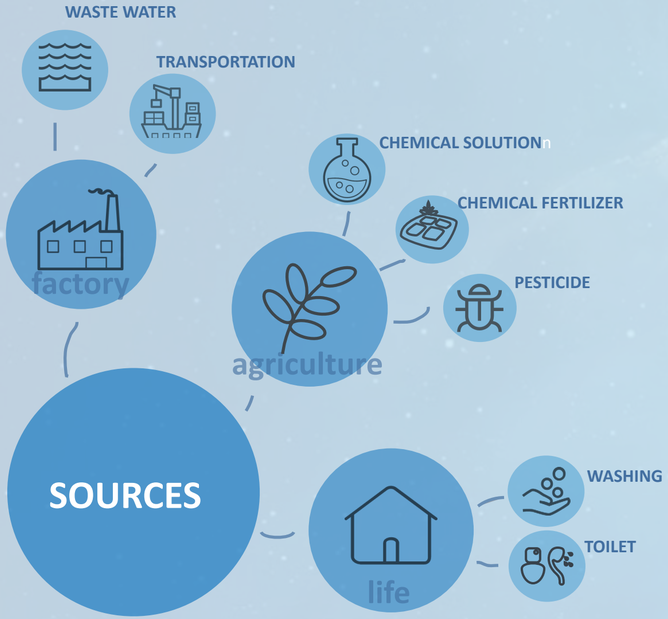
Content

Wash=Clean?

As the water contamination becomes an increasingly severe problem, which affect hundreds of sousands of people's life negtively, this project aims to make user realize how much the subtle behavior in the daily life could harm the environment and themselves through interactive experience.

BACKGROUND

Contray to the rapidly developed technology, the **water resource** becomes scarce today, and especially, in developing countries, dirty water from daily life and factory **pollute** the river without appropriate process of recycle.

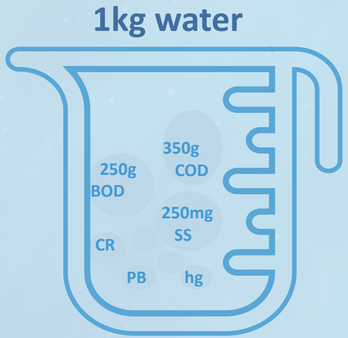


2.8 billion

People will be lack of water in the estimate of 2025.

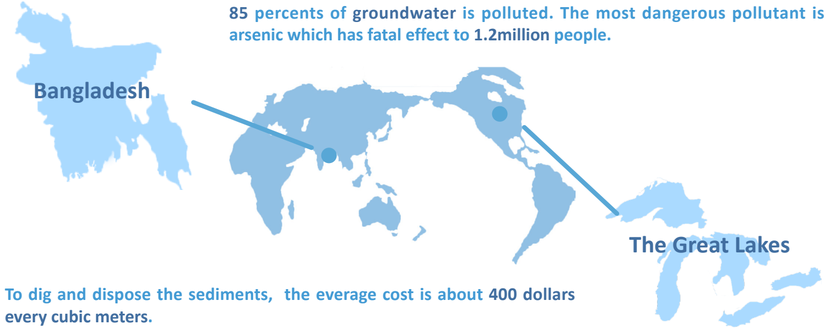
60%

Of used water is recycled in China cities in average.



OBSERVATION&DATA

The pictures are taken in the rural area in the China. The river becomes red because of the pollution from nearby **company**. And the river is filled with **plastics**.



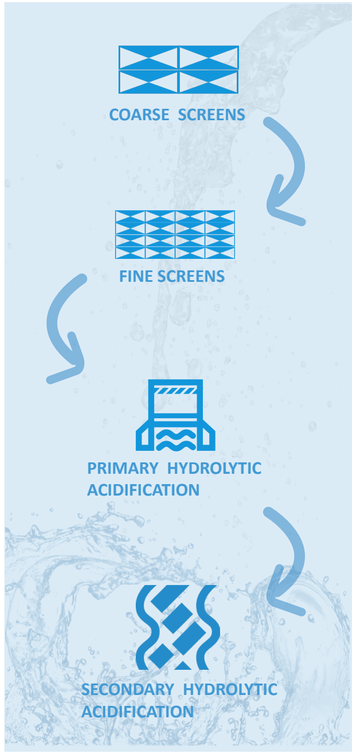
85 percents of groundwater is polluted. The most dangerous pollutant is arsenic which has fatal effect to 1.2million people.

To dig and dispose the sediments, the everage cost is about **400 dollars** every cubic meters.

SUMMARY

Most people, especially in the developing countries, are **unconscious** of the importance of water pollution and recycling.

SWEAGE PROCESS



INTERVIEW

Jia Qi a student majored in water supply engineering

"Recycling the water requires **advanced equipments and large amount of money**, so companies always discharge dirty water to the nearby river in order to save money."

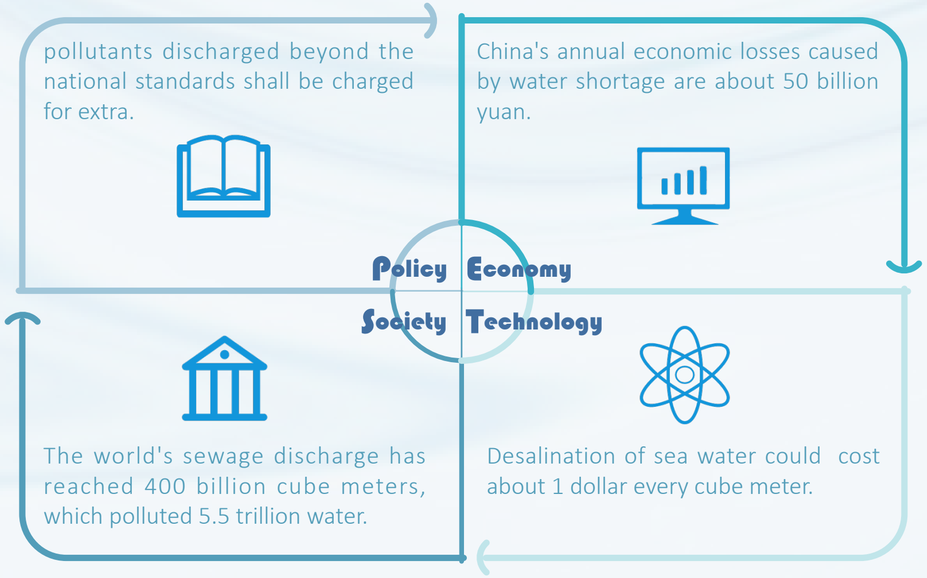
Ming Yu a student studied in London for four years

"Every time when I boiled the water to drink, there is much **waterlogging and deposits** in the bottom of the pot, which means the water is hard."

Meng Li a resident in a city of China

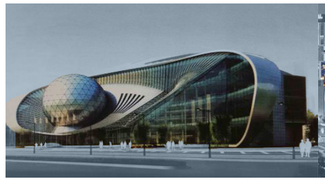
"I thought most water could be recycled, so we do not have to save water in the daily life, but I would buy the wash powder without **Phosphor** to prevent **eutrophication** ."

PEST ANALYSIS



MIND MAP

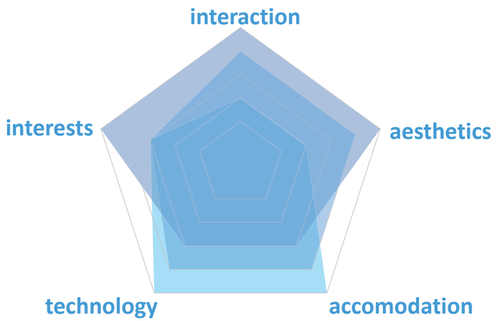
EXISTING PRODUCT ANALYSIS



China Science and Technology Museum

International Environmental Protection Industry Exhibition

Waterhouse



Conclusion

The science and technology museums in Beijing and Harbin just show pictures or display the process of recycling water, but people are tired of persuad and theroy, who tend to interact with interesting installation.

PAINPOINTS & SOLUTION

Hard to Understand

Understanding the process of waste water recycling needs professional knowledge.

Use characters to visualize

Hard to Realize

Cannot get official data and observations of water resource from a macroscopic view.

Make visual scale smaller

Hard to Spread

Traditional museums have heavy installations that are difficult to make exhibition around.

Use the VR form

DESIGN CONCEPT

Design Opportunity

Concentrate the process of recycling in smaller space and shorter period of time to make the effect manifest.

- stimulated thinking
- Sustainable development design

Concept Value

RECYCLE INTERACTION CHARACTER

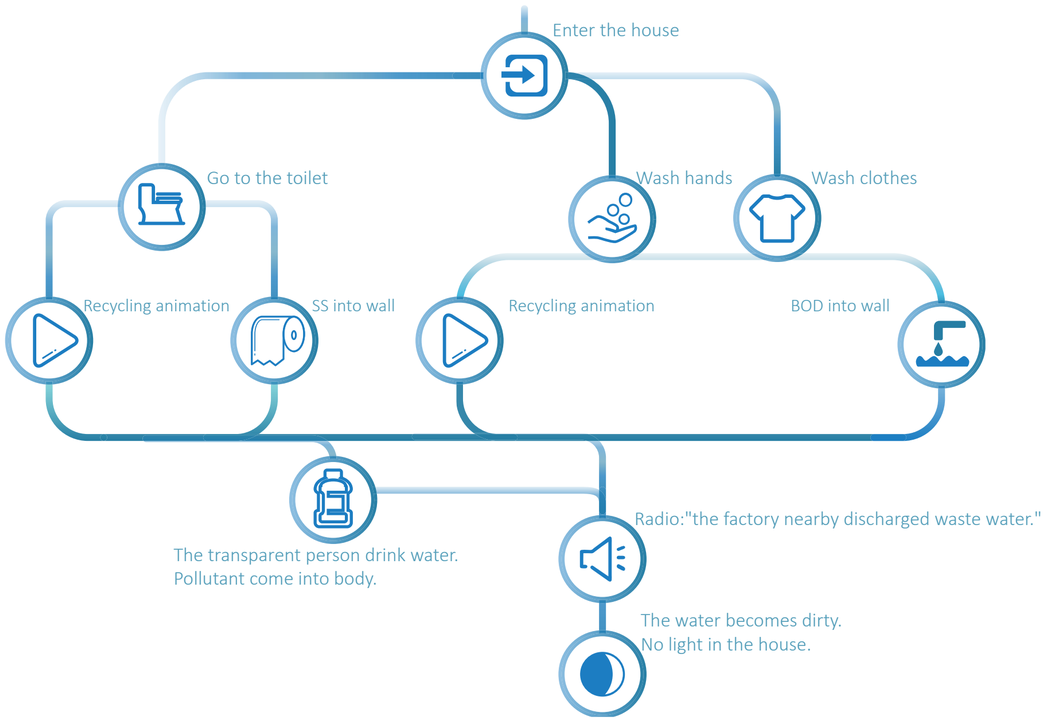
Main Functions

- data visualization
- intreresting display

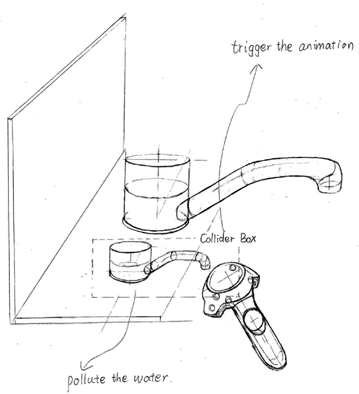
Core Mechanism

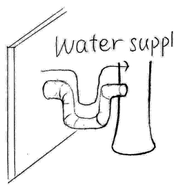
doing daily behavious
watching the changes of the water house

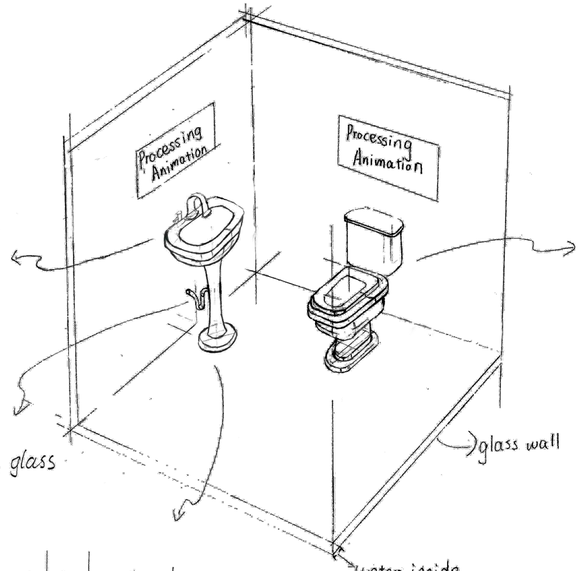
WORKFLOW

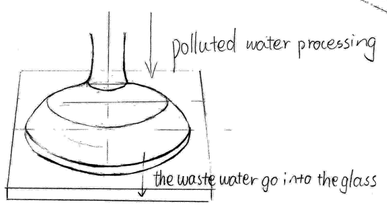


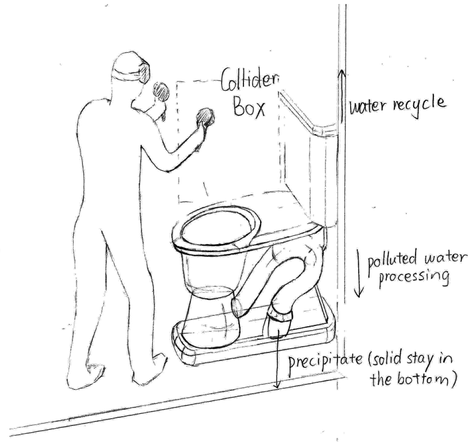
SKETCH

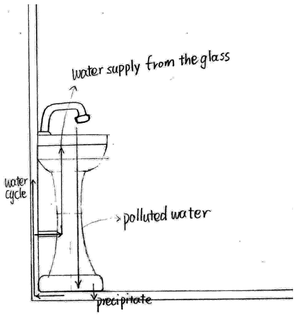






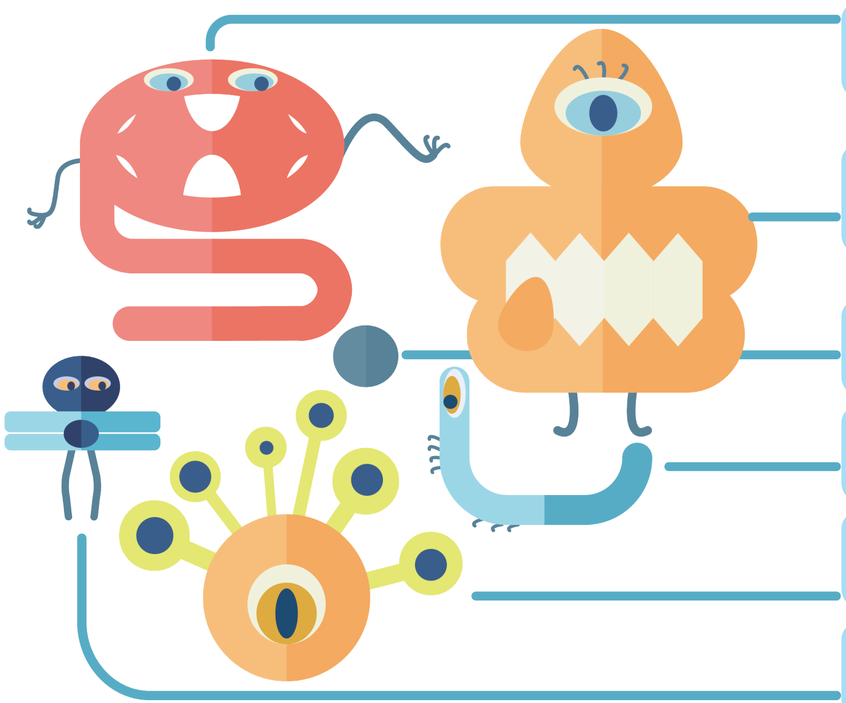






PROCESSING ANIMATION | Disease characters

Drinking dirty water could cause many health probloms.



Large Intestine Cancer

He is aggresive, who could destroys human's imune system with his claws. Most evil in the five disease.

Oil

She has a bad relationship with water, so she is always on the surface of the water, which could cause contamination.

Suspended Solid

A simple blind fool.

Parasite

Tiny and hard to deal with. He could spread disease quickly among people invisibly.

Skin Ulcers

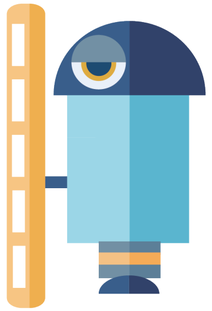
She could do harm to human's skin, which could lead to death.

Mouth Disease

With the ridiculous appearance, he could makes men's mouth black.

PROCESSING ANIMATION | Recycling Process Characters

Every part of the process is like the soldier who protect the clean water.



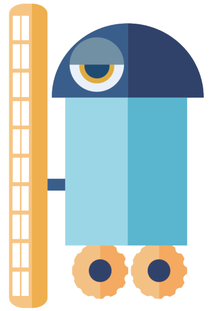
Vanguard

Brother of the soilder with delicate shield.

weapon:
simple&crude shield

character:
brave but careless

enemy:
large suspended solid



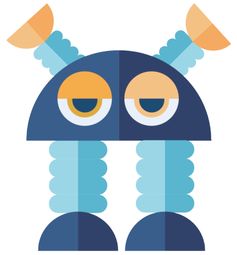
Center forward

Brother of the soilder with crude shield.

weapon:
delicate shield

character:
careful

enemy:
most suspended solid



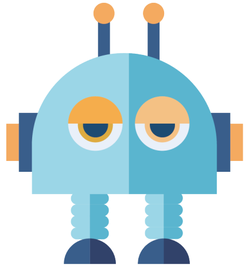
Wingback

Deal with the prisoner caught by shield soilder.

weapon:
sendimentation tank

character:
patient and strict

enemy:
solid precipitant



Technical support

Tiny and smart enimies would be killed by him.

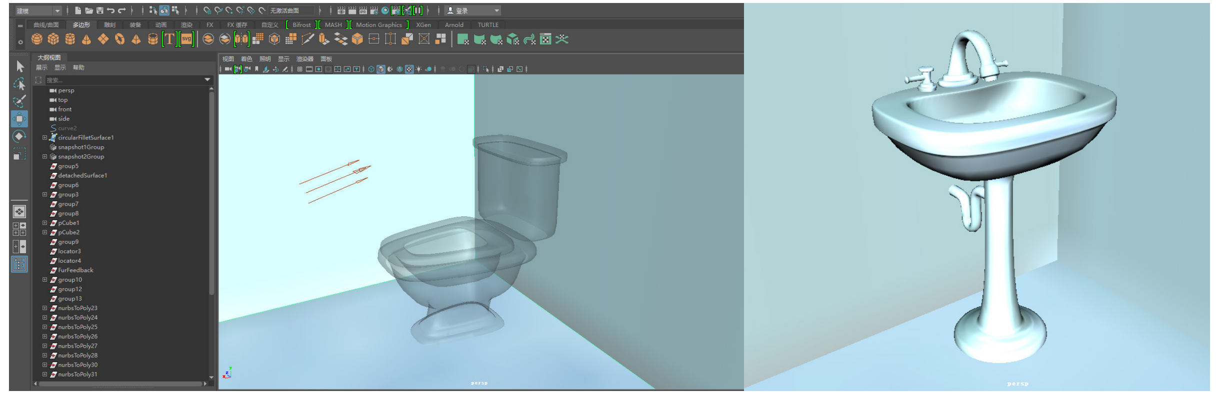
weapon:
filter

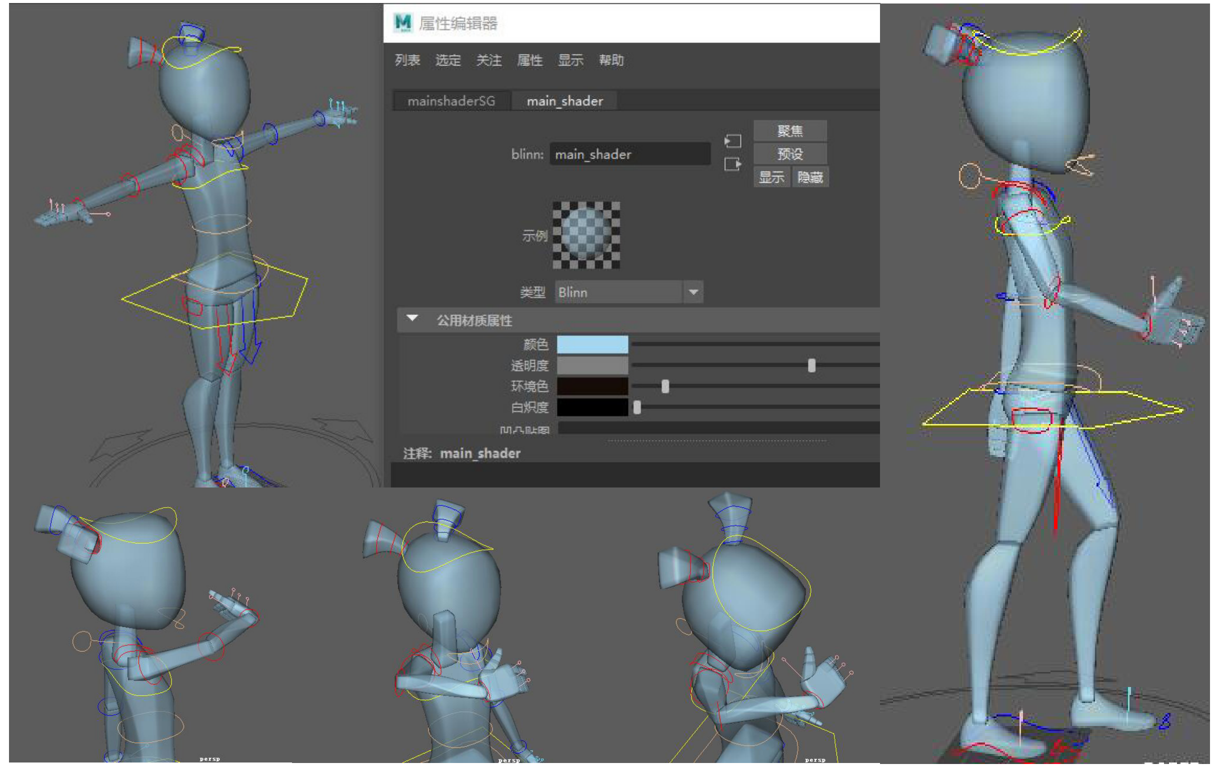
character:
intelligent and careful

enemy:
chemical polutant

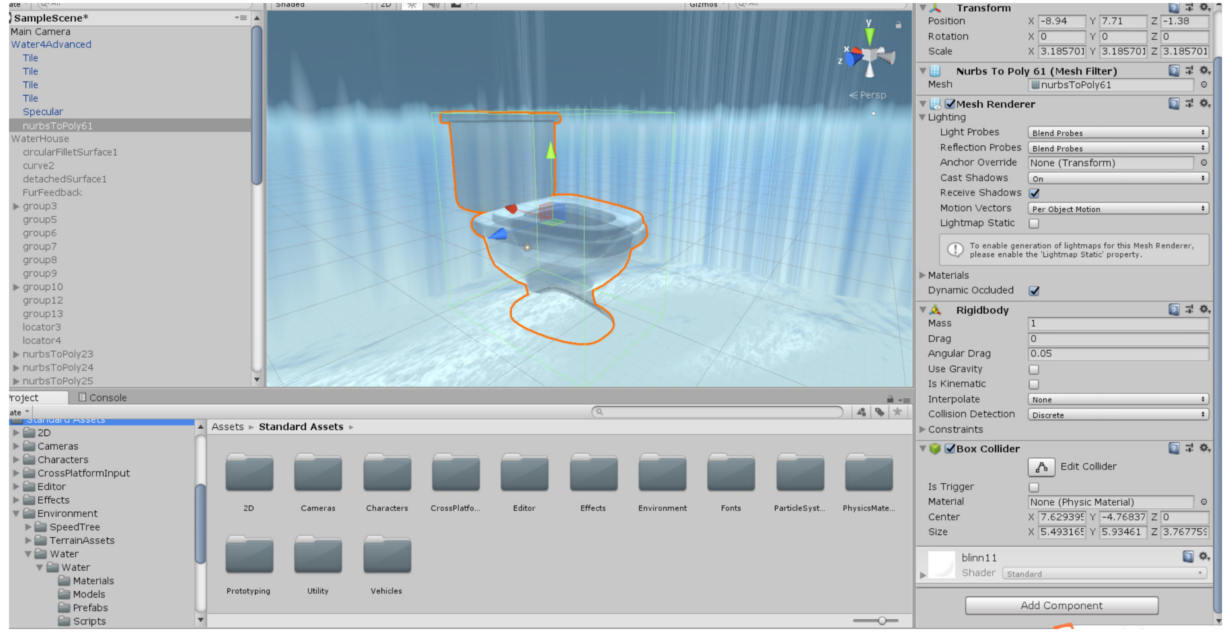
WORKING PROCESS

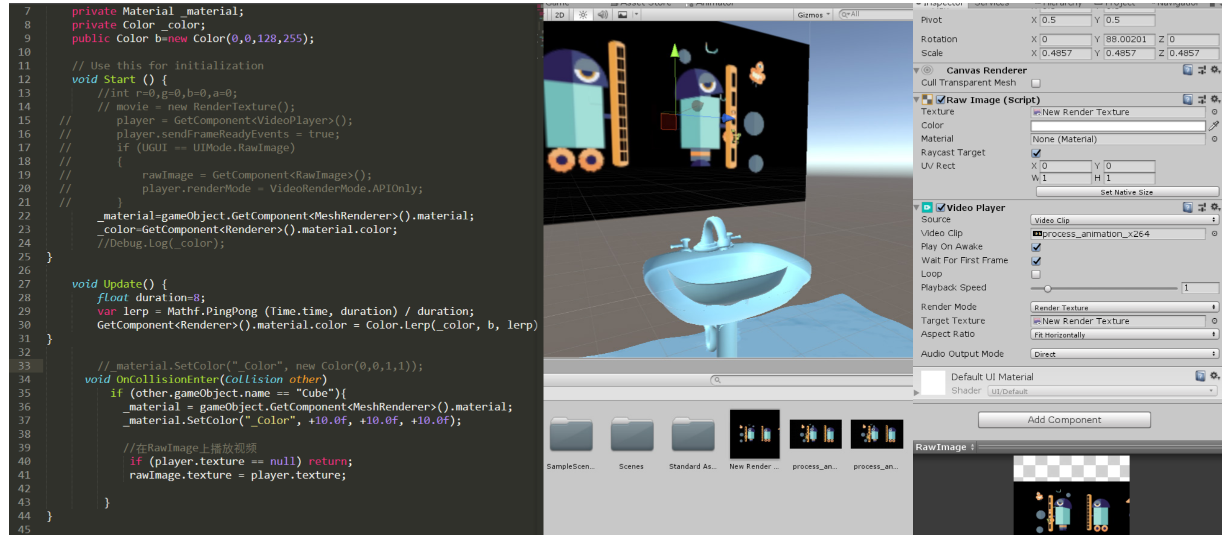
Modeling



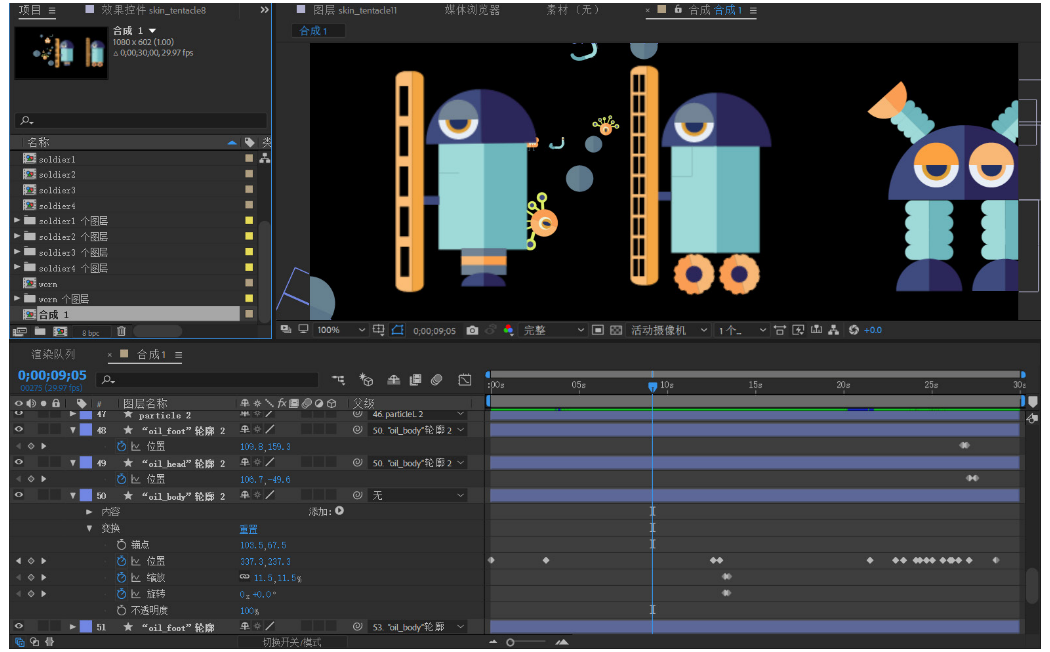


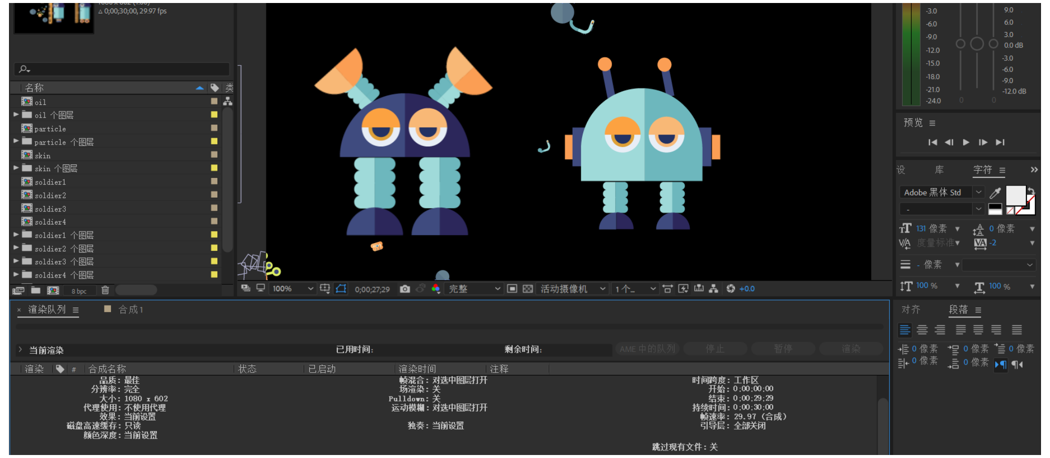
Adding Components





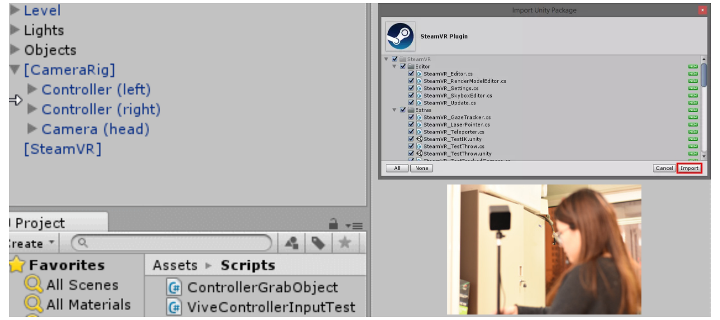
2D Animation





https://youtu.be/51vKdqEmx6s

VR Connecting



DEMO

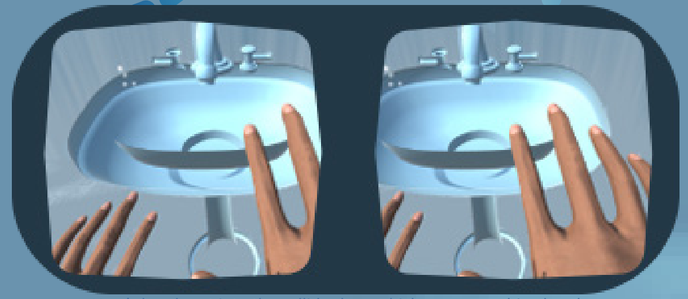
The water in the glass turns black from clear, enabling people to see the process of polluting and realize the importance of water cycle.

The particles around the tap indicate users to interact.

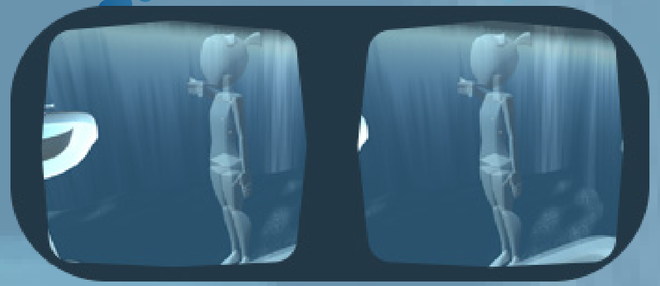
The process animation begins on the wall.

After the nearby factory polluted the water.

The whole space is surounded by clear water.



User's hands get into the collider box, which means washing hands.



Water turns dark, and when the transparent girl in the scene is drinking, bad chemicals get into her body.

Dirty water disables light to get in.

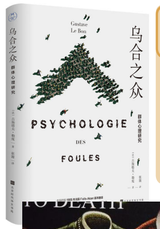
2

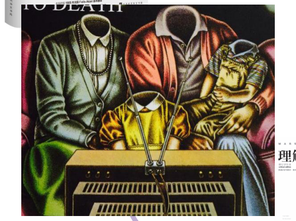
《The Crowd》

To pay my respect to the two books, *the crowd:a study of the popular mind* and *Amusing ourselves to death*, and start introspection of contemporay communicating meida in the intelligent era, this game aims to translate profound communiacation theory to images and inspire the players to take good use of the internet through game.

INSPIRATION

Main Idea
in *The Crowd*
The crowd has characters of emotional, unanimous and low IQ.
People would lose their dispensible personality following the crowd.





knowledge in books
complicated sentenses
reasonable conclusions
pearls of wisdom
difficult to finish reading

philosophy in games
attractive stories
encouraged mechanism
comprehensible images
deeper memory

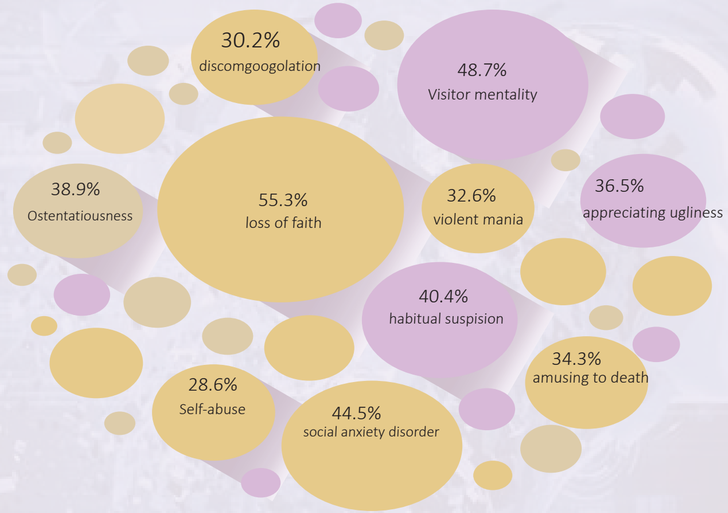
Main Idea in *Amusing ourselves to death*
The right of social public speech is turn to shallow and fragmental from rational and logical.

Are we really amusing ourselves to dealth?
What to do to keep thinking?

RESEARCH

Weibo

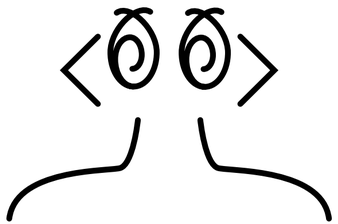
The hottest topics on the social meadia plantforms are always gossips of super stars, which shows the tendency and affinity of people.



CONCLUSION

Media as a medium is changing the way people living and thinking.Most Internet users are unaware of the disadvantages of technology and media, who becomes blind to follow others' words and actions, and no longer care about serious topics which relates to the philosophy and aesthetic of life.The instant message broaden people's access, but meanwhile deprive their ability of critical thinking.

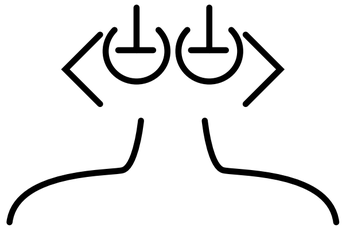
GAME CHAPTERS



Chapter 1

CROWS CHIRPING IN LOST FOREST

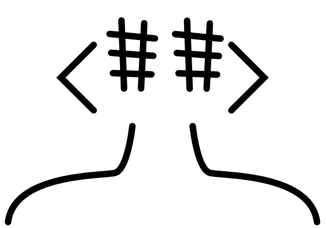
Form	AVG(labryrinth)
Symbol	The labyrinth symbols the state people in the soial media. Crows are the crowd of people losing cool minds.
Concept	In the electronic media era, people should follow their heart and ration.
Style	sketch(black and white)



Chapter 2

TVS IN BUBBLES

Form	ACT
Symbol	To indicate the filter bubble theory. Use images to visualize the algorism.
Concept	To encourage players to absolve sophisticated information, and balance entertainment and serious literary.
Style	industrial&metal

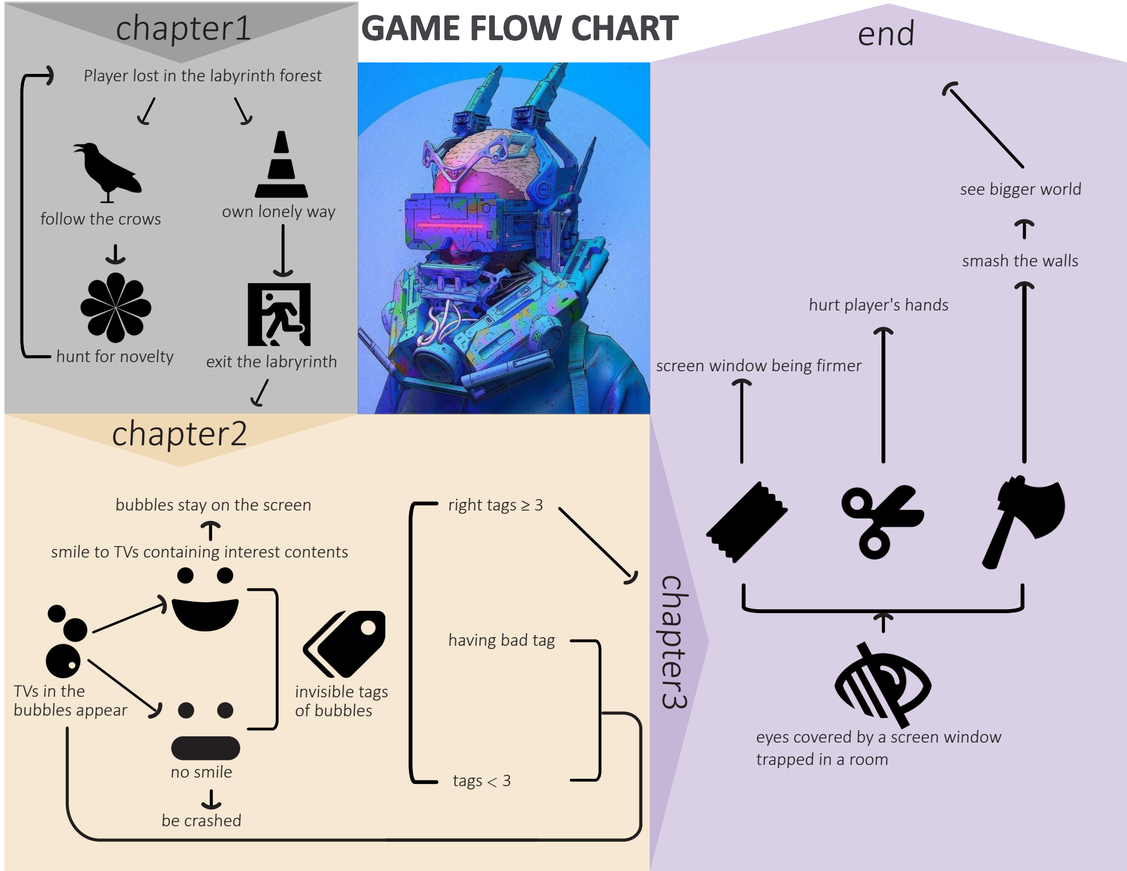


Chapter 3

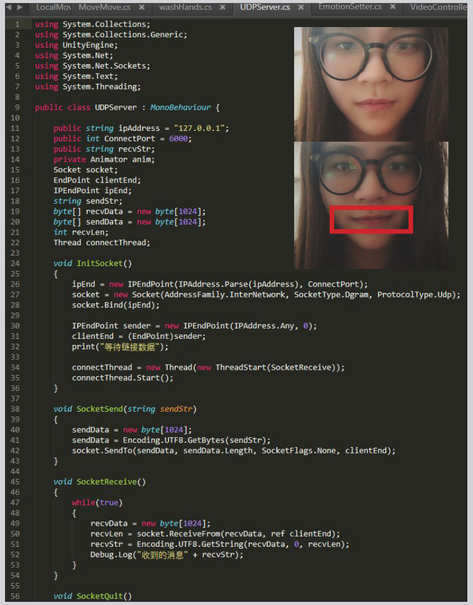
SCREEN WINDOW IN EYES

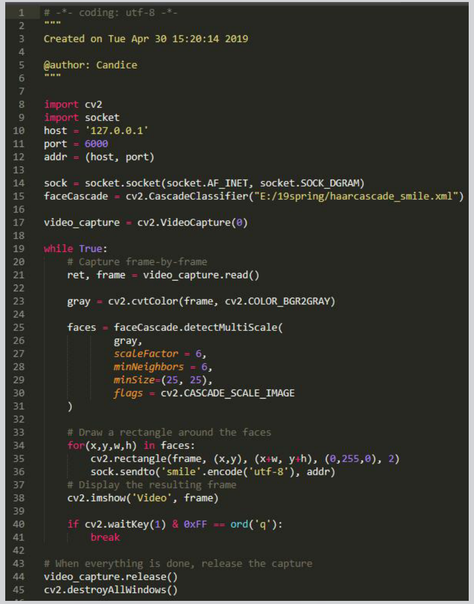
Form	PZL
Symbol	To indicate people are blind in the media.
Concept	To encourage players to meet the bigger world and broaden their horizon. Every space is just a small part of world.
Style	Punk

GAME FLOW CHART



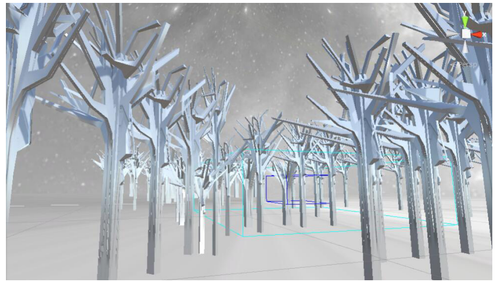
TECHNOLOGY AND ALGORITHM

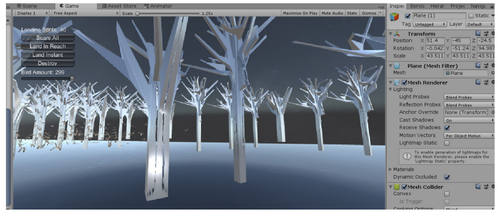


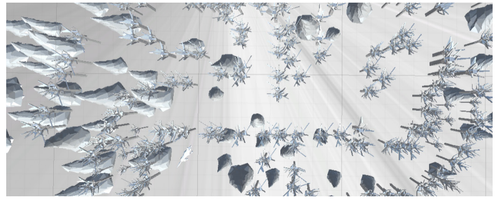


Detect the smile of the player, and control the bubbles in scene2.

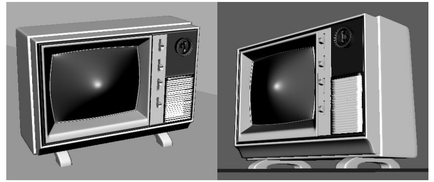
MAKING PROCESS

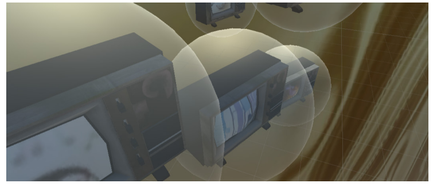




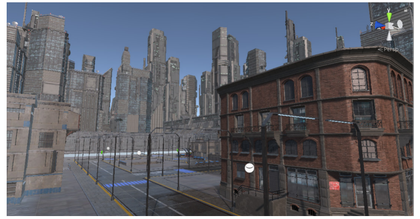


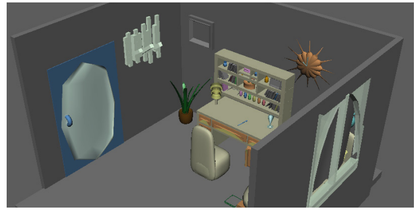
Chapter 1





Chapter 2

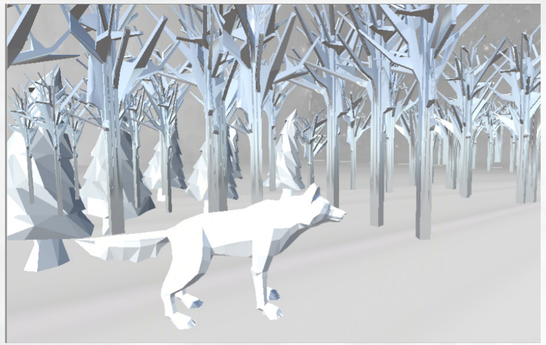




Chapter 3

DEMO

1.The beginning and instruction.

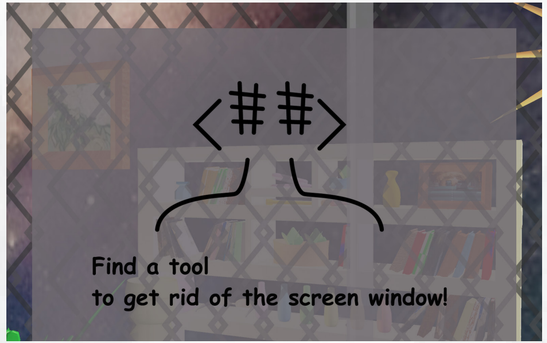


2.Lost in the forest, players following the crows find various animals.

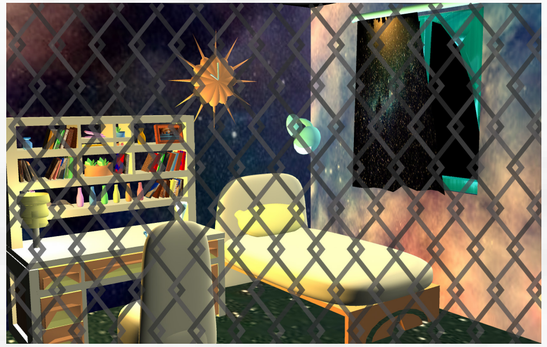
3.Transition from Chapter1 to Chapter2.

4.Smiling to the bubbles could choose the ones that they like.

5.Transition from Chapter2 to Chapter3.



6.finding tools in the room.



7.Using the axe to smash the door.

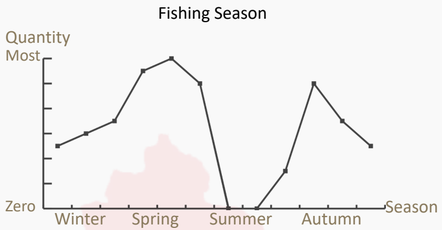
8.Breaking the wall of the house, see the whole world.

3

Hezhen Culture

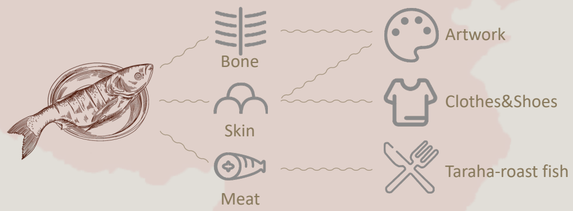
The website aims to introduce the culture and modern information of Hezhe ethinic group, which inhabit in Heilongjiang Province of China. Users could interact on the website and experience the clothes-making with fish skin online.

BACKGROUND&RESEARCH



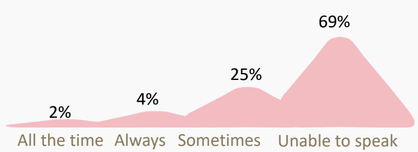
Population:5000
Position:near Wusuli River
Preponderance:fishing

Due to the harsh living conditions, Hezhen made full use of fish.



Transportation from Beijing

Frequency of speaking Hezhen language



OBSERVATION

Having observed in Fuyuan Town, making clothes with fish skin and the Imam Kan epic song are special and inspired.

The process of making clothes with fish skin.

Imam Kan-The Early Form of Talking and Sing

INTERVIEW

Among fifteen interviewers, Fu and Chen are the most representative about suggestions of preserving the culture of Hezhe.

Fu craftsman

"I usually **collect** fish bones and skins after eating them. When I pick up the material to make a picture, their shapes drive me to **imagine** the beautiful **landscape** and things in the **daily life**."

Suggestion

Chen tourist

"When I **travelled to Fuyuan**, where the Hezhen live, I missed the opportunity to watch the process of clothes-making because of the **closed fishing season** in October."

Suggestion

Conclusion

There are many people who are willing to acknowledge the culture and crafts of Hezhen. However, the **great distance** and **undeveloped tourism** disable more people to come and learn about them, even though there is **a small history museum** in Fuyuan.

CASE STUDY

PERSONA

Shang university student

Age: 21
Major: history
Residence: Shanghai
Frequently used website: Airbnb, Tencent video, Google

Hobby: Travel, Game, Music, Movie

Usual practice
Studying history: Reading, Website, Interview, Lecture
Sharing: Inspiration, Vlog, Picture, Collection

Skills
Drive ✗
Cook ✓
Painting ✓

"I learnt Hezhen culture first in a **documentary** on TV, and the **clothes-making with fish skin impressed** me. Also, the delicious foods and amazing crafts attract me. I really **wish to travel** there someday, but I could not **drive**, which makes the plan difficult."

STORYBOARD

Shang saw the fish skin colthes on TV and got interested in it.

So she searched on the Internet, but there is just a few introduction.

Going to Hezhe tribre is far, and she did not know how to go.

She posted a question on the social platform but nobody answered.

PAIN POINT

No access to communicate.

Lack interaction and interest.

Information is outdated.

Single access to information.

MAIN FUNCTION

WEB STRUCTURE

website access

web page

modules in page

link

a set of pages

Home Page

- Message
- Posts
  - Picture
  - Text
  - Collect button
  - Comment button
  - Comments
  - Icon of creater
  - Publish time
- Create Posts
- Log in/Register
- Search

Online Museum

- Language Learning
- Documentary
- History
- Fish skin Paintings

Travel Route

- VR Videos
- Maps&Routes
- Travel Tips

Fish Skin Painting

- Drying
- Picking topic
- Cutting
- Posing
- Mount/Save/Share

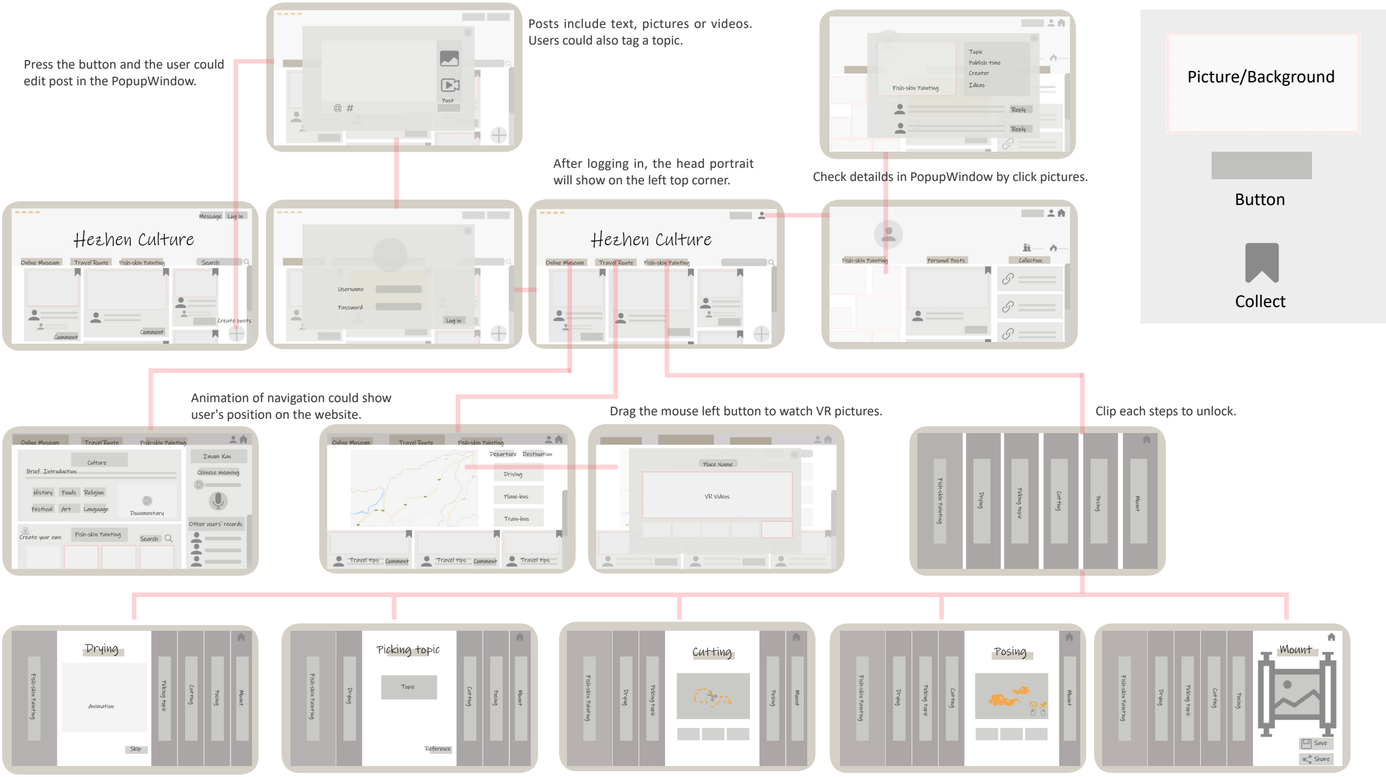
Personal page

- Personal Posts
- Painting Works
- Collection

Creater's personal page

- Personal Posts
- Painting Works

LOW FIDELITY PROTOTYPE



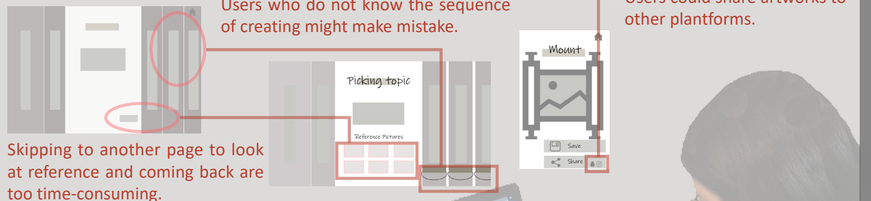
USER-TESTING

Ten testers experienced the process of website, providing feedback, and gave suggestions.

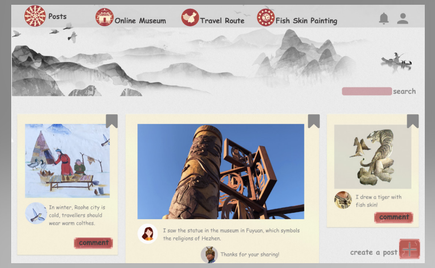
Task1: Making the fish-skin painting
Task2: Create a post
Task3: Reply to a comment
Task4: Collect a post

Fail
Have question
No problem

	Success Percent	Success Level	Average Click	Time	Efficiency Percentage
Task1	60%		23	2.5	24
Task2	80%		5	1.0	80
Task3	40%		4	0.8	50
Task4	80%		2	0.7	114

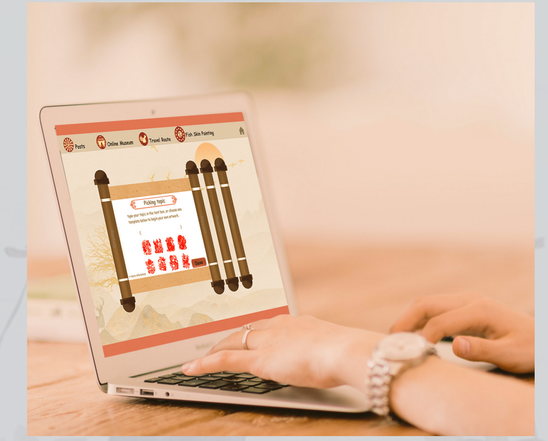


FINAL DESIGN



USER SCENARIO|Fish Skin Paiting

Step1
Enter the page of fish skin painting, and begin the firt step to watch how to dry the fish skin.



Step 2
Choose a topic or just choose a template.

Step3
Drag the left mouse button to cut basic elements.

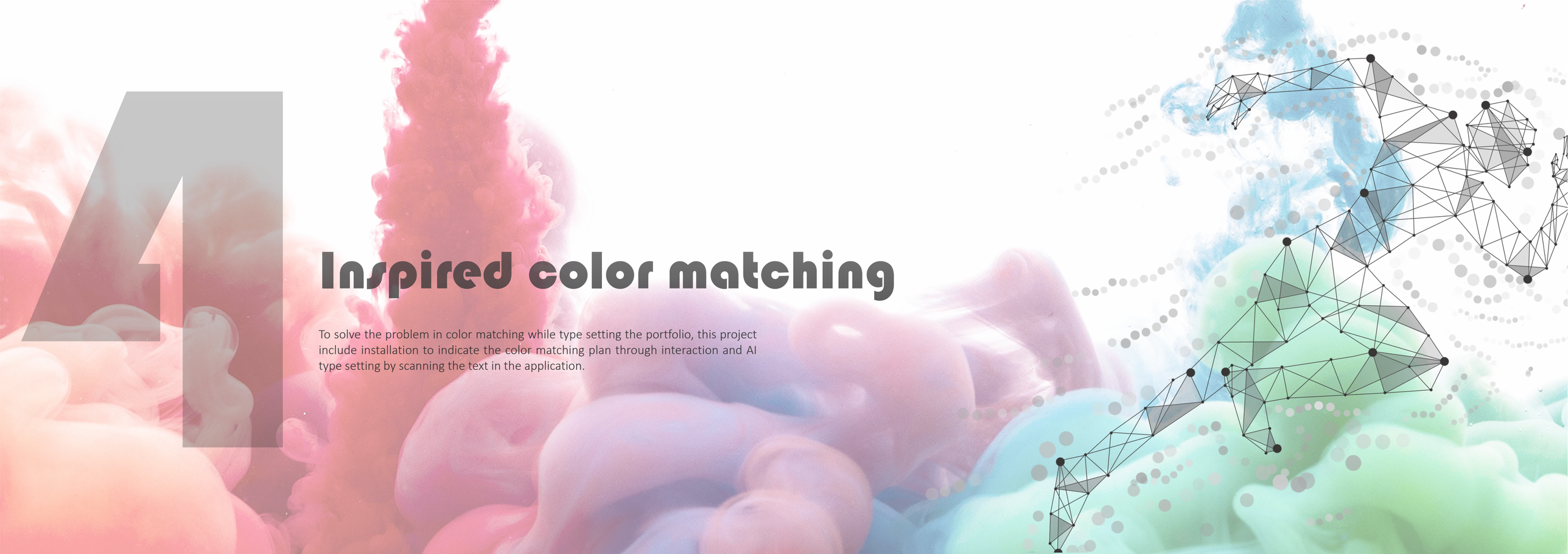
Step4
Turn the left mouse button to rotate the skin pattern, and click the right button to fix it.

Step5
Mound the fish skin painting online and share it to the platform.

4

Inspired color matching

To solve the problem in color matching while type setting the portfolio, this project include installation to indicate the color matching plan through interaction and AI type setting by scanning the text in the application.



BACKGROUND

different colors plans

type setting discord

color-matching incompatibility

Students who plan to apply for the college or a job are required to organize their artworks in an PDF or website.
During the process, matching colors to visualize the making process could confuse most people. Also, it could be a time-consuming task.

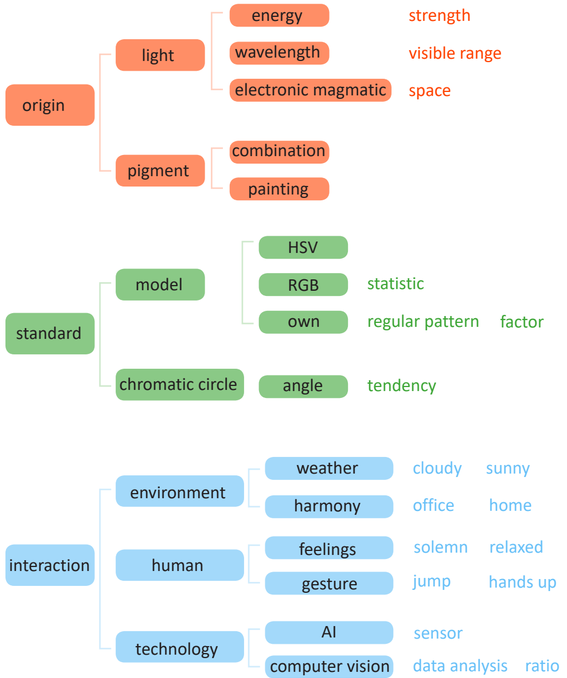
PAIN POINT

Some students could be entangled with several plans of color-matching.

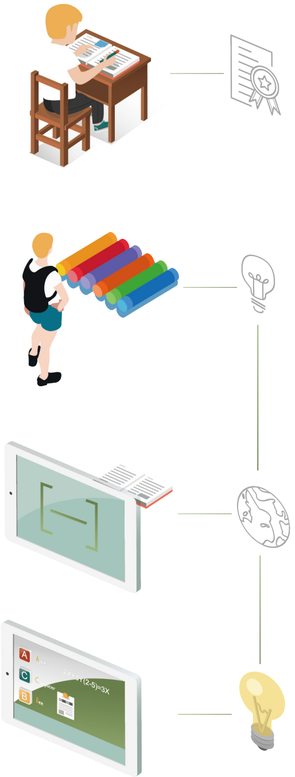
Some do not have enough aibility of aesthetic appreciation and understanding.

Others are not anble to use the appropriate colors to express the moods and purposes.

MINDMAP



WORKFLOW



Step1 Write the content on the paper.

Step2 Use pressure or projection to choose color. The color will show by LEDs

Step3 The color-matching plan will be uploaded to the computer.

Step4 Scan the written content.

Step5 Form the final type setting.

COLOR ANALYSE | k-means clustering

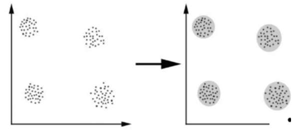
preparation for transition from step1 to step2

Algorithm theory

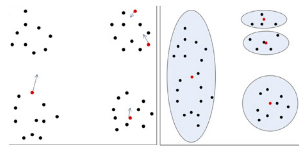
1.Classification of calculation center points.

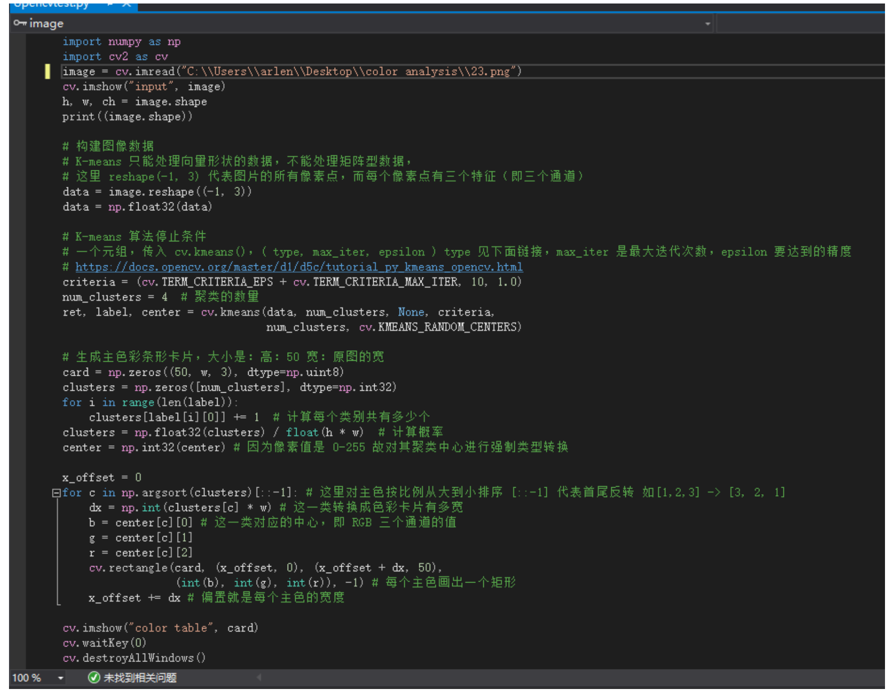
$$label_i = \arg\min_{1 \le j \le k} \left\{ \sqrt{\sum_{i=1}^{n} (x_i - a_j)^2} \right\}$$

$$a_j = \frac{1}{N(c_j)} \sum_{i \in c_j} x_i$$

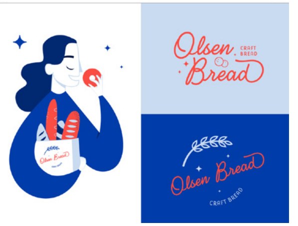


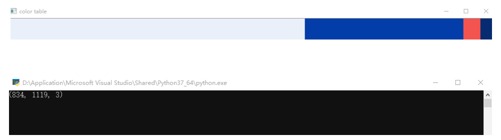
2.calculate the area of different clustering colors.

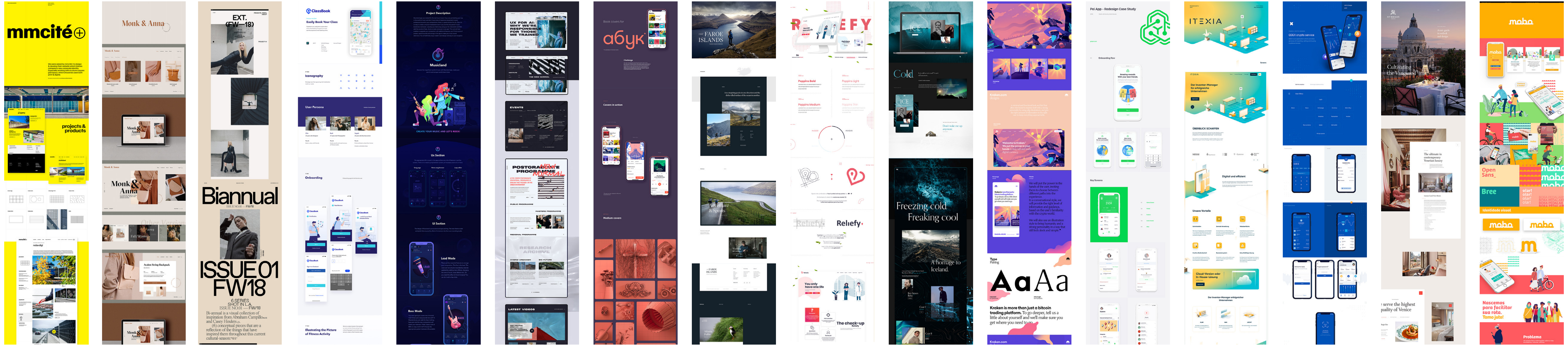


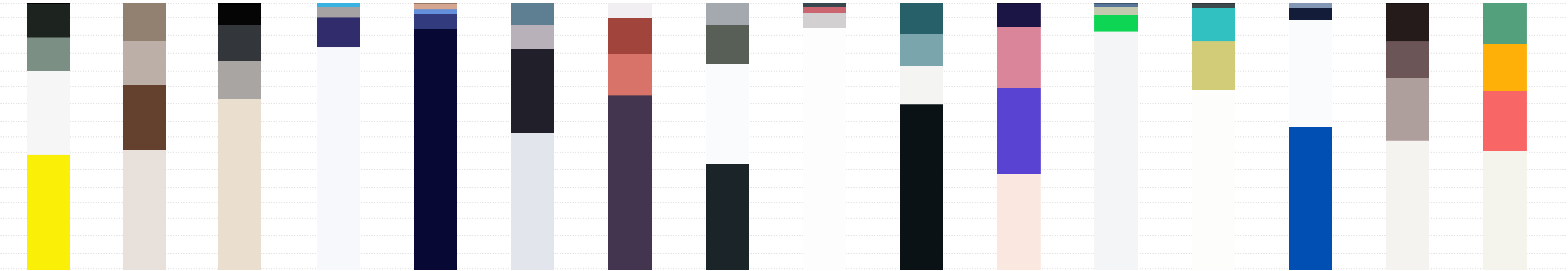


```
import numpy as np
import cv2 as cv
image = cv.imread("C:\\Users\\arlen\\Desktop\\color analysis\\23.png")
cv.imshow("input", image)
h, w, ch = image.shape
print((image.shape))

# 构建图像数据
# K-means 只能处理向量形状的数据，不能处理矩阵型数据，
# 这里 reshape(-1, 3) 代表图片的所有像素点，而每个像素点有三个特征（即三个通道）
data = image.reshape((-1, 3))
data = np.float32(data)

# K-means 算法停止条件
# 一个元组，传入 cv.kmeans()，( type, max_iter, epsilon ) type 见下面链接，max_iter 是最大迭代次数，epsilon 要达到的精度
# https://docs.opencv.org/master/d1/d5c/tutorial_py_kmeans_opencv.html
criteria = (cv.TERM_CRITERIA_EPS + cv.TERM_CRITERIA_MAX_ITER, 10, 1.0)
num_clusters = 4  # 聚类的数量
ret, label, center = cv.kmeans(data, num_clusters, None, criteria,
                               num_clusters, cv.KMEANS_RANDOM_CENTERS)

# 生成主色彩条形卡片，大小是：高：50 宽：原图的宽
card = np.zeros((50, w, 3), dtype=np.uint8)
clusters = np.zeros([num_clusters], dtype=np.int32)
for i in range(len(label)):
    clusters[label[i][0]] += 1  # 计算每个类别共有多少个
clusters = np.float32(clusters) / float(h * w)  # 计算概率
center = np.int32(center) # 因为像素值是 0-255 故对其聚类中心进行强制类型转换

x_offset = 0
for c in np.argsort(clusters)[::-1]: # 这里对主色按比例从大到小排序 [::-1] 代表首尾反转 如[1,2,3] -> [3, 2, 1]
    dx = np.int(clusters[c] * w) # 这一类转换成色彩卡片有多宽
    b = center[c][0] # 这一类对应的中心，即 RGB 三个通道的值
    g = center[c][1]
    r = center[c][2]
    cv.rectangle(card, (x_offset, 0), (x_offset + dx, 50),
                 (int(b), int(g), int(r)), -1) # 每个主色画出一个矩形
    x_offset += dx # 偏置就是每个主色的宽度

cv.imshow("color table", card)
cv.waitKey(0)
cv.destroyAllWindows()
```









COLOR-GESTURE INTERVIEW

preparation for step2-user interaction

Age:7
student

"I feel like to **chase the hope**."

Age:8
student

"It helps me to **calm down**."

Age:21
dancer

"The color seems **mysterious**, So I want to **look deep into** it."

Age:23
student

"I feel **relaxed** looking at the color matching."

"The color makes me feel **cold**."

Age:29
white-collar

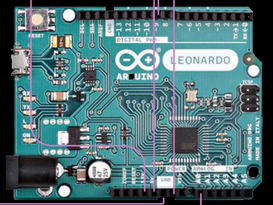
EXPERIMENT | Pressure Control

step3-produce color configuration scheme by sensor

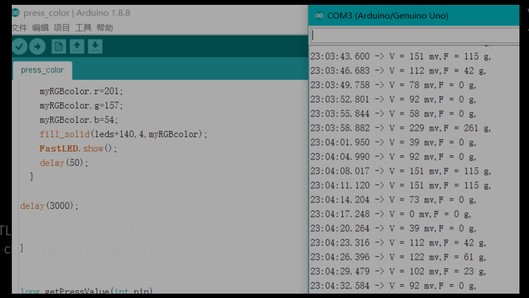
Membrane pressure sensor
RP-C18.3-LT
20-6000g
0-3600mv

LEDs strip
WS2812B
DC5V
144 LEDs/m

AO-DO modular

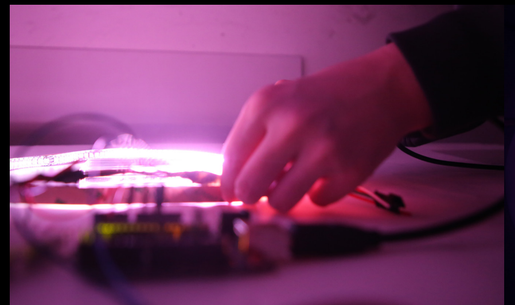


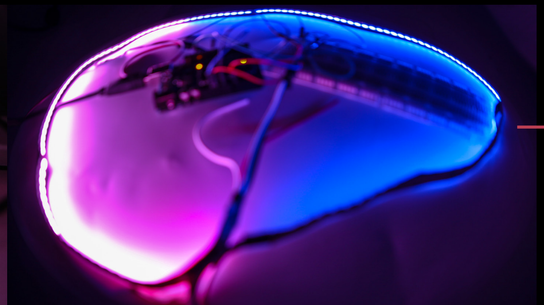

```
#include <FastLED.h>
#include <Arduino.h>
FASTLED_USING_NAMESPACE

#define DEBUGSerial Serial
int sensorPin = A0;

#define PRESS_MIN  20
#define PRESS_MAX 6000
#define VOLTAGE_MIN 100
#define VOLTAGE_MAX 3300

#if defined(FASTLED_VERSION) && (FASTL
#warning "Requires FastLED 3.1 or later; c
#endif

#define DATA_PIN    9
#define LED_TYPE    WS2812
#define COLOR_ORDER GRB
#define NUM_LEDS    144
CRGB leds[NUM_LEDS];

#define BRIGHTNESS         96
#define FRAMES_PER_SECOND  120

CRGB myRGBcolor(50,0,50);
```




```
void setup() {
 DEBUGSerial.begin(9600); // setup serialof the press sensor
 Serial.println("setup end!");//in the window print

 delay(3000); // 3 second delay for recovery

  FastLED.addLeds<LED_TYPE,DATA_PIN,COLOR_ORDER>(leds, NUM_LEDS).
setCorrection(TypicalLEDStrip);
 // tell FastLED about the LED strip configuration

 FastLED.setBrightness(BRIGHTNESS);// set master brightness control}
```

```
void loop()
{
 long Fdata = getPressValue(sensorPin);
 DEBUGSerial.print("F = ");
 DEBUGSerial.print(Fdata);
 DEBUGSerial.println(" g,");
 delay(30);
  if(Fdata>5700){
 myRGBcolor.r=4;
 myRGBcolor.g=34;
 myRGBcolor.b=102;
 fill_solid(leds,3,myRGBcolor);

 myRGBcolor.r=241;
 myRGBcolor.g=73;
 myRGBcolor.b=69;
 fill_solid(leds+3,5,myRGBcolor);

 myRGBcolor.r=230;
 myRGBcolor.g=238;
 myRGBcolor.b=248;
 fill_solid(leds+8,54,myRGBcolor);

 myRGBcolor.r=1;
 myRGBcolor.g=51;
 myRGBcolor.b=160;
 fill_solid(leds+62,82,myRGBcolor);
 FastLED.show();
   delay(50);
  }

  else if(Fdata>5400){

  }
 delay(3000);
 }

long getPressValue(int pin)
{
 long PRESS_AO = 0;
 int VOLTAGE_AO = 0;
 int value = analogRead(pin);

 VOLTAGE_AO = map(value, 0, 1023, 0, 5000);

 DEBUGSerial.print("V = ");
 DEBUGSerial.print(VOLTAGE_AO);
 DEBUGSerial.print(" mv,");

 if(VOLTAGE_AO < VOLTAGE_MIN)
 {
  PRESS_AO = 0;
 }
 else if(VOLTAGE_AO > VOLTAGE_MAX)
 {
  PRESS_AO = PRESS_MAX;
 }
 else
 {
   PRESS_AO = map(VOLTAGE_AO, VOLTAGE_
MIN, VOLTAGE_MAX, PRESS_MIN, PRESS_
MAX);
 }

 return PRESS_AO;
}
```





Feedback

delay(300);
Reduce the delay time,
and add samples
to improve the visual effect.

Instead of fixed matching pattern,
use a formula or fuction to control
the color matching.
To improve the efficiency of work.

The quality of the LEDs could affect
the visible color.
The white light of low band LEDs
tends to purple

EXPERIMENT|Gesture Control

Z-PLUS Color Matching Model

Concept
Use the body gesture to form a color matching model.
Based on the RGB color model.

Main Elements

Dominant Hue	angle of the arms
Secondary Color	angle of the legs
Contrast Ratio	angle of the elbow
Brightness	angle of the neck

Inpact Factors

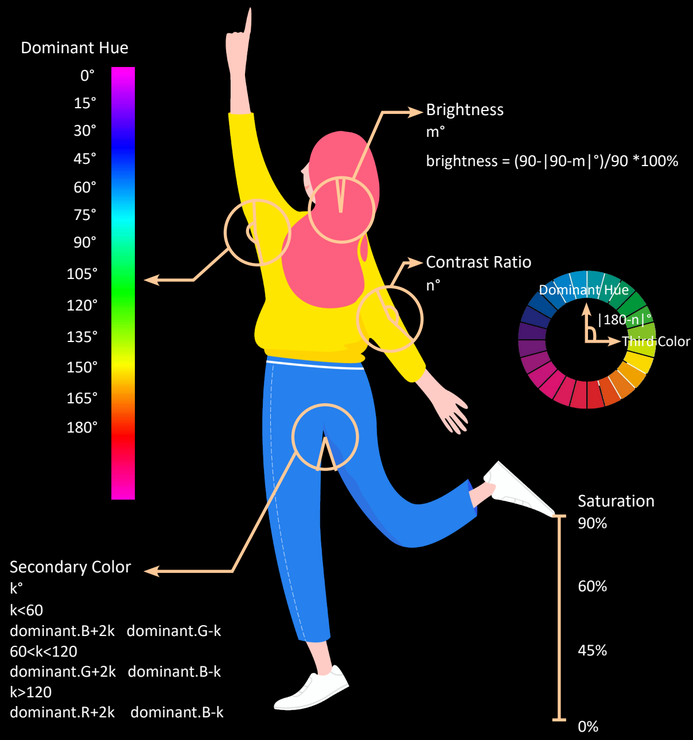
height of the shadow	h
width of the shadow	w
distance between feet and ground	a

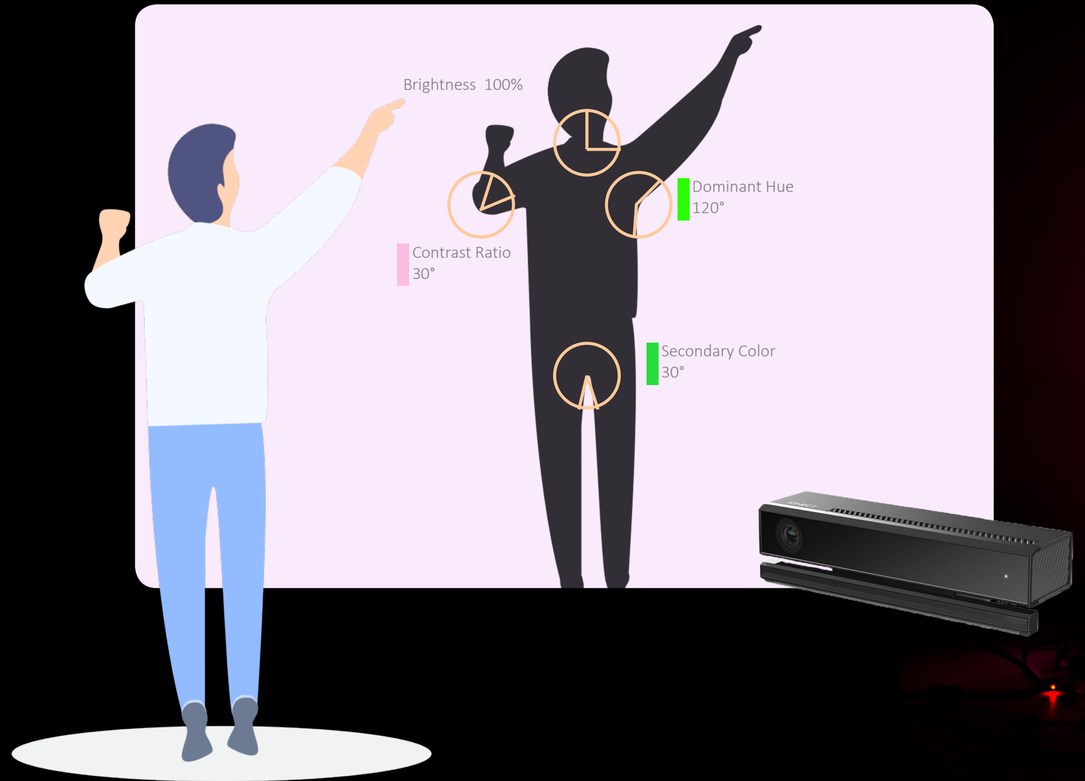
Theory
1. When people get nervous, their legs would be close with smaller angle. When they feel comfortable or cozy, the angle between legs would be larger.

2. Due to the interview test, angle of arms is more obviously changed than legs, so the angle of arms represent the dominant hue, but the legs symbols the secondary color.

3. The smaller the angle of the elbow is, the more aggresive the gesture is, so it represents the contrast ratio, as the third color for decoration.

step3-produce color configuration scheme by sensor





APP | AI type setting

step 4, 5 Algorithm theory & low fidelity prototype

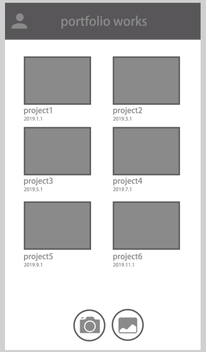
Step4 OCR (Optical Character Recognition) pipeline

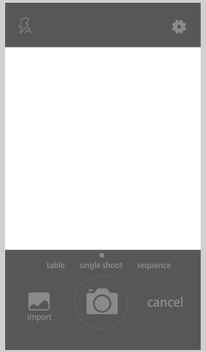
Image — Text detection — Character segmentation — Character recognition

Step5 Attention Mechanism

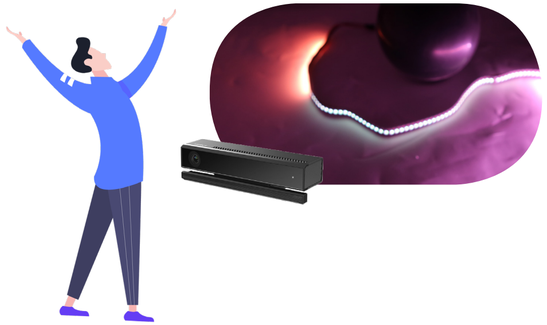
Use the attention mechanism to analyse the type-settings, and form templates.
Finish the type-setting through artificial intelligence.

low fidelity prototype





DEMO



1 LEDs will show the color scheme through analysing the user's gesture.

MOTION COLOR

Logo design:

A man is on the left, and the circles on it are the angles analysed in the APP to form the color plan.
The curve on the right resembles the relationship between angle of the gesture and color matching.

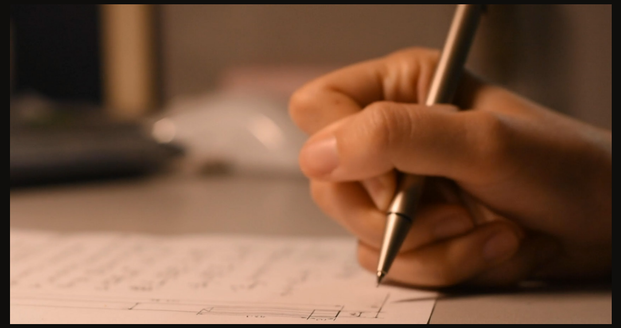
2 The color matching plan will be imported to the application.

3 Scan the text using the APP.

4 Save the type-setting.

5 Review the portfolio works.

5 Other works



Amusing City hardboard

Growing up with responsibility
public service ad screenshot

Returning boat
photography

2017.10.15 20.22 Songhua River f/8 1/80s ISO6400

2017.9.29 14:37 HIT Science Park f/5.3 1/8000s ISO1000

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