Portfolio

Muhe Yang

RESUME

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Sept. 2015 – May 2017
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CONTENTS

Introduction

This portfolio is composed of a part of works I did during internship, graduate and undergraduate studies. Ranging from Information Design to Landscape Design, from Product Design to Graphic Design, these works exhibit what I have learned so far and how my design interests changes in these years. And my design skills and program skills are shown in different projects, including visualizing, modeling, rendering, coding and sketching. Most of the projects are individual works for courses I took, and two of them are finished in groups. These works are categoried by design subjects.

As learning more about design, I realized the deepness and broadness of design, in terms of its power of connecting nature, culture and human. While digging deeper into this field, it is more important to keep beginner's mind – "In the beginner's mind there are many possibilities, but in the expert's there are few...the real secret of the arts: always be a beginner."

INFORMATION DESIGN

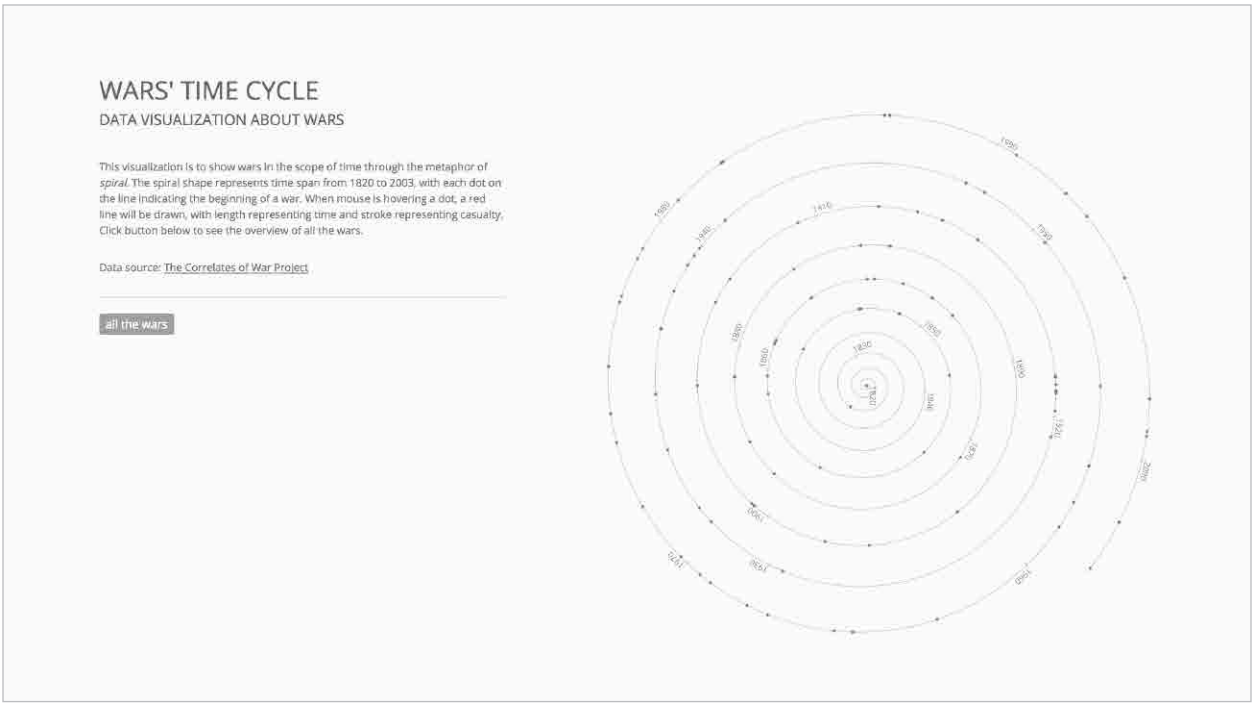
Wars' Time Cycle

Data Visualization about Wars

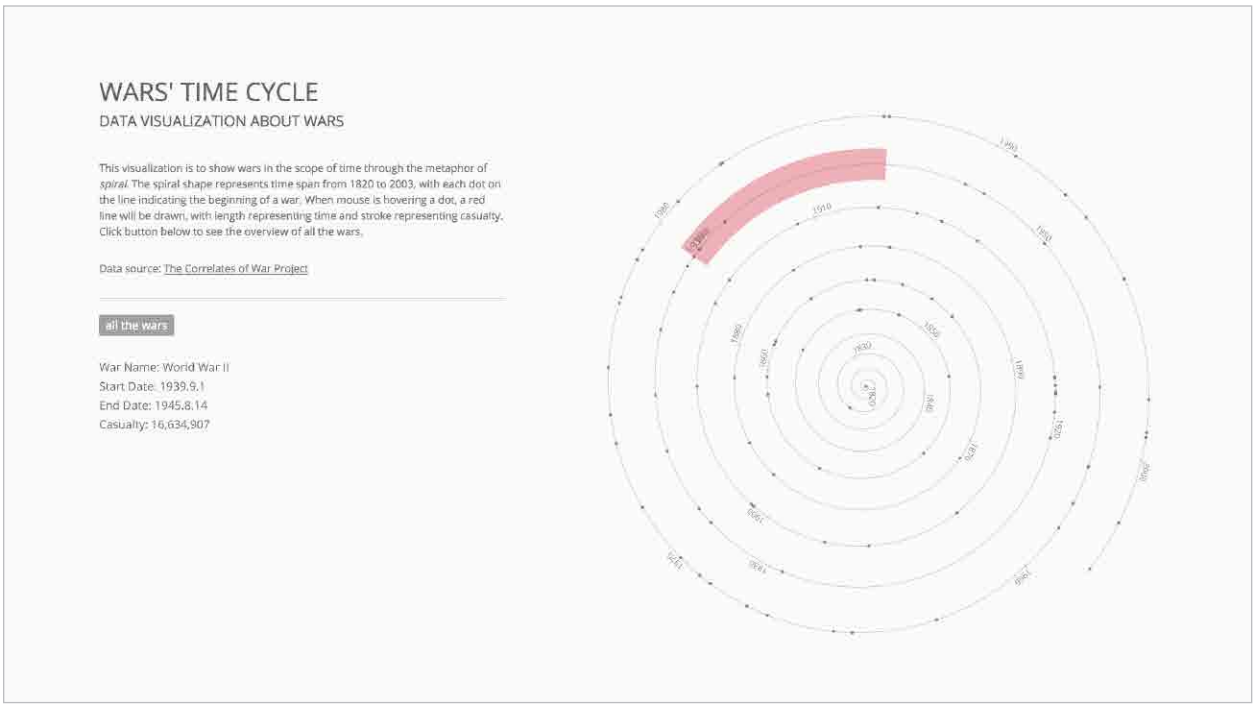
April 2016

Media: Pater + Web
Programs: JavaScript + p5.js + HTML
Description: This interactive visualization is to show wars in the dataset in the scope of time. The form comes from the metaphor of *time's cycle*. The spriral shape represents time span from 1823 to 2003 (from inner spiral to outer spiral), with each dot on the curve indicating the beginning of a war. When mouse hovers over a certain dot, the specific period of that war will be drawn in red line, with the length representing duration and the stroke (i.e. thickness) representing casualty. Click the button on the left to show the overview of all the wars. (data source: http://www.correlatesofwar.org/)

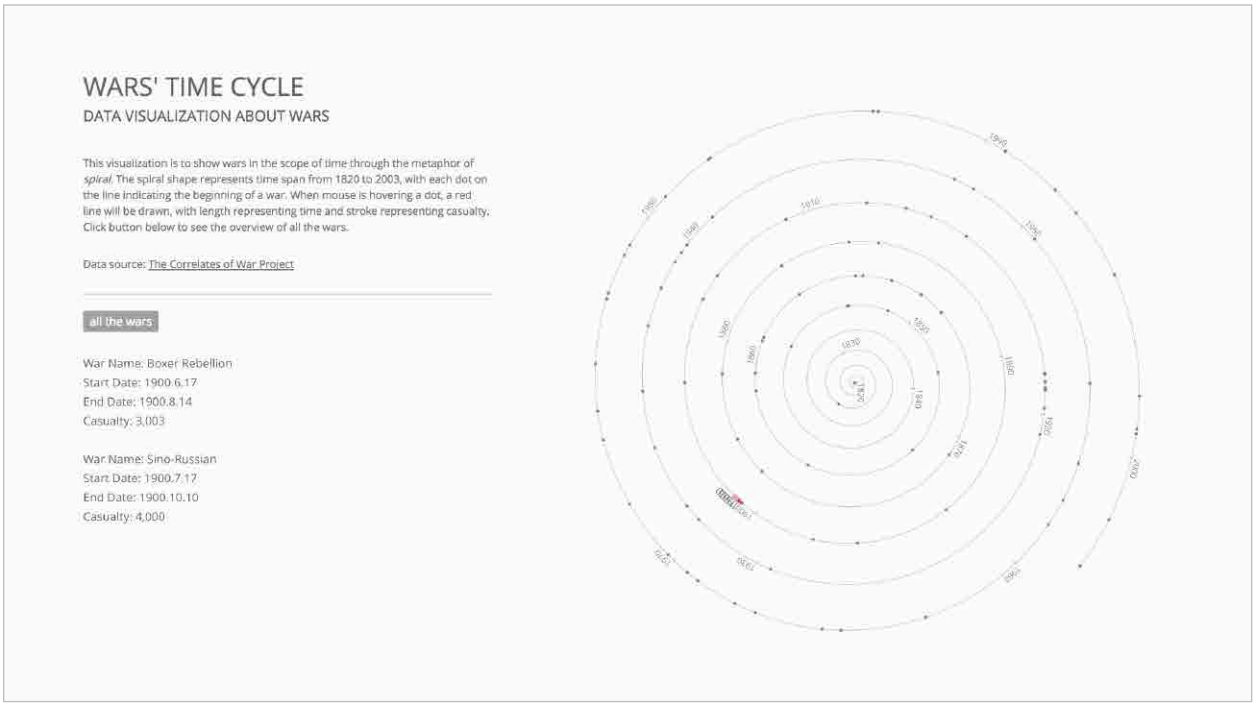
Online webpage:
https://yangmuhe.github.io/WarsVisualization/



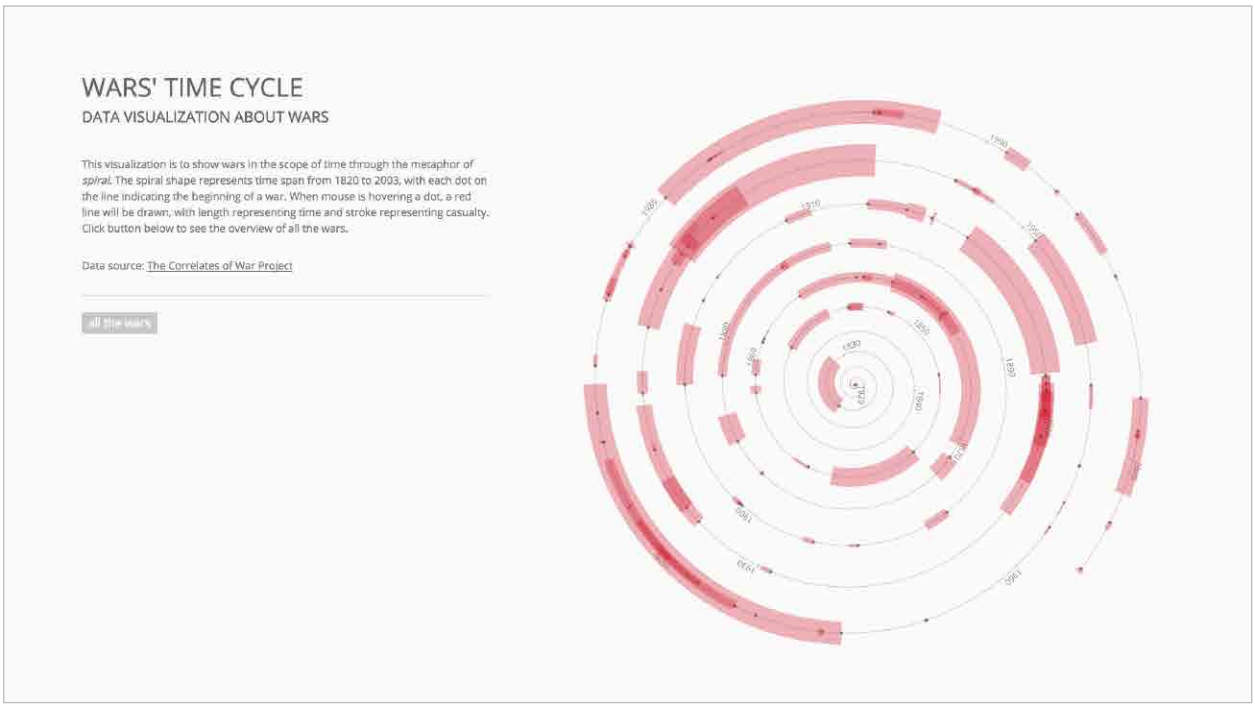
Spiral represents time from 1820 to 2003. Marks of year and corresponding short lines give a rough position of time. Every dot indicates the beginning of the war.



When mouse hover over a dot, a red curve representing that war is drawn and more information is shown on the left side. Length of the red curve represents duration of the war. Thickness of the curve represents total casualty of the war in logarithmic scale.



If dots on the spiral are too close, their corresponding information about wars will be shown together.
It requires a lot of changes in algorithms to make this happen.



Click the button “all the wars“ to show the overview of all the wars in the dataset; click again to cancel the overview.

INFORMATION DESIGN

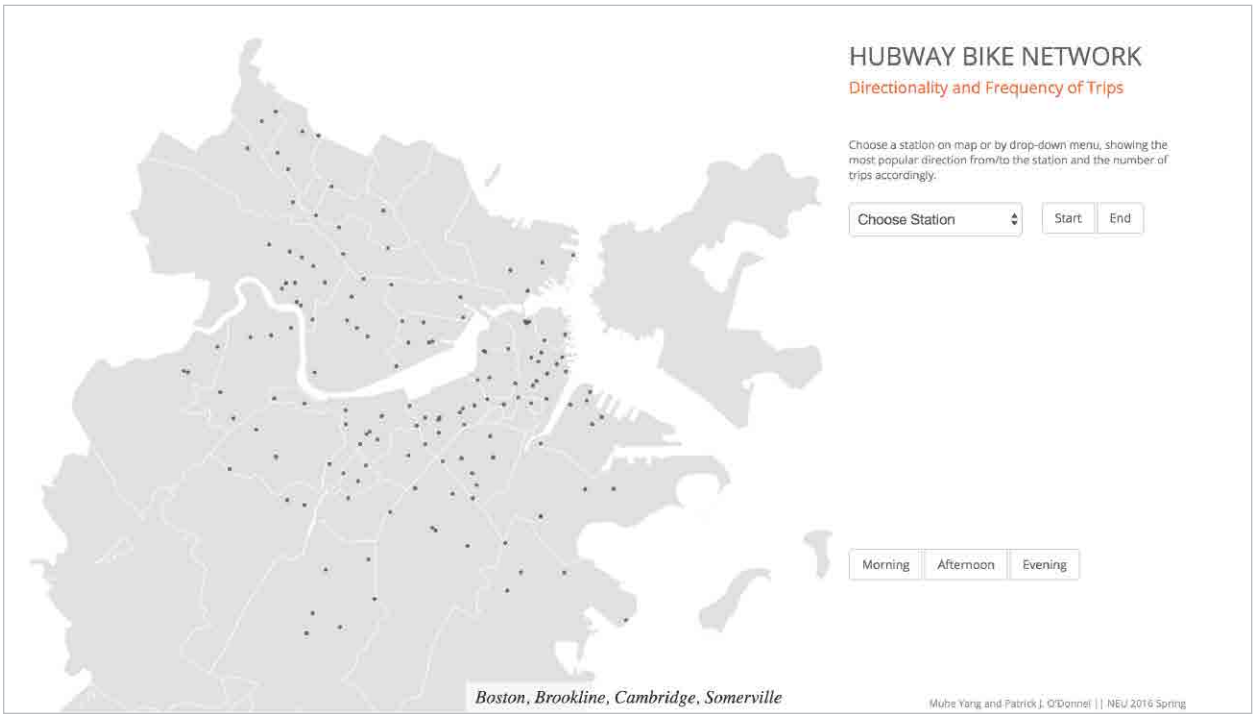
Hubway Bike Network

Directionality and Frequency of Trips

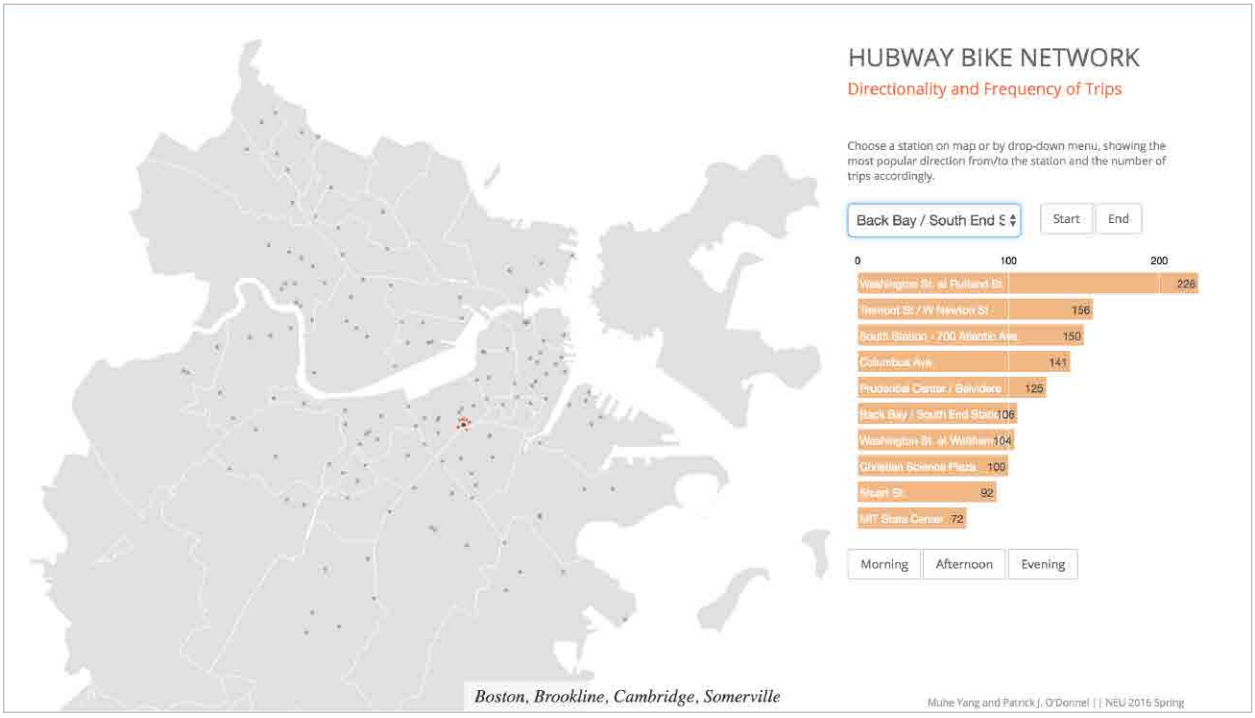
April 2016

Media: Web
Programs: JavaScript + D3 + HTML
Description: Using dataset from Boston Hubway system, this interactive visualization is to show people's biking patterns around Boston area (i.e. Boston, Brookline, Cambridge and Somerville). Users can choose a station on map or by drop-down menu to see the 10 most popular directions from/to the station and the number of trips accordingly. It is also possible to see how people use Hubway bikes during different periods of a day (i.e. morning, afternoon and evening) by clicking corresponding buttons. The visualization could help staffs in Hubway to analyze and manage bikes according to time, direction and frequency. It could also work as a reference for city planners to make decisions.
(This is a group work with Patrick J. O'Donnel.)

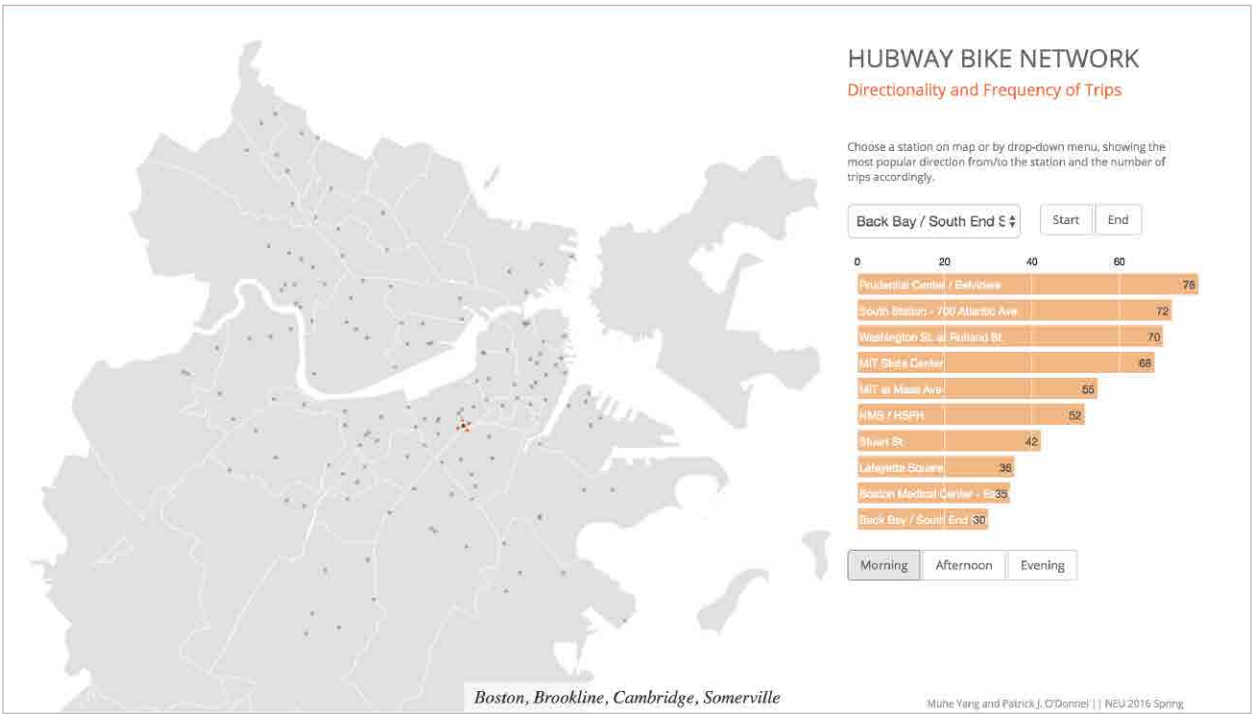
Online webpage:
http://yangmuhe.github.io/hubway-my



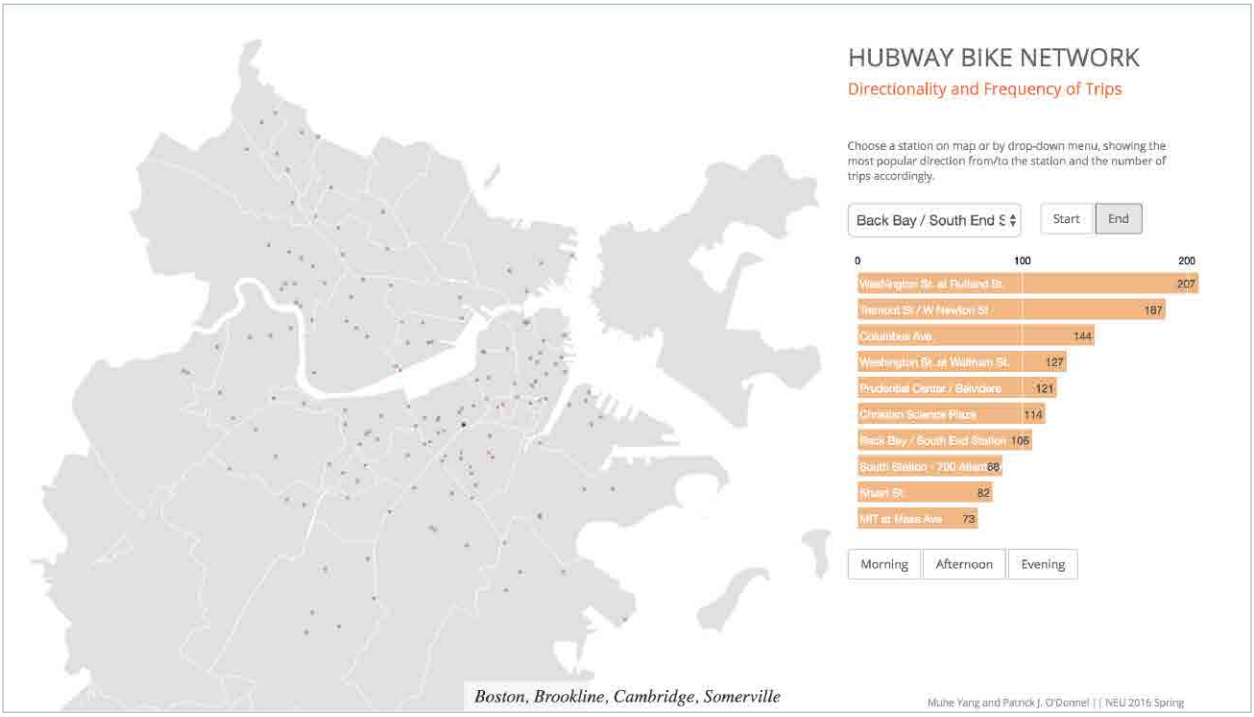
The map of Boston area is shown the the left side of the page, with black dots representing positions of Hubway stations. The right part includes short introduction, drop-down menu and buttons.



Users can choose a station by clicking a dot on map or by drop-down menu. The stations on the drop-down menu are sorted by popularity. The histogram displays the 10 most popular destinations from the station chosen, with little triangles around the dot pointing to the actual directions on map.



Three buttons “Morning“ “Afternoon“ and “Evening“ allow users to see bike-usage pattern in different periods of a day. The image above shows ten most popular directions with their frequency from Back Bay in the morning.



If clicking the button “End“, it shows the situation where the chosen station is destination with ten most popular start station displayed in histogram. In other words, “Start“ and “End“ buttons switch the chosen station between start station and end station.

INFORMATION DESIGN

From Porcelain to the World

A Research about Porcelain

April 2016

Media: Pater + Web
Programs: R + RStudio + Illustrator
Description: The research starts from an arbitrary object as ordinary as a porcelain cup which we use very often in our daily lives, and arrives at a much broader view both in the scope of time and space. Through looking into the raw materials in porcelain production, several unexpected and interesting aspects are revealed, including early history of international trade as well as some social and cultural impacts relevant to porcelain. The whole research process includes quantitative methods by R, qualitative methods such as interview with experts and looking for bibliography, and design-based methods like evaluation. Each method is a different perspective of looking into the subject. No matter which method is used, there is always chance that something beyond expectation might appear — at least I didn't expect this project could reach out to the the world from porcelain.

From Porcelain To The World

Research About Porcelain From A Historical Point Of View

Production

Raw Material

water

soil — includes — **kaolin** — Primary material. Its name is derived from Chinese *Gaoling*, a village near **Jingdezhen**, China.

- feldspar
- silica

pigment — e.g. — cobalt blue — Optional; used for painting on porcelain.

International Trade

Jingdezhen — became the center of the porcelain production in the 13th century

famous for

blue and white — Chinese blue and white is the world's first global product.

Tons of porcelain products made in Jingdezhen, especially blue and white, were exported to other parts of the world, including Europe and Middle East.

The Route of Porcelain Trade in the 16th Century

From the 16th to 18th century, more than

300 million

pieces of porcelain products landed in Europe.

Market of Chinese porcelain covered

2/3

of the landmass on earth

Social Impact

In City of Jingdezhen:

porcelain production — attracted → migrant workforce

porcelain production — led to → city expansion

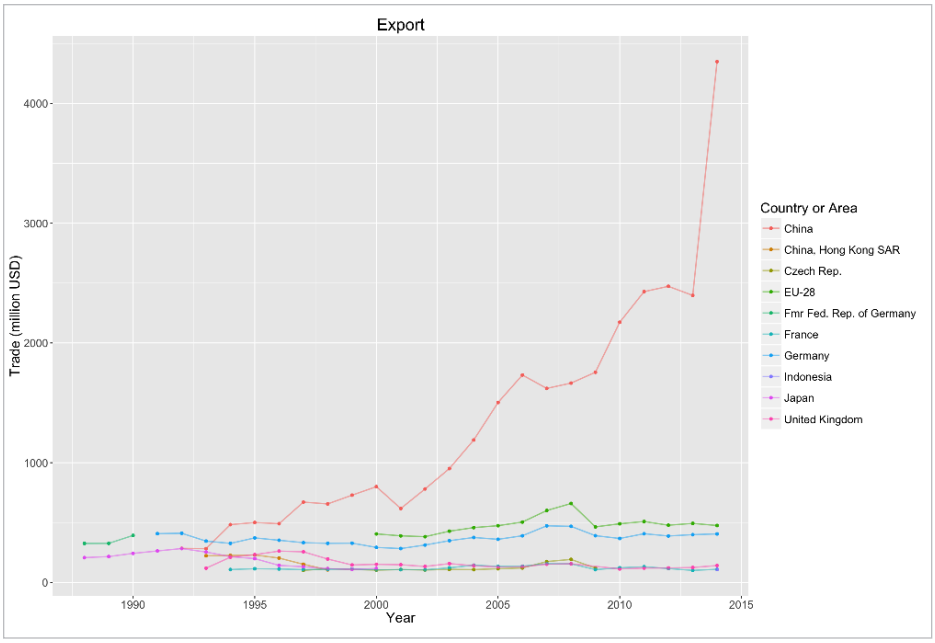
migrant workforce — led to → population explosion

city expansion — led to ← population explosion

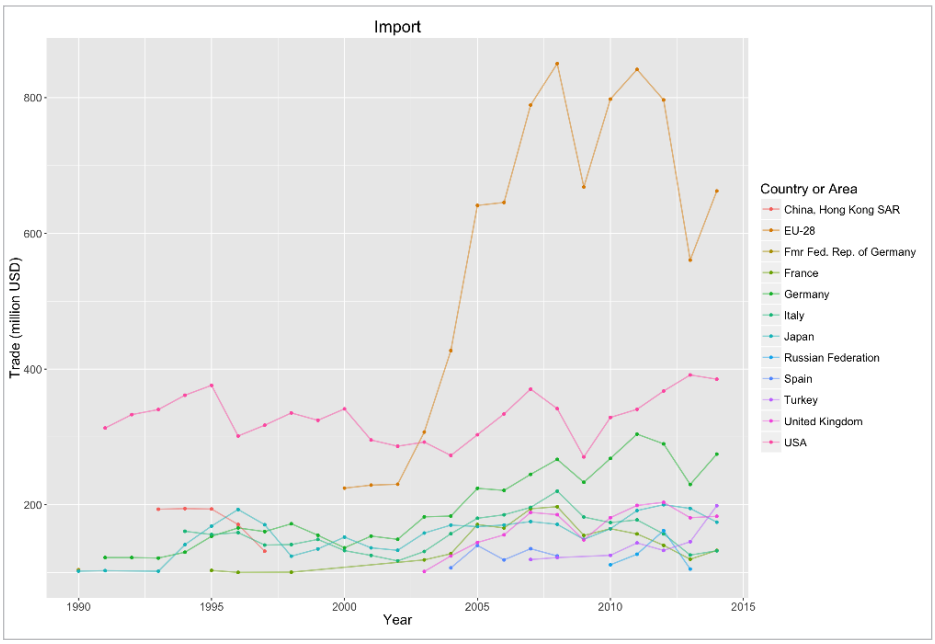
Cultural Influence

exchange of culture and art — influence → lifestyle — Drinking tea and coffee became a fad.

In order to investigate porcelain trade in recent decades, I used a dataset from UNdata and made quantitative analyses by R. The dataset is about tableware and kitchenware of porcelain or china, listing several aspects, including flow (export, import), trade, weight, quantity, from 1990s to 2014 in different countries. I put the dataset into RStudio and visualized by R. Two line charts below shows countries with largest export and import of porcelain tableware respectively.
More diagrams and analyses at http://rpubs.com/MYang/tableware



Quantative analysis by R: countries with largest export of porcelain tableware



Quantative analysis by R: countries with largest import of porcelain tableware

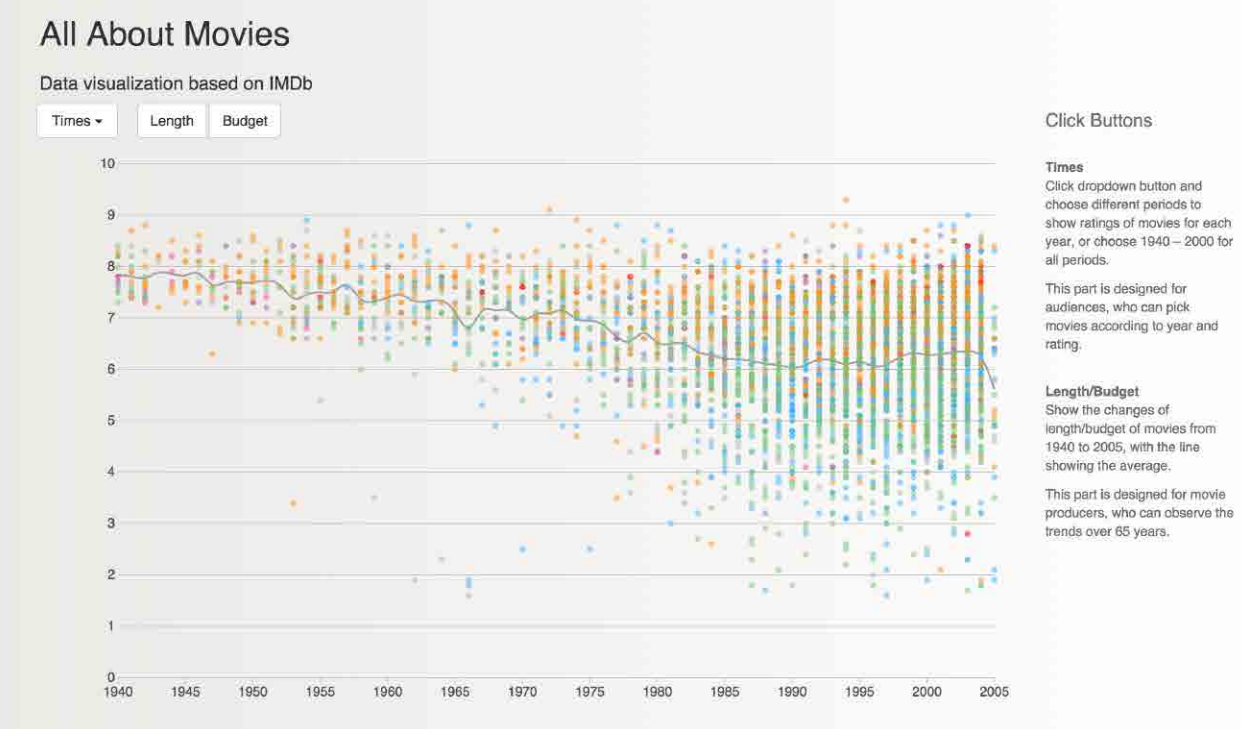
INFORMATION DESIGN

Data Visualization about Movies

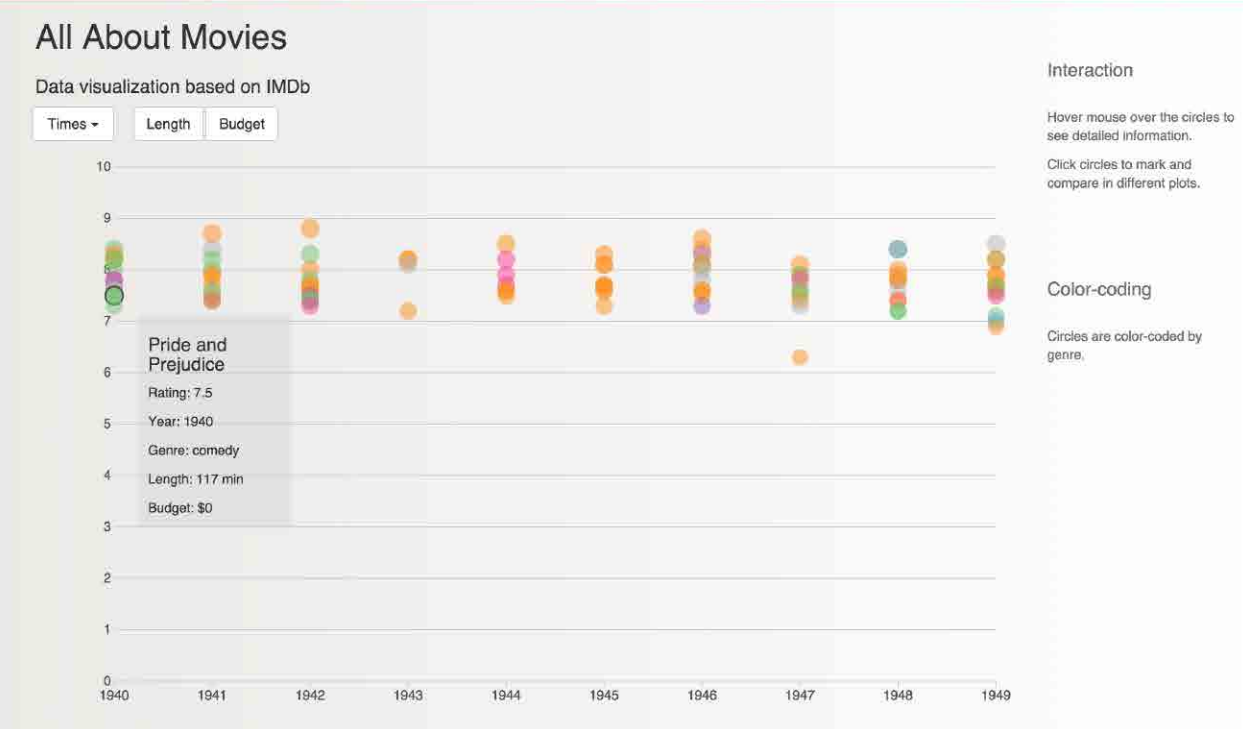
December 2015

Media: Web
Programs: JavaScript + D3 + HTML
Description: This project is a data visualization based on a dataset of IMDb, showing several variables including title, year, rating, length, budget and genre. It employs scatter plot as the basic form, with each circle representing a movie and color-coded by genre of movie. Scatter plots transform smoothly when clicking the corresponding buttons to see the relationships between different variables. Besides, there is a scroll section at the right side to show more captions and instructions.

Online webpage:
http://yangmuhe.github.io/FinalProject

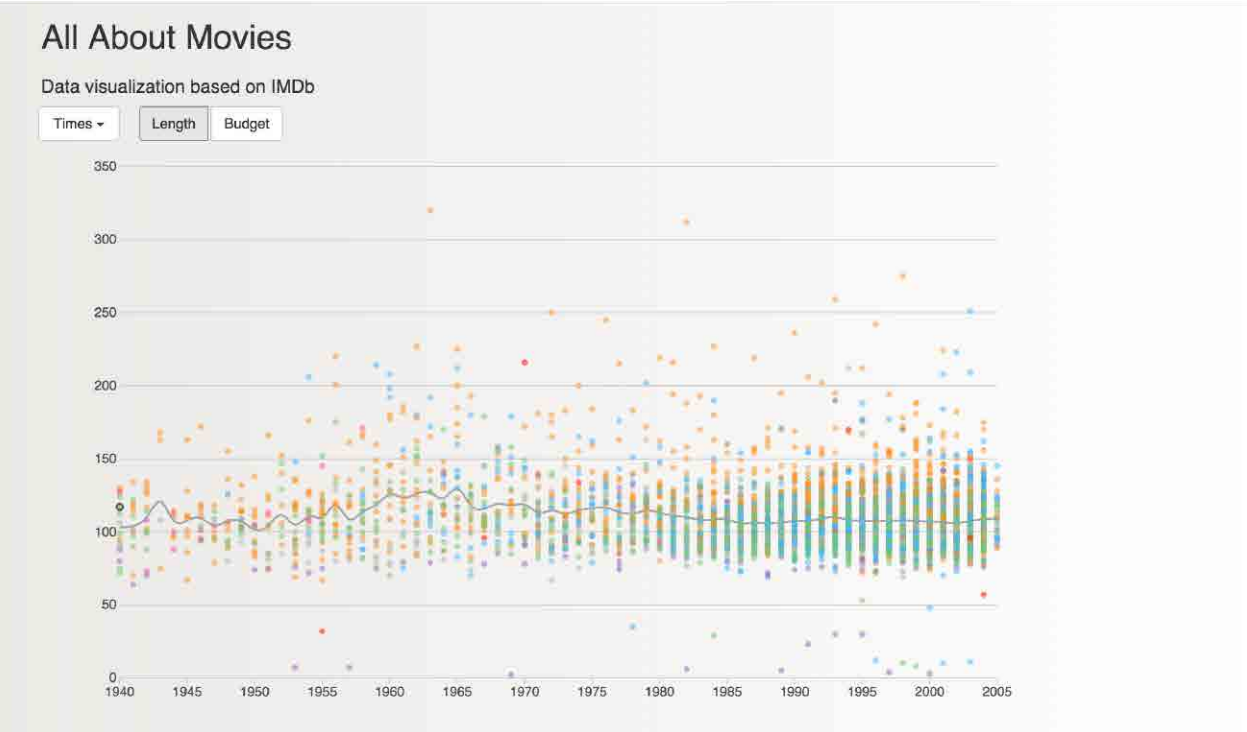


Scatter plot of time versus rating from 1940 to 2005

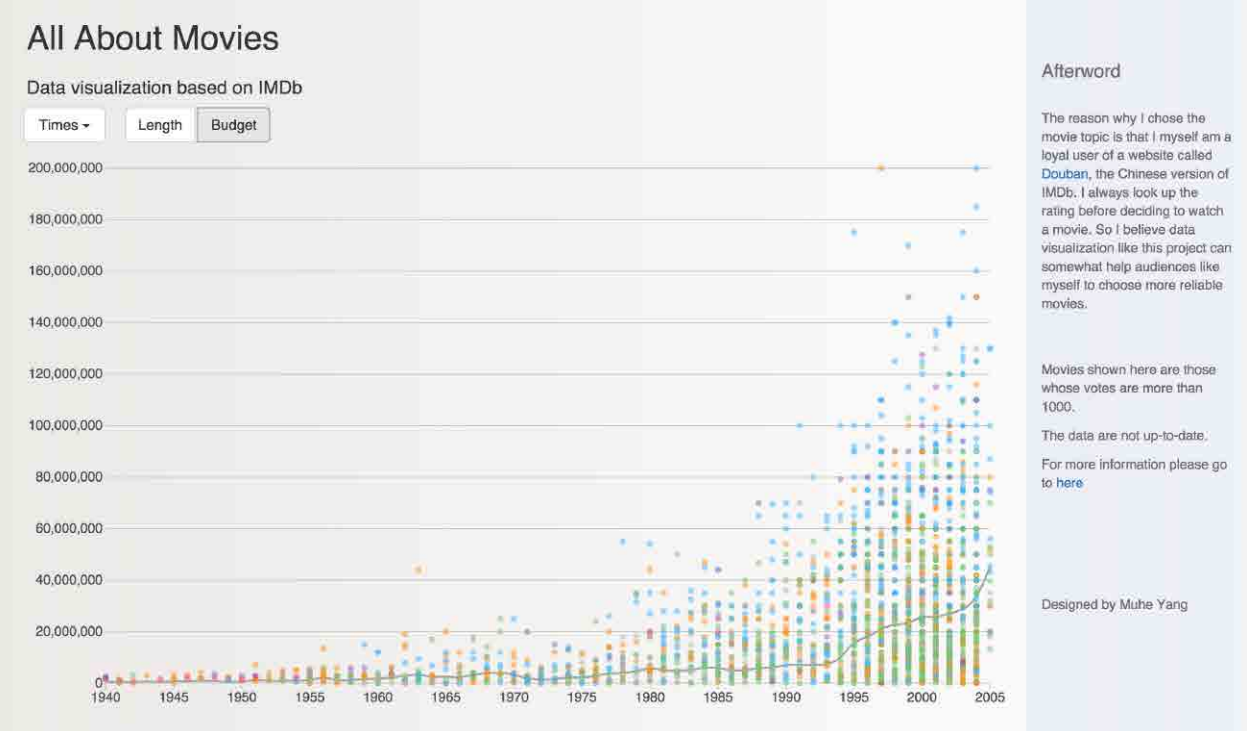


Scatter plot of time versus rating in the 1940s

There is a tooltip section to show detailed information as mouse hovering over the circles.



Scatter plot of time versus length from 1940 to 2005



Scatter plot of time versus budget from 1940 to 2005

The last part of the scroll section is afterword about this project.

INFORMATION DESIGN

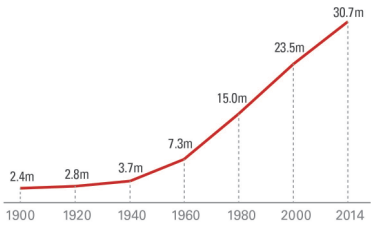
Country Data

November 2015

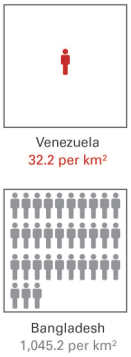
Media: Paper, print (17*22 in)
Program: Illustrator
Description: This project deals with representing information of a certain country (Venezuela, in this case) in visual means. By choosing different forms, including line chart, bar chart, donut chart and treemap, various types of data are visualized in a readable and clear way. In order to ensure readers locate their interested information more easily as well as make each part more recognizable, all the data are grouped into five parts with assigned colors respectively.

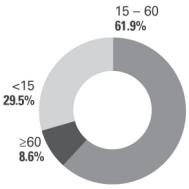
DEMOGRAPHICS

Population Change

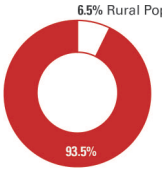


Population Density



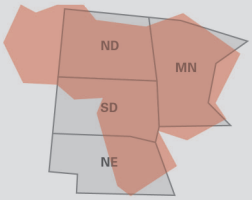


Structure of Population



Urban Population

VEN vs USA



912,050 km²

Area of Venezuela

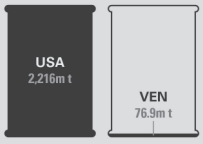
Nearly the same as the total size of North Dakota, South Dakota, Nebraska and Minnesota.

Energy Consumption

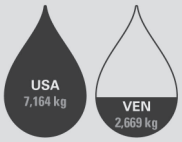
(oil equivalent)

3.5%

Total energy consumption of Venezuela compared to that of US



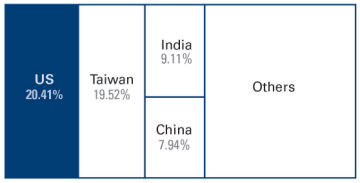
Total



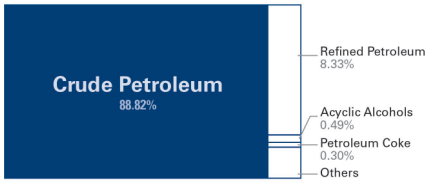
Per Capita

FOREIGN TRADE

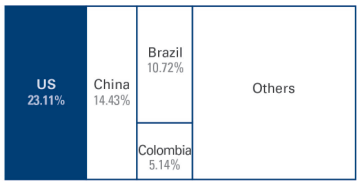
Export Destination



Exports



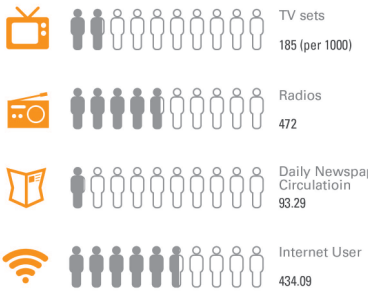
Origins of Import



97% of exports are oil-related.

The economy of Venezuela is largely based on the petroleum sector. Revenue from petroleum exports accounts for more than 50% of the country's GDP.

COMMUNICATION



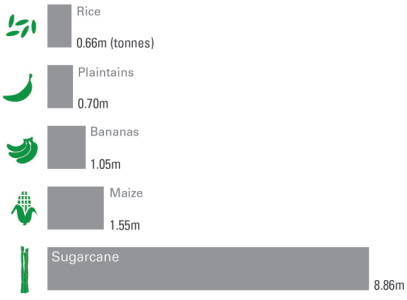
AGRICULTURE

3.7%

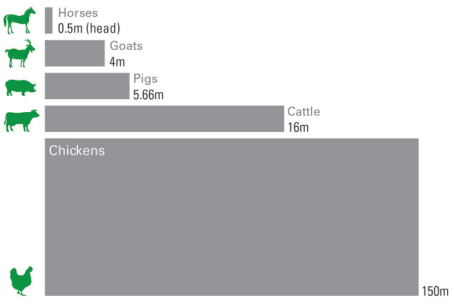
Composition of agriculture in relation to GDP

Agriculture in Venezuela has a much smaller share of the economy than in any other Latin American country. Venezuela relies heavily on food and agricultural imports.

Crops



Livestock



TIMELINE

1498 Christopher Columbus landed in Venezuela

1535 Spanish conquistadors began colonizing Venezuela

1811 Venezuela declared independence from Spain

1821 Simon Bolivar established Gran Columbia, became first president

1830 Venezuela left Gran Columbia, became totally independent

1831 General Jose Antonio Paez became the first president of Venezuela

1859 Civil war

1870 – 1888 Guzman Blanco ruled Venezuela; ended civil wars

1908 – 1935 Gomez ruled Venezuela with strong military backing

1950 Marcos Perez Jimenez becomes dictator

1958 Jimenez was forced into exile leading to the Venezuelan democracy

1964 Venezuela's first presidential handover from one civilian to another took place

1973 Currency peaked against US dollar from oil boom

1983 Fall in world oil prices generated unrest and cut welfare spending

1989 Social, political upheaval included riots, martial law, general strike, over 2,000 people killed

1998 Hugo Chavez elected president

1999 Adopted current constitution

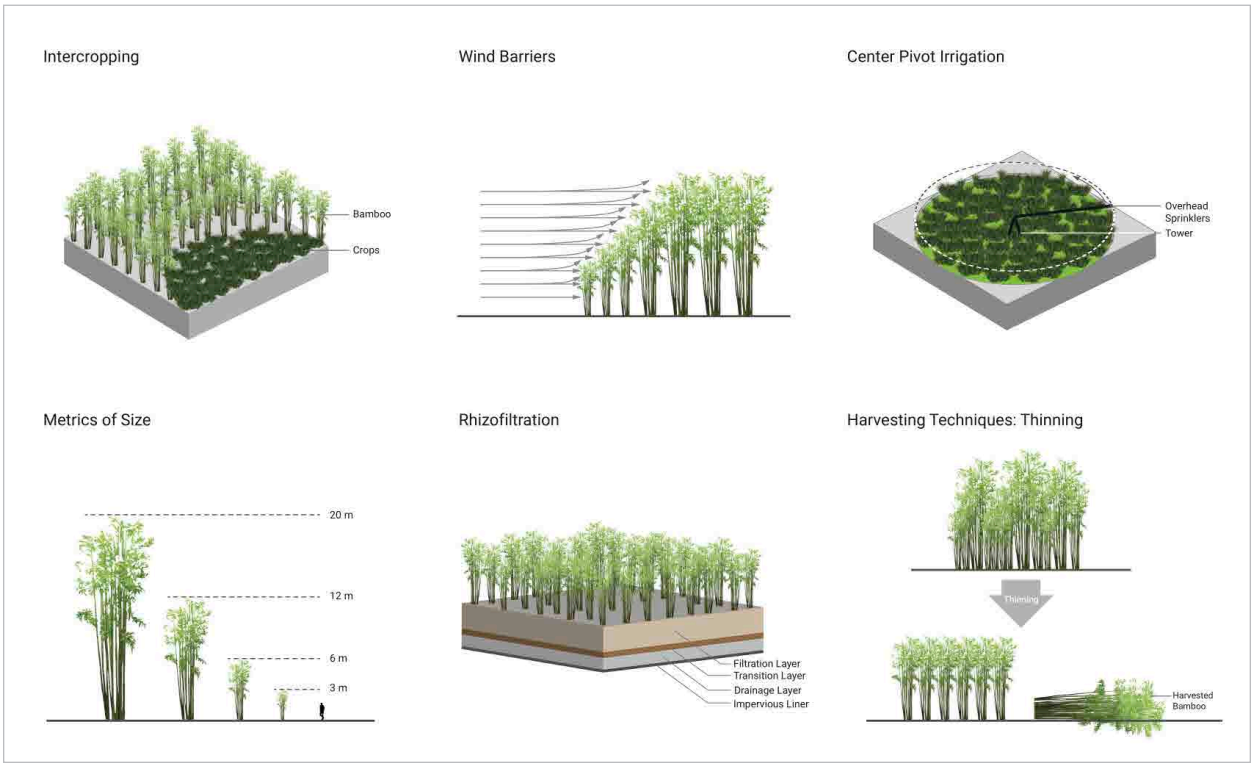
2013 Chavez died

LANDSCAPE DESIGN

Bamboo Parallax

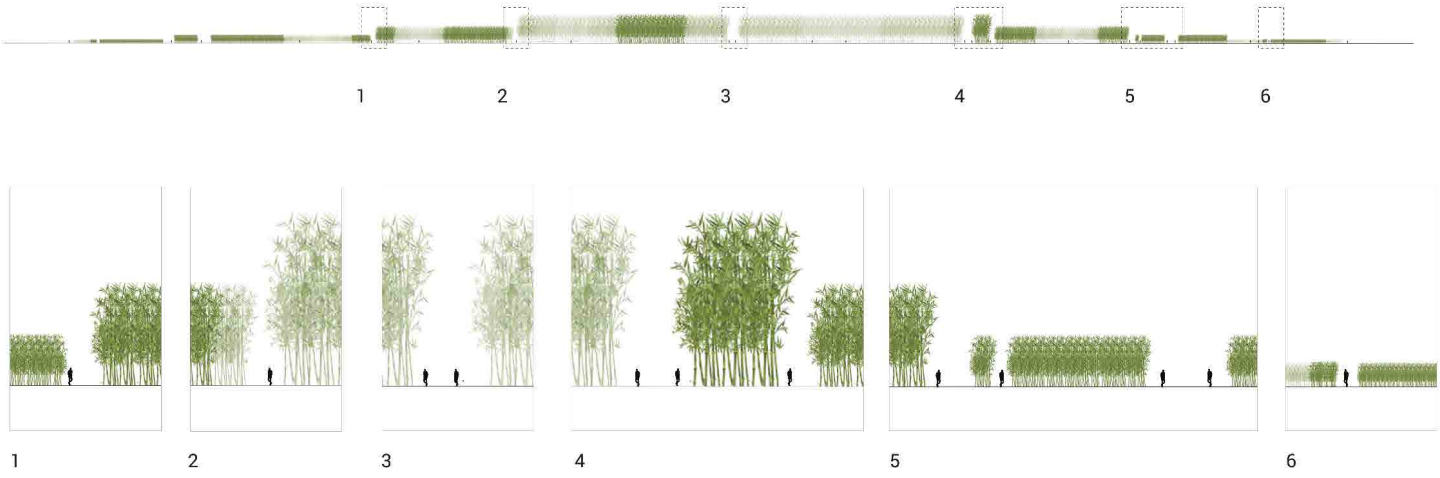
December 2016

Programs: Rhino + Illustrator + Photoshop
Description: This project is to design an ecological landscape through integrating several aspects of ecological design. Firstly, bamboo is chosen as primary material to provide provisioning and cultural services. Then, intercropping and rhizofiltration are selected as ecological engineering techniques. The project also utilizes wind-swept trees as non-anthropic formation and center pivot irrigation as anthropic formation. The project uses varying heights of bamboo to create sense of parallax, addressing people's visual, aural and olfactory feelings as well. The primary idea of this project to create a landscape that functions ecologically and has aesthetic values.
(This is a group course work with Nicole Radice and Saurabh Vashist.)



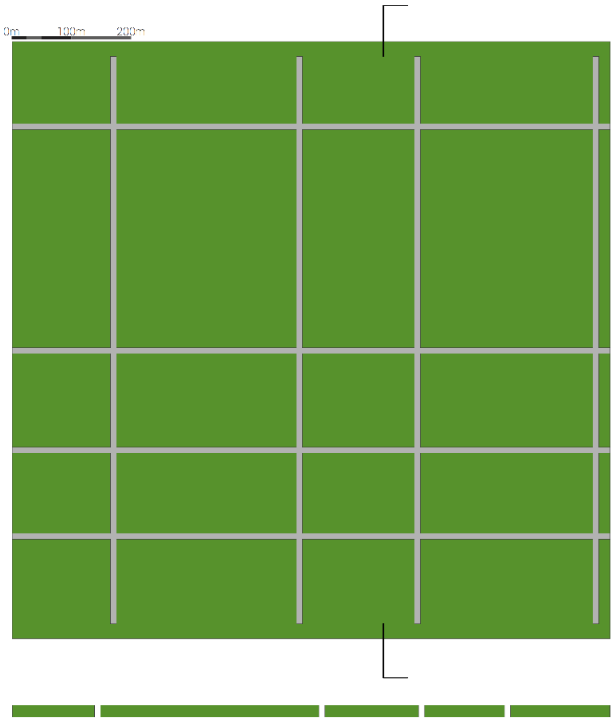
Ecological Engineering Techniques

Bamboo is intercropped with other crops, and the intercropping pattern is based on the circular pattern generated by center pivot irrigation technique. Since the harvesting time of bamboo is different, there creates varying heights: 3m, 6m, 12m and 20m (as shown in the image below). The gradients created by the varying heights can function as wind barriers to slow down wind speed. As a harvesting technique, thinning is often used in bamboo plantation and can prevent bamboo from being too congested.

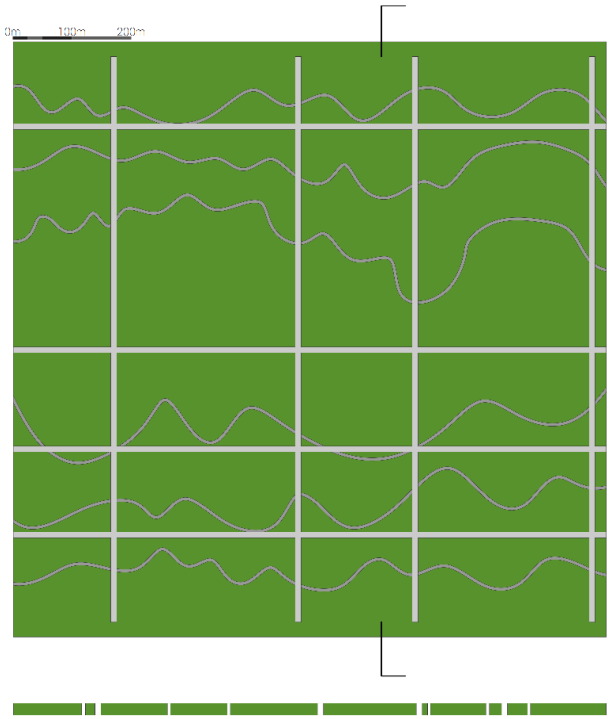


Height and Circulation Scale Details

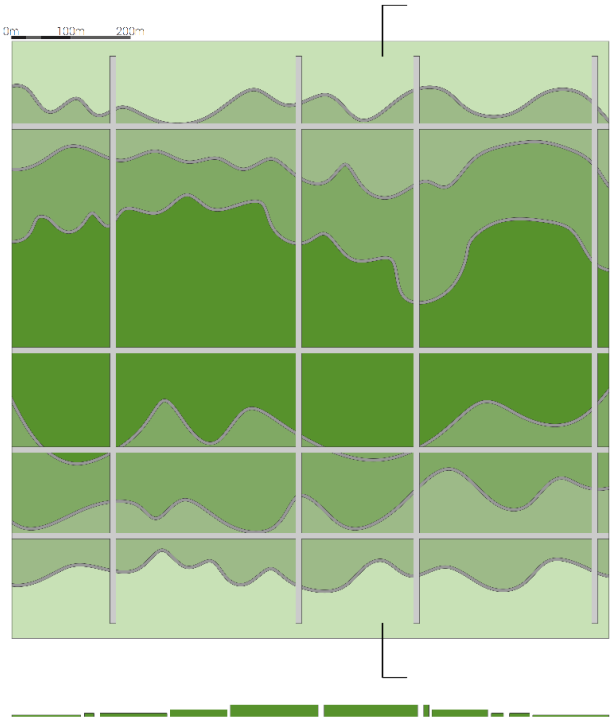
Varying heights of bamboo create different scales versus people thus different feelings when walking in there, upon which different circulations are designed. The image above illustrates six kinds of contexts.



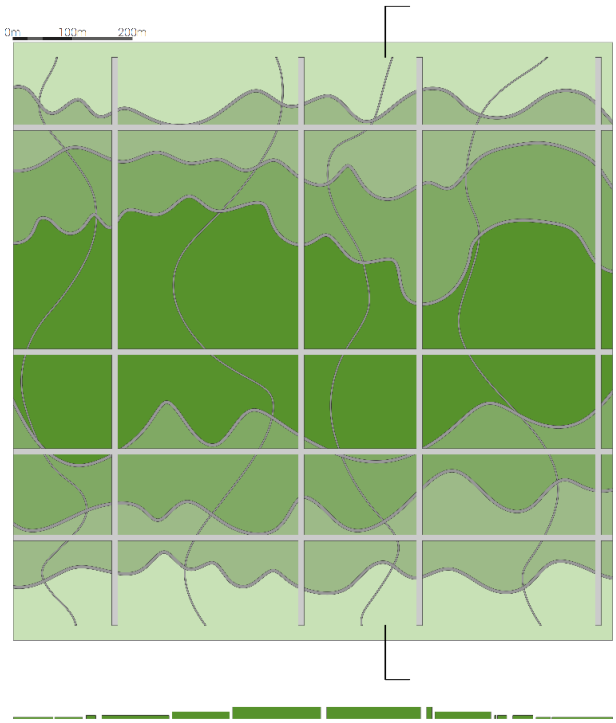
Primary Circulation: Straight lines in the diagram represent primary circulation created in a bamboo forest.



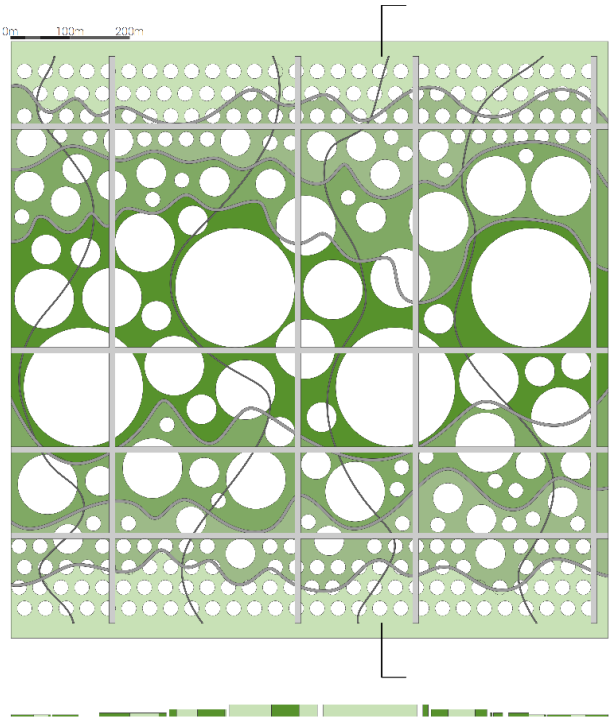
Secondary Circulation: Six curves represent secondary circulation, crossed by primary circulation.



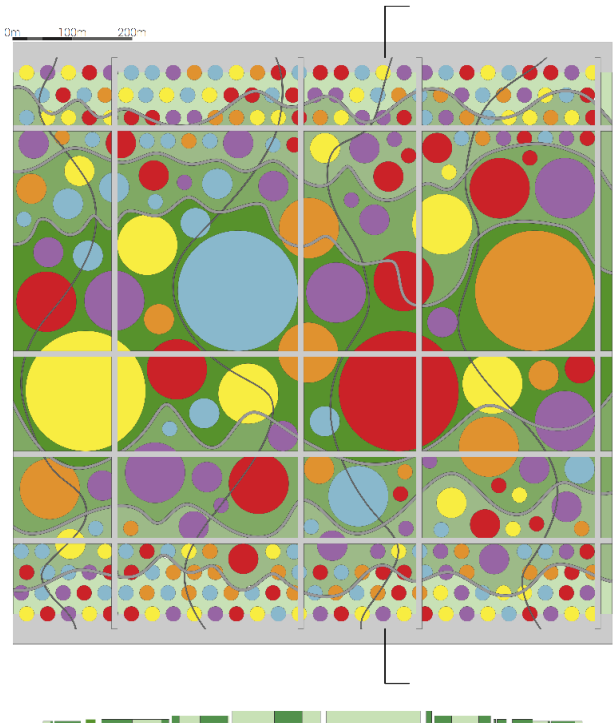
Bamboo Heights: Varying bamboo heights are created by thinning technique, based on the secondary circulation, which leads to gradients of bamboo.



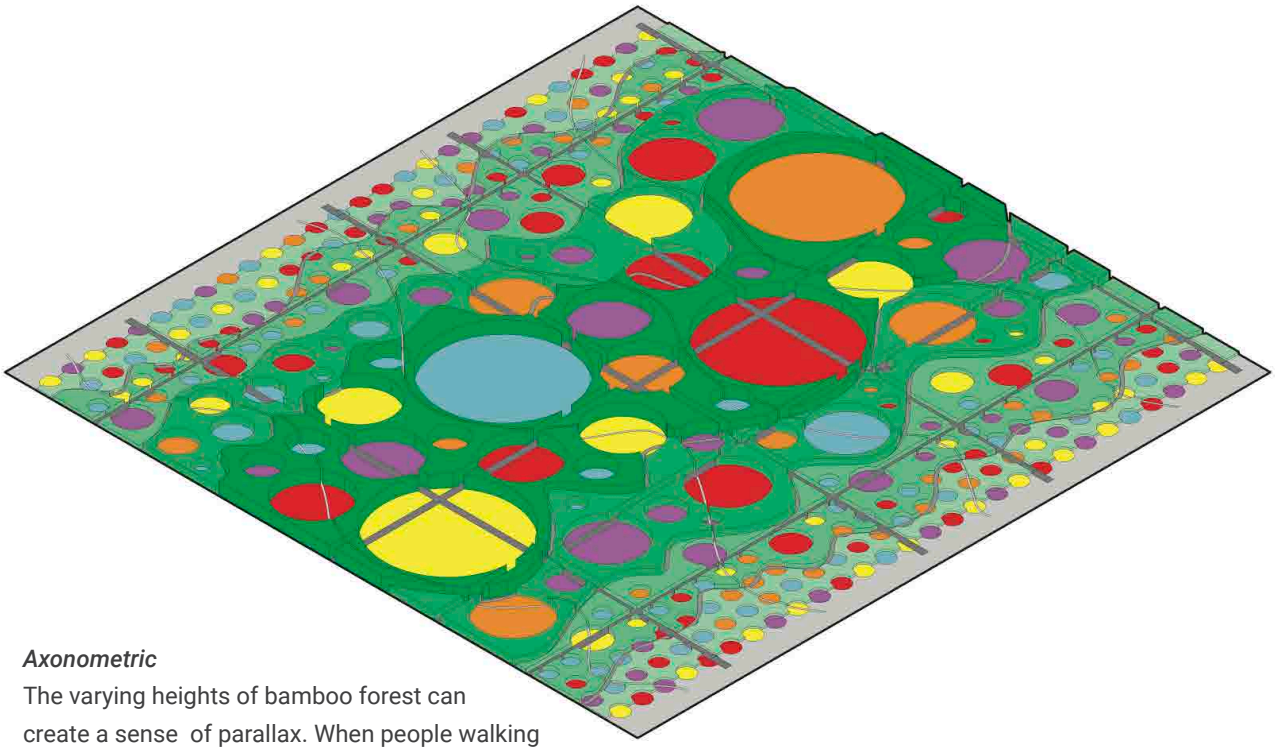
Tertiary Circulation: Four thinner curves in the diagram represent tertiary circulation.



Fields: Bamboo is intercropped with other crops that are irrigated by center pivot technique. This technique can create different sizes of circles depending on the equipment used and the field condition.



Flowers: Different species of flower with varying colors will be intercropped with bamboo. And different colors can bring people different feelings (i.e. color therapy). Some species of flower also have practical usage in addition to aesthetics, such as lavender, canola and chrysanthemun.

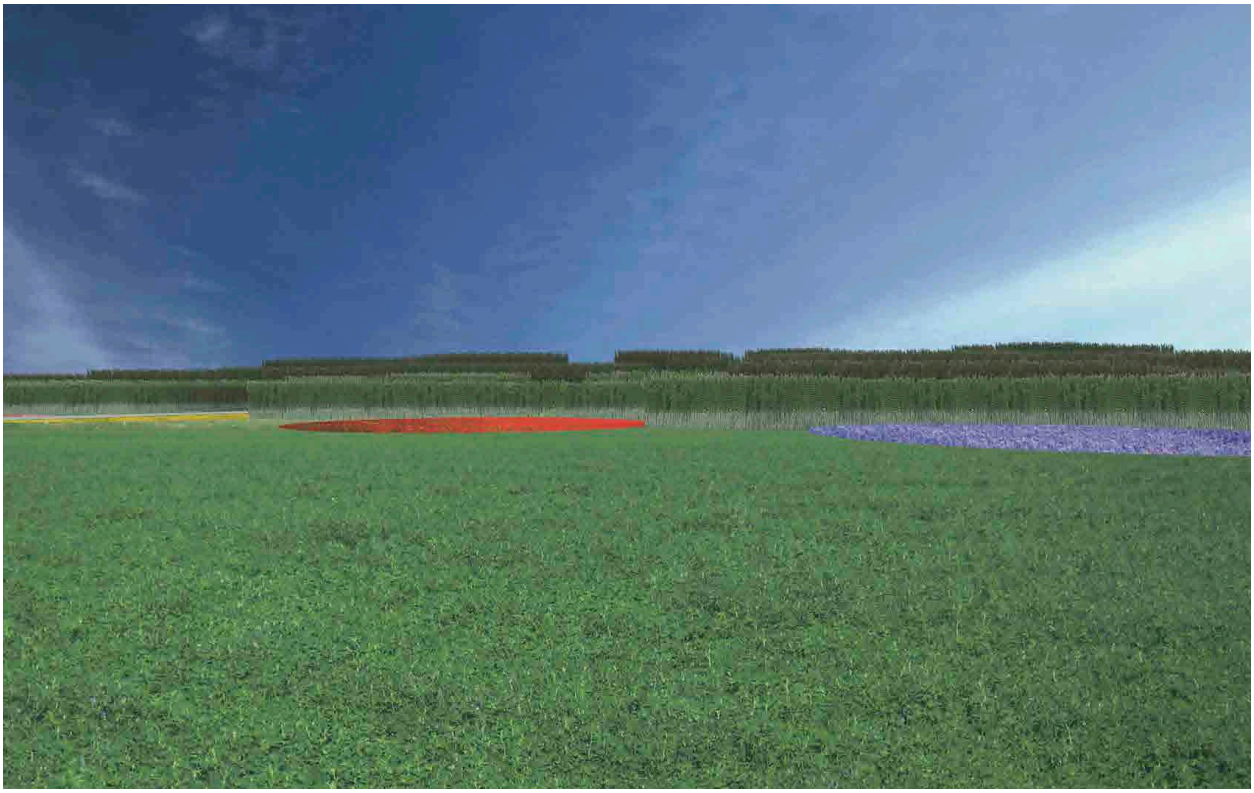


Axonometric

The varying heights of bamboo forest can create a sense of parallax. When people walking in the landscape and viewpoint moving side to side, the objects in the distance appear to move more slowly than the objects close to people.

Contextualization

This landscape is situated in an urban coastal areas where wind is strong and gradients of bamboo can work as wind barriers. City dwellers can enjoy the pastoral scenes with bamboo forest and sea of flowers, while listening to the whistling sound of bamboo and smelling the scent of flower as wind blowing.



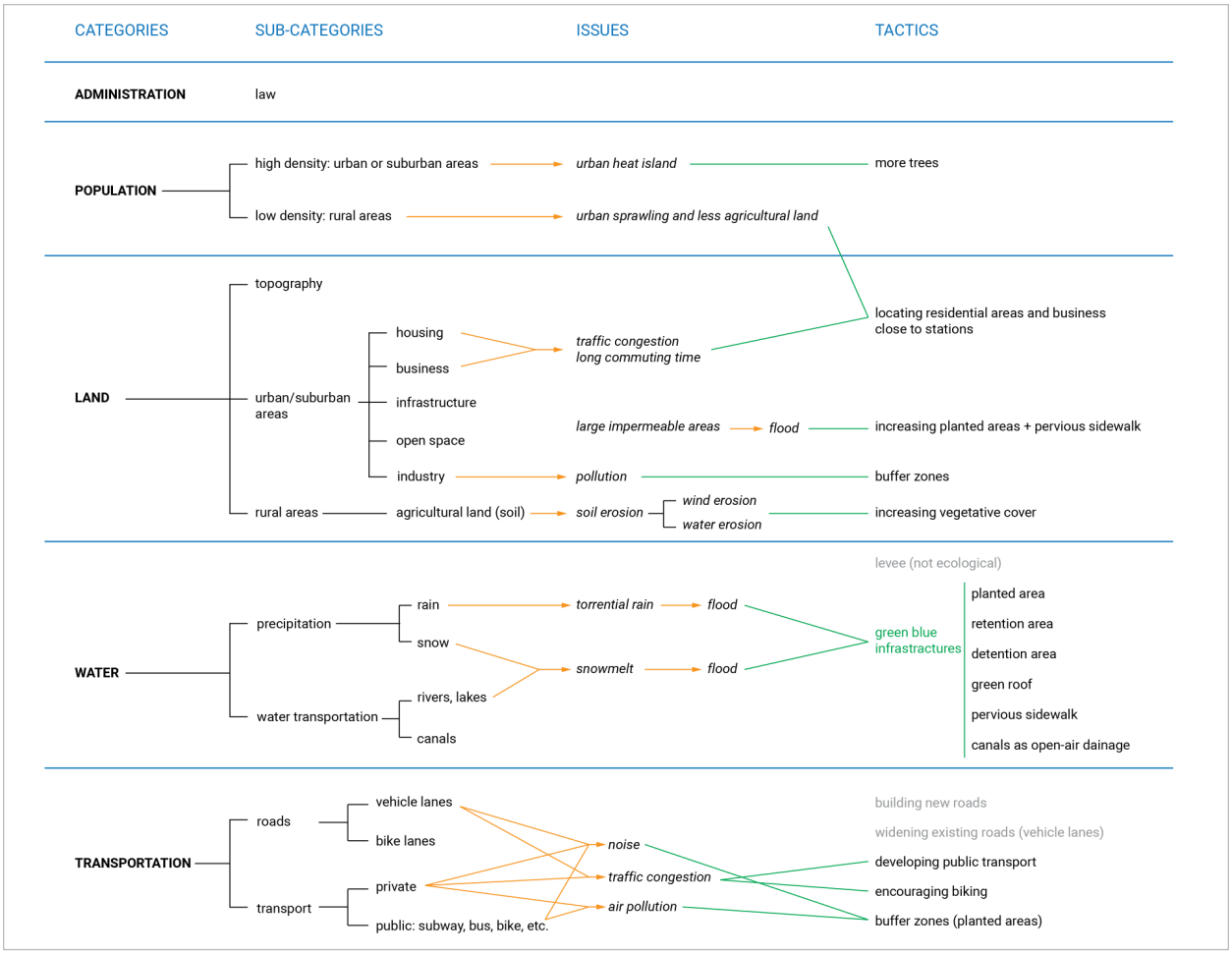
Renderings

LANDSCAPE DESIGN

Ecological City Tactics

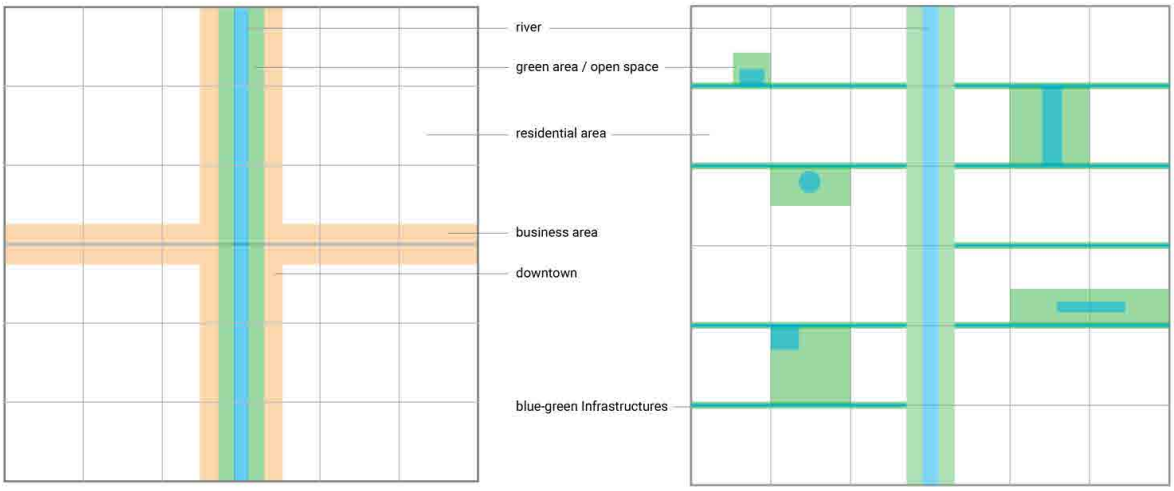
April 2017

Programs: Rhino + Illustrator
Description: Learning from Ebenezer Howard's Garden City, this project is about urban landscape design tactics for ecological city. Through listing the matrix of primary categories in urban planning, I found out that land and water system together have a great influence on urban flooding, for which blue-green infrastructures are effective solutions. Through case studies in masterplans of several cities like Copenhagen, I proposed several combinations of urban flooding strategies according to different topography conditions and causes of flooding, shown in several vignettes. Besides, the project also looks at contexts of high-density urban areas and industry areas. The project finally leads to a model of ecological city, which mainly shows the relationship between city and its natural context.



Matrix of Strategies

This map lists five urban planning categories (administration, population, land, water and transportation) and their corresponding subsets. And some issues in urban areas are also listed, as well as their respective solutions. Orange lines and arrows mean causes and effects; green lines mean ecological strategies.



Diagrams of City

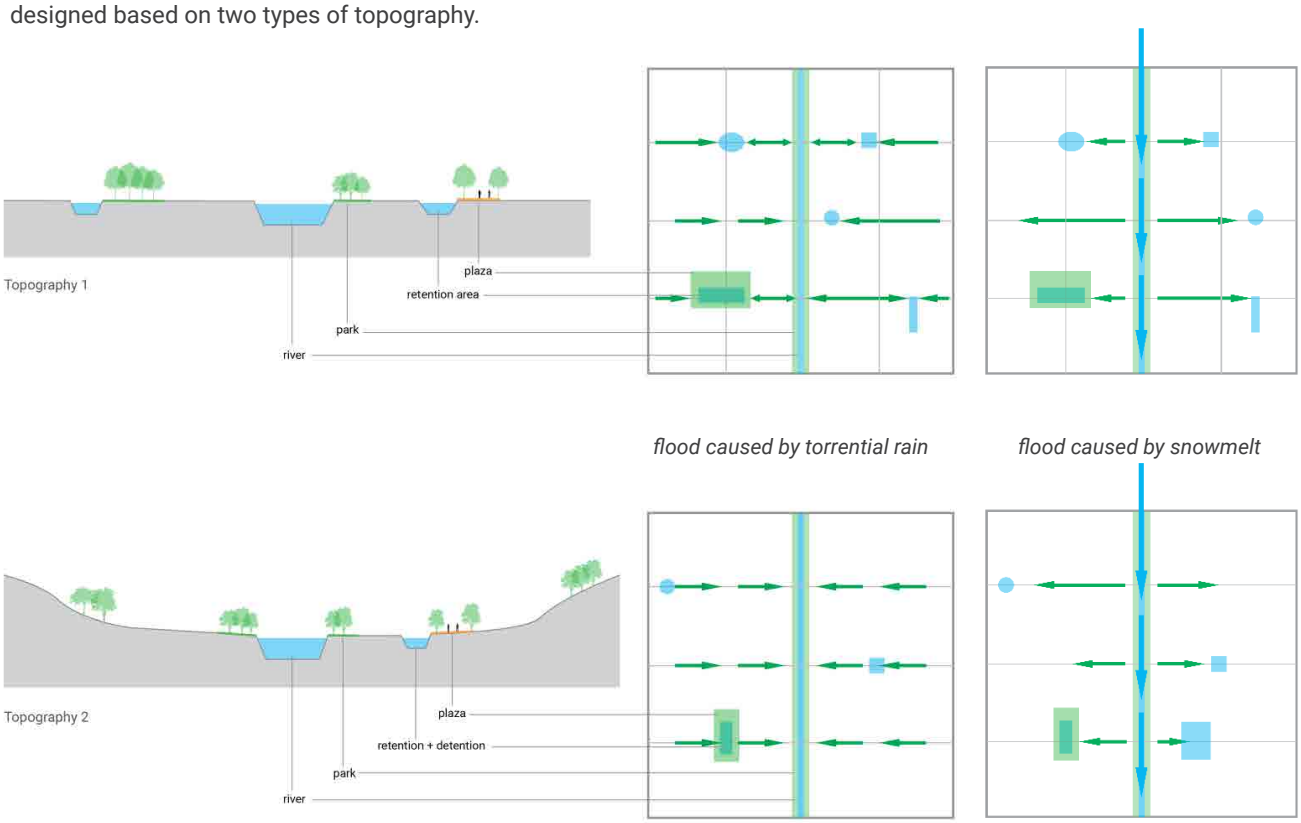
Configuration of an imaginative city

Diagrams of Design Intervention

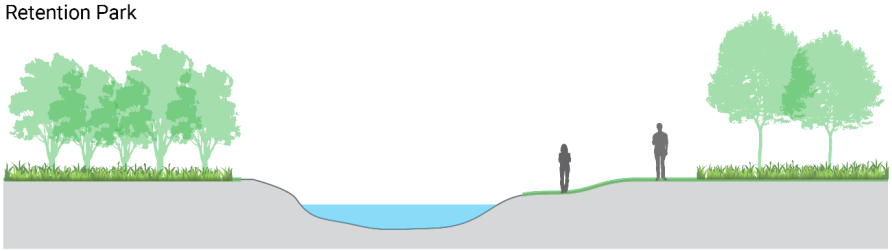
Blue-green infrastructures

Design Tactics for Urban Flooding

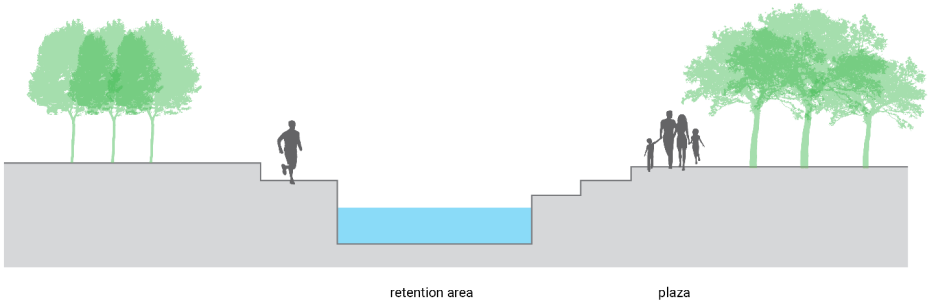
As shown in the matrix of strategies, flood in urban areas is closely related to condition of land and cause of flooding. And blue-green infrastructure is prooven to be one of the most effective strategies towards this issue. According to different situations, strategies mainly include detention and retention areas, such as retention park/plaza, cloudburst street/plaza, pervious sidewalk and green roof. Diagrams below illustrate how those infrastructures are planned and designed based on two types of topography.



Retention Park

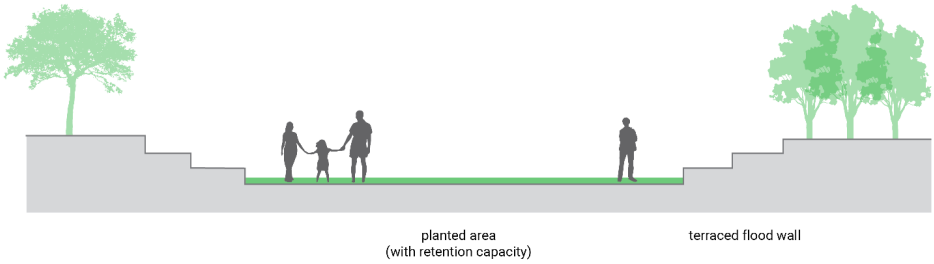


Retention Plaza

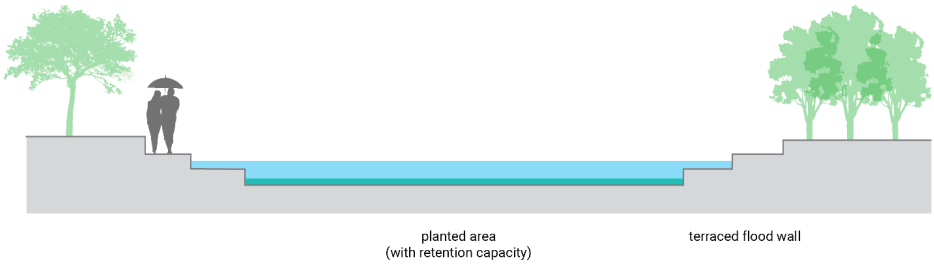


Retention Park/Plaza
Retention areas in park or plaza can manage stormwater runoff to prevent flooding, and also can provide people with beautiful places to take a walk or have a rest.

Cloudburst Plaza



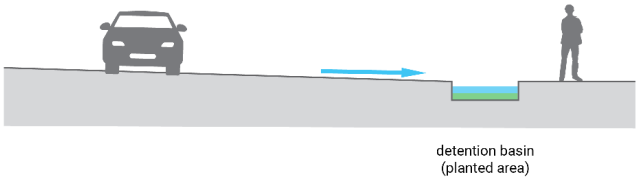
Cloudburst Plaza: flood event



Cloudburst Plaza

A part of plaza can be designed as a detention basin, which temporarily stores water after a storm. In normal days, the area is planted; when storm comes, terraced flood walls can control water within the area.

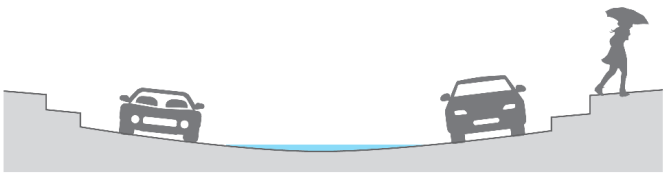
Detention Street



Detention Street

Located in the upstream of vulnerable areas, such street with slope can allow storm water to be stored in detention basin along the street. The basin is also planted and connected to canals.

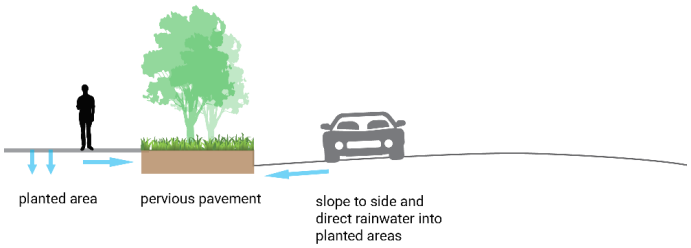
Cloudburst Street



Cloudburst Street

V-shape road alows rainwater flow to the middle of the street, and then be directed to canals or drainage system.

Pervious Sidewalk

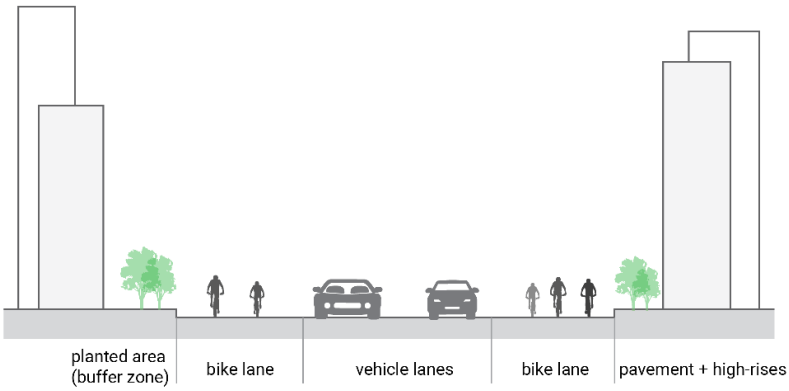


Pervious Sidewalk

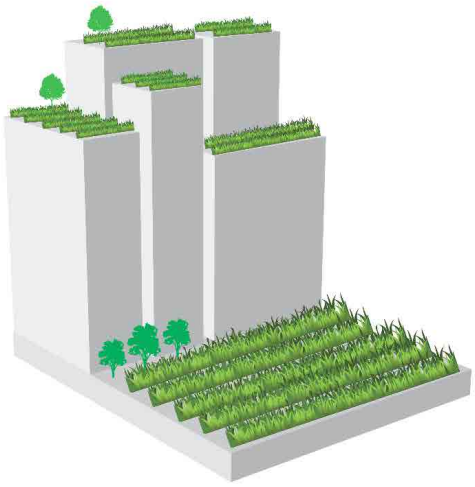
Street slopes to one side and direct rainwater to planted areas. Pervious pavement can also be designed to direct and collect water for plants along the street.

Design Tactics for High-density Urban Areas

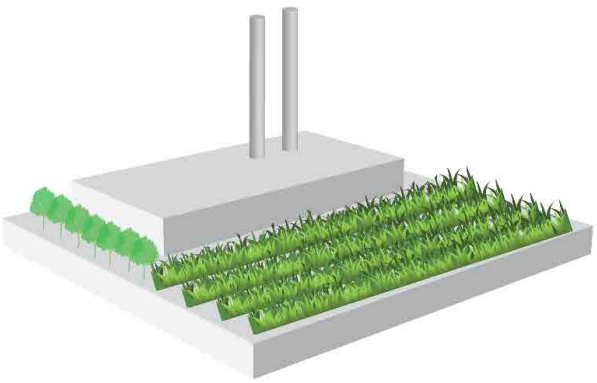
In high-density urban areas, chances are that the city is growing bigger and bigger thus commuting becomes a problem. The key idea is to locate business areas close to main transport arteries, which could alleviate traffic congestion, encourage public transport and mitigate urban sprawl. Also, it is necessary to have more planted areas for the benefit of air quality and human well-being.



Transportation in Business Areas
Goverment and policies should encourage biking. Accordingly, bike lanes need to be widened, rather than widenning the whole road. More trees need to be planted along the road as buffer zones.



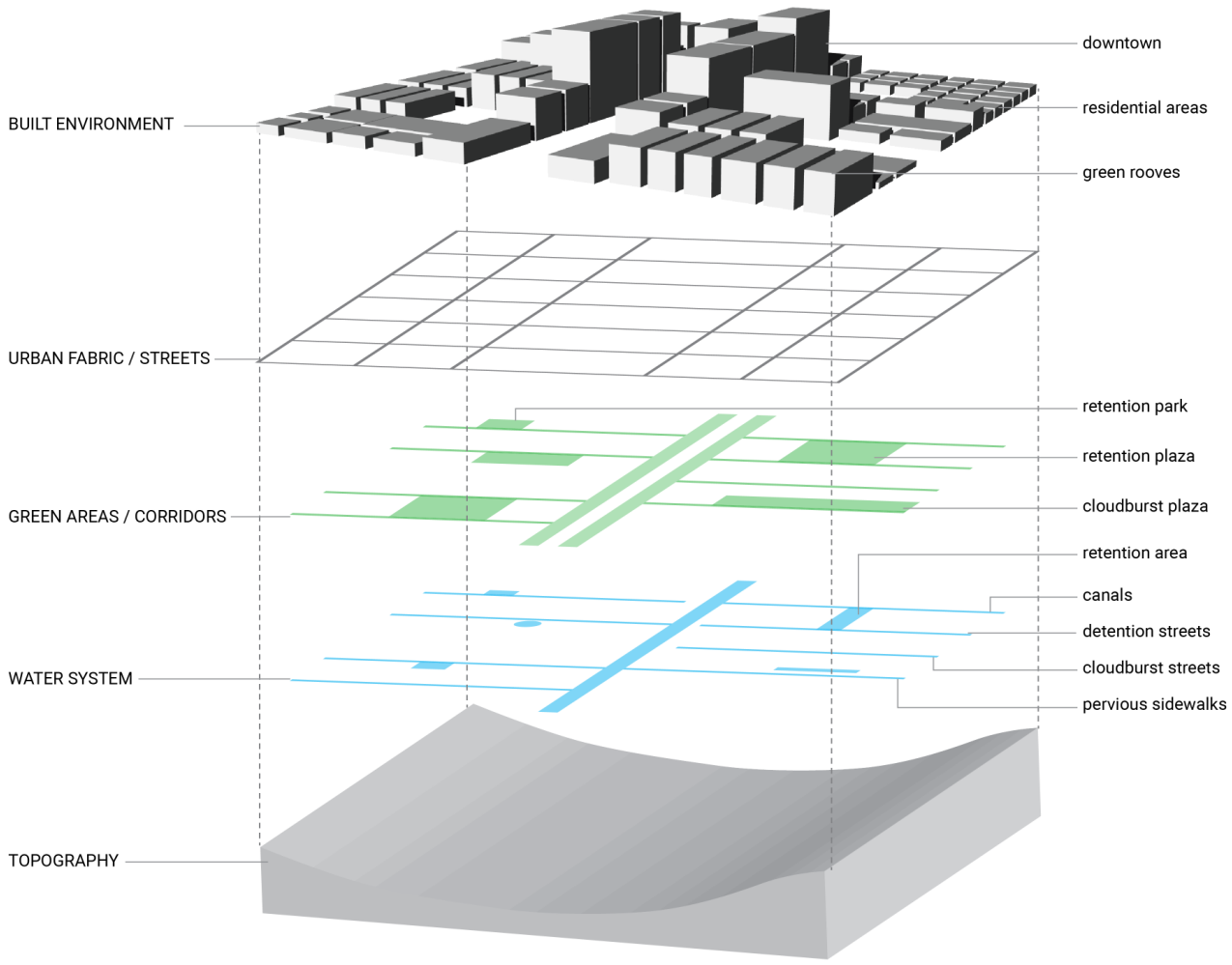
High-density Urban Areas
In urban areas, especially those with high density, it is of great importance to increase planted areas. Such areas like open spaces and green rooves are beneficial for human health and air quality, and can prevent flooding as well.



Industry Areas
In urban industry areas, planted buffer zones are necessary in many aspects. They can clean emission by rhizofiltration, absorb air pollutant, and alleviate noise.

Model of Ecological City

In designing ecological city, all the tactics should be based on the natural context like condition of land. Among built environment, blue-green infrastructures are connections between urban fabric and natural process. These designs make infrastructures as ordinary as parks, plazas and streets function ecologically, ultimately leading to a more decent urban environment.



References:
The Copenhagen Cloudburst Formula https://www.asla.org/2016awards/171784.html
City of Copenhagen Municipal Plan 2015 https://kp15.kk.dk/sites/kp15.kk.dk/files/municipal_plan_2015.pdf
GR Forward (Grand Rapids: Downtown Grand Rapids Inc., 2015) http://downtowngr.org/our- work/projects/gr-forward
Taichung Gateway Park - GROUNDLAB http://groundlab.org/
Retention basin - Wikipedia https://en.wikipedia.org/wiki/Retention_basin

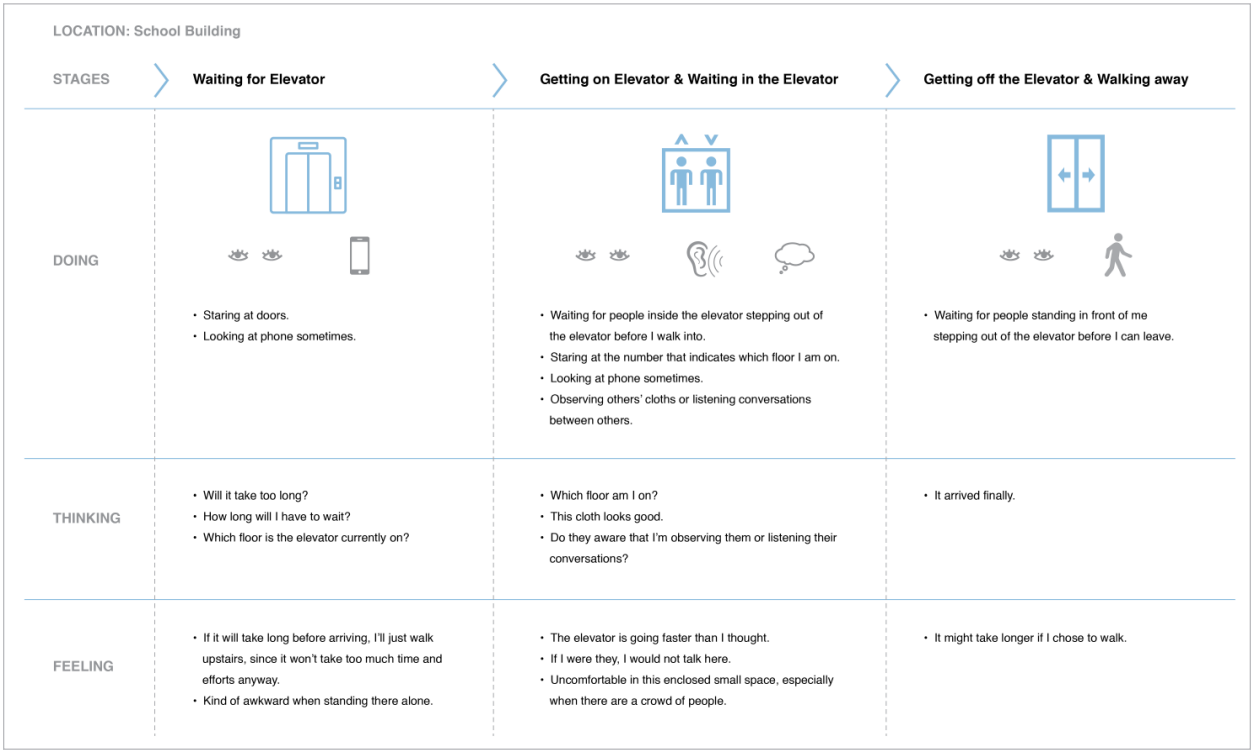
EXPERIENCE DESIGN

Elevator Graffiti

Waiting in Elevator

December 2016

Programs: Illustrator + Flash + Photoshop
Description: This project focuses on elevator-related waiting situation. In urban areas, elevators have already become a part of our daily lives, especially for an increasingly number of city dwellers who live in high-rise building and depend on elevators as a bridge between their apartments and outside world. Elevator is such an interesting environment that a crowd of people, who are completely strangers more often than not, gather in a small and enclosed cabin and stay for several seconds or even more than two minutes. Thus looking at how people behave and think during these special and sometimes inescapable situations can be interesting and might reveal something unexpected. Through observation and interviews, I proposed a design intervention to improve users' experience in eleavtors. This design is more of a concept and still needs further revision.



Experience Map: How people experience in the whole elevator-waiting process through observation and interviews.

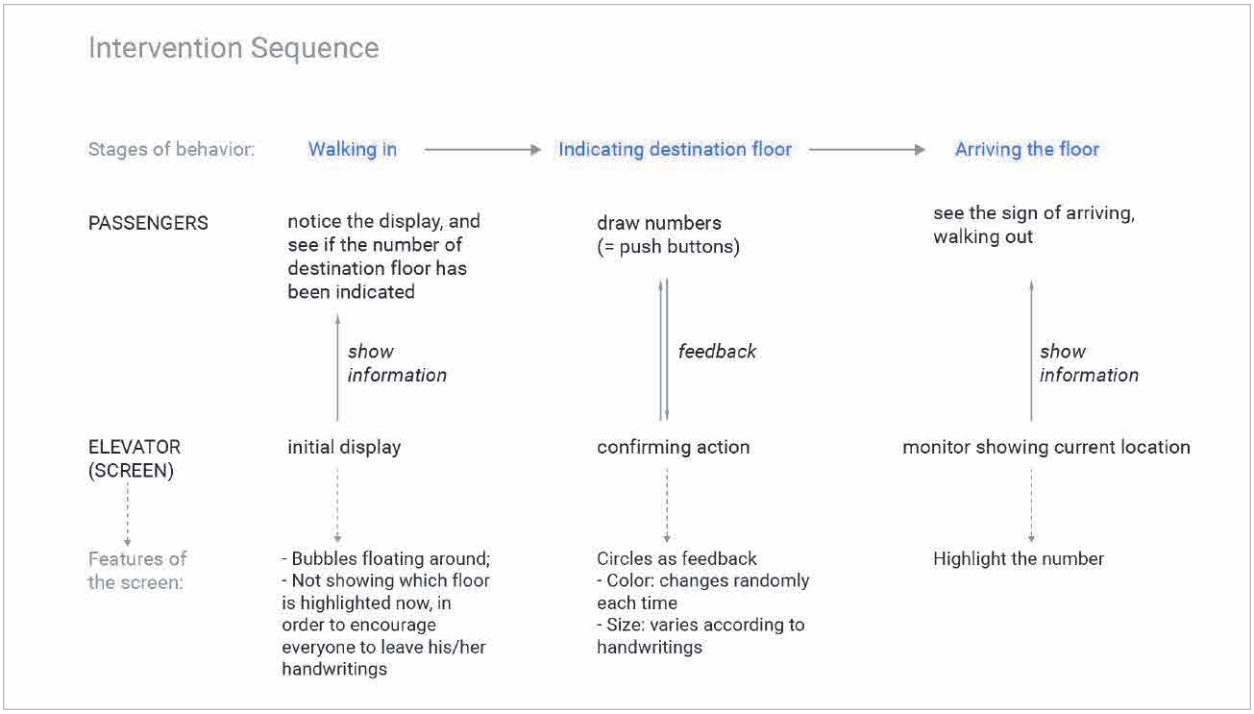
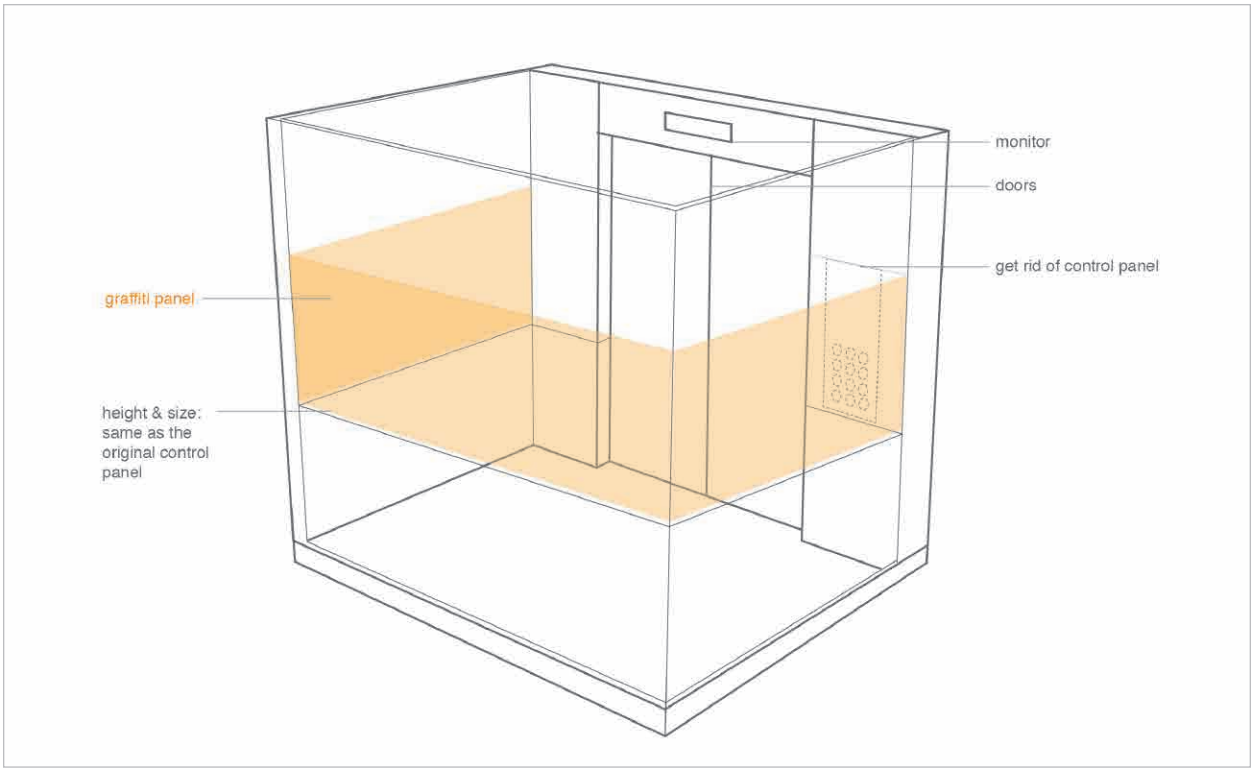


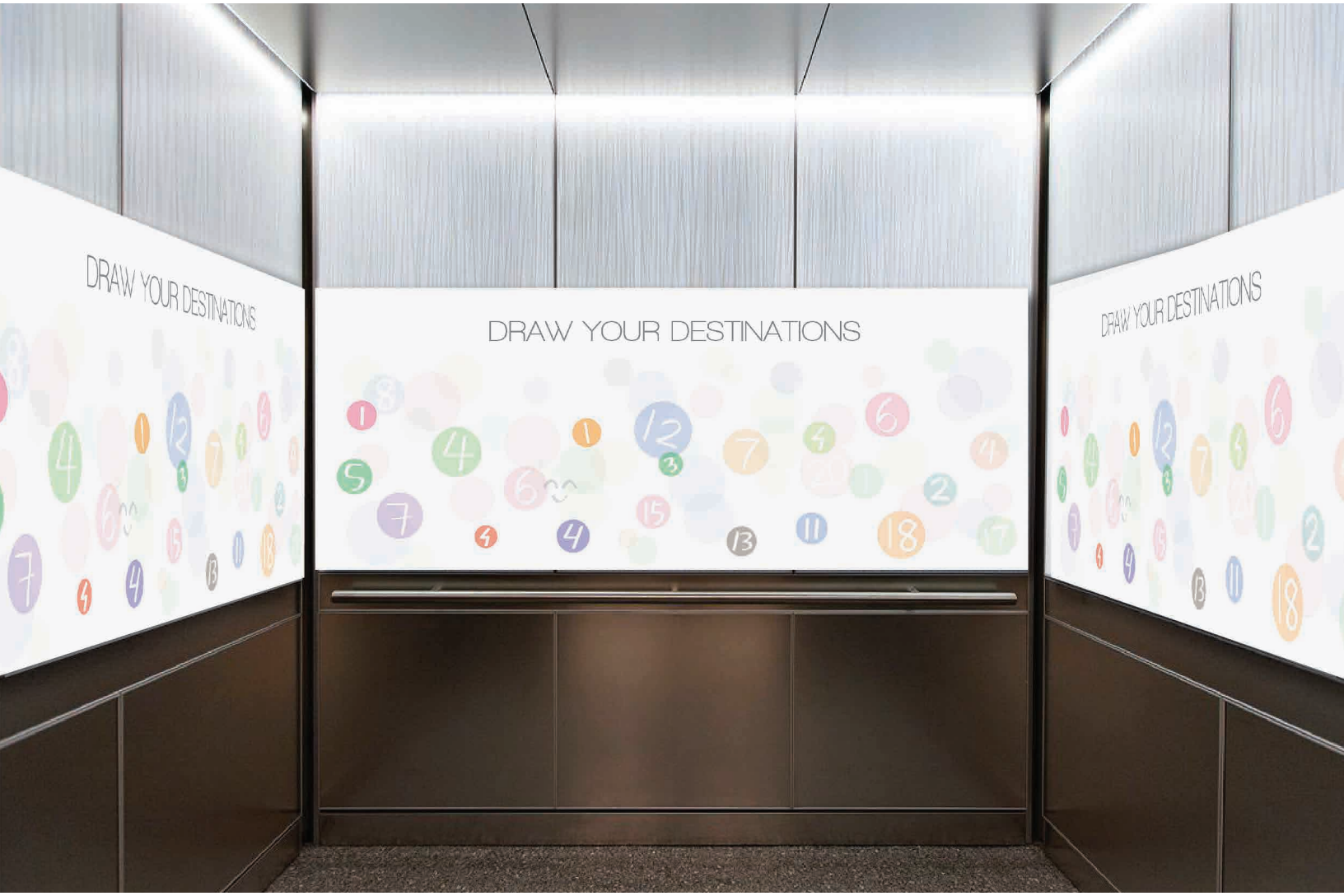
Diagram of Intervention Sequence

According to the experience map, I found out that elevator-waiting process is usually associated with negative feelings. Therefore, I proposed replacing control panel with an interactive screen where people can draw graffiti. The objectives of this design are to create a more dynamic environment where people can be more engaged in.



Location Map: Showing how design interventions are arranged. The original control panel and buttons are replaced by graffiti panels to emphasize the intervention.

Interface (graffiti panel): People can draw the floors they are going to on the screen by fingers. Anything can be drawn on the penal, but only Arabic numbers can be recognized by the interface, because writing numbers is quicker. Colors are preset and change randomly each time; size is dependent on people's handwriting. A solid circle indicates the floor has arrived, and then the circle starts floating. Circles and numbers are fading away as time goes by, and they are completely gone in 24 hours. Since handwritings are signatures of a person, people might recognize their friends by handwritings.



Scenario

This design integrates human “characters” with the original lifeless environment. And the penal would become a collaborative art showing one-day history of the elevator.

PRODUCT DESIGN

Blossom

Kitchen Utensils Serial Design

June 2014

Material: Stainless Steel
Programs: Rhino + KeyShot
Description: Based on stainless steel, this project is trying to combine the unique characteristics of the specific material with the form of products in a natural way, while not sacrificing the function at the same time. The products need to be manufactured easily and have aesthetic values with which they can fit into the context of kitchen. Inspired by different species of flowers, therefore, a set of kitchen utensils are designed in a simple and elegant form, which is also where the title *Blossom* comes from.

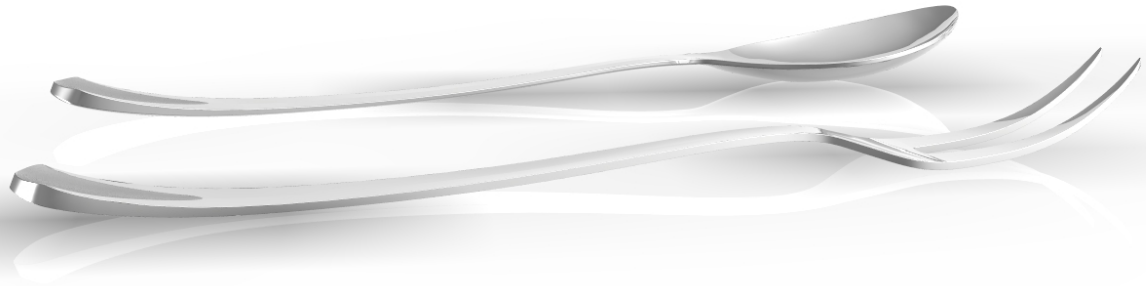
This is my graduation design project in undergraduate school.

Fruit Plates
160*160*26 mm
(6.3*6.3*1 in)

Pedals of flower have similar characteristics as stainless steel in that they are both in the form of piece and can be bent or curved. The forms of these plates shown in the image above are inspired by various kinds of flowers including daisy, gilliflower, cherry blossom, bush lily and clover.

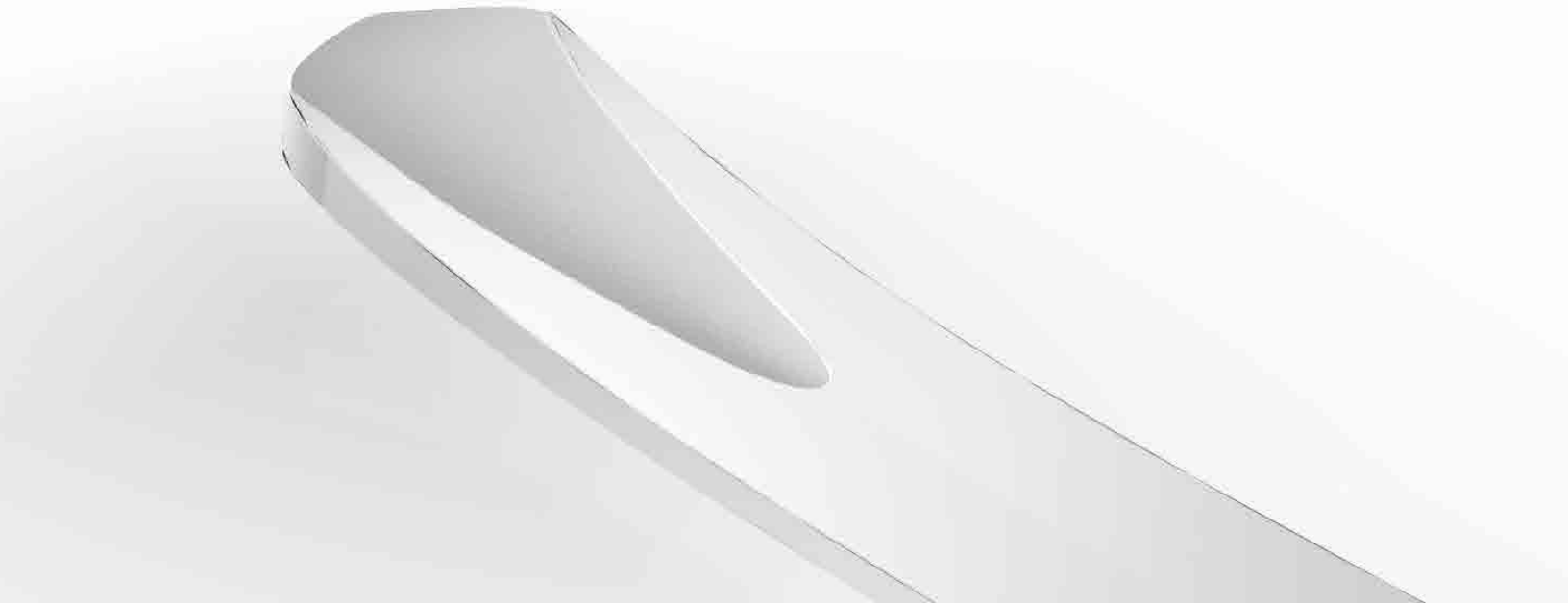
Vase
150*106*150 mm
(5.9*4.2*5.9 in)

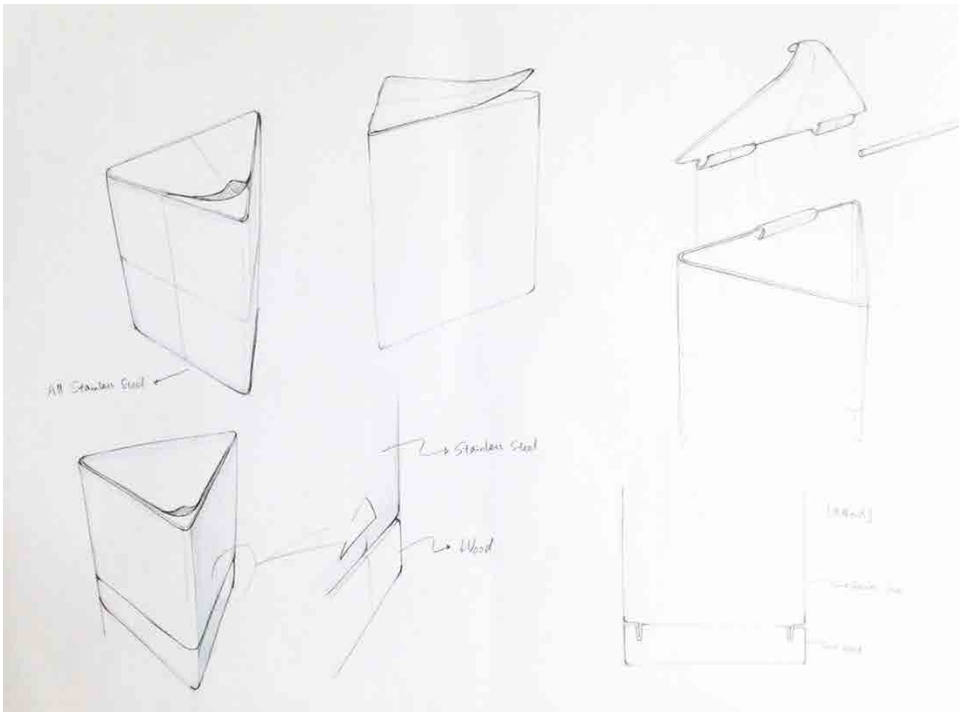
Calla lily differs from other kinds of flowers in terms of its form. This vase is trying to reflect this unique feature in a functional way.



Teaspoon + Fruit Fork
120*24*9 mm (4.7*1*0.4 in)
120*12*10 mm (4.7*0.5*0.4 in)

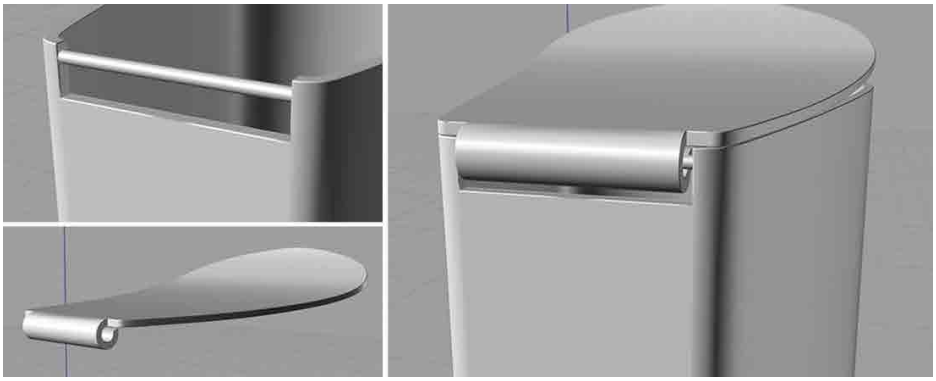
The end of the handle is frosted in the shape of pedal, in order to echo the overall style of this series.





Sketch of original idea
pencil + marker, paper

This draft has some functional and structural flaws, which need to be improved and, therefore, lead to the final plan shown below.

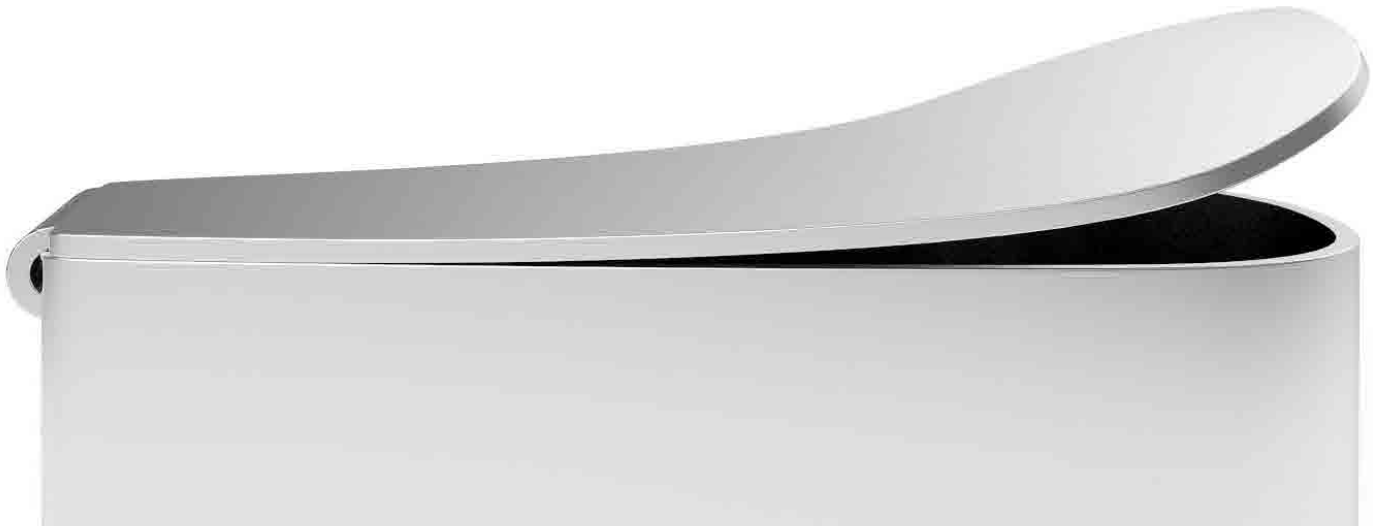


Snapshot of 3D Modelling
Rhino

The way of connecting the two parts became simpler and more plausible.

Seasoning Pots
60*40*70 mm (2.4*1.6*2.8 in)

The cover of the seasoning pot bents upward, which not only implies the action of lifting for users, also makes it easier to open the pot. The shape coincides with the theme of flower at the same time.



Blossom Series
With the hope of adding more colors to the otherwise plain and dull kitchen context, I tried to make every product as simple as possible while not losing its functions and aesthetic values.

GRAPHIC DESIGN

Poster for Shanghai Open Data Week

May 2016

Media: Paper, print (570*840 mm)
Program: Illustrator
Description: This is designed for Shanghai Open Data Week, 2016. Held by China Industrial Design Institute (CIDI), where I took my internship, this activity aimed at helping the public to have a better understanding about creating smart cities by open data. In order to reflect the activity's slogan: "smart city powered by data hero," I applied the silhouette of Shanghai in this poster and then integrated it with mask of heroes. In the lower part of the poster, there lists logos of sponsors and partners for this activity. The poster conveys the idea that our city are protected by data heroes, who utilizes various data to make our city a better and smarter place to live in. (Summer in CIDI also contributed to this work.)

上海開放數據周

2016年6月3日 – 6月8日

和数据侠一起释放智慧能量

SHANGHAI OPEN DATA WEEK

JUNE 3 – JUNE 8, 2016

SMART CITY POWERED BY DATA HERO

指导单位

上海市经济和信息化委员会

主办单位

CIDI 中国工业设计研究院
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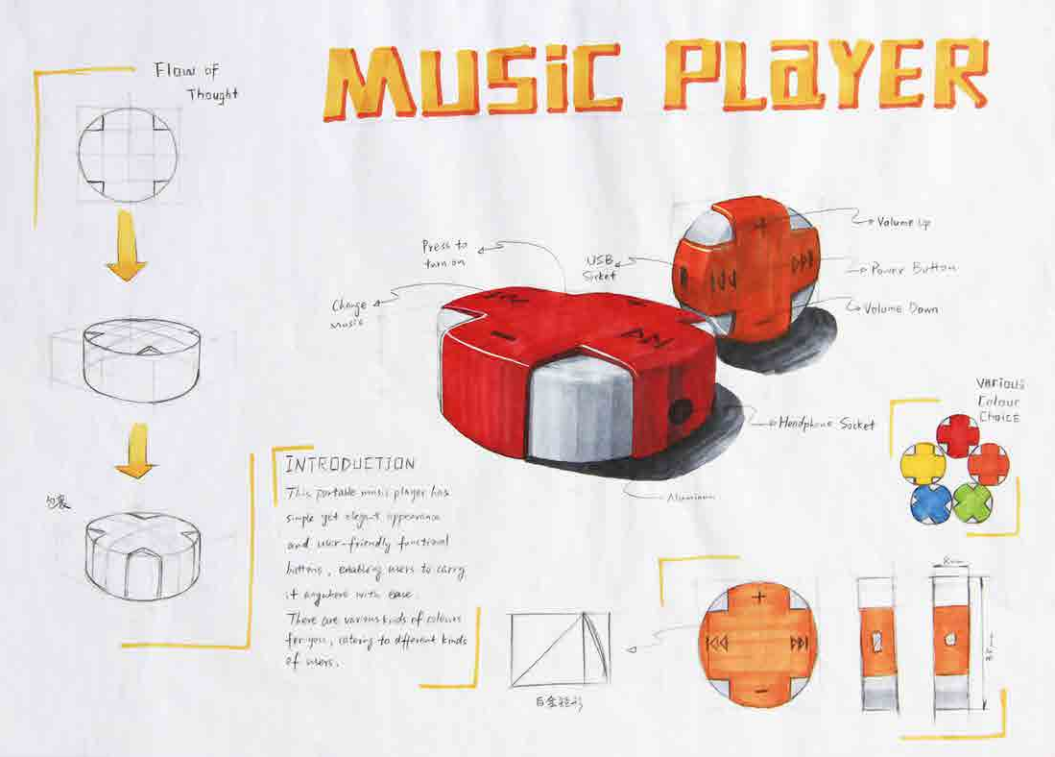
Sketch + Painting



Music Player Design Sketch
August 2013
Material: pastel + marker, paper

Lily
July 2012
Material: colored pencil, paper

Bulb or Candle
May 2012
Material: pastel + colored pencil, paper

Portfolio by Muhe Yang