01

Intelligent Suitcase Design

Because people can not search and screen out valid destination information, they would take a long time to pick up the belongings they need to bring and are prone to problems with incorrect items and forgetting to bring some items.

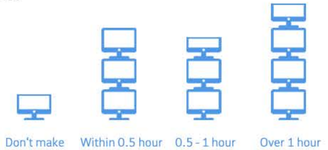
The project uses Object Detection technology to intelligently manage the suitcase, and aids people to solve the problem by designing a phone APP and the touchscreen in the suitcase.

Type: Concept Design
Form: Suitcase +UI

Qustionnaire

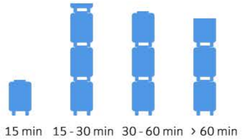
For this project, I made a two-day questionnaire. The sample size was 108, of which 98 were valid, and the final questionnaire has an effective rate of 90.74%.

Q1 Whether you make a travel guide before you decide what to take before you pack your luggage? If so, how long does it take?



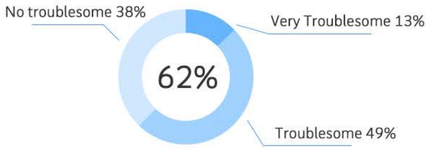
Each person's average preparation time is about 45 minutes.

Q2 How long does it take you to pack your luggage?



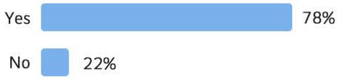
Each person's average time to pack is about 38 minutes.

Q3 Do you find it troublesome to pack your luggage?



More than half of people find it troublesome to pack their luggage.

Q4 Did you find yourself forgetting some luggage after you left home?



Q5 What factors do you think you need to consider when cleaning your luggage? Please rate the degree of importance.

Behavior Mapping

Interviewee

Name: You Wu

Gender: Male

Age: 27

Occupation: Photographer

About: He always hurried to start a trip, because of his work. Also, he had several trips in a year.

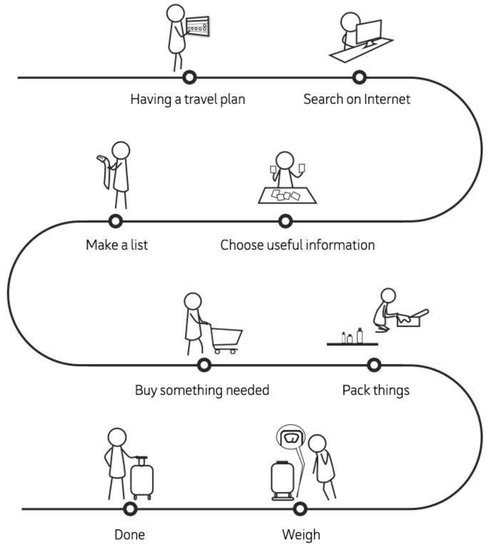
Interview

Question: What do you feel when you're packing for a trip?

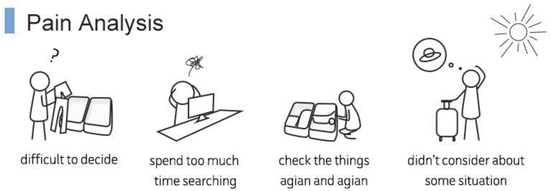
Answer: I feel a little anxiety. You know, I don't have much time to think what should I carry on. It becomes worse when the destination is unfamilar for me. I need to spend time to serach information and choose better one, but I still forget something while I have checked serveral times.

Question: What can help you to alleviate your anxiety?

Answer: Maybe someone or something that can help me to make the decision will work. Oh, and check my luggage reminding me.



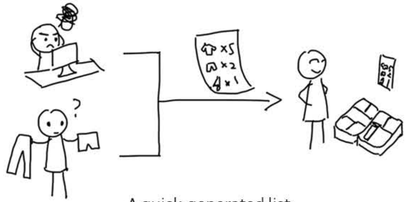
Pain Analysis



Information Architecture

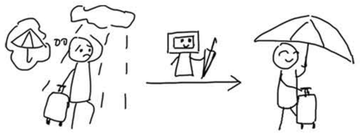
User Demand

1



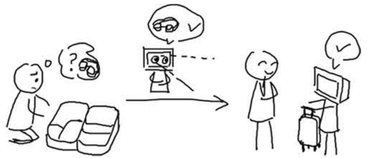
A quick-generated list

2



A thoughtful planning

3



An intelligent detection

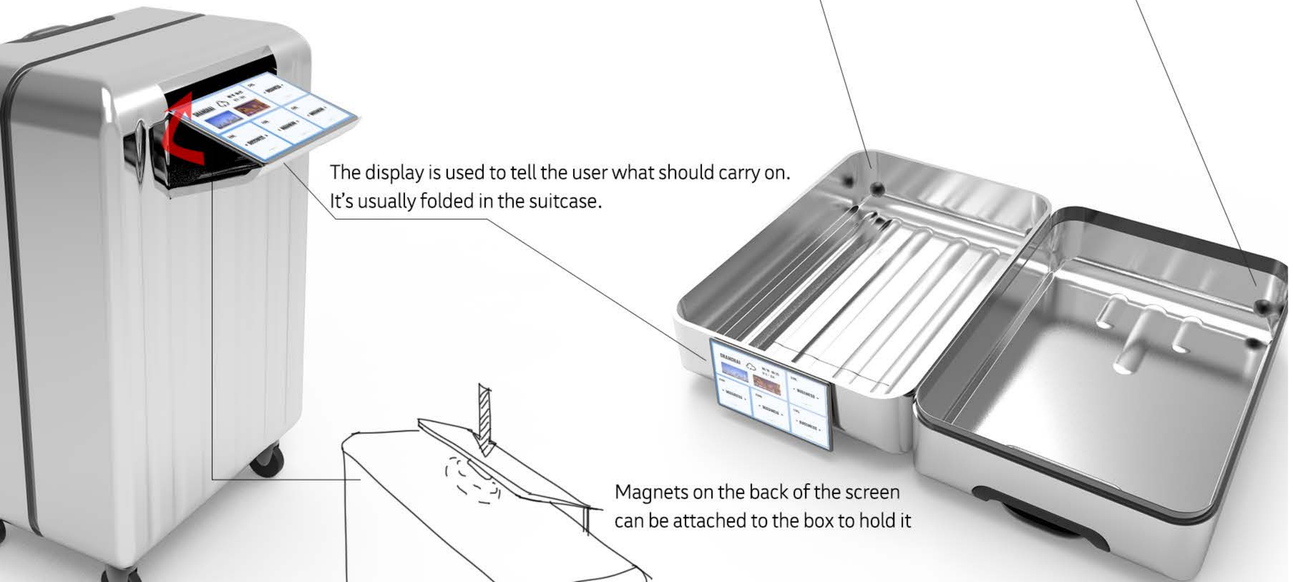
Functional framework

- Generated a list
  - Weather
  - Place
  - Transportation
  - Purpose
  - Time
  - Activitiy
  - Personal habit
- Discover a list
  - Search others list
    - Hot recommended
    - Classified search
  - Favorite a list
  - Share a list
- Remind
  - Items that need to be purchased
  - Forgotten items
- Detect
  - Detecting items brought

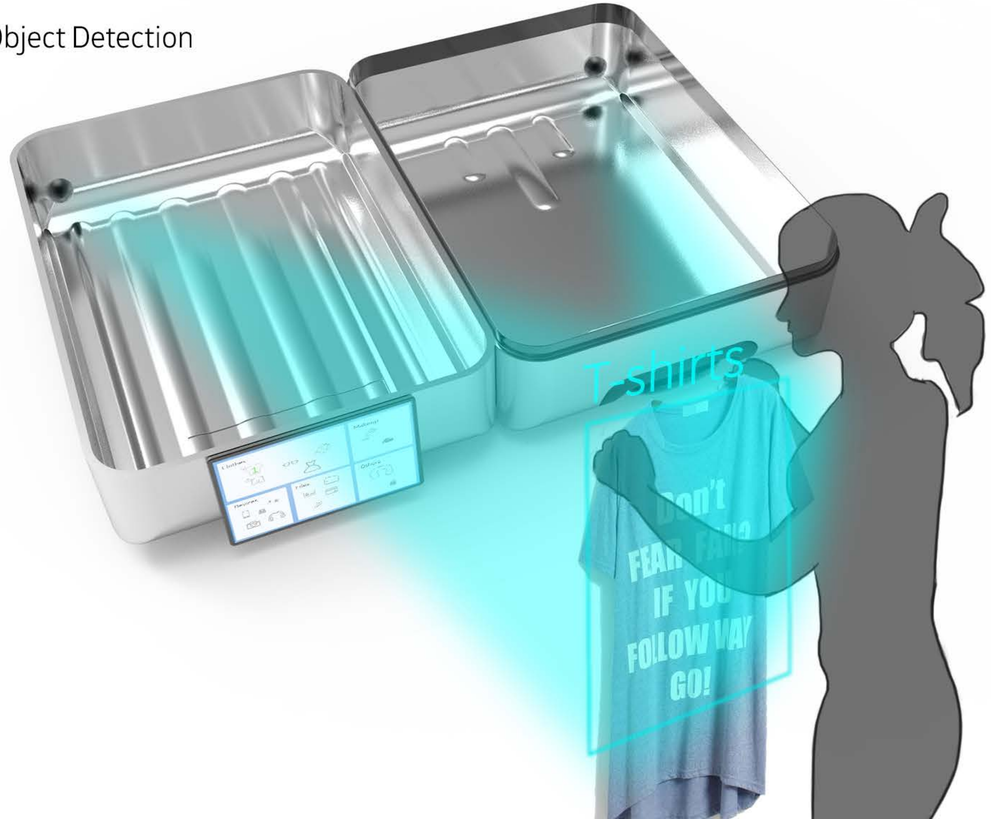
* The generation of personal lists is optimized based on users data. The more data is collected, the more personalized the list is generated.

Technology

TensorFlow is an open-source software library for machine learning across a range of tasks.
TensorFlow Object Detection API can be used to detect the object in my project.
The two cameras are the eyes of suitcase.



Object Detection



Storyboard

Name: Lisa Lee

Gender: Female

Age: 21

Occupation: White Collar

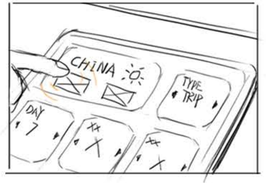
About: She is busy in working, but she also want to have a relaxed trip in annual leave. As she is too busy to make a plan for travel, it's difficult for her to choose what should carries with.

Needs: Something that can save her time to make the lists and remind her is enough.

Itinerary Reminder

Cell phone sync trip to suitcase

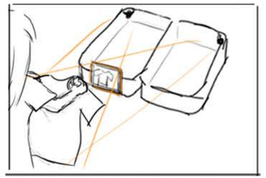
Open the touch screen



Select Itinerary Preferences

Generated a list sync to cell phone

Adjust the list according to personal preference



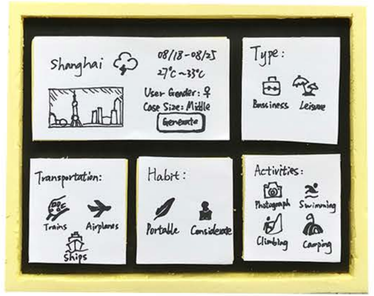
Identify packed items

Detect the items that are not brought, which can set a reminder on phone

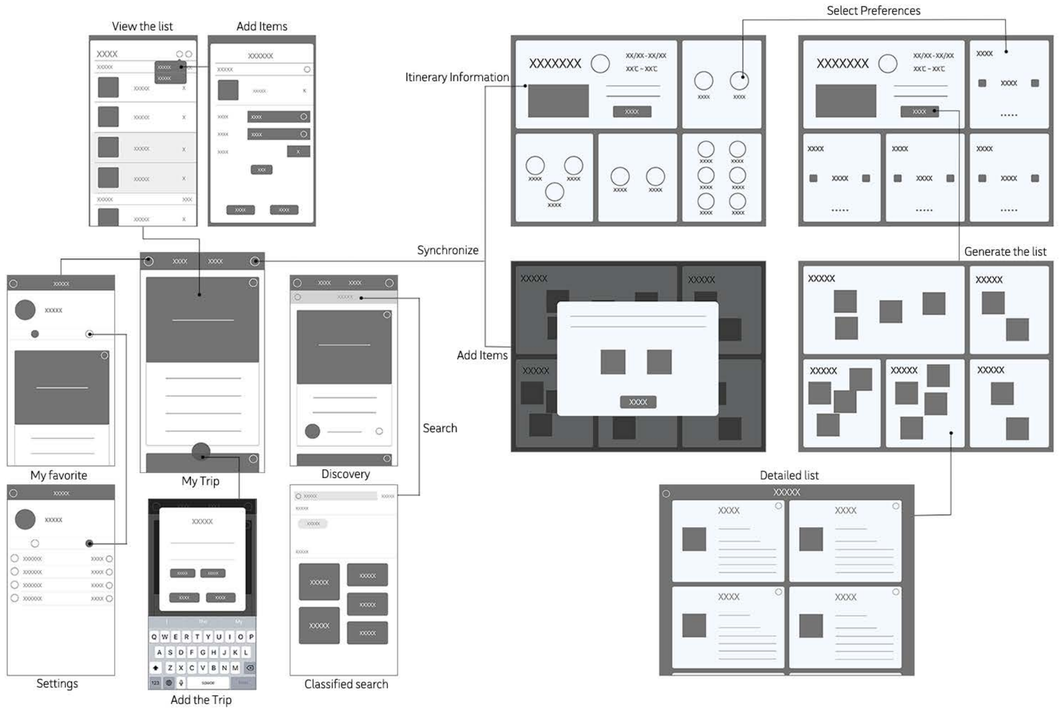
Remind to buy new items

Assessment

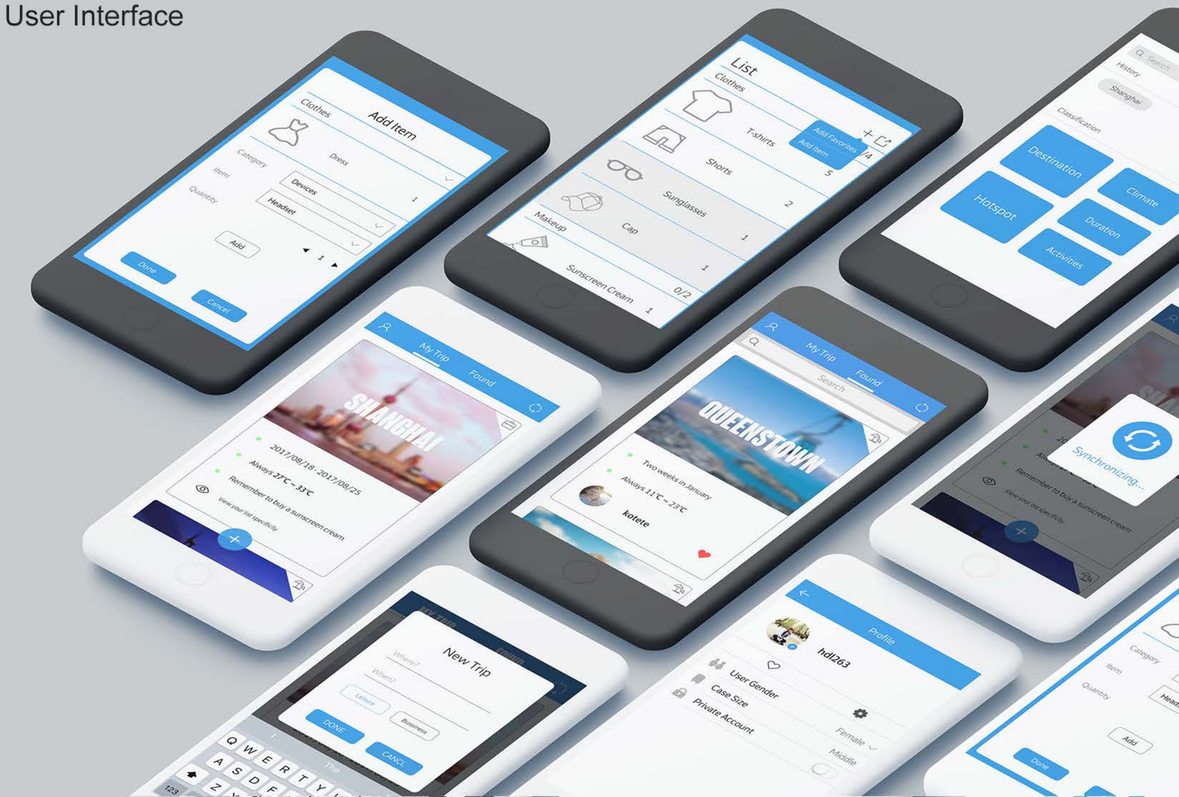
I made a touch screen model and demonstrated the functionality to my classmates. At last my design got their evaluation and I made some improvements according to their opinions.



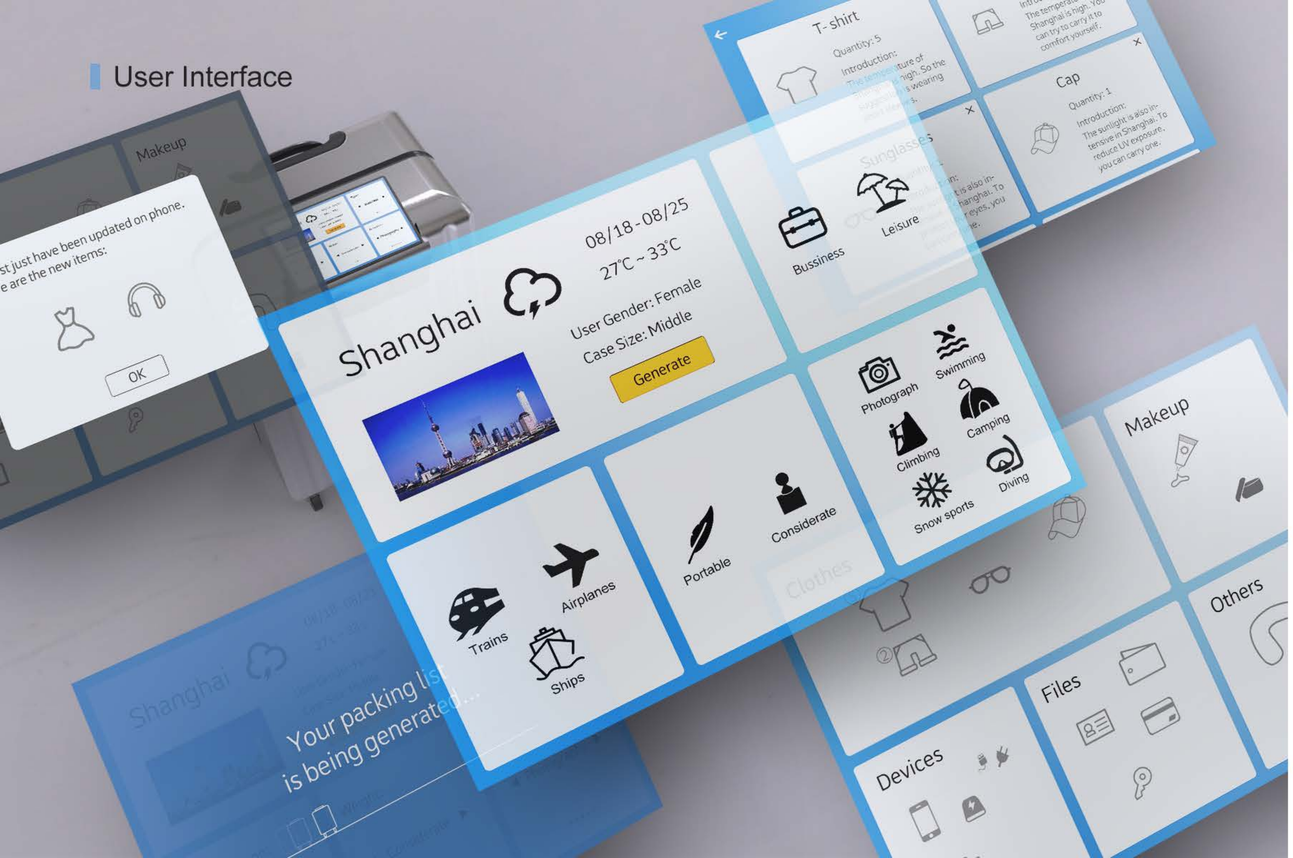
Wireframe



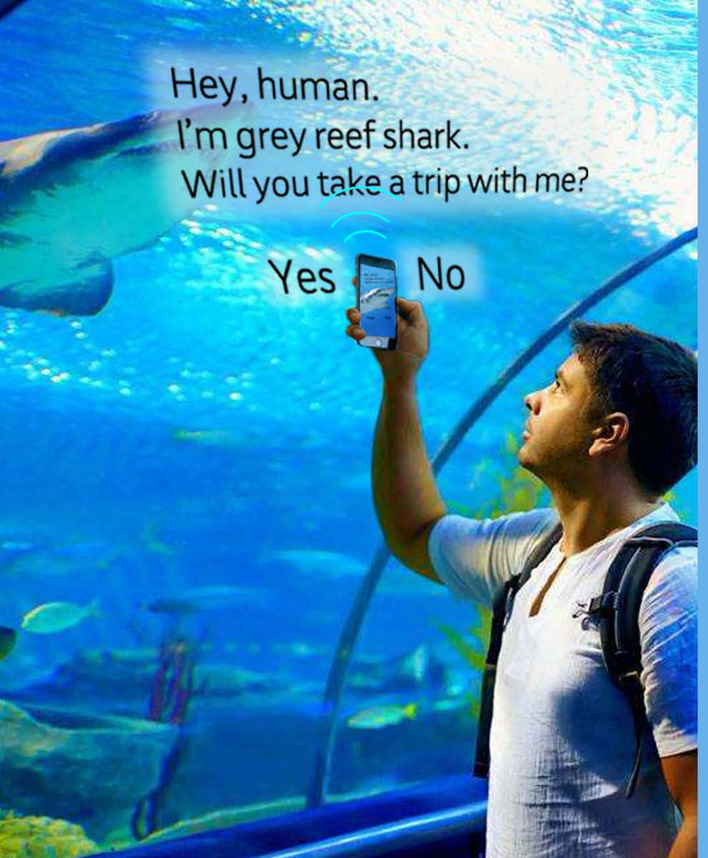
User Interface



User Interface



Synchronizing



02

Aquarium Interactive Design

A project of marine cultural creative products during the exchange of Taiwan has made me realize the charm of the ocean and an idea that let more people know it was generated spontaneously.

I found that although the aquarium as the only place that people can contact and learn the knowledge of marine life, there are many deficiencies in the design. So I made a narrative interactive design for the aquarium. It is mainly through the AR technology simulating the marine life and human communication. In the interaction between them, the people can get close to the sea, learning related knowledge in the entertainment.

Type: Concept Design
Form: AR+APP+Installtion

Behavior Mapping

The behavior path of the user in the aquarium is a complex process, so here I have summed up their main behavior into the following six categories.

Appreaciate animals

Take photoes

Study knowledge cards

Feed interaction

Watch shows

Buy souvenirs

Field Study

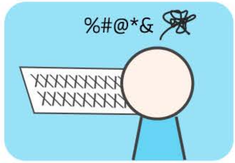
I chose an aquarium in my City for field research. The purpose of this research is to observe and analyze the users and find some deficiencies in the existing aquarium.

Linear Museum Map

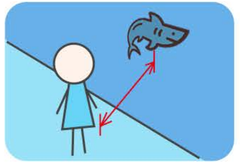
Complex Knowledge Card

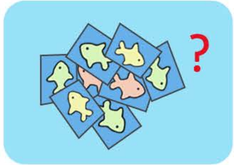
Marine animals isolated from humans

Pain Analysis

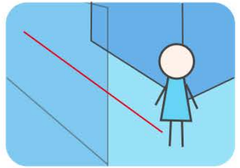


Text presentation is not intuitive


Too little interaction with animals



Only record, but not remember


The layout of the museum linearization

Persona

Name: Xiaoyan Fang
Gender: Female
Age: 10
Occupation: Student

Behaviors: She is inquisitive and outgoing.So, she is very interested in sea animals and wants to play with them.

Needs & Wants: Talk and be friend with the sea animals. See the how beautiful they are.

Name: Min Liu
Gender: Female
Age: 36
Occupation: White Collar

Behaviors: She has a son like Xiaoyan. She likes her kid so much and always goes to the place as company which he's interested in.

Needs & Wants: Make kids learn happily. Have more chance to interact with her son.

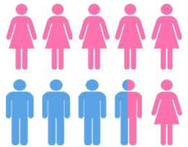
Name: Suolin Jiang
Gender: Male
Age: 21
Occupation: Undergraduate

Behaviors: He loves exploring the world. He thinks that ocean is arcane. It's enjoyable for him to use the new technology to feel the world.

Needs & Wants: Learn more marine knowledge in some funny ways.

Questionnaire

In the field survey, I also made a questionnaire for the dissemination of the marine knowledge, aimed to explore the direction of the aquarium improving design .



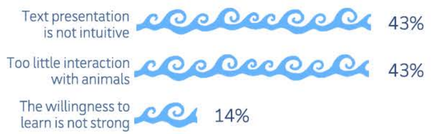
65% of the respondents **were female.**

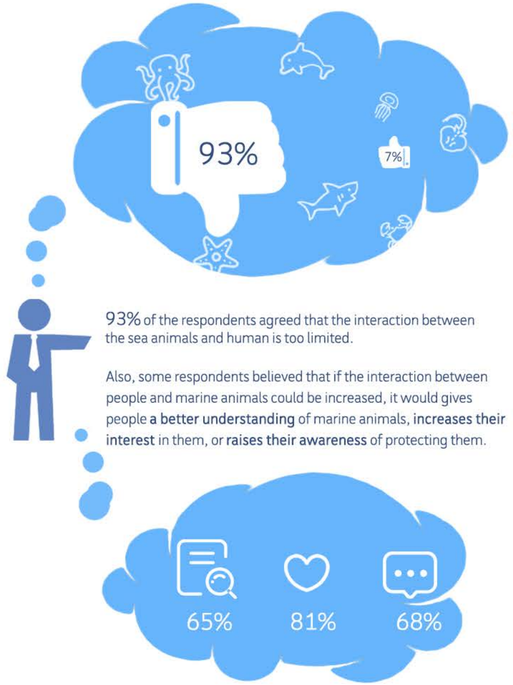
Indicating that female are more interested in marine lives than male.

54% of the respondents shows that they cannot read carefully about the knowledge card displayed in the aquarium.

Almost **All** the respondents shows that they cannot recongnize the sea animals in their photo after they left the aquarium.

The interviewer thinks the reason for the above phenomenon is:





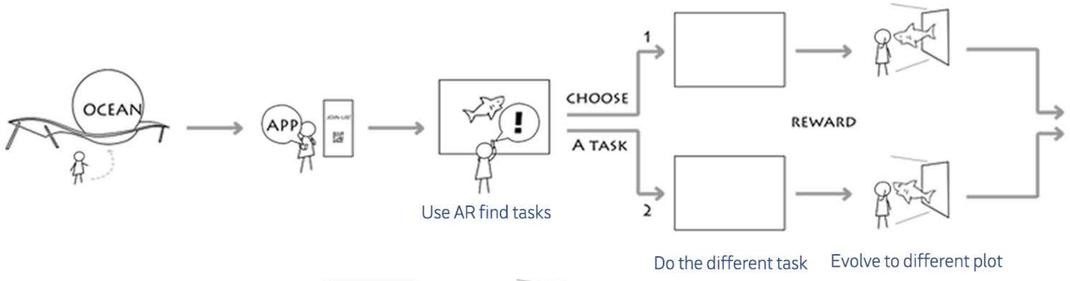
93% of the respondents agreed that the interaction between the sea animals and human is too limited.

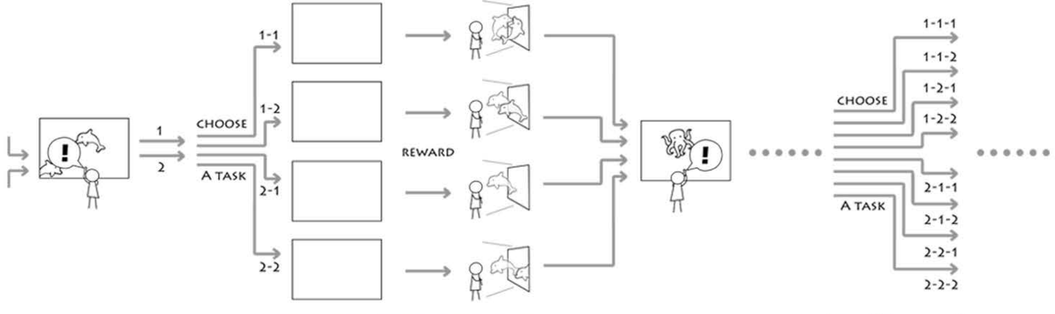
Also, some respondents believed that if the interaction between people and marine animals could be increased, it would gives people **a better understanding** of marine animals, **increases their interest** in them, or **raises their awareness** of protecting them.

Those results show that we should design something that can increase the comunication and interaction between the human and animals.

Journey Map

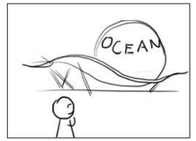
I use the concept of interactive narrative to create an APP game based on the Aquarium. A different choice leads to a different ending.





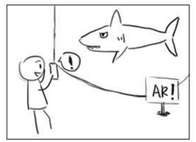
Storyboard

With the APP, the user enjoy his experience and even want to play again to find out other ending.

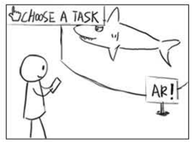


1. Li came to the narrative interactive aquarium.

2. Li downloaded the Aquarium APP to experience.

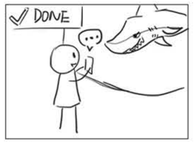


3. Li and Shark conducted a virtual conversation via AR.

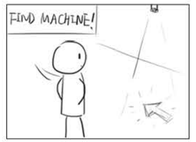


4. The shark gave him 2 tasks, and he chose one of them.

5. The mission is to find the baby shark.

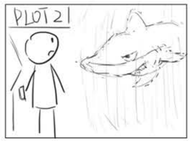


6. Li has completed the task by observing, studying, and identifying.



7. Li got a unlock code and needed to find the machine.

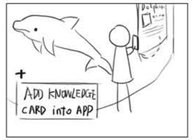
8. When Li found the machine, he used it to scan the QR code and unlock it.



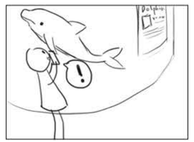
9. Unlock the holographic images to show the next episode.

10. Li interacts with Virtual sharks.

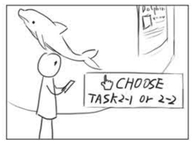
11. Li came to the dolphin area.



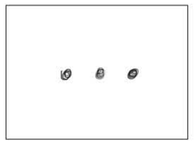
12. Li added a knowledge card to his app.



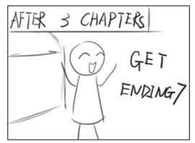
13. Li continues to simulate dialogue with Dolphin by AR.



14. The current plot moves in different directions through the previous selection of Li.



15. Li continues to experience in the aquarium.



16. After experiencing 3 chapters, Li got the ending 7.

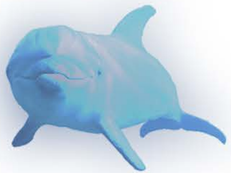
17. After Li returned home, he reviewed the day's record through APP.

18. To explore more different plots and interaction, Li went to the aquarium again.

Product Prototype

After scan QR Code

Looking the direction of
3D interaction



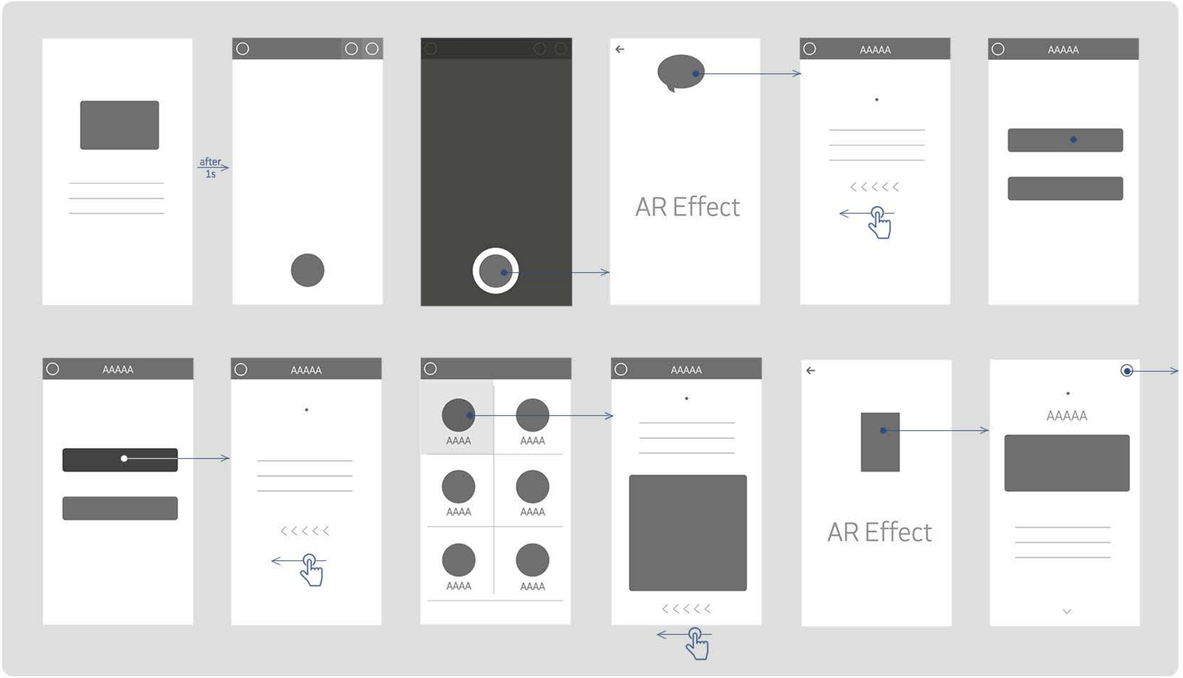
The imagine is projected.
User can move their arm to interact with animal.

Sitemap

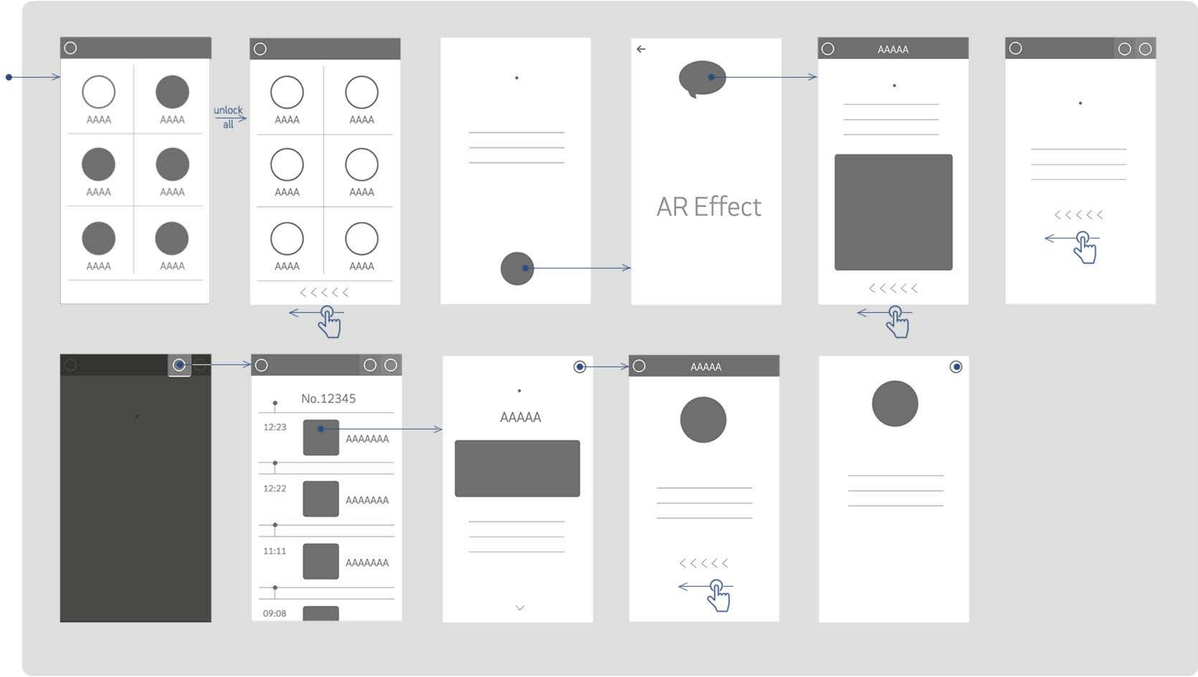
- 3D map
  - Guide
  - Found new AR Point
  - Photo Location record
- Narrative Interactive Game
  - Ocean Animal Dialogue with AR
  - Choose a task
  - Complete the task
    - Collect AR Cards
    - Observe marine animals
    - Knowledge Quiz
    - A photo of a particular animal
    - .....
  - QR code Unlock
  - Generate Different endings
- My Favorite
  - Add Cards
  - View Cards
  - Classify Cards
- My records
  - List of tasks completed

Paper model

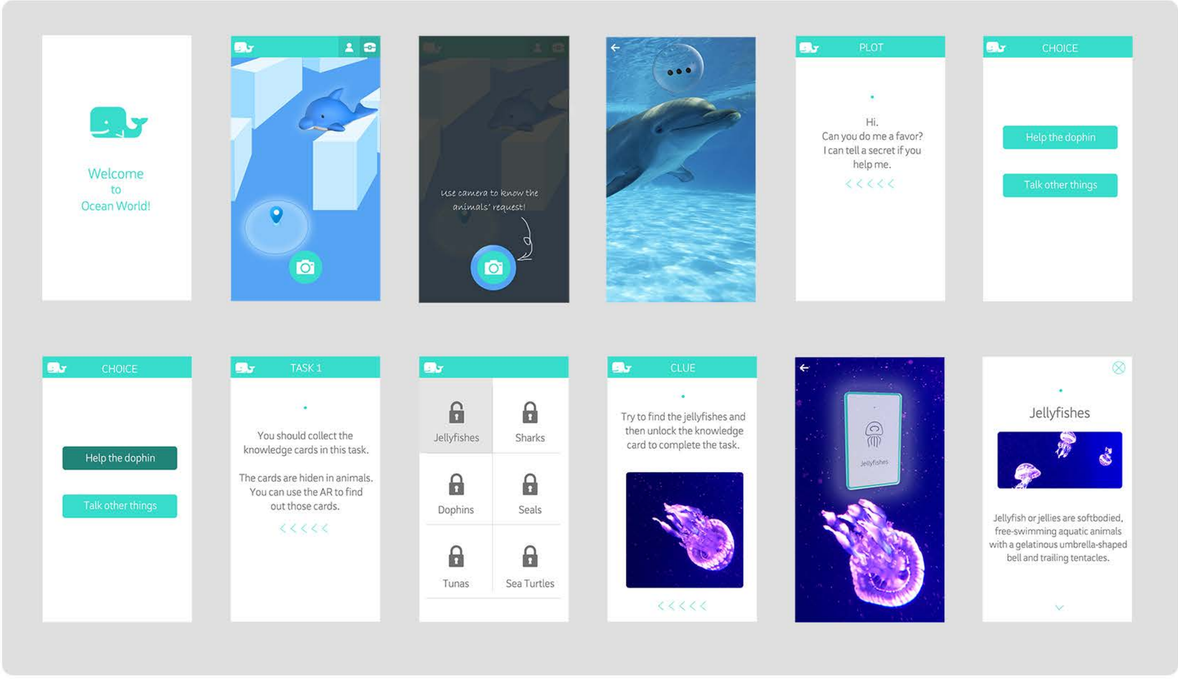
Lo-fi Prototype



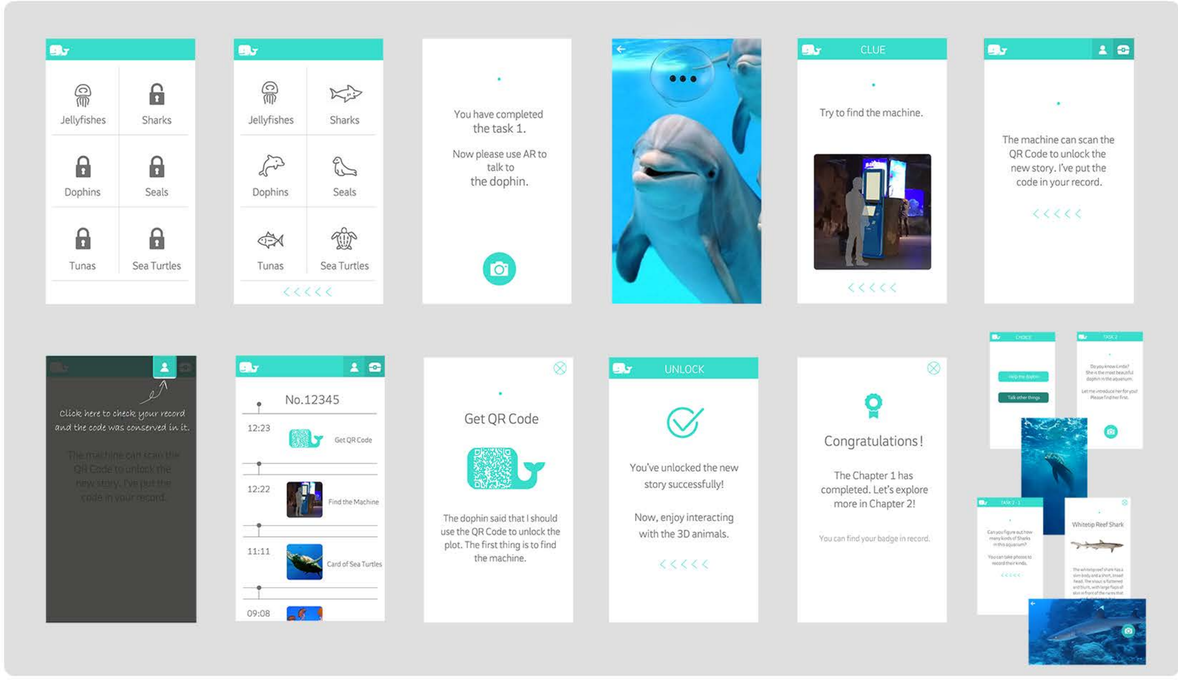
Lo-fi Prototype

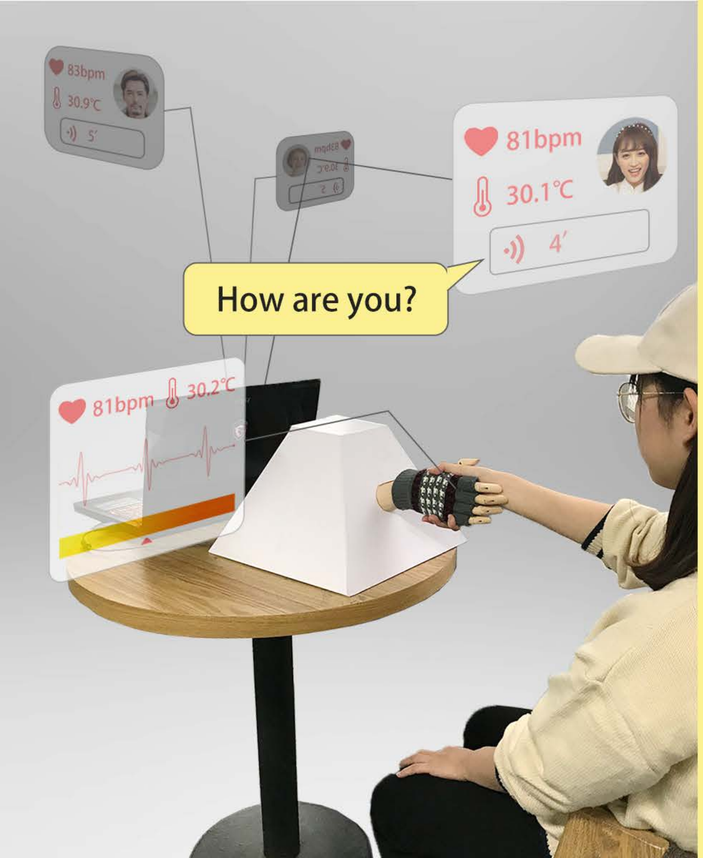


User Interface



User Interface





03

Installation Design “X Indifference”

The rapid development of social network has changed the way of human communication, leading modern people to prefer to communicate in various virtual worlds. How to make people aware of the warmth of the connection between people in the real world is the main research issue of this project.

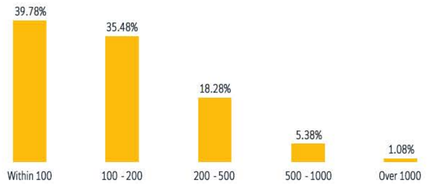
This project mainly designed an interactive hand based on Arduino. It collects and lets people know the information they send when they shake hands. Then it connects the similar two people by matching the same data, allowing the two to greet each other and generate interactive fun.

Type: Concept Design
Form: Arduino +Installtion

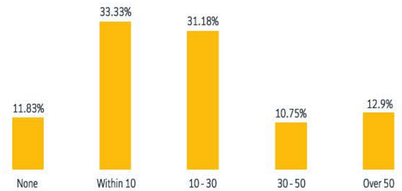
Questionnaire

Because WeChat occupies the main market of Chinese social software, I conducted a questionnaire survey using WeChat as an example.

Q1: How many friends are there in your WeChat?



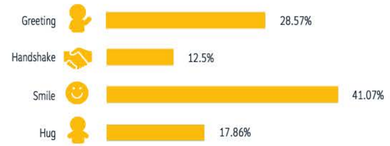
Q2: How many people are netizens in your WeChat?



Q3: How many of your WeChat friends have never talked to you on the Internet?

Q4: What do you think of such a social approach?

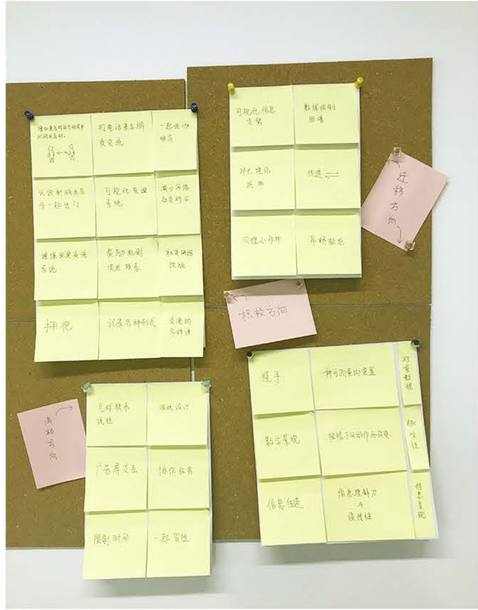
Q5: What do you think is the best way to convey a person's feelings?



To sum up, people have realized that this virtual social approach is inappropriate and indifferent. But they are not actively changing it in the real world.

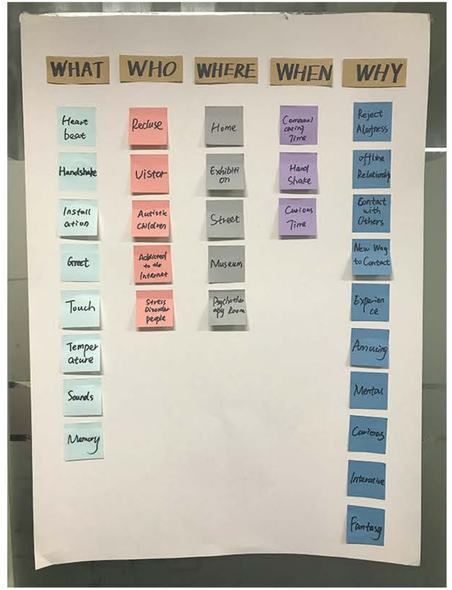
How Might We

Based on the survey results, I used HMW method to help myself find the general direction for this project.

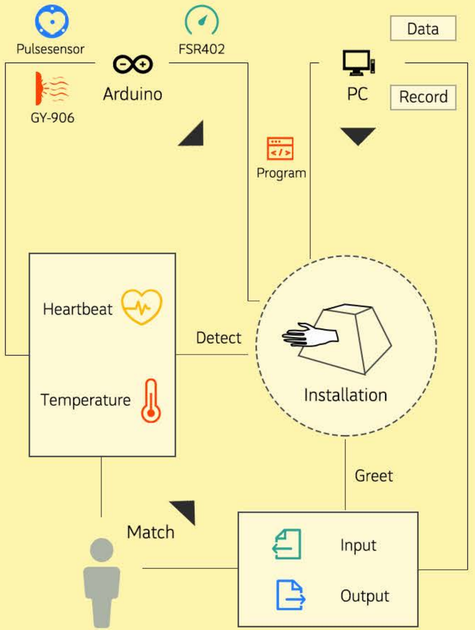


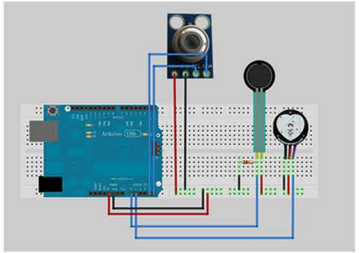
Card Sorting

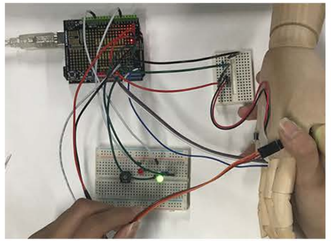
In this direction, I carried out card sording on this project from what\ who\ where\ when\ why to further clarify the project specific strategy.

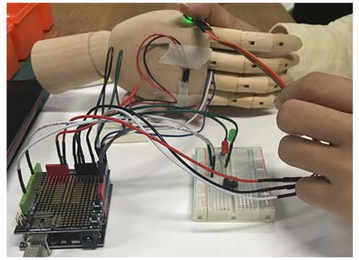


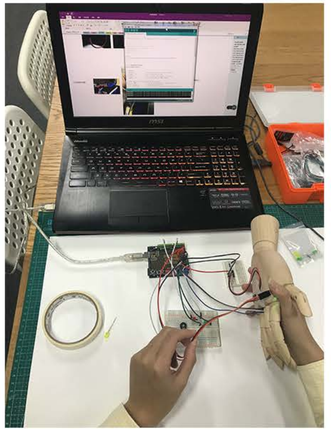
System Test











In order to test the response and speed of the device, I used Arduino to connect the infrared temperature sensor, pressure sensor and heart rate sensor to my model hand.

Storyboard

1 Mike found an interactive installation and was curious about it.

2 Mike shook hands with it. At the same time, the device measured his hand temperature and heart rate.

3 According to the data just measured, the device screened the person who matched Mike.

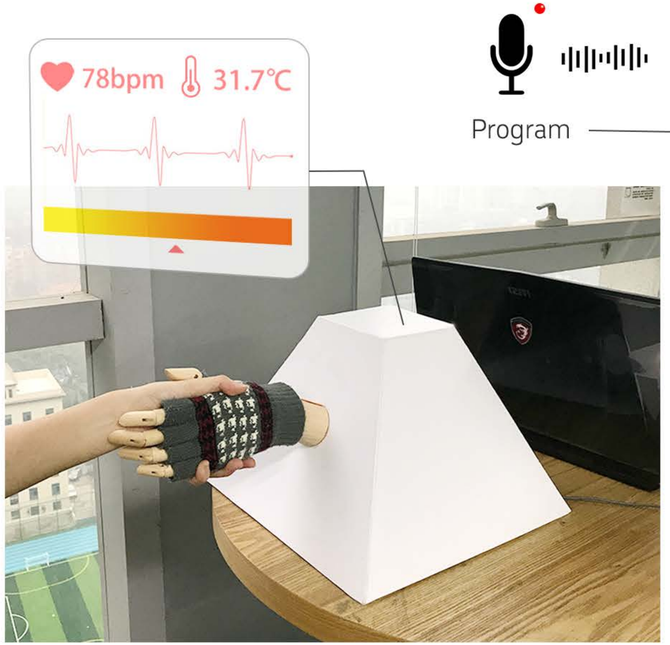
4 Lily, the one who matched Mike, greeted Mike through the installation.

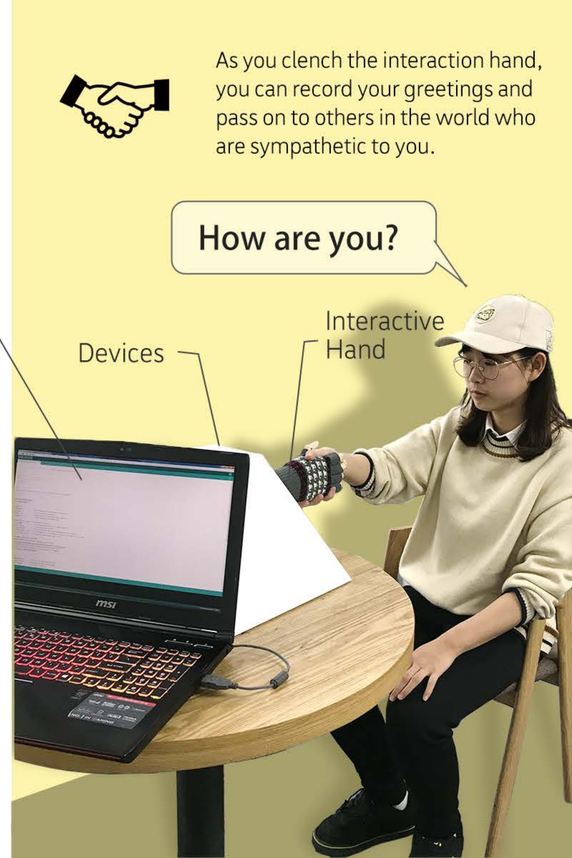
5 Mike found it very interesting and recorded his greetings in the installation.

6 A moment later, Alan received a greeting from Mike while experiencing the installation

Usage scenario

When the interactive hand senses that someone is shaking hands, it automatically detects the user's heartbeat and palm temperature.





As you clench the interaction hand, you can record your greetings and pass on to others in the world who are sympathetic to you.

04

Twist X Ease Interactive Belt

Low back is the most hard-working part of the body which provides support for the body and protects the spine. For those who always sit in the office and lack of exercise, it is easy to cause back pain and even lumbar degenerative disc disease if maintaining a posture for too long.

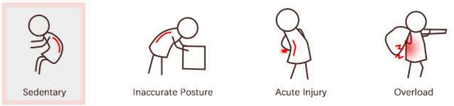
This project uses the belt as the interactive carrier to connect people's movements with the program, which greatly improves the detection accuracy of the user's movement and plays a role of enhancing the lumber muscles and relieving the pain. Meawhile, users can get the corresponding rewards through this interactive game, so as to improve the user's initiative in sports.

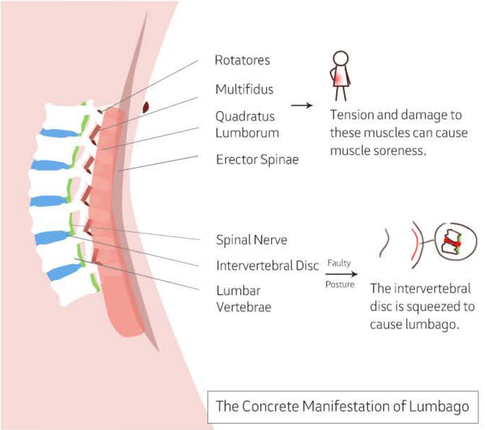
Type: Concept Design
Form: Interactive Belt + UI

Field Study

Nearly 80% of people in today's sociaty have suffered or suffer from long-term back pain. After research, the number of back pain patients in the surgical field ranks the first and the age of these patients is getting younger.

In response to this phenomenon, I first investigated the main forstors that cause back pain. Totally there are four main forsters among which sedentary leads to the most cases.





Sedentary is the main cause of the back pain for most modern people.

In an upright position, the spine of a man is subjected to a pressure of 1.4 times that of a standing person, and when the patient is sitting badly, he will suffer 1.85 times when bending forward.

Muscular tension caused by sedentary needs regular relaxation and exercise, and when the muscles are properly relaxed, the pain will also be reduced.

White-colar workers and students accout for the majority of sedentary peope.

The features of them is:

Sedentery more than 8 hours every day

Long-term stay in sitting position with hunchback and leaning neck

Rarely exercise

At a very young age

To conclude, for sedentary people such as white-collar workers and students, we need to improve their exercise initiative, thereby enhancing their lumbar muscles and relieving pain.

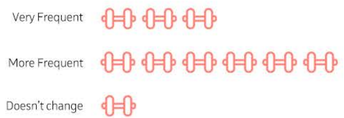
Questionnaire

Because I want to understand what factors drive the user to take the initiative to move, so I made this user research. The survey number is 60, the number of valid questionnaires is 60, the questionnaire is 100% efficient.

Q1 If you did not keep the habit of regular exercise, the reason would be?

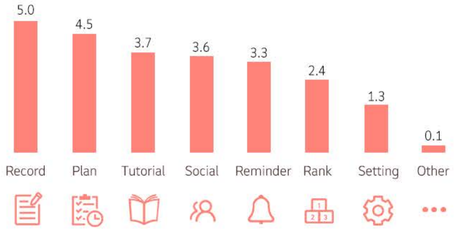
Exclude the time factor, the fun of exercise is the primary factor

Q2 Is there any change in your exercise frequency after using exercise app?

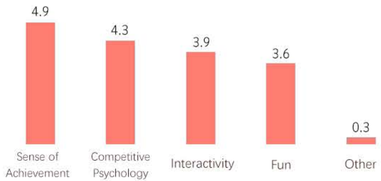


After using the app, 90% of the people do exercise more frequently

Q3 Which APP function makes you have such a change?



Q4 What do you think the essential reason is, for such a change?



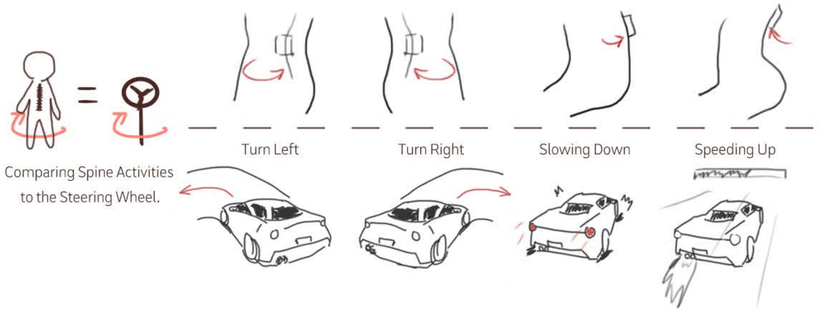
To sum up, I decided to add fun and interactivity to my design while saving time for users, for enhancing exercise initiative.

Development

After the survey, I started to try to discuss the interaction design and appearance design of the product with other students.

1 hours once, 3 minutes at a time

In order to effectively relieve the pain, we need to relax the muscles at intervals of fixed time. The use of sitting motion can save people's time in work or study to the greatest extent.



Comparing Spine Activities to the Steering Wheel.

In the game, users can compete with their colleagues and classmates in real time and generate ranking due to the accuracy and timeliness of the twist action.

Accumulate health values in different rank

Health values Keep eggs growing

Long-term exercise accelerates hatching

Persona

I am an art student who uses computers for a long time to make all kinds of works. I love my major, and I enjoy using the computer to create a variety of cool product images.I spend an average of more than 10 hours per day on computer use.

Cong Wong

Hardworking Senior Students

Age 21 | Single | Hubei, China | Industrial Design

Frustrations

- Sitting in front of the computer every day and having no time to exercise
- Sitting for too long, leading to a worse sitting posture
- Having a bad low back pain every day and cannot relieve it

Needs/Goals

- Want to exercise, but hope to be able to not too much delay study time
- Can remind him to maintain the correct posture and regular activities
- Can relieve his low back pain

Summary

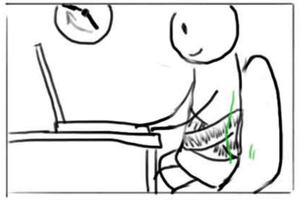
Cong Wong is an undergraduate graduate in industrial design and he wants to apply for a graduate student this year, so he works very hard every day to design, in order to be able to go to a better school.

He thinks he could give up some things for the design this year, but the long-term desk work made his low back pain very obvious. But he did not have extra time to exercise.

Therefore, he is hoping to be able to relieve his back pain through exercise without losing too much time and maintain good sitting habits.

Sroryboard

After a day of sitting work, my low back pain started again

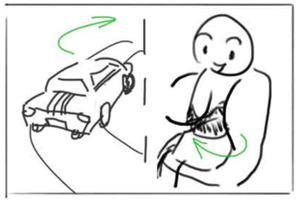


This interactive belt helps keep my posture right

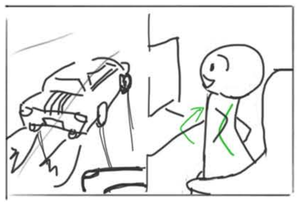
At the set time, the belt starts to vibrate to remind me of the exercise

Because it has been paired, the computer will also pop up an interface

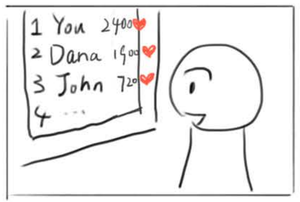
There was a little game on the screen, and I could compete with my colleagues.



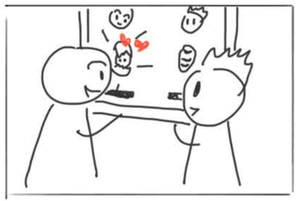
I can control the direction of the car by twisting my waist.



By moving my waist forward, I can speed up the car

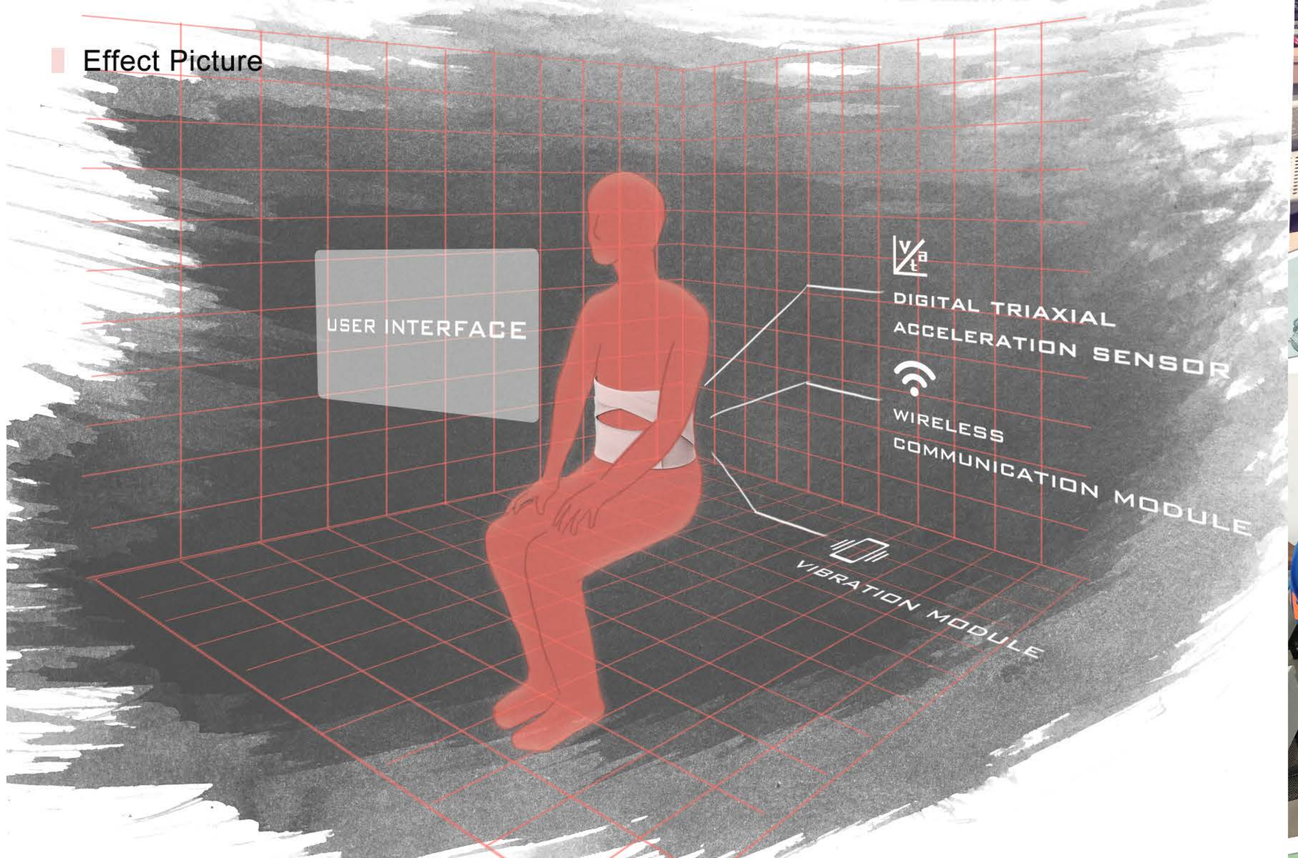


After game ended, everyone got different health values according to different rankings.



My colleague and I talked about the recent e-pet hatched by our health values.

Effect Picture



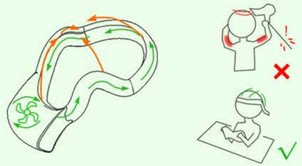
00

Some Product Design

Here are some of the products I designed during my undergraduate work.

In chronological order, they are: a headset hair dryer, a foldable bed which can provide a resting space for the family members who accompany the patient in the hospital, an interactive alarm clock designed with Chinese traditional culture.

Type: Concept Design
Form: Product

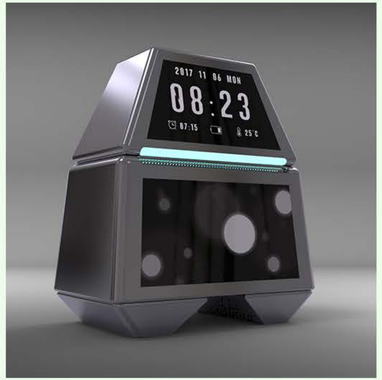


Headset Hair Dryer 2015

This is a hair dryer designed to solve the problem of female hair blowing for a long time and laborious. It utilizes the principle of air multiplier to make the product portable.

Folding Bed 2016

This is a folding bed that can be used in a ward. When it is folded, it can be used as a chair. When it is the state of the bed, the structure can be easily extracted, for the family to provide sleeping places in a small ward .



iClock 2017

This is a traditional Chinese percussion instrument - Chime as the basic concept of the design. It adds interactive elements to help solve the problem of people not being able to get out of bed in the morning. At the same time this kind of percussion way can let more people understand Chinese ancient culture.

Portfolio

Huang Dan Lan
Interaction Design