



Xing.P, Portfolio

PANGRUI XING

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01 Eclipse

Standalone project
06/2016 - 09/2018

A User-friendly Desktop Lighting



Exhibited in 8th Guangdong Industrial Design Expo, China, 2016

Background



Developed, the development of electronic and computer technologies have changed many aspects of peoples' lives.



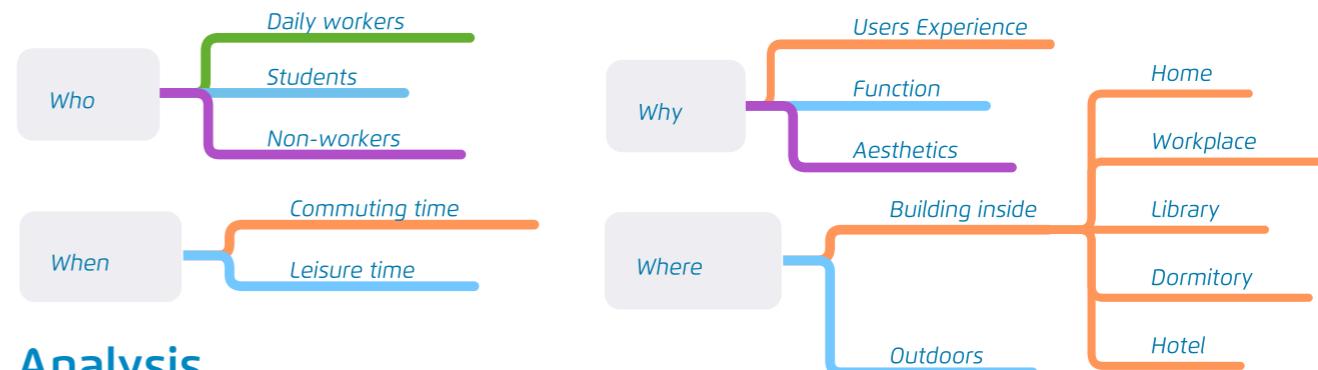
Rich, the purchasing power of Chinese people has increased, and those adults have more disposable money to buy items more than they need.



How designers use digital technology for innovation has become one essential approach to redesign traditional products. And I decided to seek opportunities in lighting designs.

Research

Classified the factors listing below to identify the targeted user group.



Analysis

Generated possible combinations (72 in total) and drew three typical user groups and sought participants to conduct interviews.

- 1 Student Living in the dorm Better experience leisure time
- 2 Commuter Living at home Aesthetic but affordable at leisure time
- 3 Non-workers Living at home Better experience at leisure time



Interview

Conducted an in-depth interview and selected three typical users out of nine participants (see the table below), and then *analyse the table to look for pain points*.

Info	Problem	Solution	POV
22 yrs, Student	* Living in shared / tiny dormitory together with other three roommates. * Most students sleep with closing curtains and off-lights, the inconvenient adjustment of the brightness can affect other roomates' sleeping quality.	* Changing the way of lighting brightness adjustment * Smart control of lighting, e.g. IoT, Siri, Amazon Echo	"The idea is unique, but it may bring uncertainty on product life expectancy"
27 yrs, Senior designer	* Failed to find aesthetic lighting products with relatively low costs from the market	* Redesign product form with strong emphasis on aesthetics	"Be aesthetic but should also be functional and affordable"
40 , Stay-at-home mom	* Even with various repairing tools at home, she still has difficulties installing some electrical devices or equipments on their own. * Cannot understand installation manual	* Provide non-tool installation design	"...may resemble Apple family products..."

Product positioning

After interviews, I managed to perceive the following demand for lighting.



Functional (Smart control)



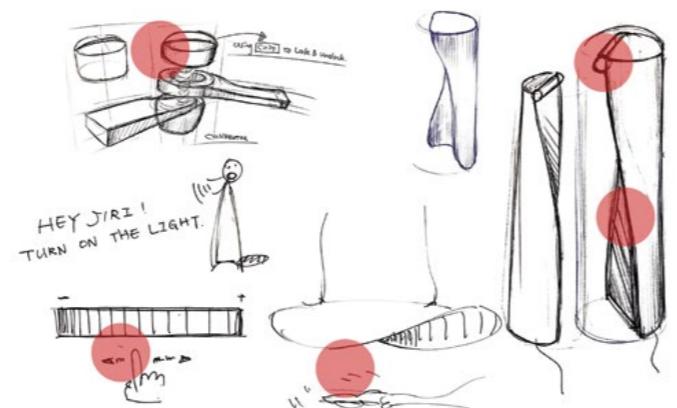
Emotional (Aesthetic form)



Friendly (Easy to use)

Early ideation

Based on product positioning, I mapped out the various possible product modellings with different emphasis.



Keywords bore in mind
Control, Gesture, Smart, Wireless, Form, Aesthetic, Easy-installation, Curve

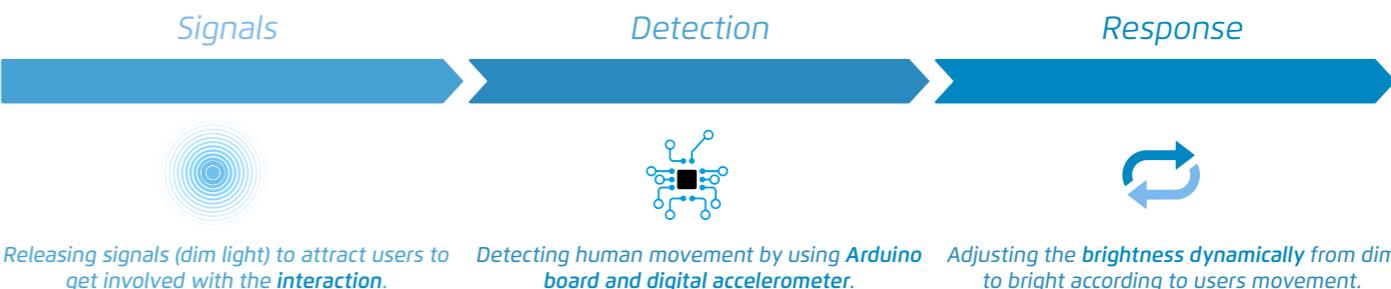
Challenge

How to apply technologies to create the interaction that seamlessly merges into new product design and eventually to meet users' needs.

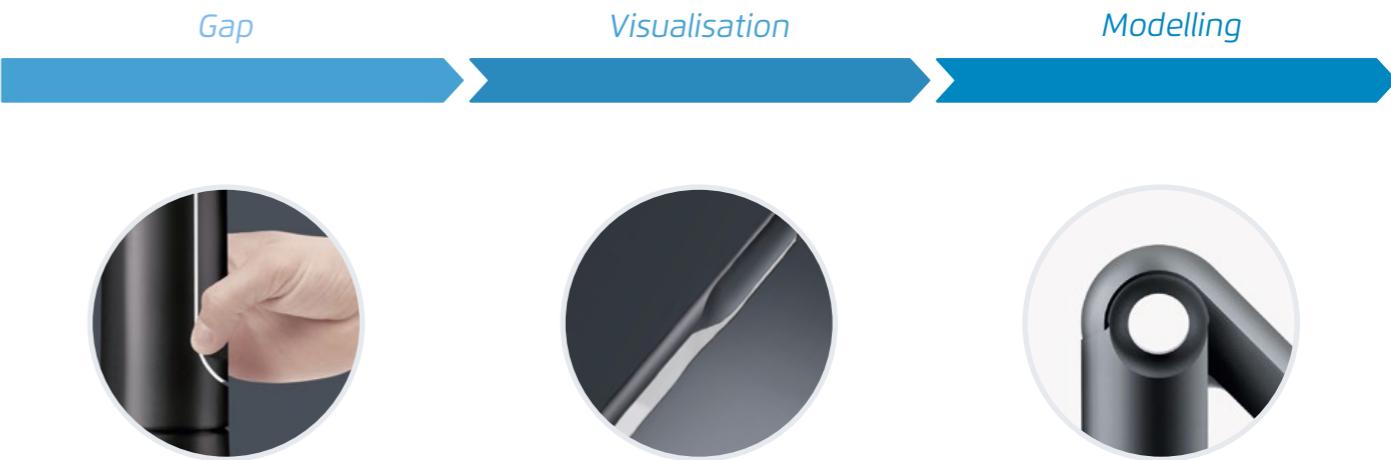
Solution

The experimental solution consists of two parts, interaction design (functionality) and product design (aesthetics). My mission is to balance these two parts to meet users' pain points.

Interaction design - Functionality



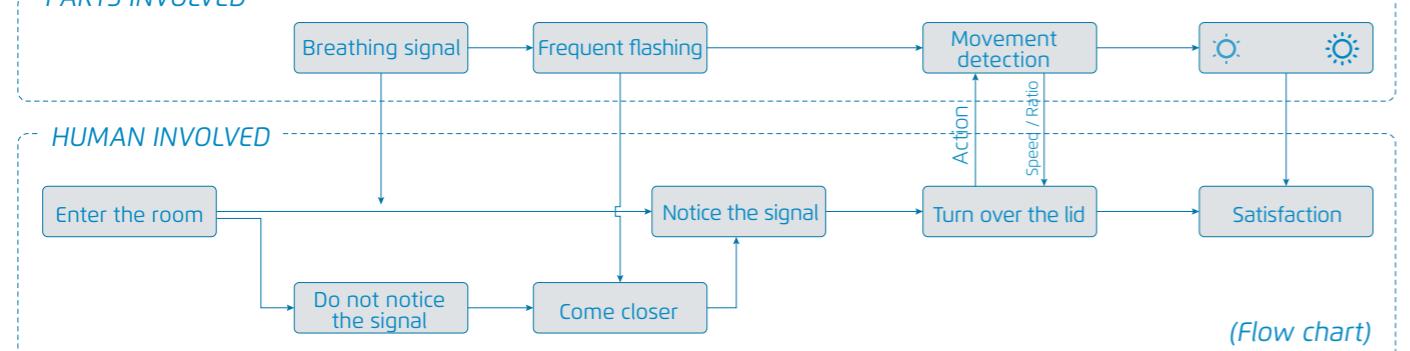
Product design - Aesthetics



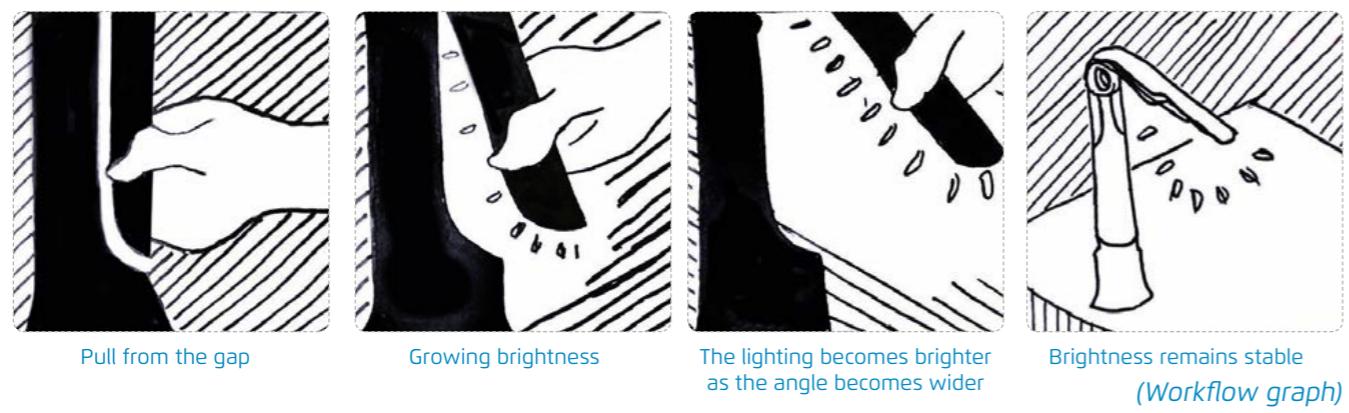
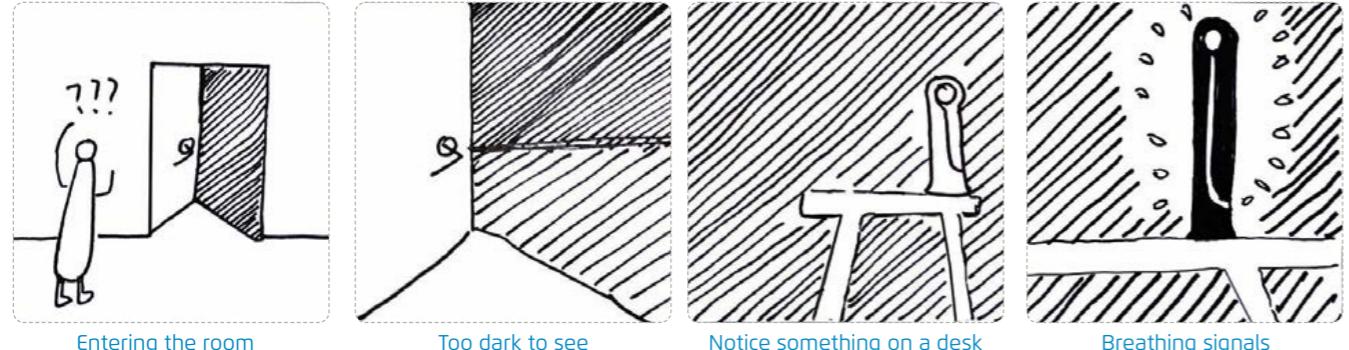
How it works

Combining the flow chart and the workflow graph can help clarify ideas and check the logic.

PARTS INVOLVED



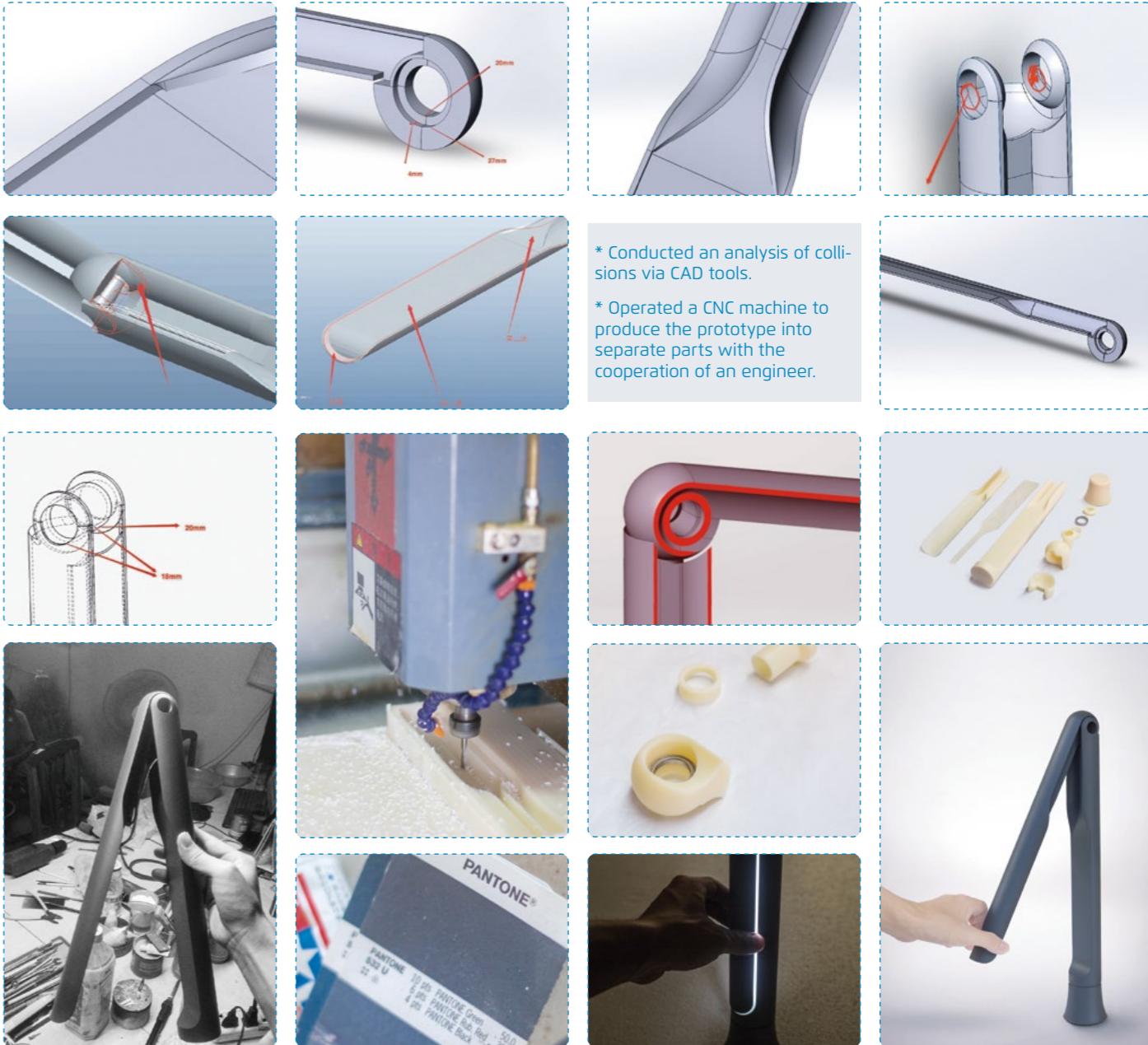
EXPECTED SCENARIO



Validation

Structure Prototype

using a CNC prototype to validate the structure of the lamp.



Interactive Prototype

Using an Arduino-based circuit to validate the interaction design.

Arduino Code

```

void loop() {
    delay(50);
    if(movementDetection()==0){
        breathingLed(0,60,50);
    }
    if(movementDetection()==1){
        Serial.print("DynamicLed Started");
        Serial.println("");
        sensorValues();
        dynamicLed(zpin,284,375,0,100);
    }
}

void sensorValues(){
    Serial.print("x:");
    Serial.print(analogRead(xpin));
    Serial.print("\t");
    Serial.print("y:");
    Serial.print(analogRead(ypin));
    Serial.print("\t");
    Serial.print("z:");
    Serial.print(analogRead(zpin));
    Serial.println();
    delay(300);
}

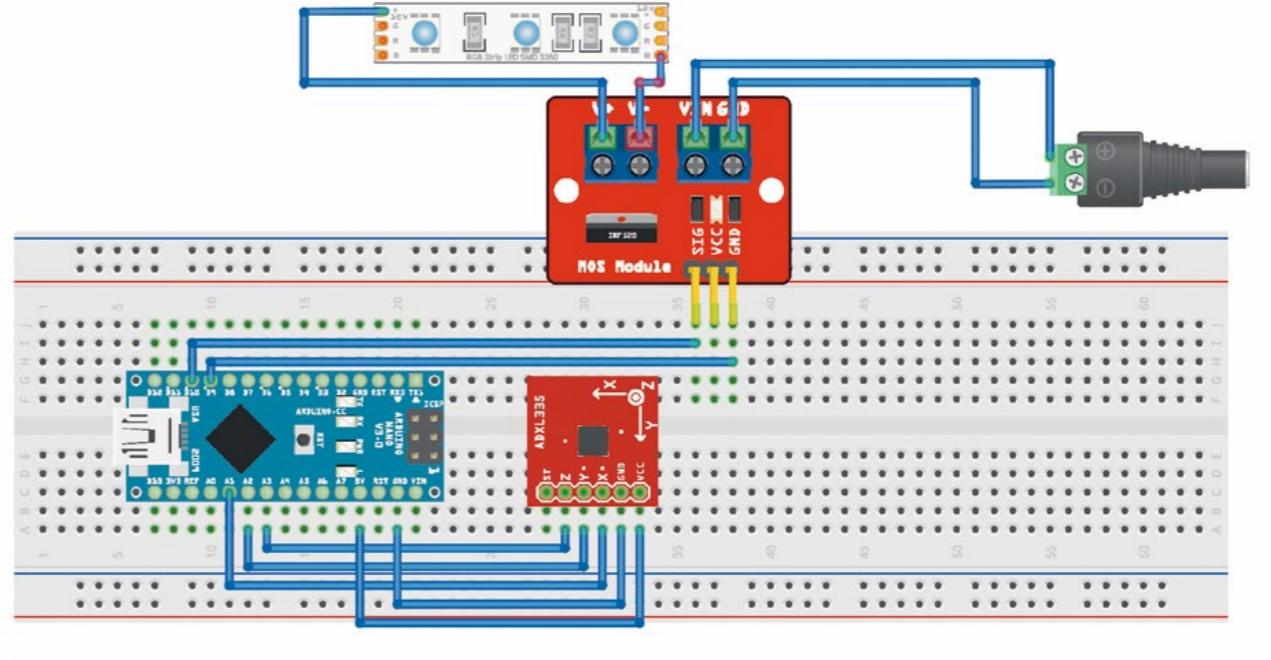
boolean movementDetection(){
    boolean state = 0;
    for(int i = 0;i <= 3;i++){
        if(analogRead(xpin) > 361 + 3 || analogRead(x-
pin) < 361 - 3){
            state = 1;
            goto label;
        }
        if(analogRead(zpin) > 285 + 3 || analogRead(x-
pin) < 285 - 3){
            state = 1;
            goto label;
        }
        return state;
    }
label:
state = 1;
return state;
}

void setup() {
    pinMode(ledNegative, OUTPUT);
    pinMode(ledPositive, OUTPUT);
    pinMode(sensorPositive, OUTPUT);
    Serial.begin(9600);
    analogWrite(ledNegative,0);
    digitalWrite(sensorPositive,1);
}

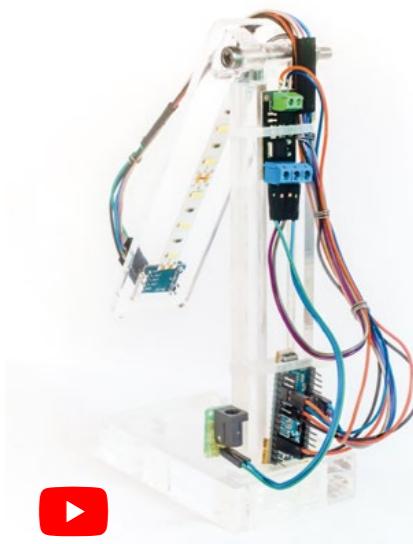
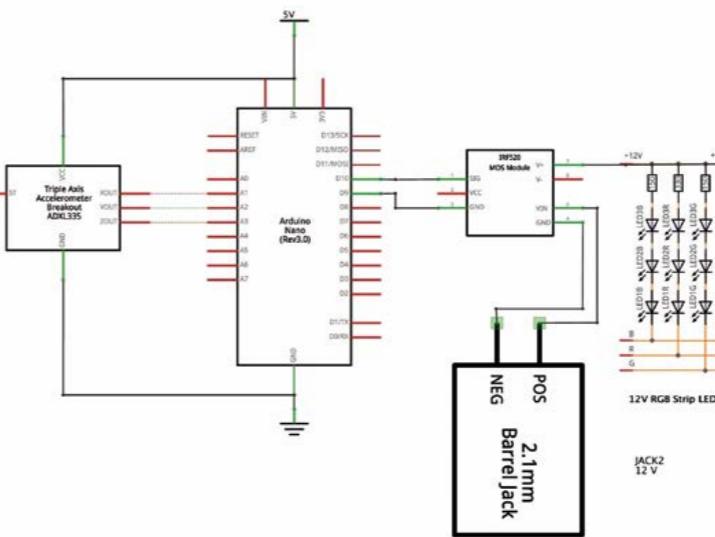
void breathingLed(int brightnessMin, int bright-
nessMax, int delayTime){
    for (int fadeValue = brightnessMin ; fadeValue
    <= brightnessMax; fadeValue += 2) {
        if(movementDetection() == 0){
            analogWrite(ledPositive,fadeValue);
            delay(delayTime);
            Serial.print(".....");
            Serial.println("");
        }
        for (int fadeValue = brightnessMax ; fadeValue
        >= brightnessMin; fadeValue -= 2) {
            if(movementDetection() == 0){
                analogWrite(ledPositive,fadeValue);
                delay(delayTime);
            }
        }
    }
}

```

Breadboard Connections



Schematic Diagram







02 Pikapika

Cooperative project
09/2016 - 12/2016

A Parent-Child Interaction Design



Xing, Pangrui. 2017. Folded paper toy kit. CN 206,404,327 U, filed Dec 26, 2016, and issued August 15, 2017

Xing, Pangrui. 2017. The driver for folded paper toy kit. ZL 201630571980.0, filed Nov 24, 2016, and issued June 20, 2017.

Challenge

2016 DiD Award, concept group, entertainment (genre),

- Create entertaining designs that focus on the local industries' needs.

Solution

Pikapika is a kind of origami combining traditional folding skills with remote controlling techniques. Our design aims to help children construct their own toys with the co-operation of their parents, after which, children can place a drive module from the bottom of the paper-doll to get it controlled by the controller. During the folding and playing process, children may develop their intelligence at their early ages as well as foster relationship with their parents.



Research

Insufficient designs

Due 2015, there were only approximately 100 papers related to the keywords of parent-children interaction (in China). Most of them emphasize on the theoretical aspects, such as pedagogy, psychology rather than the corresponding products.

Source: Xianxian, Xu, *Applied research pre-school children's development of psychology in Parent-child interactive product design*, Beijing Institute of Technology.



Limited participation

The current parent-child interaction designs such as *The Burr Puzzle*, *Parent-child chairs*, are mainly or solely focus on the entrainment or intellectual practice rather than emphasizing the other factor, the development. Parents primarily play a role as supervisors to ensure children's safety but rarely get involved the games.



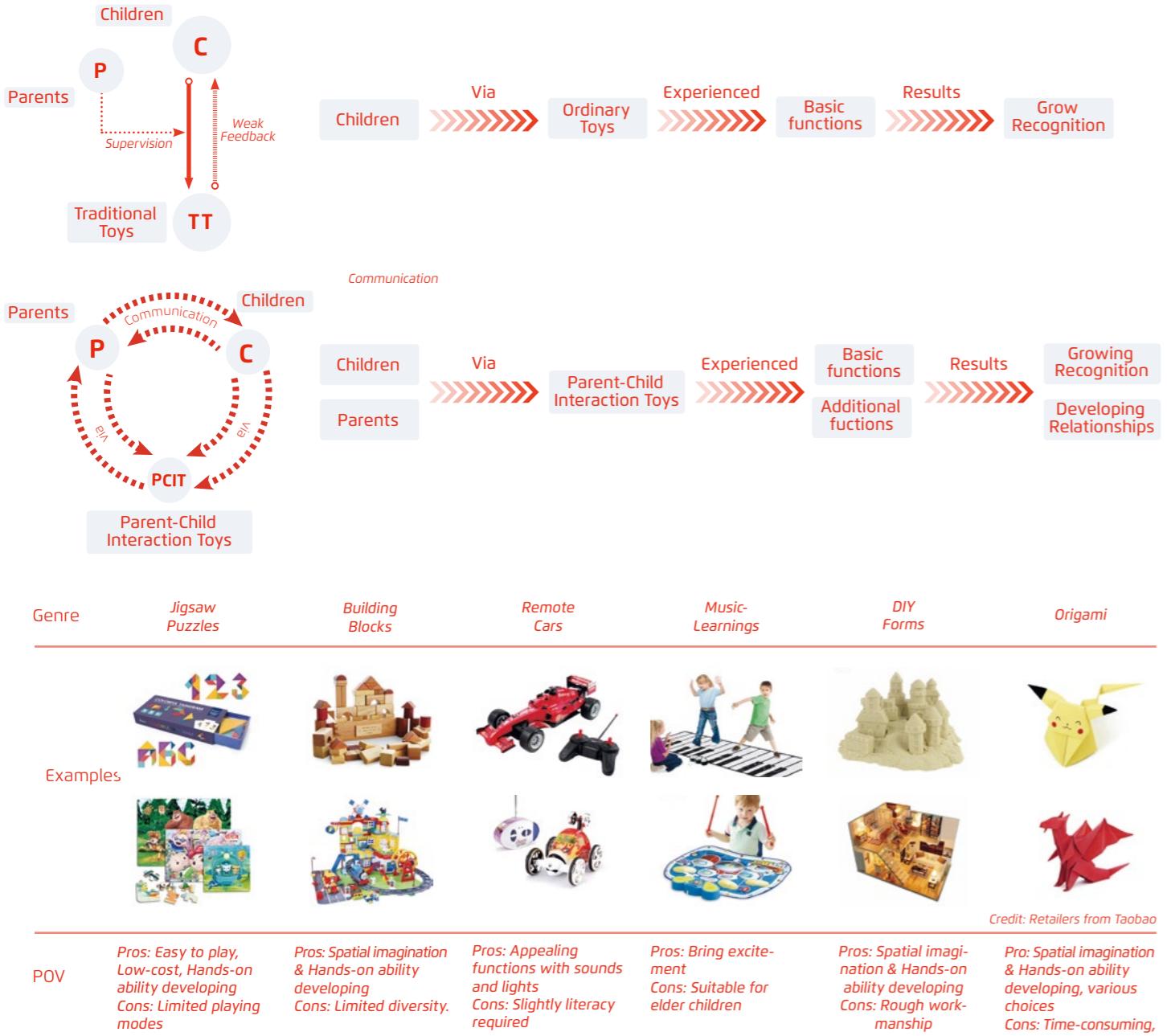
Robust capabilities

Over 1/3 of anime derivatives including *Hello Kitty*, *Doraemon*, were produced in Dong Guan due to the robust OEM factories in the local areas. And they are looking forward to transforming into ODM companies.

Source: *Southern Metropolis Daily*.

Analysis

Using diagrams to demonstrate the differences between traditional toys and parent-children interaction toys (PCIT).



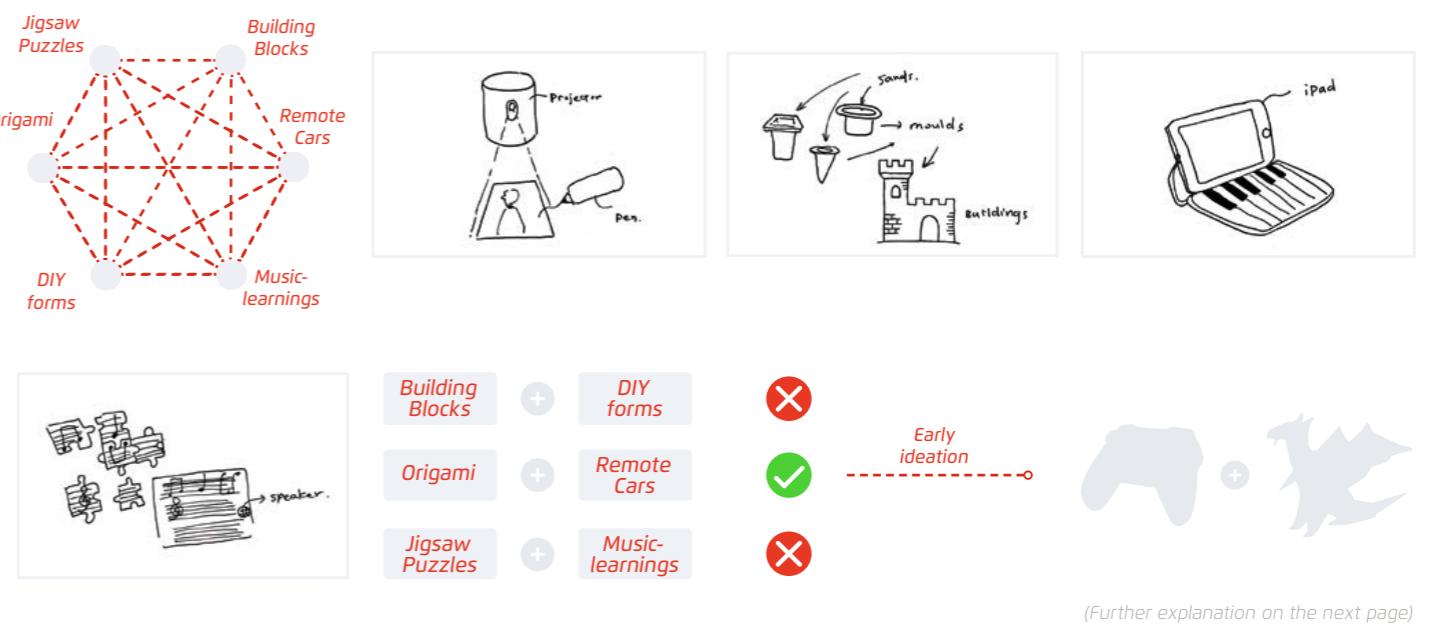
TO FOSTER INNOVATION, A SIMPLE BUT EFFECTIVE METHOD IS TO COMBINE TWO THINGS THAT SEEM TO BE IRRELEVANT AND BUILD RELATIONSHIPS BETWEEN THEM.

OKI SATO, NENDO STUDIO



Application

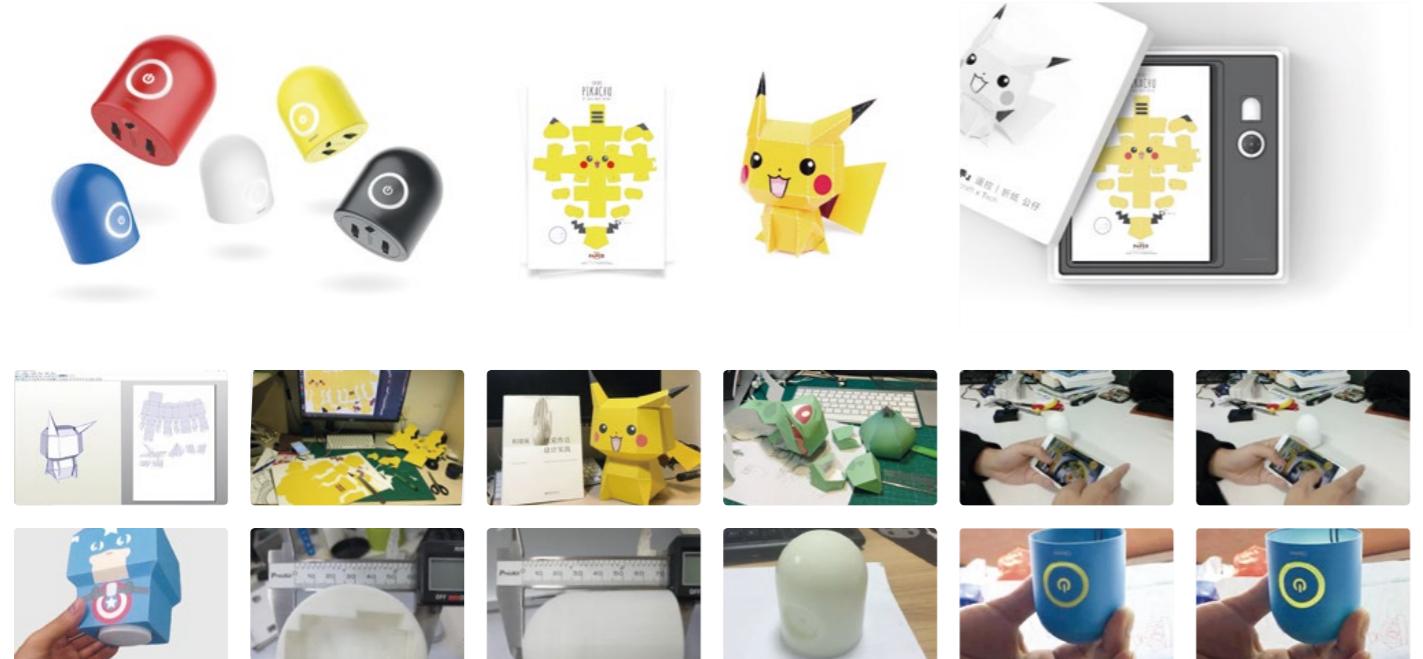
By applying Oki Sato's design principle, we may be able to generate some possible combinations (${}^2C_6 = 15$) and select a few of them to start a new design.



Business Context

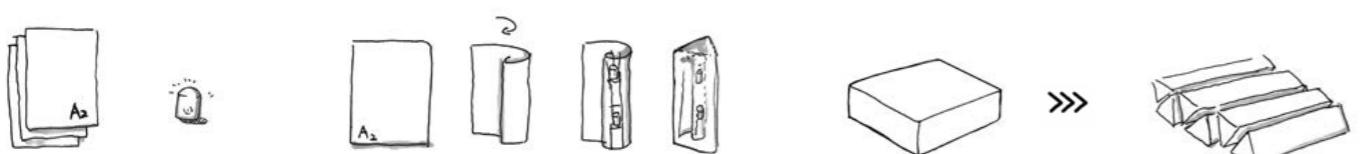
According to our previous research, we recognized the robust manufacturing capabilities at local, which can significantly help them cut the operating cost. Meanwhile, one of the local factories can offer us a *1/5 of the price* (approx. 9 RMB each item) of the palm-sized remote cars on the market, and thus we decided to combine them with anime derivatives.

Quick Prototyping



Improvements

To contain a remote-controlled driver (60mm in diameter, 72mm in height), the origami would need an A2-sized (at least) paper to have enough space for all drawings on a one-single page. However, this would cause waste for packaging as well as insufficient delivery.



To further develop children's spatial imagination and hands-on ability, more drawings should be added by increasing the diversity of anime derivatives and the difficulty of origami.



Scenario

This demonstrates how to play a pikapika in a real scenario, unboxing, cutting, gluing, assembling, and playing.



This may seem to be easy, but in fact, it took us up to 4 hours in total to finish all the jobs.



Contribution

XING P.R

- Ideated the original concept of Pikapika and acted as the chief designer in charge of the patent application, task distribution.
- Collaborated with Mr YANG conducting the design research and proposed possible solutions for the project.
- Responsible for all rendering jobs, camera shots, 90 seconds time-lapse video shooting, and post-editing.
- Developed illustrations from two-dimensional into three-dimensional models and assisted Mr YANG in processing prototypes, executed layout design for posters, introduction brochure, and prepared presentation slides as well.

YANG Z.P

- Responsible for producing the packaging design, final prototypes, and final presentation including the Q&A section.
- Developed manufacture-ready Rhino CAD models of the driver and the package.
- Contacted A2-sized 2D/3D printing service, shooting studio, and models.

Shot/Edited by XING P.R
Models YU T.E, YANG Z.P, YU S.E



03 Root 6

Standalone project
10/2016 - 12/2016

A Comfortable and Detachable Stool



THE DESIGN IS MORE ABOUT PRACTICALITY RATHER THAN AESTHETICS.

SUNNY WANG
EXPERIENCE DESIGNER

Task

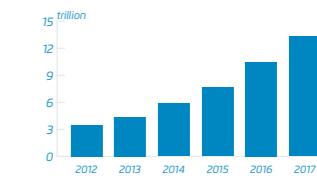
You are required to design a piece of furniture with a tight budget (less than €40). Factors including *ergonomics*, *aesthetics*, *marketing*, and *mechanics* should be taken into account.



Background

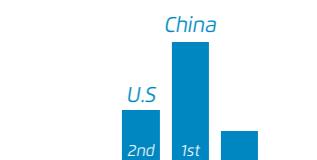
Boom

Since the e-commerce boom in China, it has now become widespread and accessible to place an order online for a wide range of age groups. And this trend is still growing in both metropolitan and rural areas.



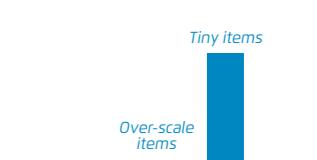
The First

Since 2014, China's express delivery volume has ranked 1st in the world with 14 billion deliveries made in that year. And this amount increased dramatically up to 36 billion (or 1 billion for every day) in 2017, by 250 percent more extensive than the year of 2014.



Reversed Trend

These trends listed above were not phenomenal in large-scale or over-weight products, such as large household appliances, furniture, etc.



Insight

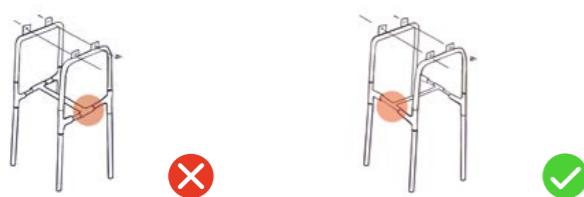
The inconvenience and expensive cost of shipping a large-scale product may contradict the robust delivery system and that's where a design insight comes in.



Solution

Mechanics

1. Adding two parallel pipes (in the front and the back) to provide maximized restrictions on the stand pairs and avoiding them breaking apart. (See two compared figures)



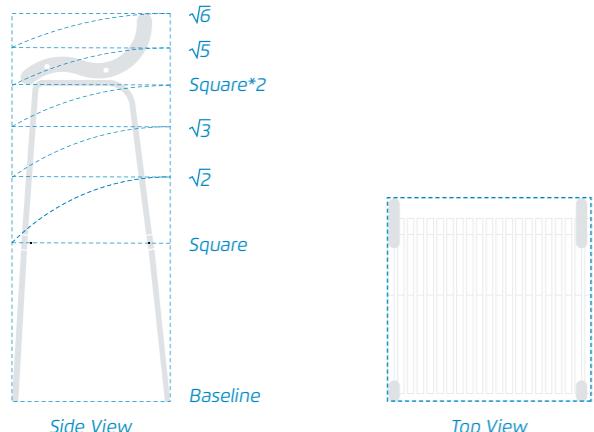
Ergonomics

1. Using CNC techniques to shape the proper seat isn't tangible and affordable. Instead, by dividing shapes into pieces, a seat can be assembled later by separate parts, and this would also help test out ergonomics during the prototyping phase.



Aesthetics

Aesthetics can be measured by geometry.



Budget

To meet the budget requirement, less post-processing (e.g. Cutting, Bending, Drilling and Wedding) and material utilisation were needed.

Name	Cost
PMMA Pieces (21 pieces, processed)	€23
Wedding Services	€6.4
Paints	€3.1
Steel pipes	€1.9
Bolts	€1.8
Others	€1.1
Total	€37.3

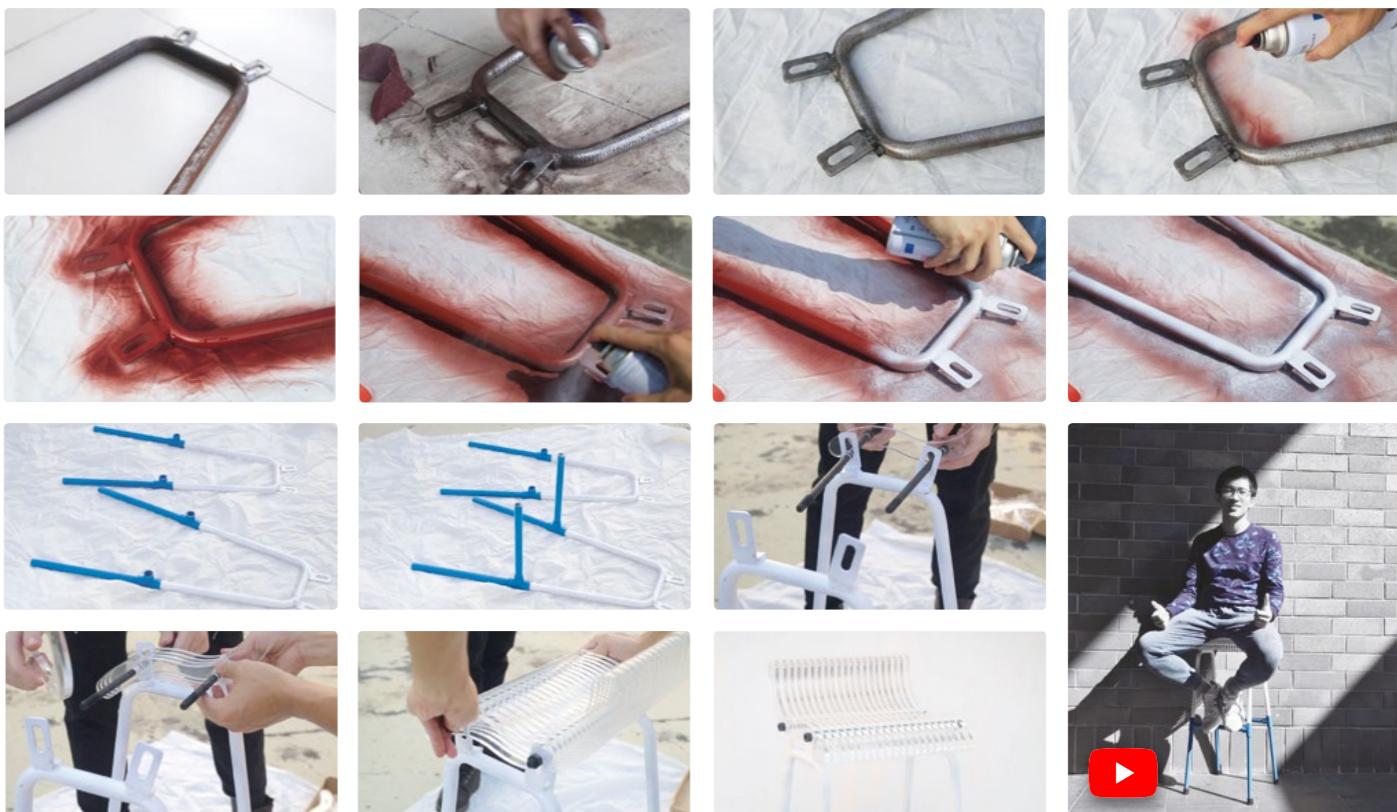
Marketing

To meet the ultimate goal, sales. Root 6 has been designed that can be flattened for better delivery efficiency.



Installation

The snapshots shown below demonstrate anti-rust painting, coating white primer, assembling PMMA pieces.





04 Pre-bike

Cooperative project
12/2016 - 01/2017

A Design Proposal for Bike-Centered City 2030

Winner of iF DESIGN TALENT AWARD 01 2017,
was highlighted within the iF online exhibition,
selected for the 2017's design special "Architecture & Urban Design",
but was NOT awarded by the jury of iF DESIGN TALENT AWARD 2017.



Task

Start with a bike, design a city of tomorrow around it.

or new ideas on how to change roads, traffic lights, footpaths and more.

We're looking for bold products to make bike riding in the city even better

How public transportation can be adapted for bikes?



Background

Excessive demand

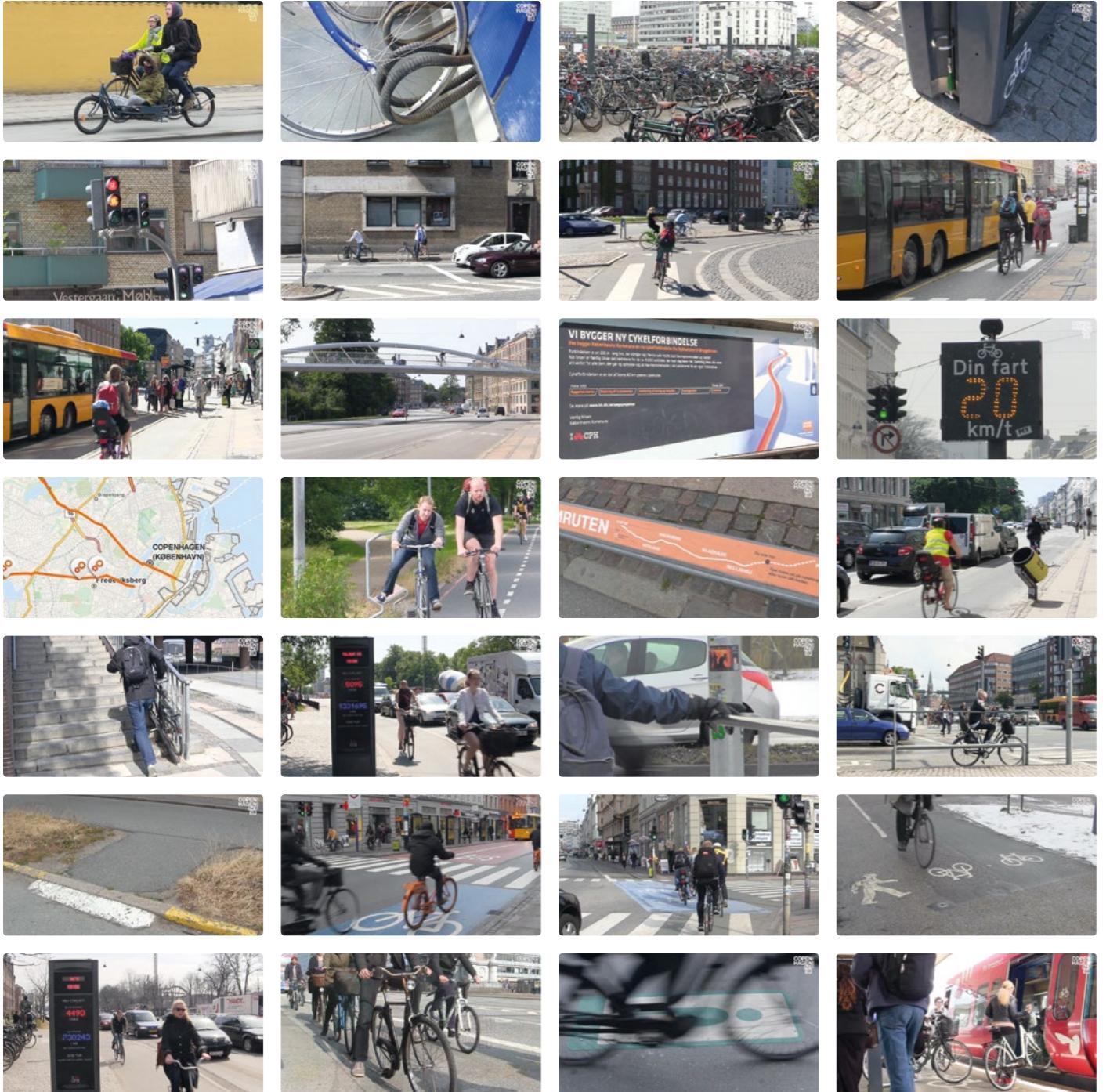
China is the largest market for two-wheeled vehicles, and Europe and North America have more bikes than cars: 80 million in Germany alone (or one for every person).

Urbanization

Asia, Europe and the rest of the world are urbanising at an unheard of pace. Migration from rural to urban areas has already reached drastic extent in some countries and will increase in the future.

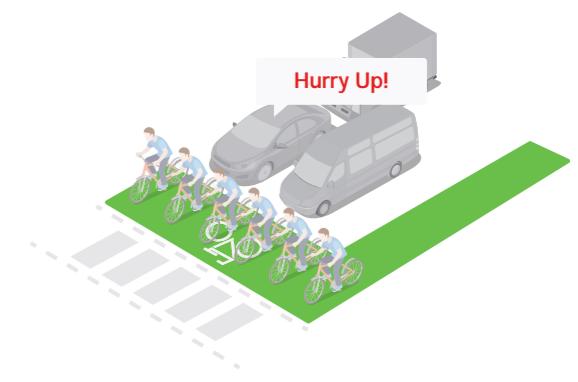
Copenhagenize

Our team dug into the research from a blog developed by Copenhagenize. Especially, the film series: *Top 10 Elements in Bicycle-friendly Copenhagen* was the essential part of our understanding of the current European traffic systems. And we started to find out what else we could do.



Issue1: Pre-greens in Copenhagen, Denmark.

The current traffic lights are designed only with vehicles in mind. As bicycle became more popular, we added more instructions on the traffic light, this may not be suitable for traffic in 2030.



Issue2: Bicycle parking area at intersection, UK

In the UK, cyclists are allowed ahead of vehicles at intersections. This can be viewed as rude or unfriendly and may cause chaos.

Creativity Management

In this case, the end result has been identified, and they were all listed in the task, while the action and the corresponding result have not, yet.

ARE Map, Action - Result - End result



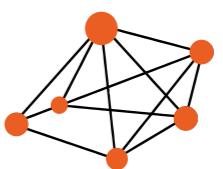
Brainstorm

To collect every idea that may relate to the *End result*.



Mindmap

Discard unreliable ideas and dig into tangible ones



Connections

Build possible ARE Maps between early ideas and the *End result*.

"Bike-friendly City" is too abstract to conduct any further research, which means it should be concretized. For example, the *End result* may be defined as "*How to quickly pass the traffic intersection*".



Based on the keywords, "Quickly Pass" to start a brainstorm. "Jump to accelerated lane", "Install injection to maximize velocity", "Slow down the vehicles"

Mapping

Build Maps between Step 1 and Step 2.

ARE Map, Example

- A1: Slow down the vehicles by complicating the vehicle's lane
- A2: Tell vehicles to slow down by sending signals
- R1: Improve the cycling efficiency
- R2: Spare sufficient room for cyclists
- E: Quickly pass the traffic intersection

N.B.. The overall process has been refined and simplified for clarity, there were lots of abandoned ARE Maps as they did NOT pass the validation section.

Acknowledgment

Here're the abandoned *ARE maps* contributed by all members of the Official Design Research Studio (e.g., TIAN Y.B, LIN L.Y, ZHANG B.Y, LEE Q.L, TANG H.E, LIU G.B, ZENG X.Z, DENG Q.X, LUO Y and etc). Those maps were produced during the brainstorm meeting hosted by me and my partner, Miss TIAN Y.B.

心电感应给提示 - 心理产生错觉 - 快速通过
加入效果音 - 产生错觉 - 快速通过
让汽车线路复杂话 - 提高自行车效率 - 快速通过
十字路口设置圆盘 - 转动形成快捷通道 - 快速通过
摩天轮/连通器原理马路转动 - 垂直上升 - 快速通过
弹射起飞 - 通过穿越空间轨道有序磁悬浮吸引 - 快速通过
十字路口有自行车专属 - 用传送带让自行车通过 - 快速通过

投射引导线 - 优化自行车行走路线 - 快速通过
轴承旋转 - 地下缆车化整为零快速通过
取消红绿灯 - 直接走地下通道 - 快速通过
十字路口 - 交换车辆 - 快速通过
地下通道利用导轨搭载电子弹射方式
机械手夹自行车 - 引导过去 - 快速通过
取消十字路口 - 地下行走汽车 - 快速通过

公共汽车安装支架 - 自行车附在支架上 - 快速通过
地下通过分支利用导轨将自行车上带过去
汽车和自行车分岔过滤 - 提高自行车
潮汐式(涨与落)交通法规 - 提高自行车带宽 - 快速通过
汽车道上加入减速带(波浪形) - 降低汽车速度 - 快速通过
氮气/氢气加速 - 喷气加速 - 快速通过

Scenario

Considering in 2030, in order to improve bike riding in the city, a cycling-friendly city should give cyclists the priority instead of vehicles. We put cycling as the top priority on traffic lights and merged instructions for cyclists into the traditional traffic light to create the pre-bike. It is a green bicycle-shaped signal that gives priority to cyclists. During this period of flashing, cyclists will be ensured safety at intersections.



Bonus

--- Keil Code ---

```

void main(void){
    int loopLED;
    for(loopLED=0;loopLED < 3;loopLED++){
        ledMatrixDisplay(15,bike);
        inaccurateDelay(20);
        ledMatrixDisplay(20,null);
        inaccurateDelay(20);
    }
    ledMatrixDisplay(500,circle);
    ledMatrixDisplay(20,null);
    flashLED(Yellow,3);
    flashLED(staticRed,20);
}

int bike[]=
{
    0x001C,0x003E,0x001C,0x01E0,
    0x07E0,0x0FF0,0x1FDE,0x1FC0,
    0x01C0,0x389C,0x44A2,0x82C1,
    0x8241,0x8241,0x4422,0x381C,
};

int null[]=
{
    0xFFFF,0xFFFF,0xFFFF,0xFFFF,
    0xFFFF,0xFFFF,0xFFFF,0xFFFF,
    0xFFFF,0xFFFF,0xFFFF,0xFFFF,
    0xFFFF,0xFFFF,0xFFFF,0xFFFF,
};

int circle[]={
    0xF00F,0xC003,0x8001,0x8001,
    0x0000,0x0000,0x0000,0x0000,
    0x0000,0x0000,0x0000,0x0000,
    0x8001,0x8001,0xC003,0xF00F,
};

void Delay_50ms(void) //50ms Delay Using Internal timer registers {

    TMOD &= 0xF0; TMOD |= 0x01; ET0 = 0;
    TH0 = 0xC5; TL0 = 0x68; TF0 = 0; TR0 = 1;
    while (TF0 == 0);
    TR0 = 0;
}

```

(Only main part of the code were shown)

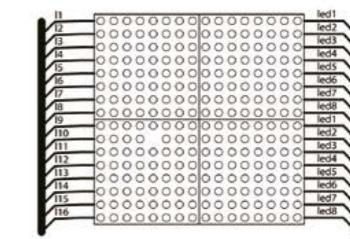
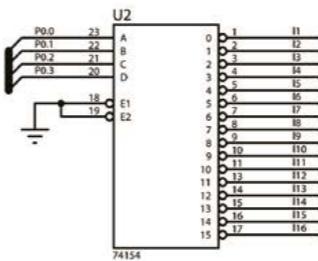
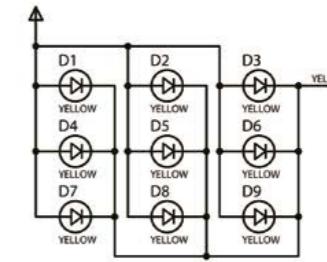
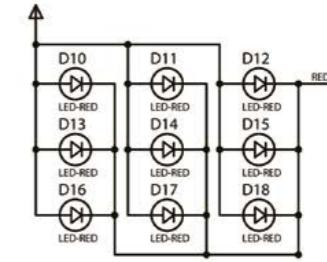
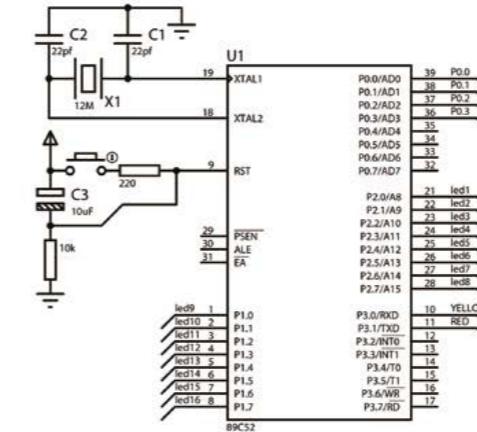
```

void flashLED(char color,int times){
    int i;
    switch(color){
        case 1:for(i=0;i<times;i++){
            YELLOW = 0;
            Delay_1s();
            YELLOW = 1;
            Delay_1s();
        }
        break;
        case 2:for(i=0;i<times;i++){
            RED = 0;
            Delay_1s();
            RED = 1;
            Delay_1s();
        }
        case 3:
            RED = 0;
            Delay_custom_1s(times);
            RED = 1;
            break;
    }
}

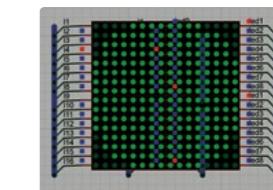
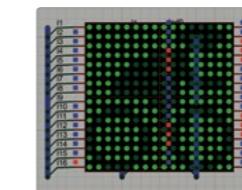
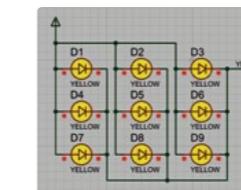
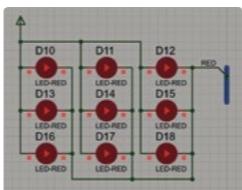
void ledMatrixDisplay(int time, int *input) {
    int i,j;
    for(j=0;j<time;j++){
        for(i=0;i<16;i++){
            tran.il6=input[i];
            columnPort=i;
            linePort1=tran.c8[0];
            linePort2=tran.c8[1];
            inaccurateDelay(10);
            linePort1=0xFF;
            linePort2=0xFF;
        }
    }
}

```

--- Schematic Diagram ---



--- Proteus Simulation ---



Contribution

Cooperative sections (with TIAN Y.B): Research, Early ideation, 3Ds Max modelling, Illustrations.
Standalone sections: Rendering, Graphic design. Schematic design.

05 E' handler

Cooperative project
04/2017 - 06/2017

An Experimental Design for An Existing Product



Task

Select a daily necessity product, find what may cause lousy user experience around it and try to make improvements.

Observation

When it comes to daily necessities, we think of water and its related products such as bottles, kettles, etc. Our group decided to research on household kettles because it would be more accessible and practicable to do so.



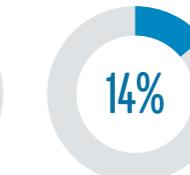
To get reliable data, we observed a group of 11 participants drinking water for 68 liters within 33 days and tried to take notes for the unpleasant moments.



We've also calculated the frequency of having access to each part of the selected kettle, and we would be able to assess its corresponding influence on the v.



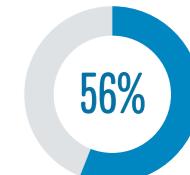
Pot Lid
44 times



Power Switch
51 times



Lid Lock
58 times



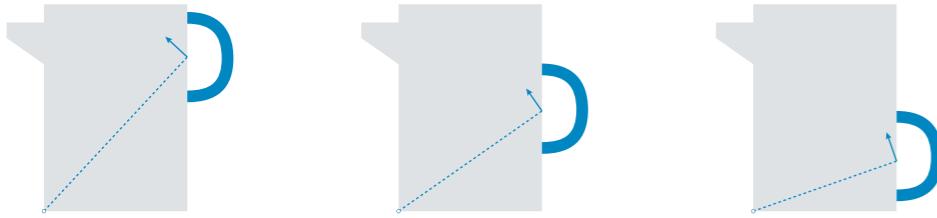
Handler
212 times



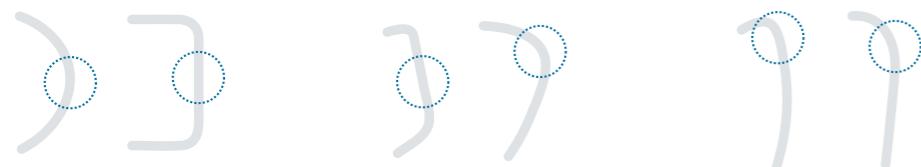
Analysis

As the data show, we realised that the handle had the most significant influence on the UX and our team tried to analyse the possible reason regarding the relative position, forms, centre of gravity (COG).

Relative Position



Handle Forms



Centre of Gravity



Conclusion 1

The handle should be placed in a relatively high position of the kettle body.

Conclusion 2

Various forms of handle shape should be well-considered during prototypes making.

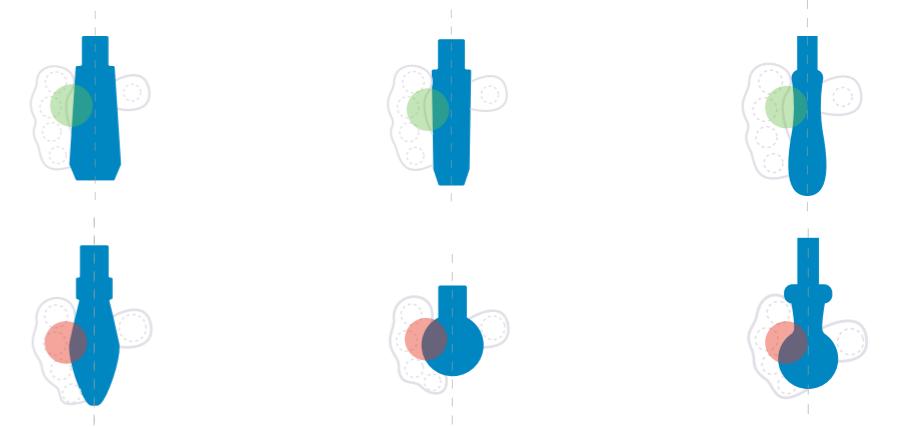
Conclusion 3

From the perspective of the kettle development, the centre of gravity has been gradually raised.

Blank Leaving

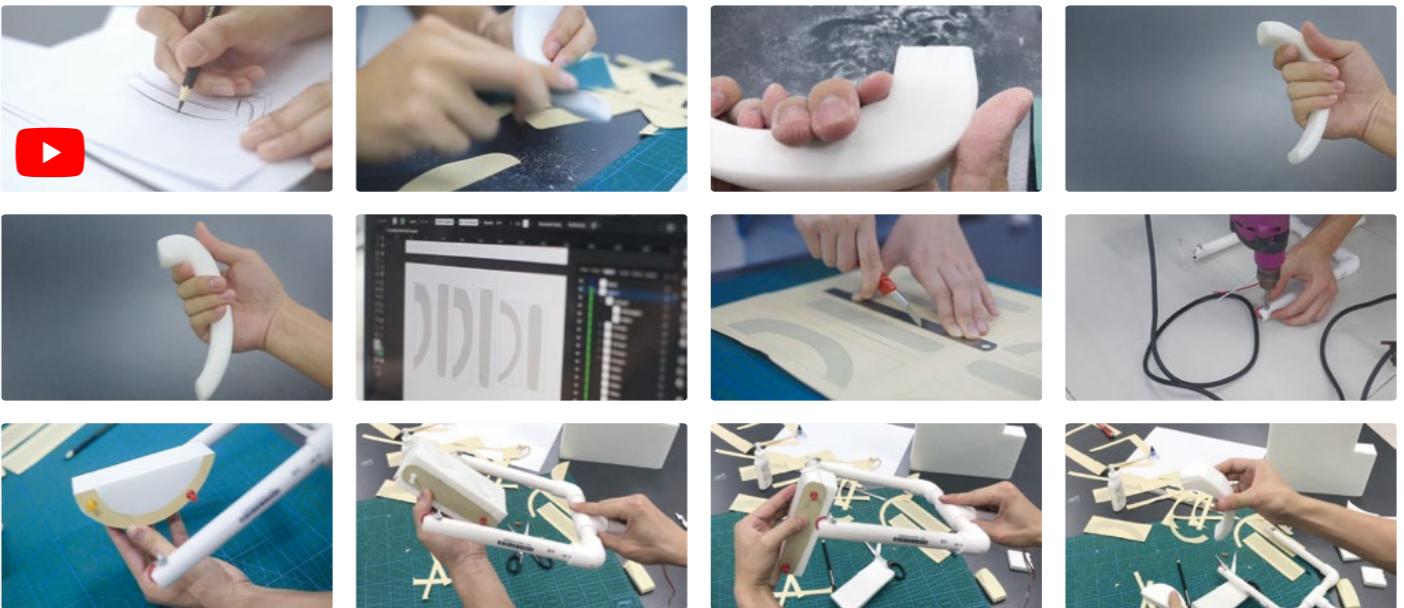


Insufficient Muscle Strength



Prototype

Using shaped foam to quickly test out our experimental design (*Ergonomics research based*) and be able to make instant adjustments accordingly.



Contribution

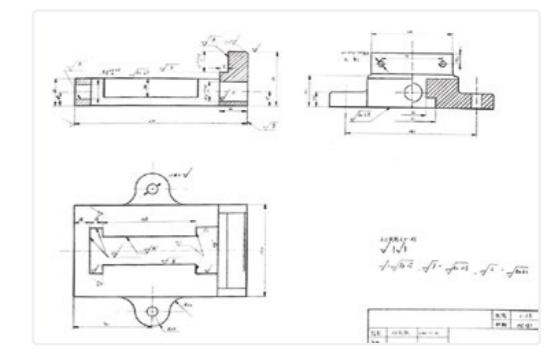
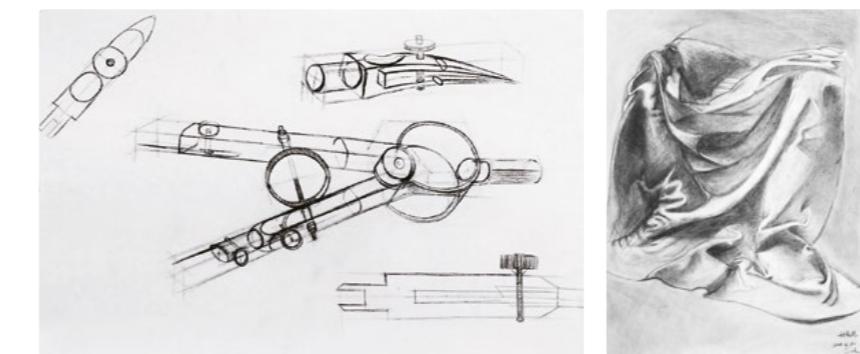
Cooperative sections (with TIAN Y.B, LUO Y): Research, Illustrations, Sketch, Presentation Slides.
Standalone sections: Prototypes, Photo taking & Video Editing.



06 Others

*Standalone projects
09/2014 - 12/2017*

Graphic Designs, Renderings, Drawings, Photography Included



贛坊



東方古建



111
796



Minging



KNOT



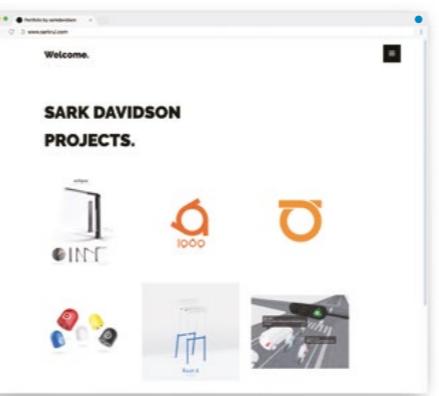
汇和选矿设备



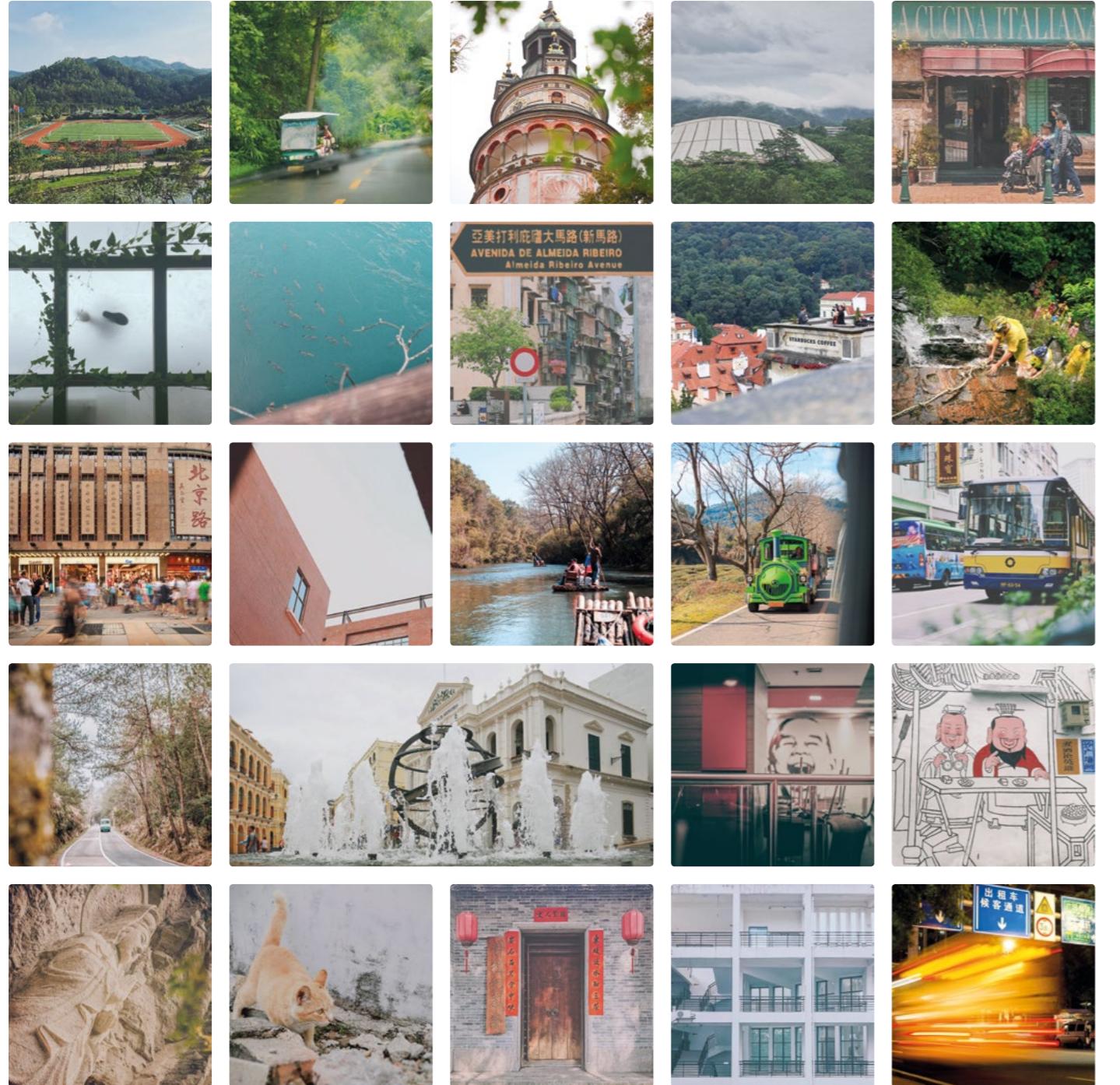
HME
汇和选矿设备



- Cooperative project
- Commercial project



- Portfolio site, hosted with Github, powered by HTML/CSS
- Blog site, hosted with Github, powered by Hexo



• Pics were selected from Instagram @sarkdavidson

Curriculum vitae



September, 2014
Enrolled in BNUZ

2015 CUMULUS Dafen
International Maker Summer
Camp, ranked 3rd,
Tong Ji University, Shenzhen

December, 2015

3rd Prize Scholarship,
School of Engineering
and Technology

2016 Dong Guan International
Industrial Design Competition,
ranked 2nd out of 3,200 entries

September, 2016

8th Guangdong Industrial Design Expo,
2nd Biennale of The Academy Awards

December, 2016

1st Prize Scholarship,
for outstanding performance
as #1 ranked candidate

505 Official Industrial Design
Research Studio

October, 2016

Ownership of Two Patents

Jun & August, 2017

September - October, 2017

Jingzhou Electrical Appliances Co.,
Ltd, UX Design Intern

Achieved GPA 87,
among the TOP 5%

Present



June, 2018
Graduation
(expected)

Skills and Interest

Languages: English (competent, IELTS 6.5/9), Mandarin (native).

Interests: Marathon Running, finished Haft Marathon Running within 130 minutes, ran over 1,000 kilometres in total since 2016.

MORE COMING SOON ...

FUNCTIONALITY × AESTHETICS × UX

Designed by Pangrui XING
@sarkdavidson

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