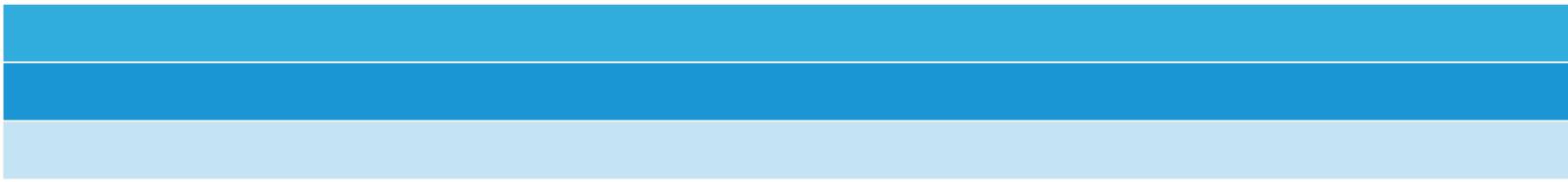
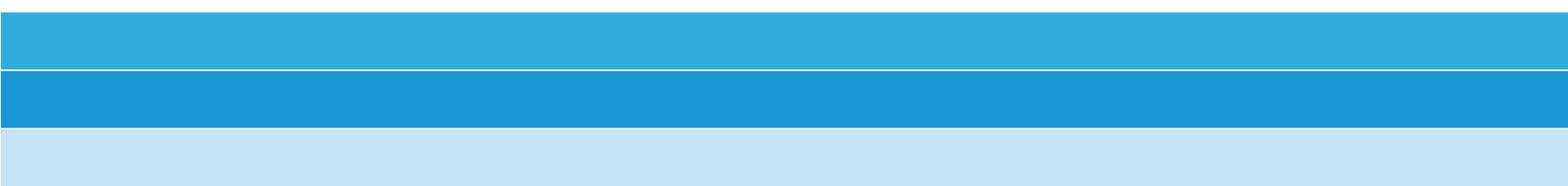
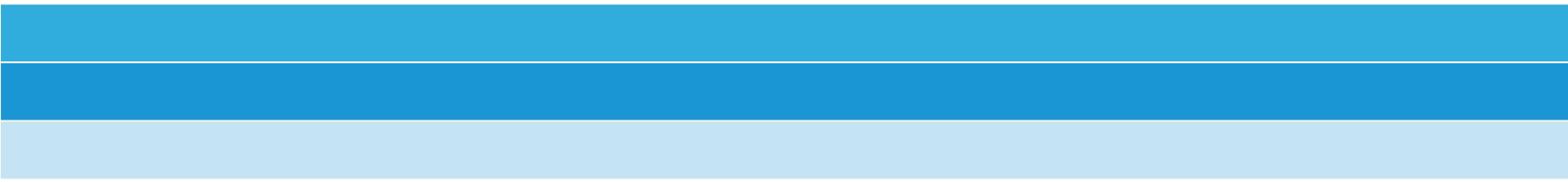
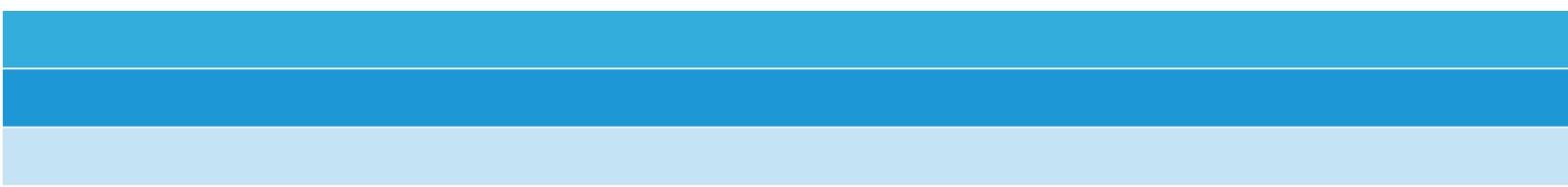




I certify that the work included in this portfolio is my own original work. Work included which was conducted as a part of a team or other group is indicated and attributed as such- the other team members are named and a true description of my role in the project is included.

Last Name: Zhang
First Name: Ruofan
IUe-App Number: IU001544543



Mechanical Design

1

Shopping Robot

2

Rotatable Chair

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Graphic Design

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Identity Design & Branding

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The Class Journal

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Single Serve Website

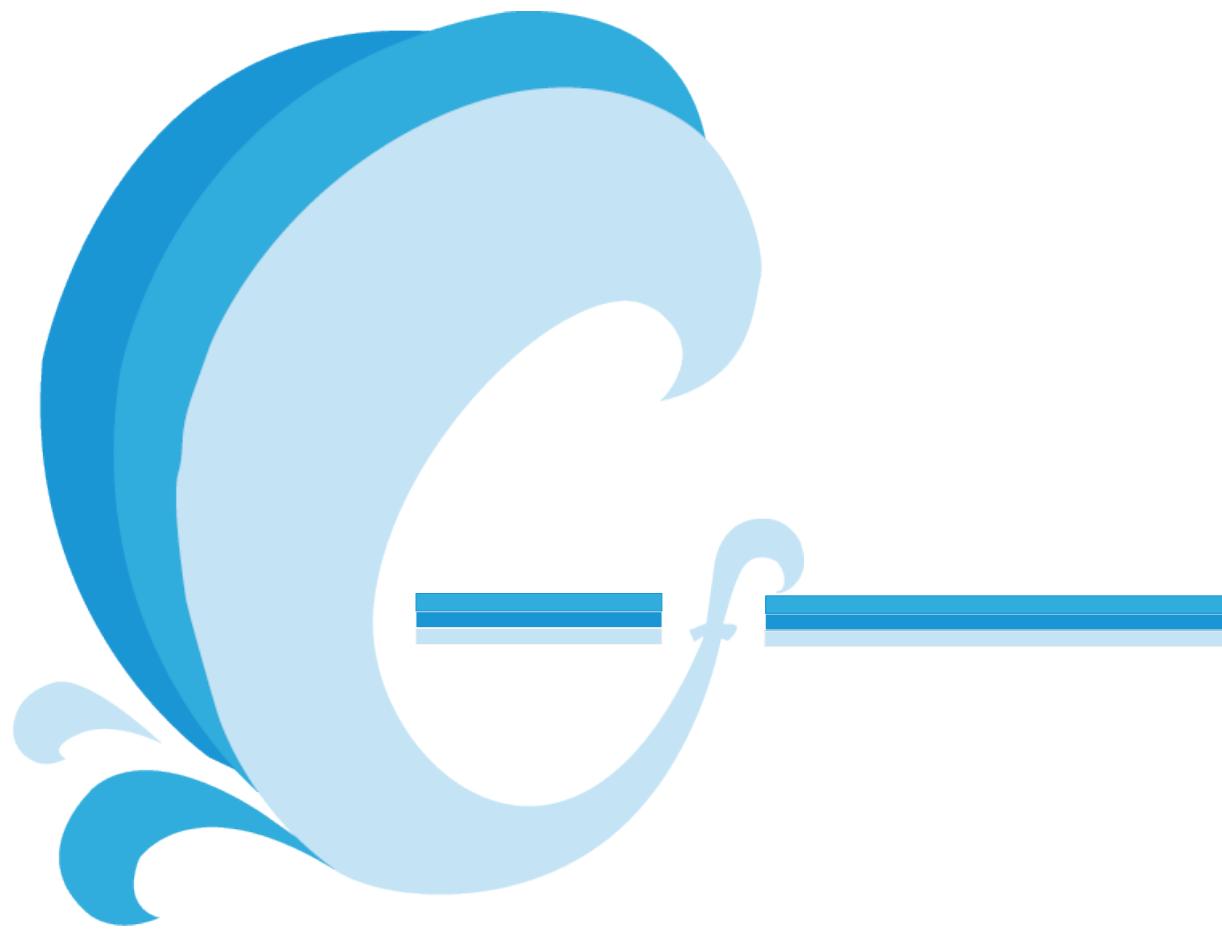
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Portfolio Website

<http://ruofaniris.github.io/>



Mechanical Design

Shopping Robot

Rotatable Chair

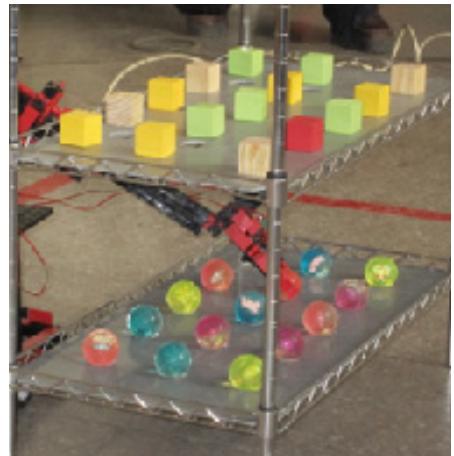
Shopping Robot

Design, Manufacture and Assemblage

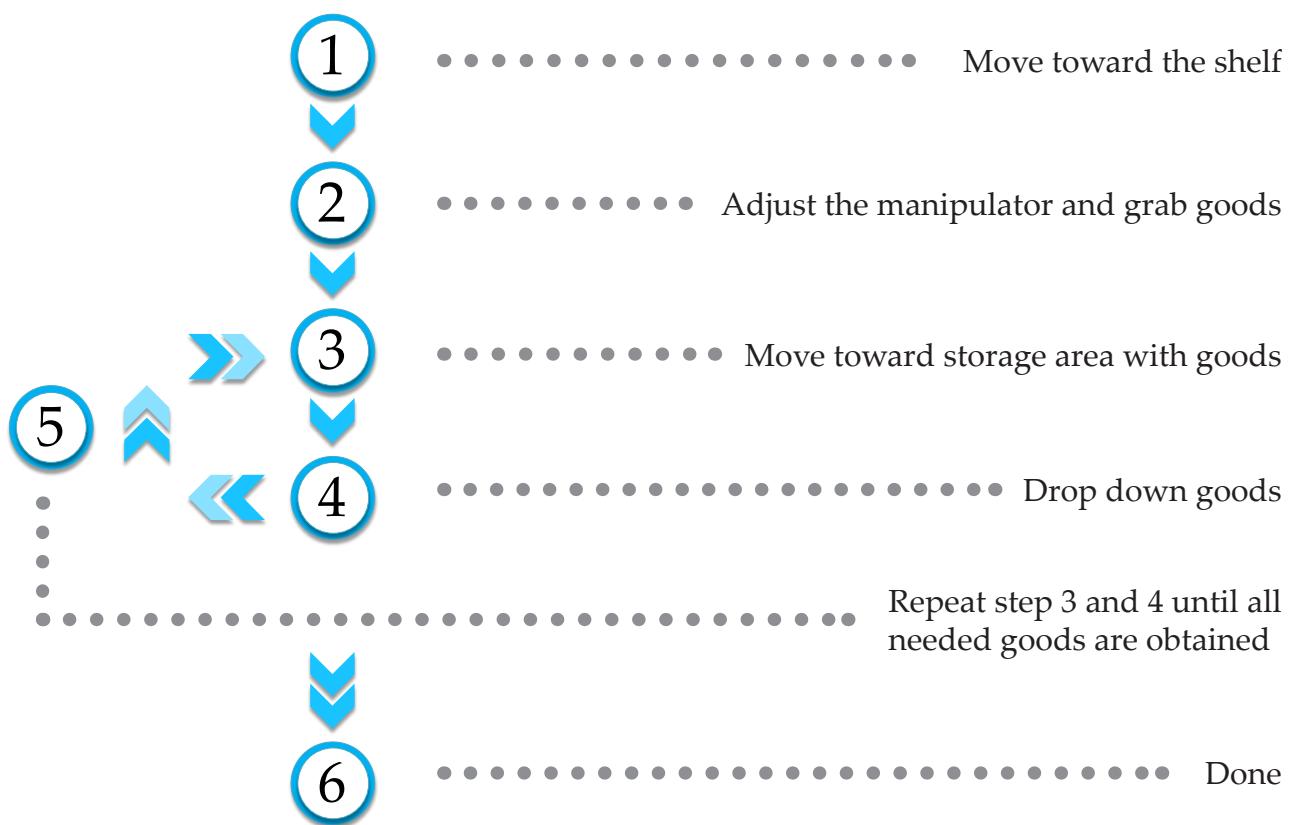
Background

In order to assist people with disabilities and the aged people to buy goods in supermarkets, the concept of remote controlled shopping robot have been proposed. Such a robot is designed to provide those groups of people with an easy and comfortable shopping experience as common people enjoy.

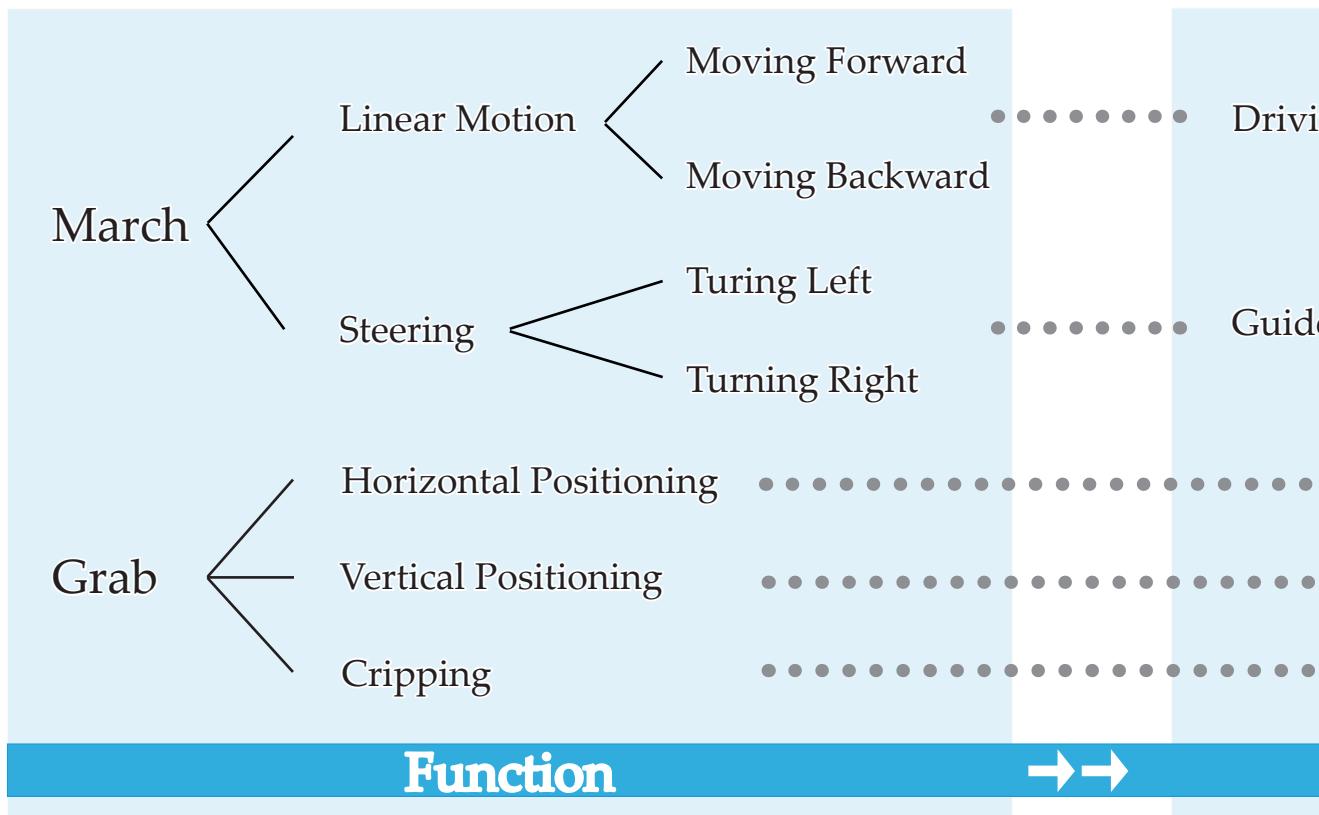
The remote controlled robot is required to implement the function that moving to the shelf at first and then clamping the goods, which are represented by small cubes and balls here.



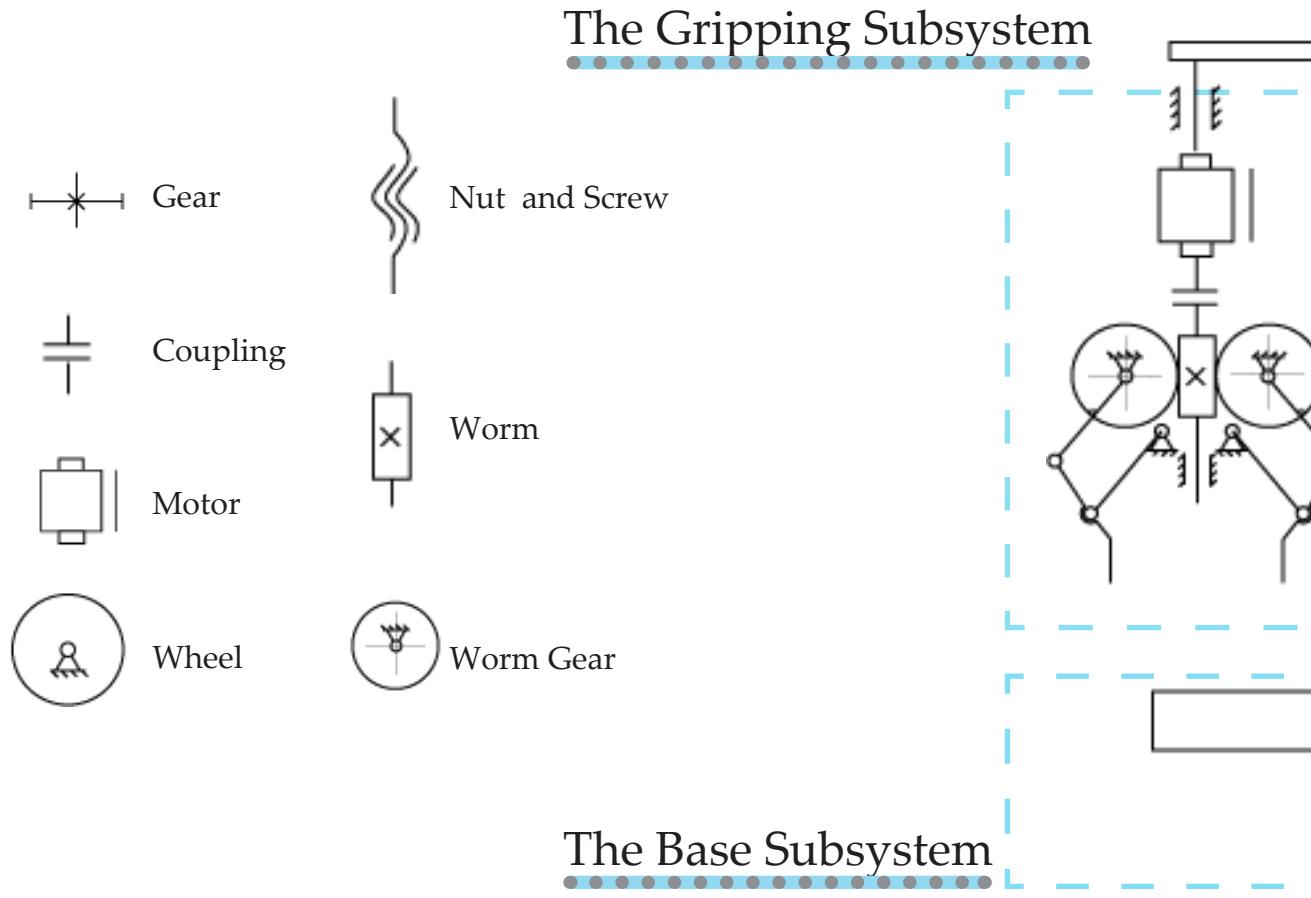
Workflow

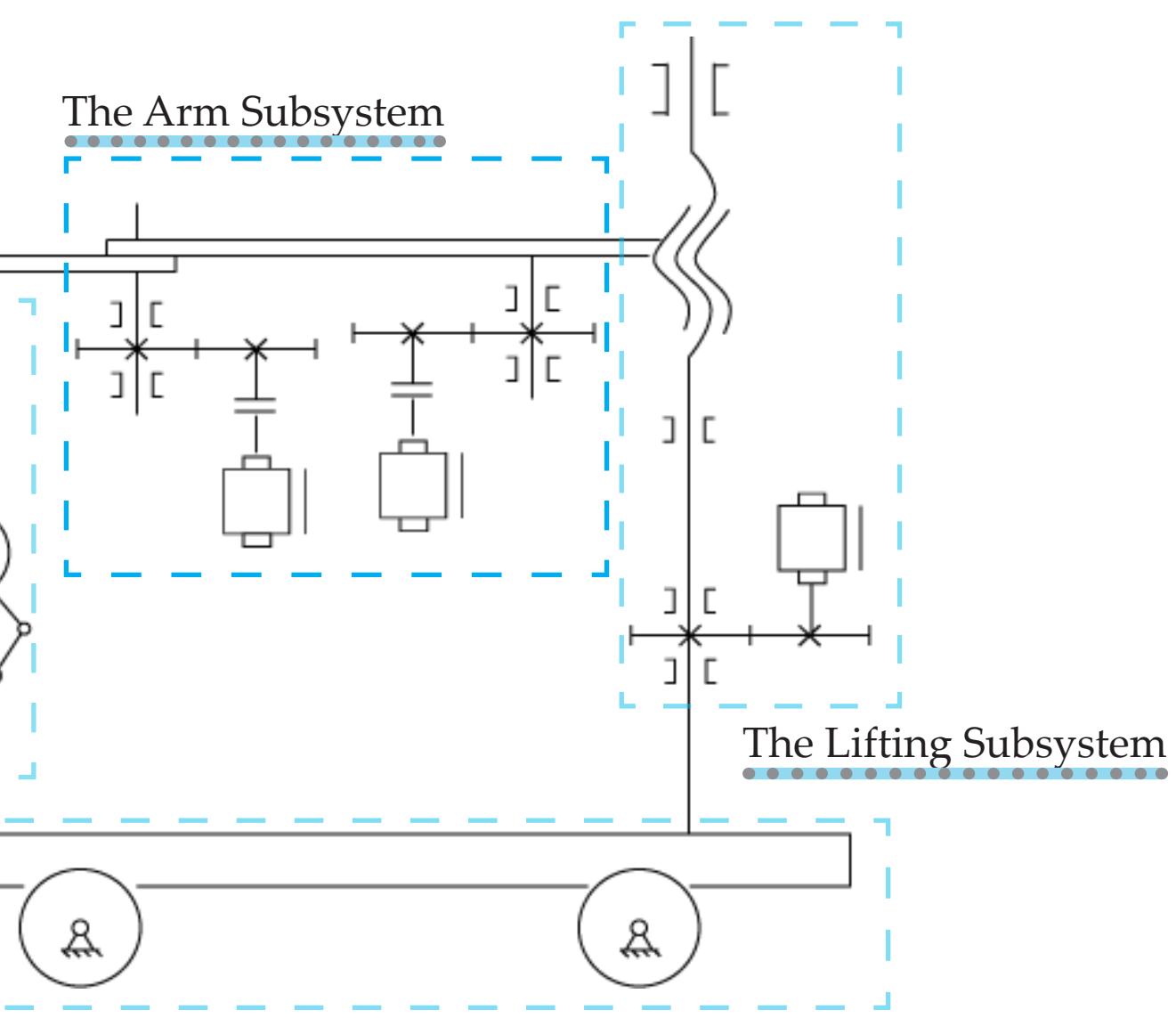
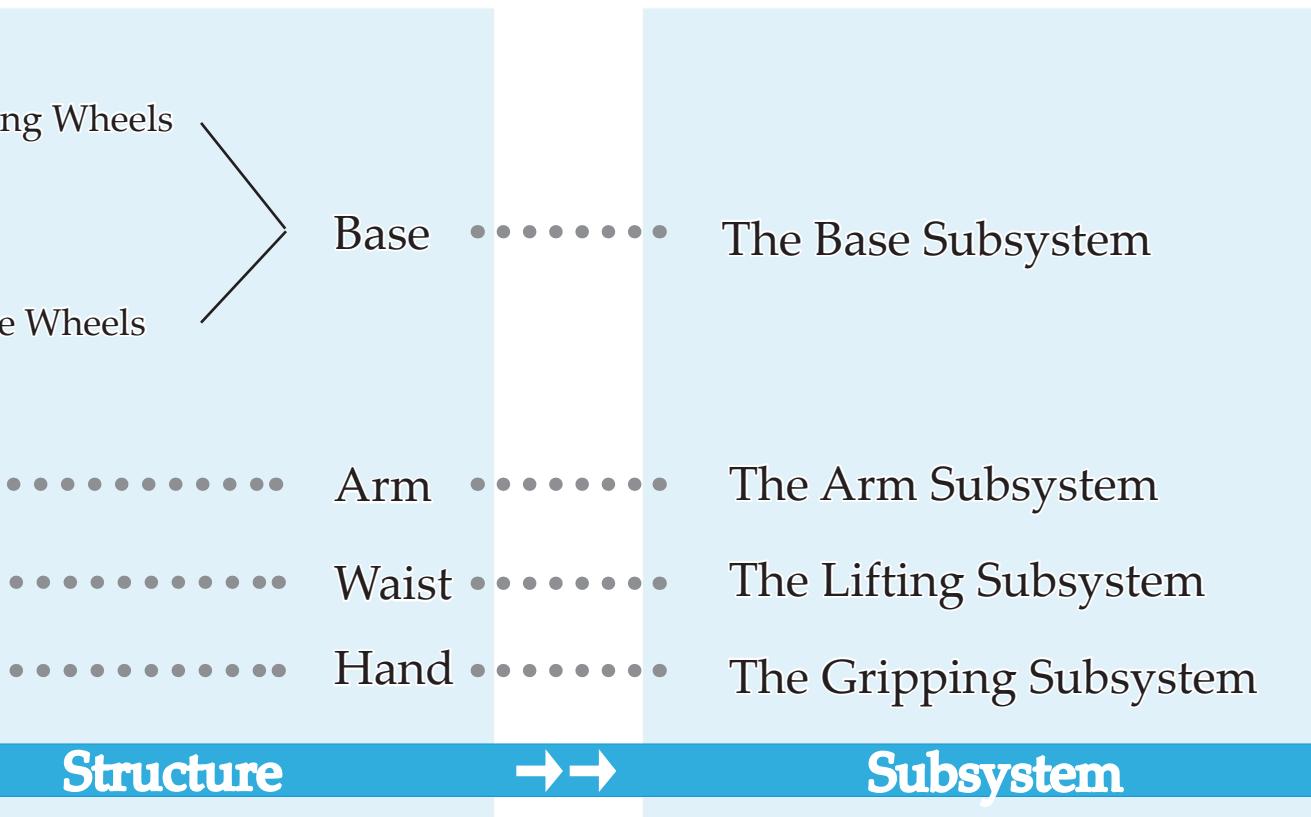


Function Analysis



Mechanics Diagram





Subsystem Design ---- The Arm Subsystem *

The main function of the arm subsystem is to adjust horizontal position and ensure the gripping subsystem move flexibly in the shelf area.

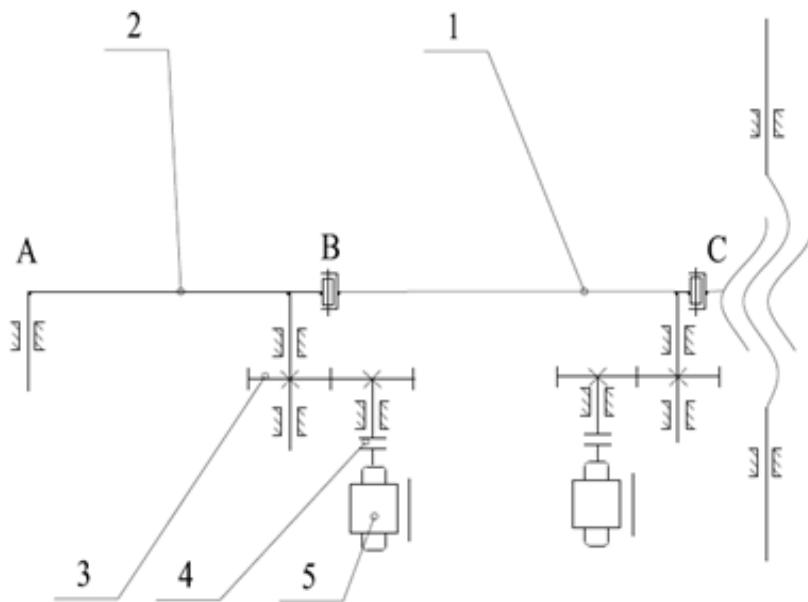
- 1) Together with the base subsystem, stretch the gripping subsystem to the good to be picked up;
- 2) After obtaining the good, pull back the gripping subsystem on the top of the basket and drop off the good.

The horizontal position cooperation of the base property of base limit positioning, the arm 1 positioning.

Single-axis rotation is area, but its positioning and the motion path. Therefore, the two-d mechanism is chosen, positioning and high ab

1 Function Analysis

2 Principle



Schematic Graph of Principle

1	Rear Arm
2	Fore Arm
3	Gears
4	Couplings
5	Motor
A	Joint with Hand
B	Fore-Arm Axis
C	Rear-Arm Axis

* Subsystem Design is divided into four tasks and each group member was responsible for one of them. I was in charge with the arm subsystem.

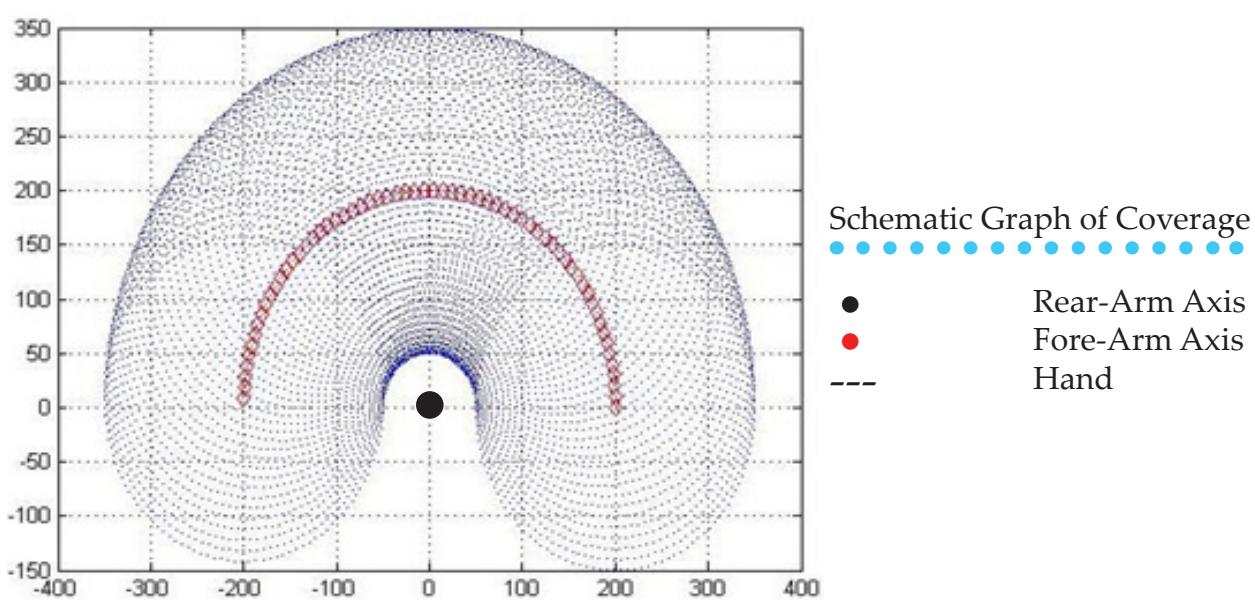
ion is achieved by the
e and the arm. Since the
its function into coarse
need to achieve precise

is able to sweep a sector
g is not precise enough,
is too simple as well.
degree-of-freedom link
, in terms of its precise
bility of regulation.

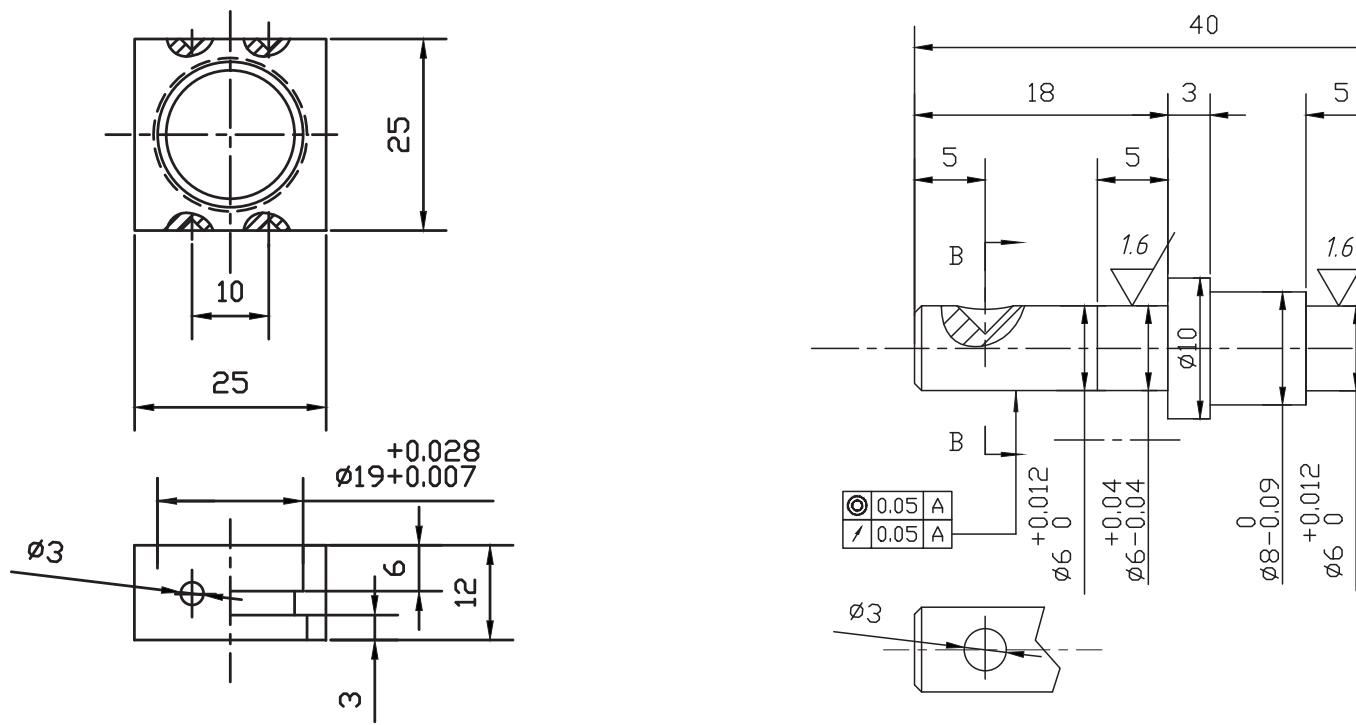
Mechanics analysis and calculation have been done with critical components, such as shafts and screws, in order to ensure the whole system can work in stability and security, without appearance of situation such as shaft fracture or gear stuck. Based on these results, the final sizes and specifications of structure have been determined.

Sample Scheme

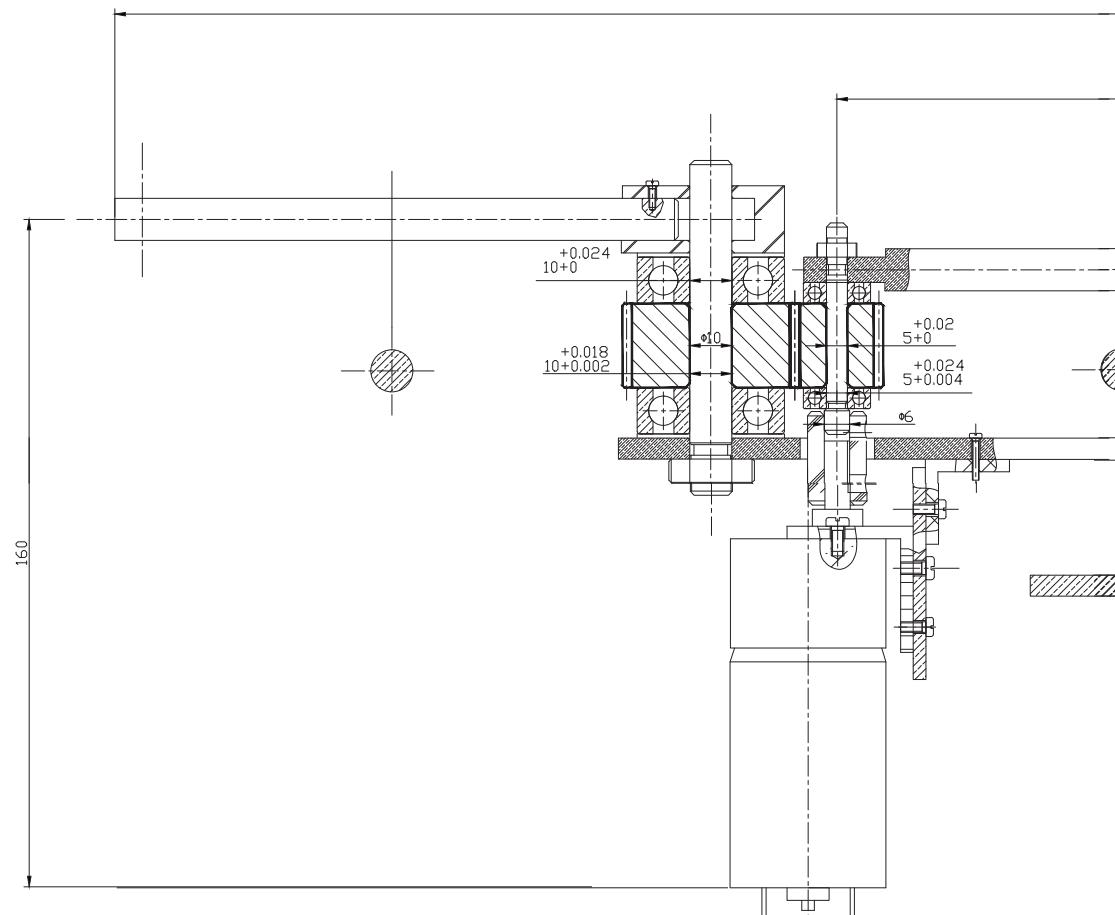
3 Mechanics Analysis

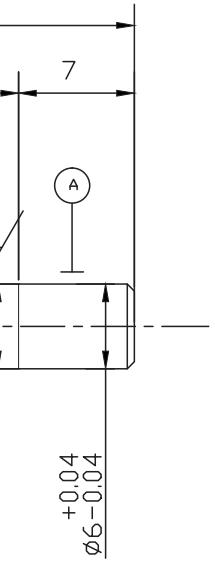


Subsystem Design ---- The Arm Subsystem



4 Assembly Drawing and Parts Drawings



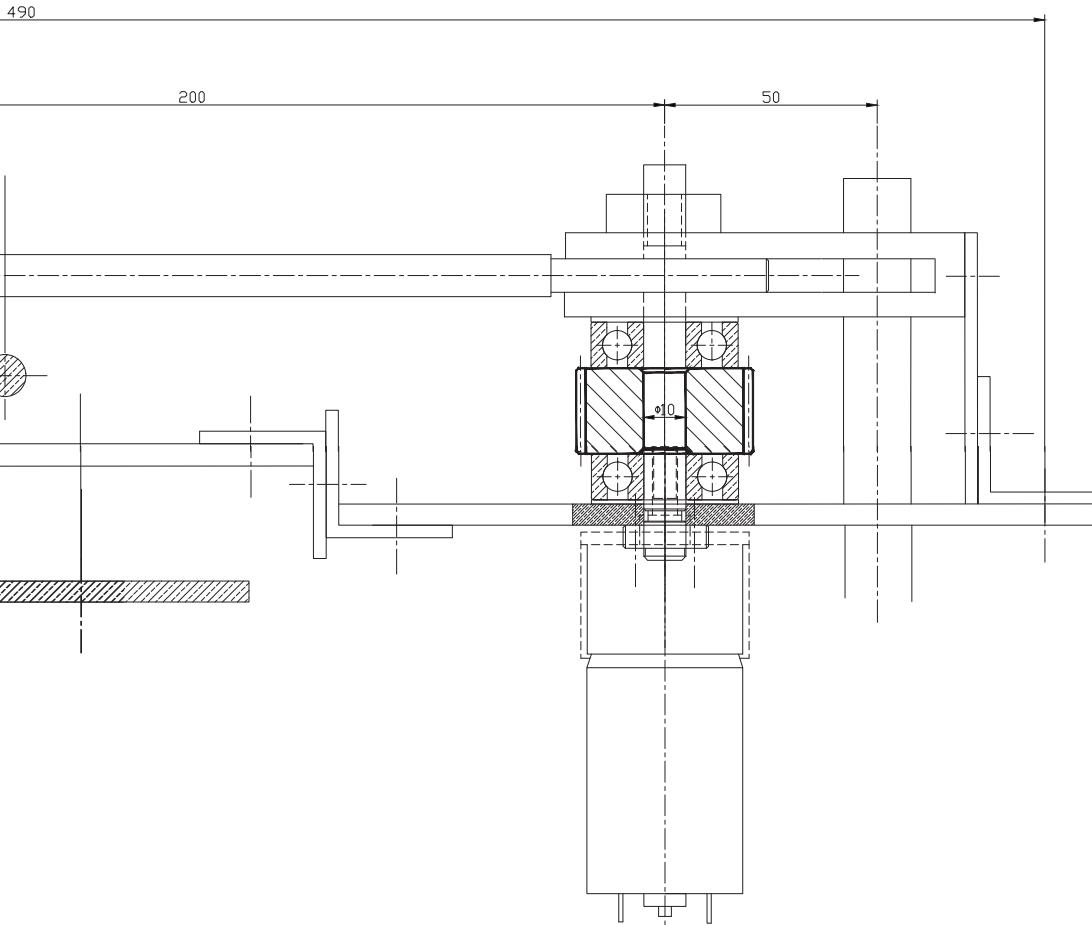


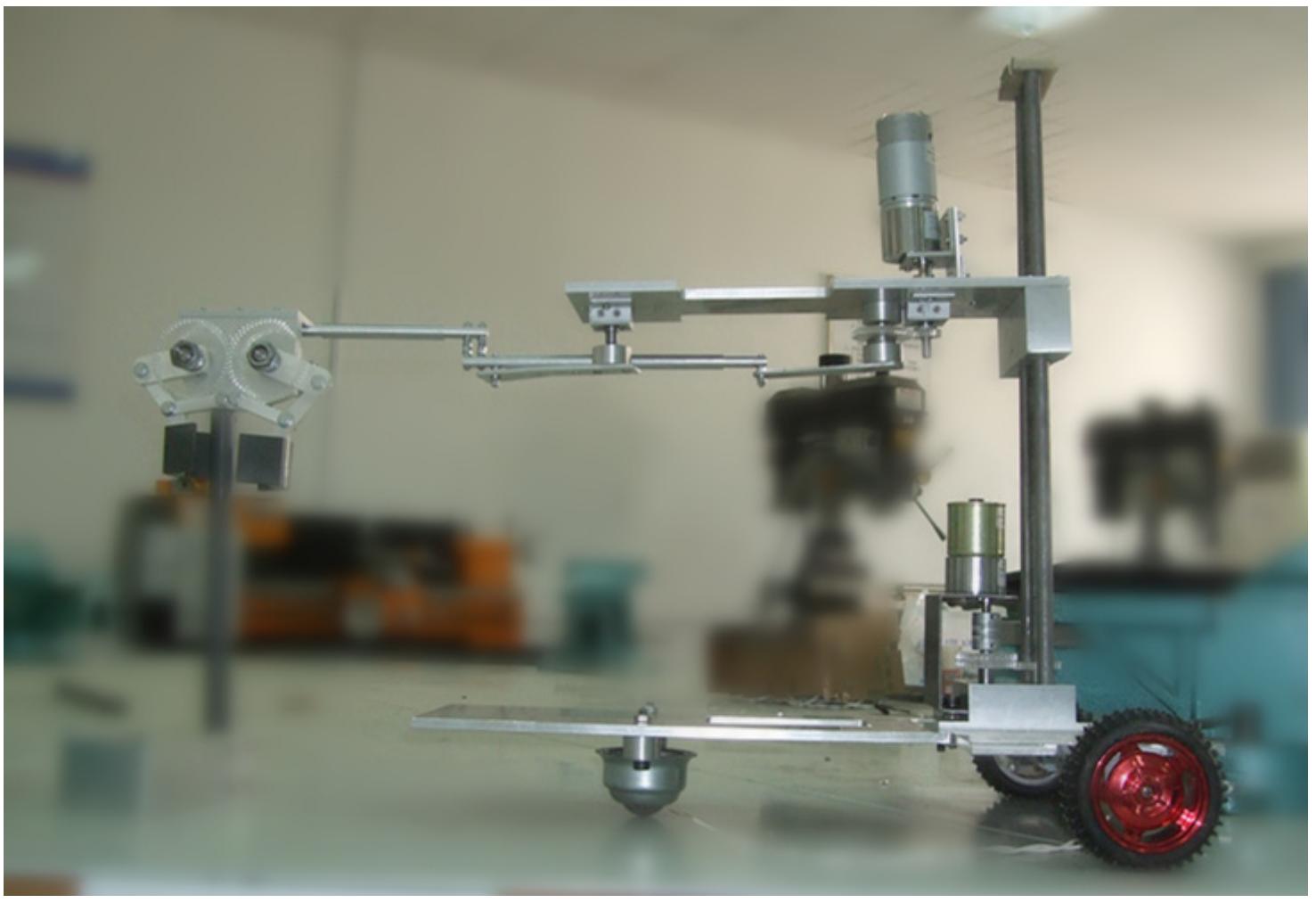
In terms of lack of practical experience, the first edition of drawings contain problems calling for more consideration. Take the revision of the bracket part as an example.

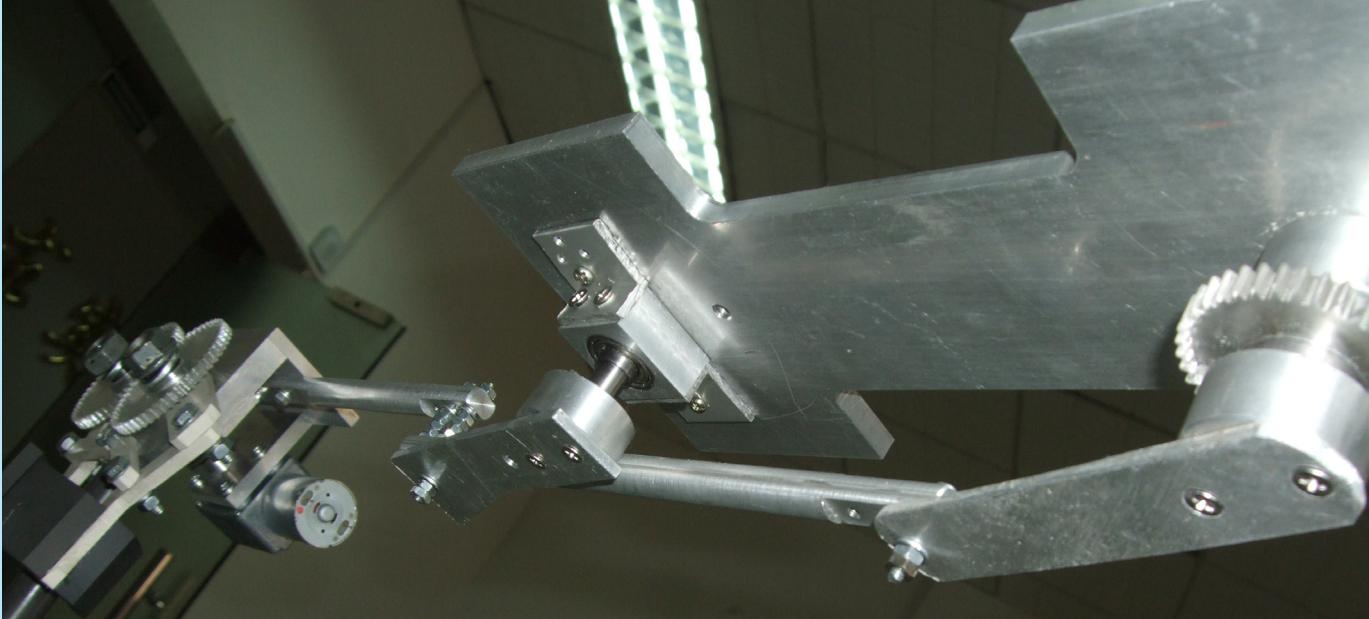
The initial design of one-piece bracket had several disadvantages requiring high precision during the process of manufacture. Moreover, the bracket as the whole part was large in both size and mass, thus obtained a poor stiffness and it was easy to deform;

According to these reasons, the bracket then was split into four individual parts. Through making this improvement, the fabrication difficulty and weakness were reduced and the subsystem was easier to assemble.

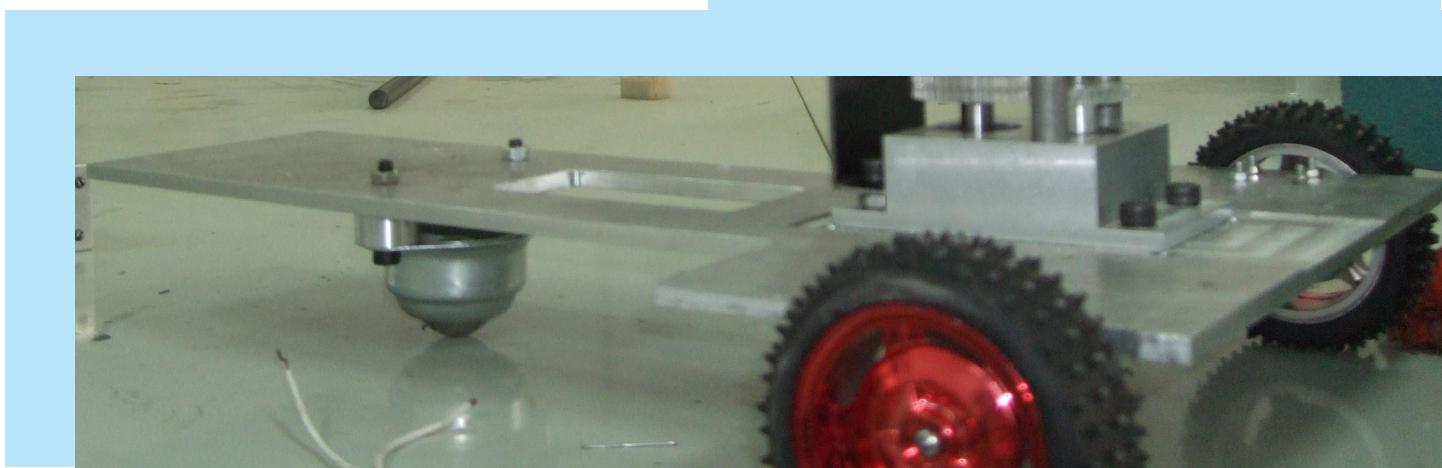
5 Manufacture and Revisions







Final Product



Rotatable Chair

Design and Modeling

Background

It is simple for normal people to change posture from sitting to standing, but cases are different with the aged people and those with disability of lower extremity. Due to the decline or loss of motor function, they find it difficult to stand up by themselves and need others' help to accomplish the standing process.

Aiming at providing convenience to the aged people and the disabled ones, we proposed an assistant device to aid users along the sit-to-stand process.

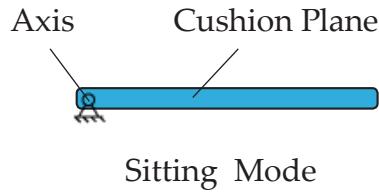
A chair with rotating seat is an ubiquitous form of the sit-to-stand assist device, that is the motor provide assistant force to

compensate the lack of user's own ability.

However, all of existent assisting chairs are more or less so heavy and complicated that they can only be settled at a proper position without the possibility to move with the user.

In order to meet the possible sit-to-stand need at anywhere and anytime , this project devised a rotating chair cushion, which can be placed at any ordinary flat plane to assist users. Compared with traditional whole chair device, such a portable cushion is of higher convenience and performance-price ratio.

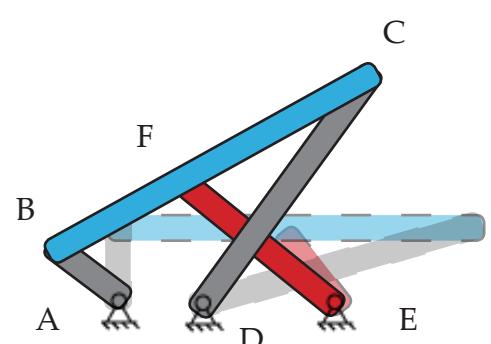
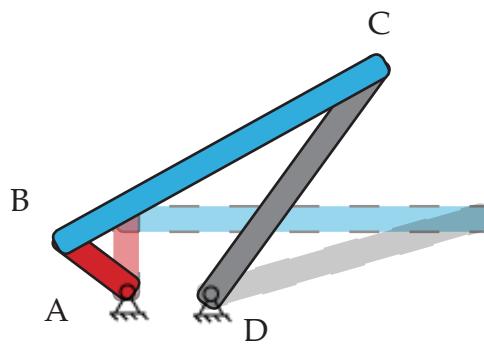
Function Analysis



Principle Scheme

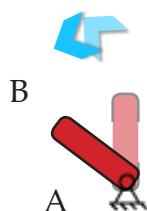


Schematic
Diagram

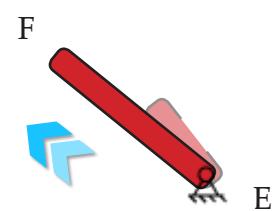


■ Original Motive Part ■ Cushion Plane ■ Supporting Part
■ ■ ■ Standing Mode ■ ■ ■ Sitting Mode

Motor



Rotary Motor



Linear Push Rod

Structure

Simple ✓

Normal

Efficiency

Low

High ✓

Stiffness

Low

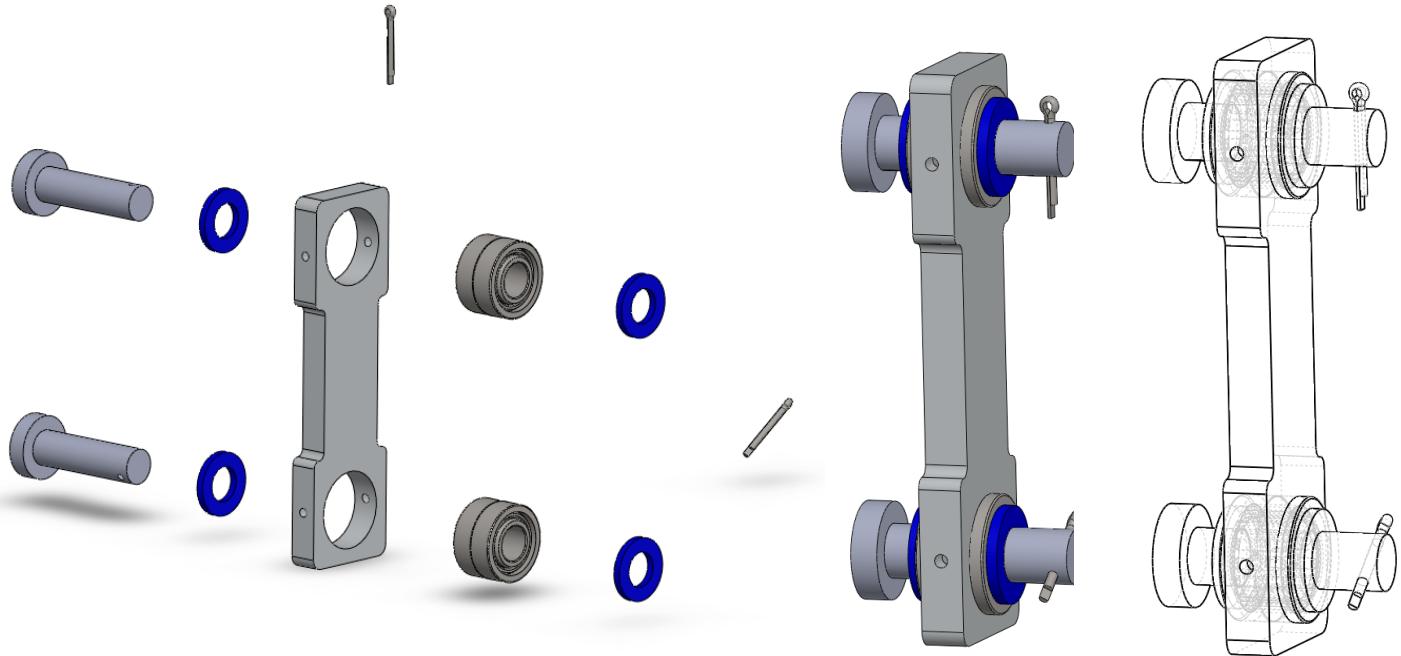
High ✓

Final Decision

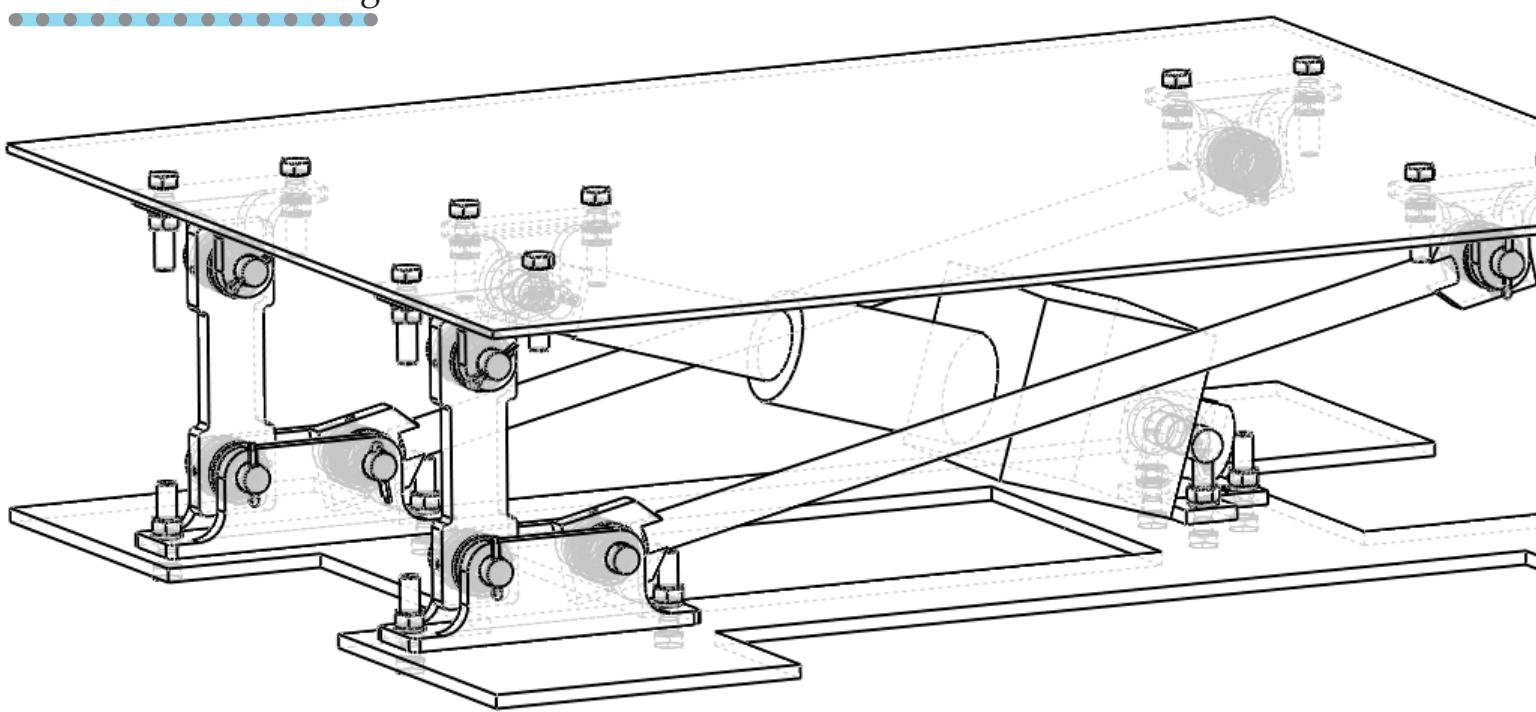
✓

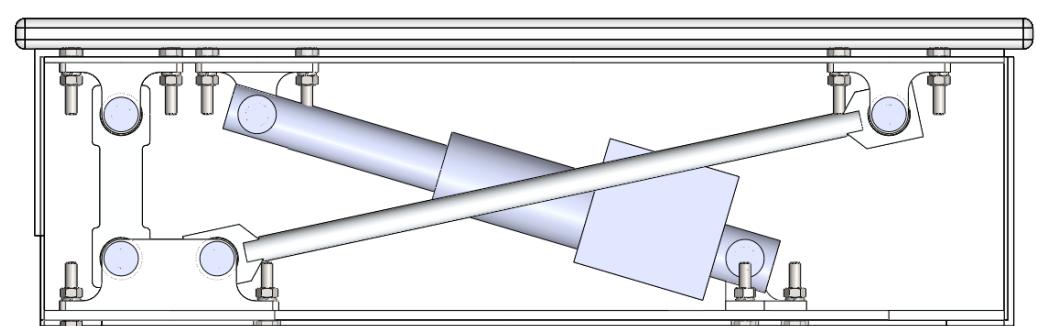
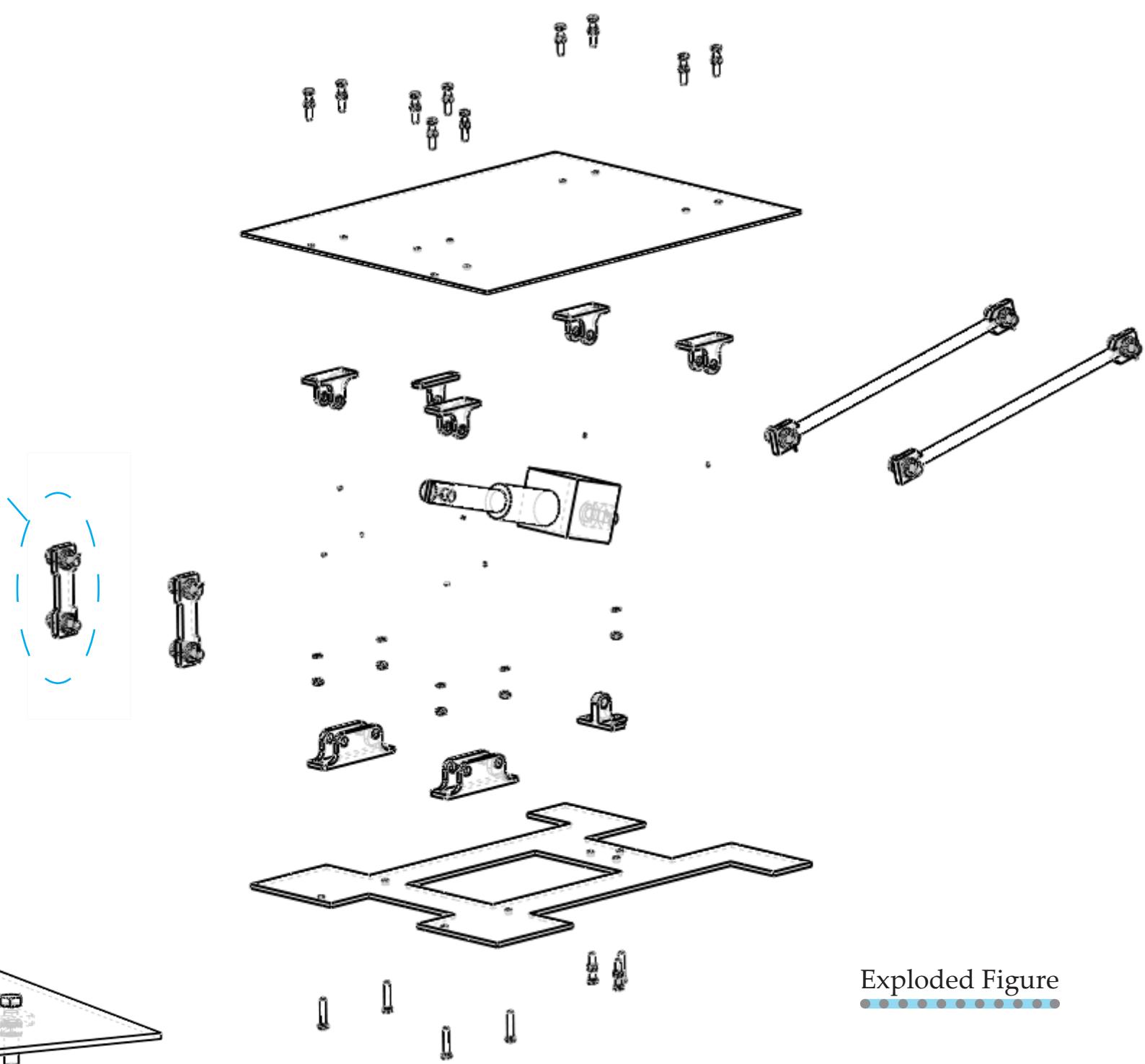
3D Modeling

-- Internal Structure



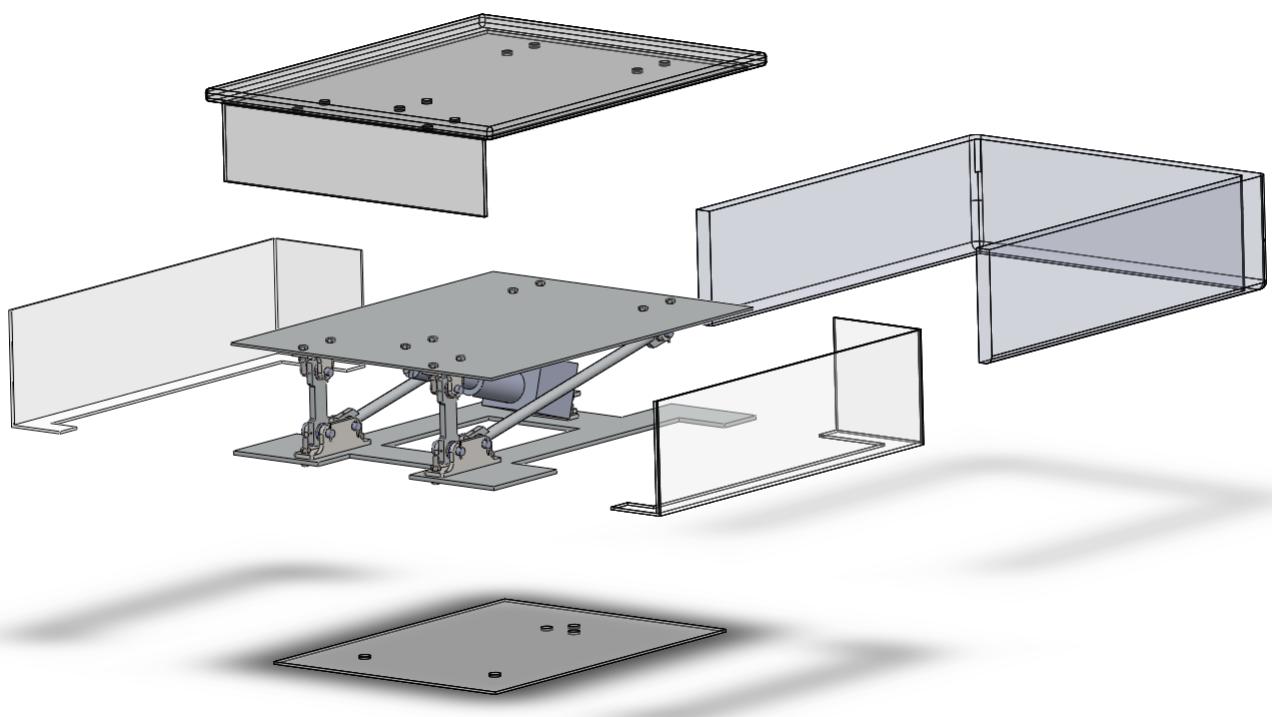
Axonometric Drawing



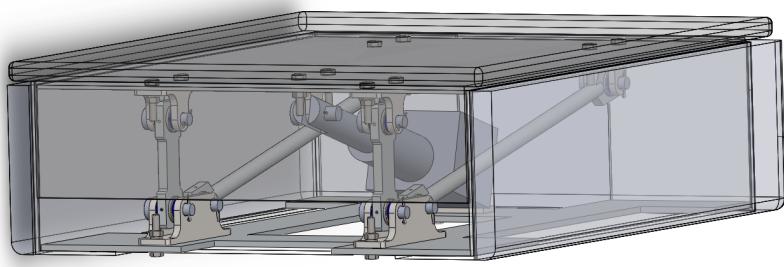


3D Modeling

-- Overall Structure



Exploded Figure

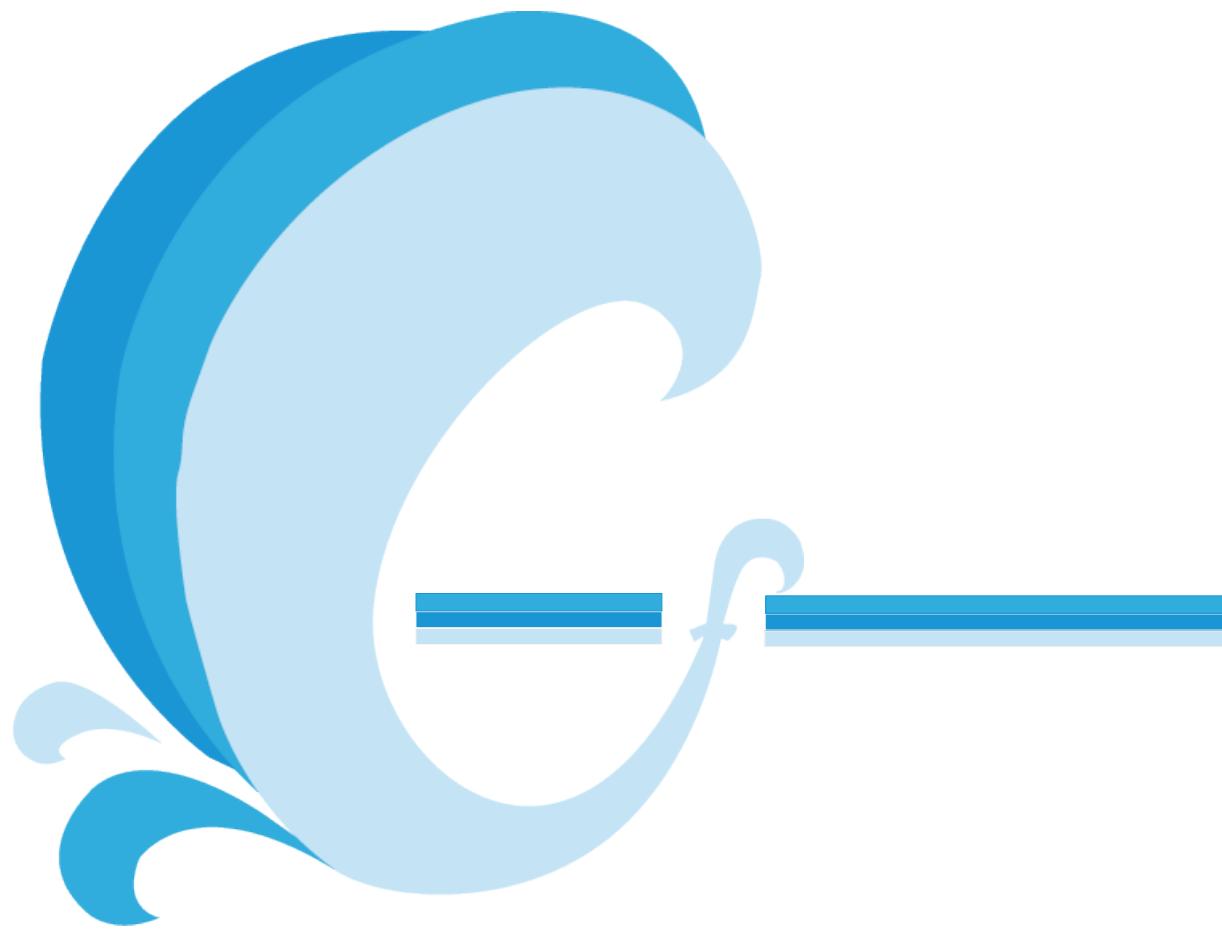


Sitting Mode



Standing Mode





Graphic Design

Identity Design & Branding

The Class Journal

Single Serve Website

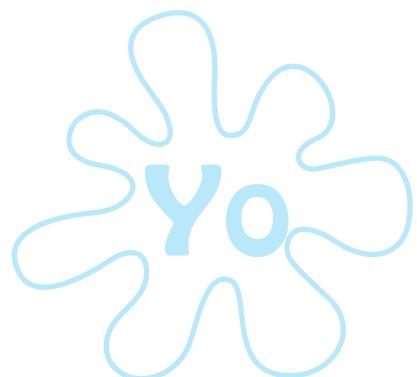
Yogurt Company Identity

Identity Design and Branding

Background

From the end of June 2014, I have spent two weeks in a summer course of Rhode Island School of Design to achieve basic skills and to experience a complete process of identity and brand design.

“Yo” was an imaginary yogurt company which I designed for.



Identity Manual

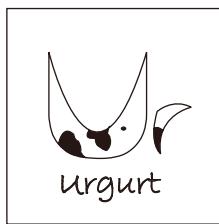
Get details from the electronic version :

<http://issuu.com/ruofanzhang/docs/manual-ruofanzhang/1?e=11954684/8849958>

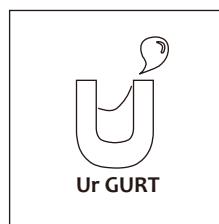
Logo -- Evolution Process (excerpts)



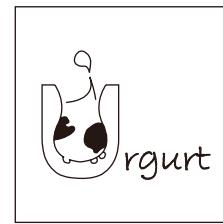
1



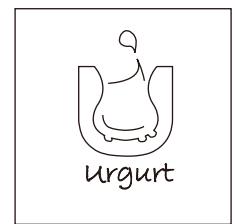
2



3



4

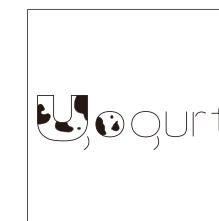
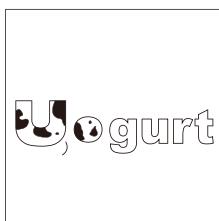


5

Step 1 At the very beginning, the brand name was ‘Urgurt’, meaning ‘your yogurt’ to provide a sense of friendless. In order to illustrate another brand value, pure, either the symbol of yogurt drop or milk cow was used. The main composition of the logo was a capital U, which was the initial of the name ‘urgurt’.

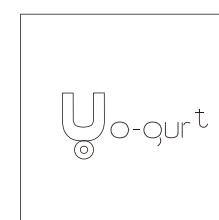
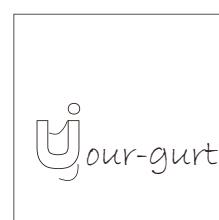
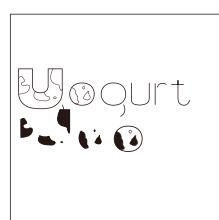
Element The pattern of milk cow - 1 2 4
The horn of milk cow - 1 2
The yogurt drop - 3 4 5

Why not The name using ‘ur’ as the abbreviation of ‘your’ might be confusing at first glance.



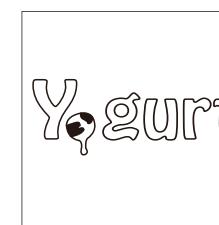
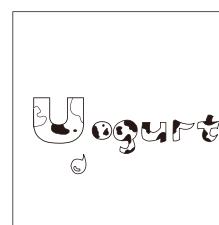
Step 2

The name was changed to ‘yogurt’ as the product-itself, making it easier for customers to understand what the company is producing.

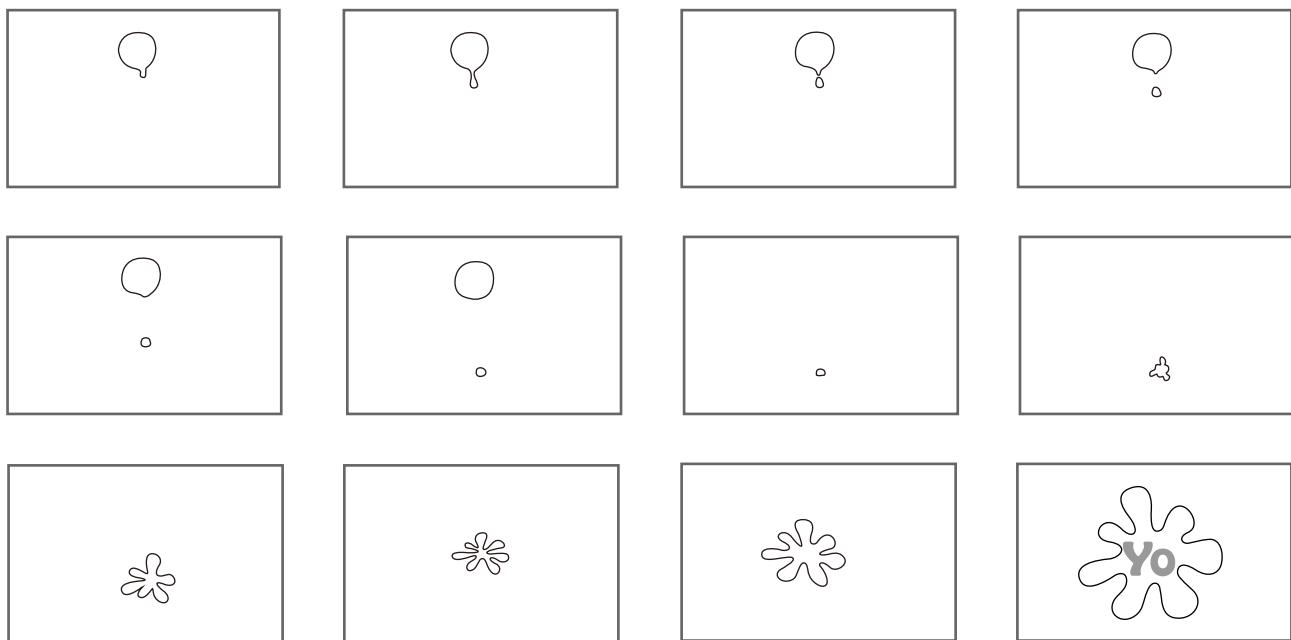


Element The pater of milk cow
The yogurt drop

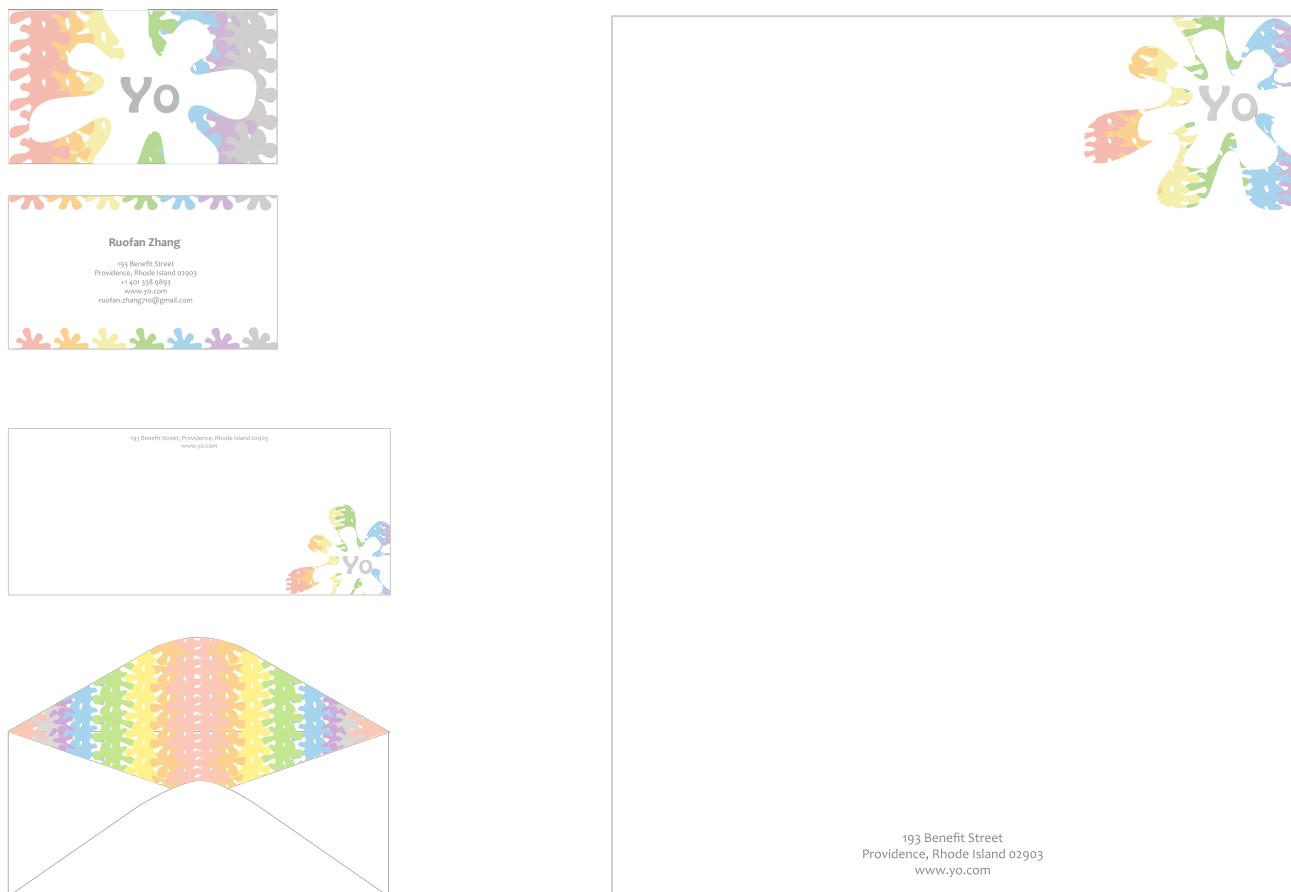
Why not The logo using ‘yogurt’ as a whole word was a little redundant, not simple and strong enough to catch attention.



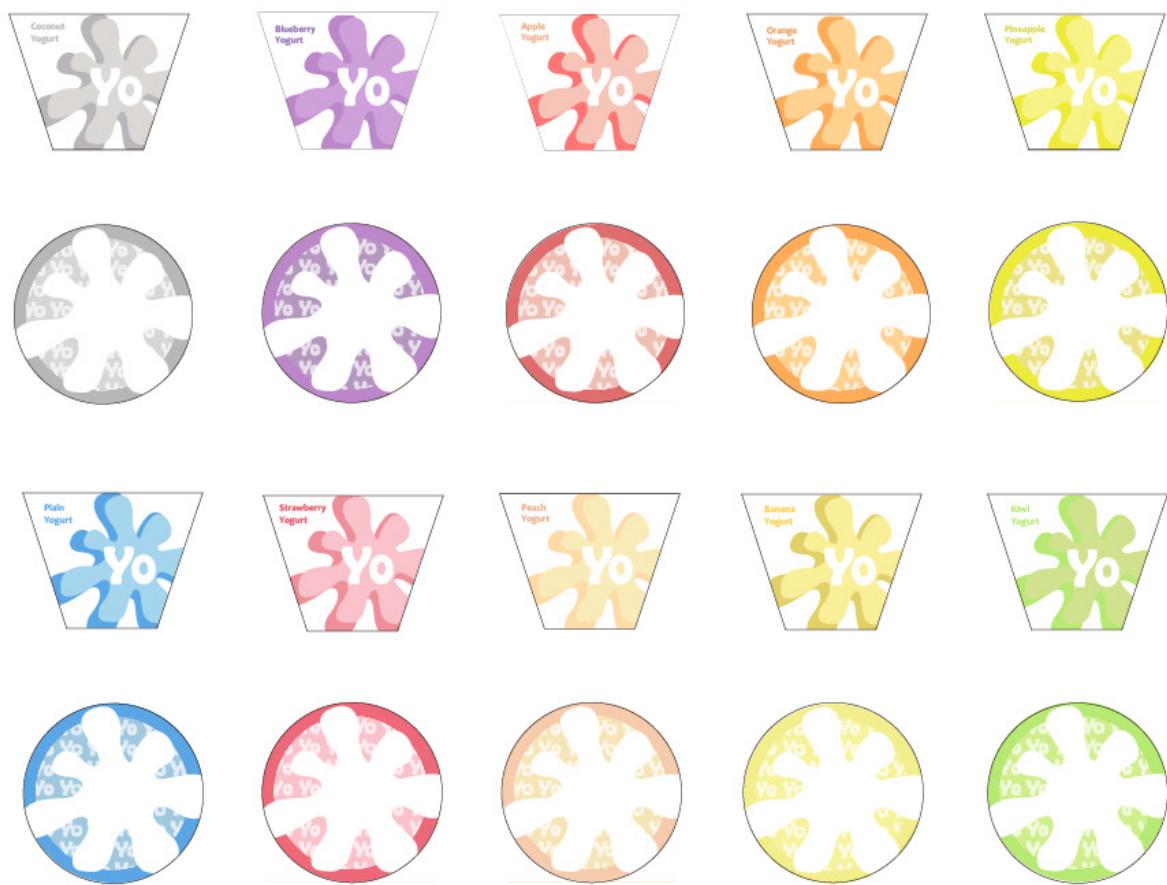
Logo -- Animation Storyboard



Stationery



Package -- Yogurt Cup



The Class Journal

Record
Self-Recognition
Communication
Group Coherence

Why

The first and foremost, we, as a group of engineering students, were so drunk into our own world full of numbers and formulas that we scarcely take initiative to record our daily lives and even seldom shared with each other our interesting and remarkable experience.

Communication and record of unique life stories and thoughts were of great significance for both a group and members themselves, promoting individual self-recognition and group coherence.

As for the other reason, that was quite personal. Until that time, I had been working in the school newspaper as both

journalist and editor and got familiar with the typesetting work. Though such work was kind of trivial and even boring for some people, it was the process laying out text and picture materials disorderly at first in an organized way that attracted me extraordinarily.

Compared with newspaper arrangement, journal layout was much more complex: abundant topics, plentiful colors and rich formats. Without any guidance, the task was no doubt self-challenged for me. However, rather than being an obstacle, all of these challenges strongly intrigued me and I couldn't wait to organize a journal by myself.

What

All articles were originally written by my classmates and our supervisor, with topic ranging from philosophy impression to unique game guides. The cover title was inscribed by my classmate Wenzhuo Yu who has learned writing with a brush for years. The front and back cover were produced by Yuelong Wu using Photoshop. And I was in charge of all the material collection, content organization and final layout.

How

Lacked of journal layout experience, I referred to a series of famous Chinese journals to determine the overall style. Despite that reference could effectively open my mind, it brought up another question : how to perform uniqueness of our journal ? how to build up our own identity that showed differences between our journal and others' ?

How to perform UNIQUENESS of our journal ?

How to build up ore own IDENTITY ?



This class logo combined iconic elements of both our university and department and the distinct information of my class, allowing people to discern the class identity at first glance. It was put next to the page number on every page, thus emphasizing the identity during the whole reading process.

The class logo was designed based on the school logo.



Class Logo

The center part of the school logo was two Chinese character of Tsinghua, the name of our school, which was replaced the school name with the class name Jing 83 to highlight the class identity.

The Chinese character of Jing resembled Tsing in the original logo, so I put Jing in the same position as Tsing and use the same font.

The number 8 and 3 were illustrated by a pair of gears, which were the ubiquitous symbol of mechanical engineering. By following the half-slice rule of mechanical drawings in a creative way, the two numbers were shown as a whole rather than separately : the complete image of two gears illustrated the number eight, and the half part with shade revealed the number three.

Kept 'TSINGHUA' in outside ring, and replaced UNIVERSITY with DPIM 83, the abbreviation of my class: Department of Precision Instrument and Mechalogy 83.

清 淸
精 精
Tsing Jing

Department of
Presicion
Instrument and
Mechalogy

Enrolled Year 2008
Class 3



©smarty



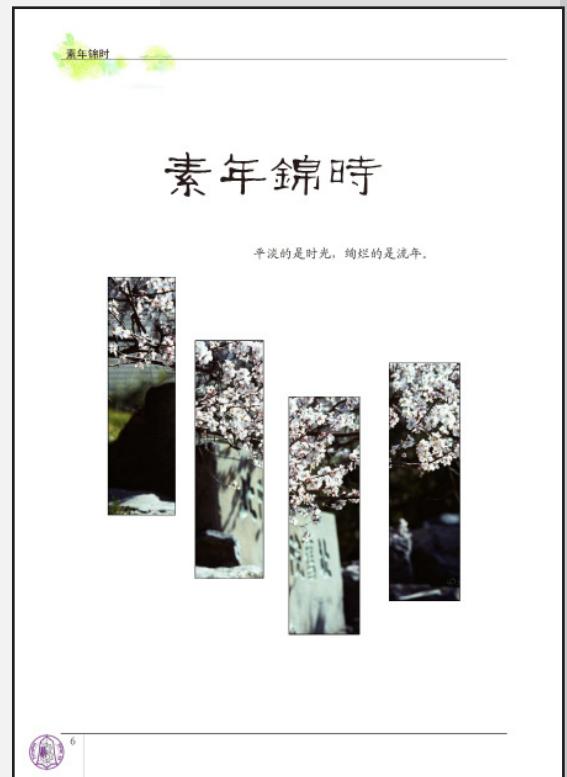
©smarty

Secondary Cover

The whole journal was divided into six parts according to topics. In order to inform the transition between different parts, I made a series of secondary covers at the beginning of every part. Each secondary cover contained a title, opening words and a picture of the view in our university which was in consist with the style of the part at the same time. For example, a vivid spring scene was chosen as the cover picture in the part telling funny stories and serious fall scene came to the deep thoughts part.

The method of showing the pictures was unique. Instead of putting up the whole picture directly, I split them into separate parts and then put them in different height but leave some space in between. Such process turned out that the picture parts seemed more lively than kept as one.

In addition, the series of continuous parts of a same view accomplished an effect as viewborrowing, a concept of Chinese traditional architecture, which made the view more than a picture, but seemed like to be borrowed directly from outside through a set of windows.



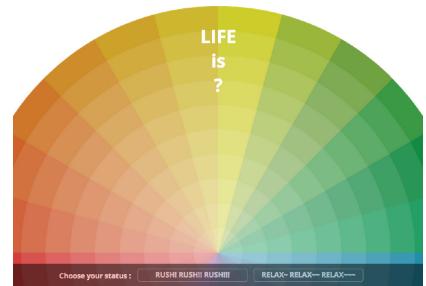
Why Not Stay Lazy?

Single Serve Website Design

Background

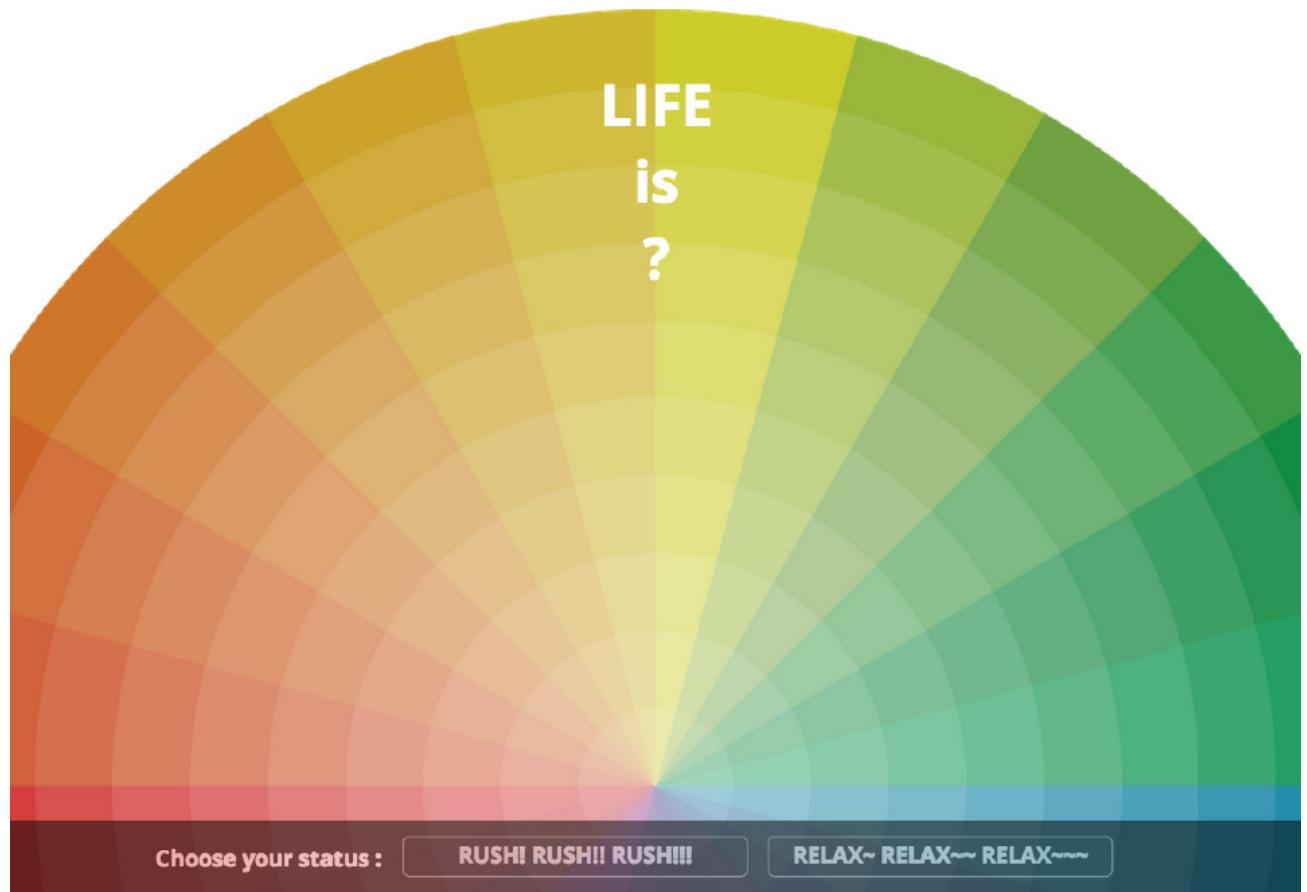
When color wheel rotates at an extreme speed, colors will turn to grey. This is where the concept of this single serve comes from, that is, when people rush their life too fast, they may miss the colorful around them.

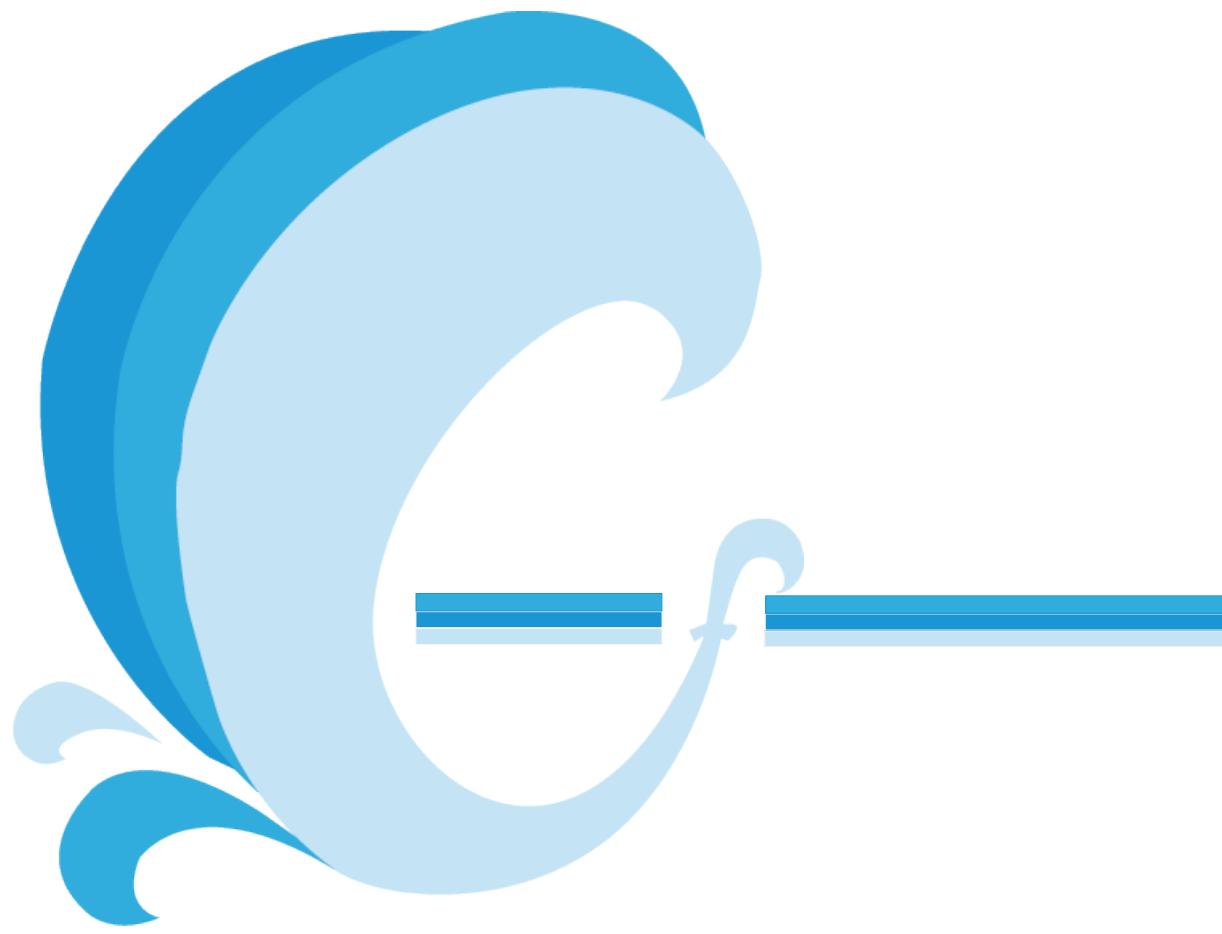
So why not stay “lazy” and enjoy the colorful world !



Enjoy the Website

<http://ruofaniris.github.io/single/singleservepage.html>





Sketches



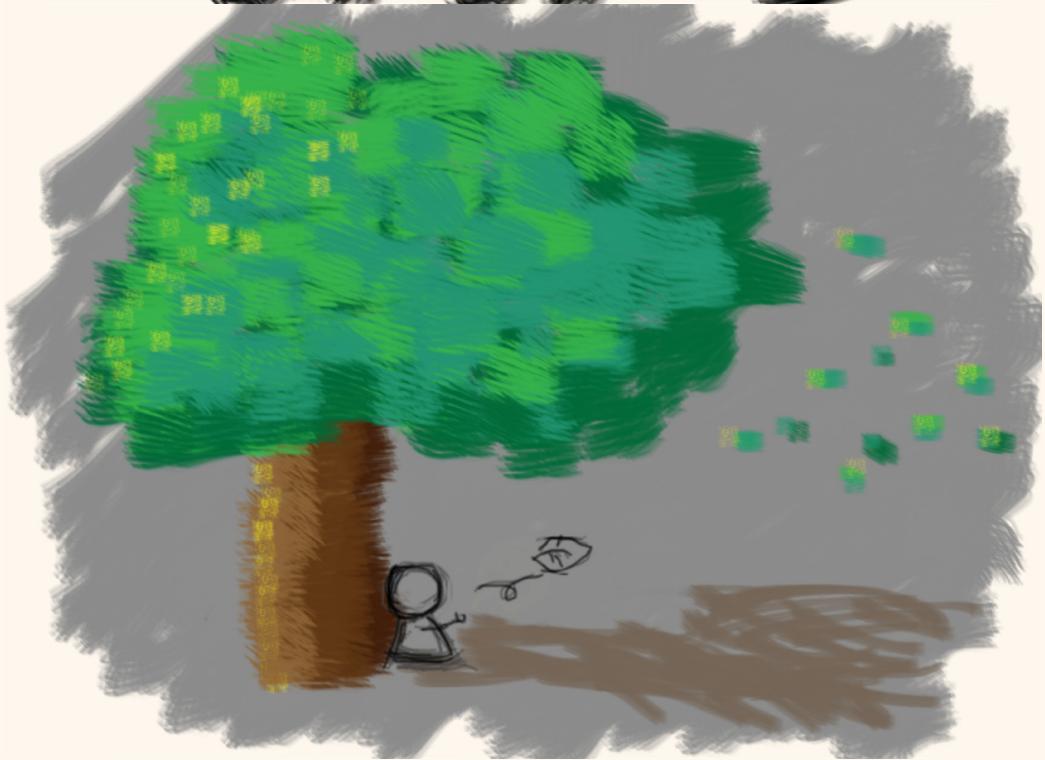
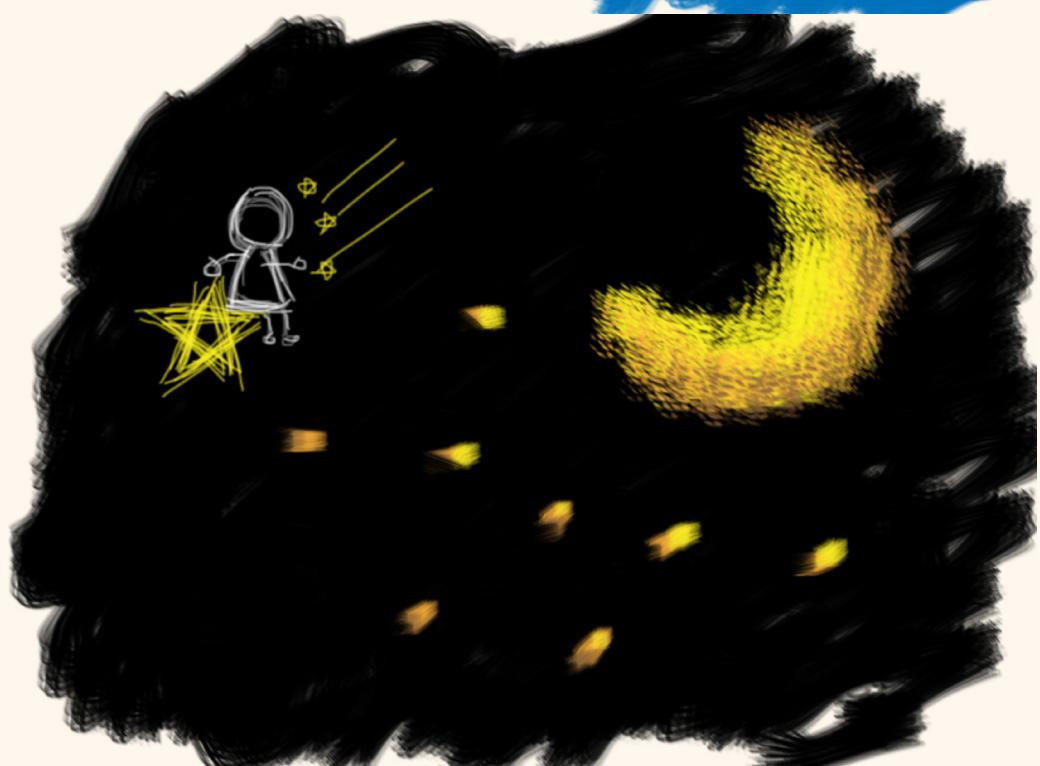
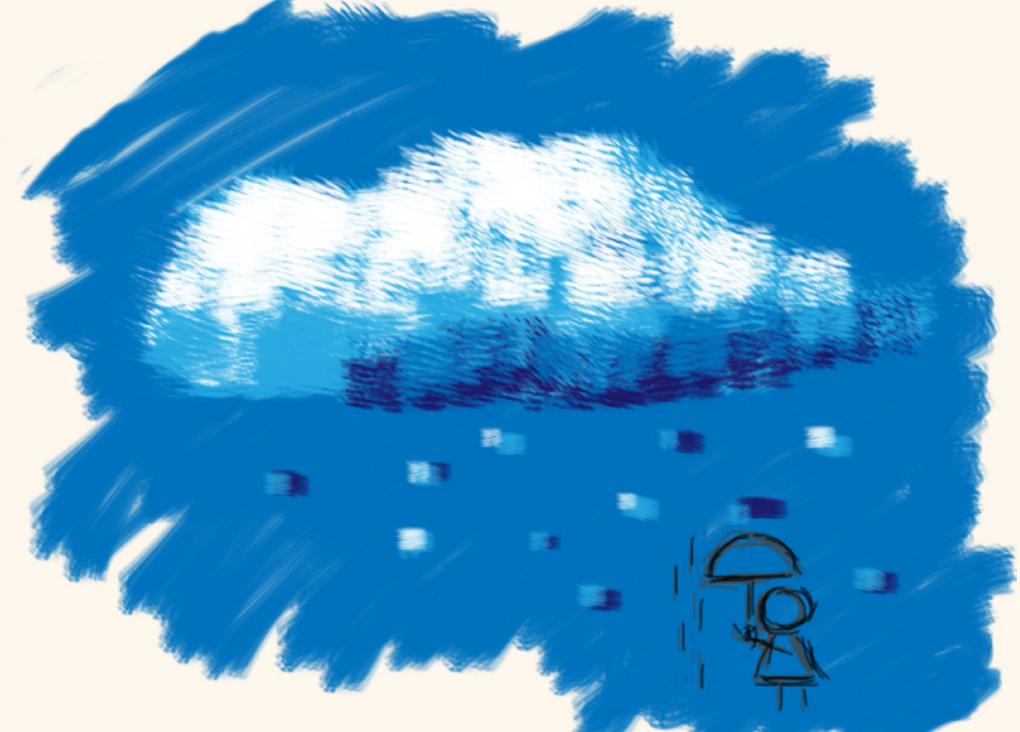
"When the night falls down,
my shadow grows up as a flower."

---- if the grass had a secret.

*Perhaps,
I can never reach the world in dream,
but thank you, the imperfect one,
still lighting me all the time.*



*Sometimes,
being a simple traveler in black and white,
passing through the colorful world,
may also be fine.*





*"Fly your heart when upset.
You are sunny Sunny all the times."*

----Birthday blessing for my friend Sunny

Ruofan Zhang