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Master’s Thesis
Academic Year 2018

Beauthy: Creates Enjoyable and Simplified Beauty Product Finding Process

Keio University Graduate School of Media Design

Zixin Wang
A Master’s Thesis
submitted to Graduate School of Media Design, Keio University
in partial fulfillment of the requirements for the degree of
MASTER of Media Design

Zixin Wang

Thesis Committee:

Professor Masa Inakage (Supervisor)
Professor Matthew Waldman (Co-supervisor)
Professor Ichiya Nakamura (Member)
Abstract of Master’s Thesis of Academic Year 2018

*Beauthy*: Creates Enjoyable and Simplified Beauty Product Finding Process

Category: Design

Summary

Women consider beauty product as an important part of their life, but while organizing beauty products, lack of organization skills lead to spend many times on finding a certain product, which keep bringing negative experience and meaningless time losing to them. The goal of this research is to help women simplify their beauty product finding process at home, create enjoyable interactions between the designed system and women, so that make them feel more delightful while using beauty products. With the support of current improving technology, this research tries to help with beauty product finding process by providing *Beauthy*, a system designed to be a possible solution for women’s beauty product finding process.

Keywords:

Interaction Design, Organization, Objective Finding, Beauty Products, Woman

Graduate School of Media Design, Keio University

Zixin Wang
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Chapter 1
Introduction

Find lost stuff is a common issue happens to many people, and for women, finding lost beauty product is actually a commonly happened annoying thing.

This research aims to design a system for women to better track owned beauty products information, understand where are their beauty product are, at the same time simplify their finding process, guide them find the exact beauty product they want through application which communicate with them. The goal of this research is to investigate how technology can help and support in beauty product finding genre, and more importantly, to find out what is women’s preferred interaction and communication way, especially in a scenario that women tries to find beauty products.

1.1 Background

1.1.1 Beauty products in womens life

In todays world, not only in developed countries, but also in developing countries whose economy is stably increasing, when residents can feed themselves and dont need to struggle to survive, people have more times and also money to contribute to their upper level needs, such as live a quality life, or polish their body shapes and looks. Under this background, when takes an observation to womens daily life, its not hard to find out that beauty products is, and will continuously becomes an really important part of a normal womans life.

Everyday, from face to body and to hair, from face washing to face massage, from face masks to makeups and makeup removers, women actually own and use beauty products more than publics’ imagination. According to [6] a research did to 1,800 of 15 to 75 years old female who live in Japan by POLA Culture Research Institute in 2017, 92 percent of the interviewees said they are using skincare products, 87 percent of all interviewees regard skincare as a really important
thing to them, and towards all, they averagely spend 3,809 JPN (34.6 dollars)
every month on buying skincare products. Similar results can be also observed
from makeup products area. Another research [7]\textsuperscript{2}, also from POLA Culture
Research Institute did in 2017, saids that 83 percent of 1,800 interviewees are
using makeup products, 78 percent of all interviewees regard makeup as a really
important thing to them, and they average money they spend every month on
buying makeup products is around 2,156 JPN (19.6 dollars). Also, from both
of the research reports, POLA researchers mentioned that a trend of trying to
use more skincare and makeup products can be observed, according to vertical
comparisons of recent 3 years POLA research reports.

As previously said, because women keep spending money on buying new skin-
care and makeup products every month, women have a common habit of buying
new beauty products monthly. Also, there is a increasing trend of use more prod-
ucts on daily skincare and makeup routines. Base on these facts, its obvious that
women have more and more beauty products at their homes.

Even without counting skincare products or makeup tools, only looks at makeup
products, a search\textsuperscript{3} involved 4,000 women did by Poshly and Stowaway Cosmet-
ics found that the average woman owns about 40 makeup products, which is a
huge number when especially if people think about how many things they owned.
Beauty tools, including makeup tools, skin care tools and assistant tools like hair
pins or cotton swabs, can also become another huge number if people count. An
example to show one part of it, is that based on an informal makeup discussion
board Temptalias\textsuperscript{4} record, women averagely own 23.5 makeup brushes with them,
from a discussion of 50 different age members.

The numbers showed previously not only represents womens habits of buying
more beauty products, but also clearly relates to women have strong interests
with beauty-related topics and services, which is a huge potential market for both
business purpose wise and research purpose wise.

1.2 Motivation

Owning and using beauty products, without a doubt, will help women become
more confident of their appearances, make them feel more enjoyable of their daily
life. But at the same time, owning so many beauty products, at the same time
more beauty products will be added on monthly, can cause many problems, and
may even harm the owners’ feelings.
1.2.1 Issues of finding things

Bad at organization

Generally speaking, find lost things is a common problem happen to everyone. As compared to men, women are comparatively more associated with clean, sensitive or attentive to details, the general public have the opinion that women are comparatively doing better organize works than men, therefore women have less difficulties and worries of finding belongings. But from research data, we can know the fact is different with publics imagination. In 2015, FelissimoLife did a survey to 412 female participants between 20 to 59 years old who lives in Japan, and found out that women dont feel confident of their organize skills, and many of them have the eager needs to organize. According to the result, over half of the participants said they are not good at organization, and 99 percent of interviewees have the feeling of I want to clean up and organize my stuffs. From their answers, it’s clear that women not only not as good at organization as others’ image, but also having many negative thoughts about their organization skills.

Spend a huge amount of time on find lost things

As women dont have enough organization skills, they spend more time on finding owned stuffs. In 2017 TrackR. Inc did a survey to 2350 Japanese residents aged between 20 to 69, to research about losing and finding things realities. TrackRs reports shows that interviewees averagely spend about 145 hours per year on finding things, which means interviewees spend 24 minutes everyday on findings, shows a huge time lose is being conducted by normal people everyday. And when talking about the time interviewees spend on searching lost things, 75.7 percent of interviewees said they think its a meaningless way of time spending. Cant find things will also causes bad emotions, about half of all interviewees reported that no matter it is themselves try to find things or their roommates help them to find things, they both feel annoyed by this lost things finding process.

Issues of finding beauty products

Beauty product, as mentioned above, occupies a significant place in womens current life. Even though general lost stuff finding is already annoying enough, when especially looks at beauty product finding genre, beauty products special characteristics and peoples beauty product using ways make beauty product’s finding
1.2 Motivation

process becomes more complicated, and also more easier to give owners bad finding experiences.

- Bring-in and Bring-out issue

An important reason for beauty product makers to make most products so handy and compact, is because they want their products can be easily carried everywhere. After eating meal women will redo their lips by using lipstick, when weather is too dry women will use hydrating mist, even when there's nothing happens, women may look at their small carry-on size mirror to check their situation. As a result, beauty products not only live in women's home, but also be carried to many places by using bags, or even be put into clothes pockets.

As women put beauty product into their bags and clothes, different with products stay at home and never be moved, if they forget to return beauty items to their homes beauty product container, they may have a harmful time when tries to find a daily-carry product.

According a lip cream related research did in 2015 [8], in 1500 participants aged in 20s to 60s, 64.7 percent of participants said they can't finish their lip cream mainly because they lose it. And when especially looks into ladies data, 81.3 percent of 20 to 29 years old women said they have the experience, shows the biggest percentage compares to other demographics. Handy size and be carried to many places by different containers, beauty products special points at the same time causes longer finding times and duplicate buying actions.

- Own organization way

Everyone has its own organization way, for example, for beauty product organization, some people organize it by brand, some organize it by category like distinguish by lipstick or eyeshadow, but some may put frequently used items together so that to keep themselves closer to these beloved items. As beauty products have different shapes and size, when products are mixed together, some smaller size product or product beneath others may be ignored by owner. As a result, even though owner believes a product should be in a certain container, but as they use their own way to organize, no one can help confirm that it is in the container she thinks, so that owner may
lose a bunch of times on checking other containers if they can’t see or find it at the first one.

- Similarity between products

Figure 1.1: Similar packages but different contents: Lipstick and Eyeshadow examples, credit to YASUJUNKO, picture source: https://www.marthastewart.com, RENbeauty, picture source: http://renbeautyjz.blogspot.com

As shown in figure\(^8\)\(^9\), another special point of beauty products is the packages. For many products, owner cannot tell what the color inside, unless they remember its name and check the back side; or they need to open the cover and watch inside to see which one is the one they need. Even some product have see-through top cover, owners can become confused if they see it from back side. As women owning more and more products, the similarity between different products increase the difficulties of finding the exact product owner wants, and at the same time increase whiny emotions during the finding process.

1.2.2 Contribution

In current life, women consider beauty product as an important part of their life, but while using it, lack of organization skills and spend many time on finding a certain product keep bringing negative experience and feelings to them. With the
improving technology, more and more researchers put their attention into things finding process and try to give their own answer.

But as beauty product means special to women, and have so many unique points influence the finding process, designer of this research believes that there should be a way designed for especially beauty product finding, so that to give women a more relax beauty product using experience.

At the same time, another important question is "what is womens preferred interaction way while checking and finding beauty product". Even with new technology we may be able to know a certain items place, but if we cant deliver this information in a correct way to user, user wont keep using this way, so that when take a look in the long term, this design will be meaningless as its not accepted by user.

With considerations about these problems, this research tries to help with beauty product finding process by providing Beauty, a system designed to be a possible solution for women’s beauty product finding process.

The goal of this research is to help women simplify their beauty product finding process, create enjoyable interactions between the designed system and women, so that make them feel more delightful while using beauty products.

1.2.3 Thesis Construction

The five chapters of this thesis are listed below:

- Chapter 1, as discussed before, mainly describes background, motivation and how can this thesis contribute to this topic.

- To better define this researchs unique concept, Chapter 2 will focuses on related works, shows how other designers trying to solve beauty product organization problem and product finding problem, so that to learn but also distinguish this research from other designs and studies.

- Chapter 3 includes the whole process of design, from fieldworks to better understand target users, till the final tested prototype, the design concept will be shown during this chapter.

- Chapter 4 talks about evaluation and validation. The design and prototype were tested and proved by target users.
The last chapter concludes the research, at the same time discusses expected future works.

Notes
1 Reality Research of current women’s makeup recognition 2017 Report 2, POLA
2 Reality Research of current women’s makeup recognition 2017 Report 3, POLA
3 https://www.goodhousekeeping.com/beauty/makeup/a34976/average-makeup-products-owned/
7 https://sirabee.com/2015/01/02/12362/
8 https://www.marthastewart.com/1086477/ysl-couture-eyeshadow-palettes
9 http://renbeautyjz.blogspot.com/2013/04/favorite-8-mac-lipsticks.html
Chapter 2
Related Works

Learn from current researches and existing products in related genre is really important when building concept. In this chapter, women’s struggles of how to organize their beauty product both in traditional ways and technical supported ways will be discussed from a broad angle, and then several examples from the existing products and research ideas of how to help user find wanted product will be listed. Finally, learn from current situation and other existing products, the key findings and structures which will support Beauthys design will be discussed.

2.1 Struggles of beauty product organization

For women, organization is a forever topic. As mentioned above, women don’t feel confident about their organization skills, but it doesn’t mean that they don’t care or didn’t attempt to do organization works at home. When especially looks into beauty product organizations, not only women themselves try to organize products more clearly, but also many designers already tries to help with beauty product organization problems.

2.1.1 Traditional ways

According to Amazon Japan’s 2018 Julys best selling ranking, top 4 of popular beauty product containers are shown in figure. As we can see, even though the 4 containers are in different shape, color and even serve for different type of beauty products, they are some common points which makes them to become the most welcomed products to beauty product owners.
Viewable

From figure is easy to tell that it’s an important reason to view owned products when users are buying beauty containers. The containers are either made by see-through materials, or have bigger layers so that to let users check items easier.

Clear category

The containers are all divided it to different and easy-understand categories, so that trying to help owners store their products more easier. And as each layer is comparatively designed to be shallow, products wont overlap with each other, thus to help users save times when try to find a certain beauty product.

Organize in my way

When look into each beauty containers user comments, easy to use and organize in their own way are main reasons listed online. For example, some want to organize all owned beauty products in one place, but some want to distinguish by different categories, the preference of placing beauty products in my way can be concluded from top ranking product’s function and users’ comments.

However, the special problems of organizing and finding a certain beauty product mentioned before cant be solved from these struggles, even though women already try hard on make their in-door beauty product organization clear and easy to check. By using women’s own memories and just using physicals ways are sometimes not effective enough for women to remember each products place. If
they can’t see or remember what kind of products they already own, duplicate buying and bad emotions will happen to them.

To help women check how many and what kind of beauty products they have more efficiently, there are some designers come up solutions aimed to help with solve this problem, and examples listed below are examples from related genre.

2.1.2 Existing product help checking

Sortly

Sortly\(^2\) is a professional application made for both individuals using and business wise using to keep tracking items. By taking photos and input items information, users can create folders in application so that to organize items clearly. The information will be backed up on to cloud so that user can use different devices to view and check items at whatever time and places they want. User can even creates and prints QR code labels of different folders, therefore they can just scan the code and see what kind of products were put inside a certain container.

Sortly is particularly welcomed by users if they are moving out to another place, or for business uses, as users can track what kind of items are inside the box without unbox a packed cardboard box. Individual users also use it to track how many products they have, so that to help with reducing over-buying behaviors.
While it really helps for product list checking, one main limitation of this application is that it can only track items which won’t move, such as store in a cardboard box, therefore if user move a product without changing information on application, it will cause problems. Also, this applications main function is more related to inventory organization, for individual users they might think the user interface is not that friendly to them and not that easy to use.

myBeautyCache makeup organizer

myBeautyCache is an application that mainly focuses on beauty product organization. It can help user always check their owned beauty product list, so that to reduce duplicate product buying behaviors. Also, by inputting more detailed information of each product, user can know when did they open a product and when will the product expired, what kind of product do they want to buy, how much they spend on buying beauty product and so on. They can even share these information with their friends, thus to encourage have more beauty related communications between each other.

myBeautyCache focuses and really create an application for beauty product lovers, for example, the categories inside even include morning and night rou-
tine lists, users can change product list base on their minor product changing seasonally.

But as this application is more like a beauty product usage recorder and product list creator, it focuses on pure product list organization. It doesn’t serve the purpose of finding a certain product at which place, therefore it doesn’t help with beauty item finding process. Also, even though this application is design for women and for beauty product, the user interface is really literal, the serious and confusing look of the user interface may causes user lose interests of keep using it for tracking beauty product.

2.2 Existing products help item finding

As mentioned before, even women try to use containers to organize beauty product better, and there are already many products help with beauty item tracking and organizing. But because womens organization ways and skills are only a part of product finding problem, many other genres such as the characteristics of beauty products, or behaviors of women carry and change beauty products to different containers also hugely influence the difficulty level of finding a certain beauty product. Therefore, the problems cant be solved by only have a product list in womens hand.

When expand to a bigger angle of view, as item finding is a commonly happening issue for most people, there are also many products and researches tries to solve item finding problems from different approaches. Here are 4 interesting examples listed below, which shows how designers use technologies to provide own solutions for product finding area.

**Nut**

Nut is a bluetooth key tag that users can buy and tag it with any important thing they dont want to lose such as keys or wallet. Whenever user finds out he cant find its important item, he can open the Nut application and check where the product is, and can let the tag sends alert so that to show a rough direction of that item to owner. The tag itself can also send notification to application if user should take it with him but forget. It has up to 50 meters sensing distance, owner can check the last available place if user goes too far from the item. Battery inside bluetooth tag can be replaced by owner if it run out of battery.
As Nut promoted, having a Nut tag is more like a mind saver, as user doesn’t need to worry that much even he can’t find his wallet with him, if he can uses the application and knows his wallet stays at home.

But when talks about finding a certain product, Nut also has limitations. As shown in figure, when trying to search an item with application, the application can only tell owner a broad location, like its around home area or a spot in street. User can only follows the alert sound to find the item is at which part of his house, which is helpful, but maybe not that efficient and may also creates some annoyed emotions during the finding process. Also, the battery needs to be changed in every several months. If user forgets to change, the whole system won’t help at that time.

**TansuBot**

A design called TansuBot [4] tries to help solving item finding problems from another angle. TansuBot is a drawer-type storage system which includes a camera-implemented cabinet and an application. When user open a drawer of the cabinet and put items into drawer, pictures will be automatically taken by cabinets cameras and the certain drawer will be remembered. Pictures and record of which drawer be opened will be sent to application, so that when user check with application, he can both views each drawers contents and checks which drawer was opened before, so that to find out the item he wants.
According to its research report, with TansuBot system users showed a significant time saving record when tested in an item finding process. This system tries to provide visual contents like pictures or which drawer was opened to user, so that at the same time reminds user of where did he store a certain thing.

But there are also limitations can be discussed of this study. The first one is the picture taken by the system is only from a top-view angle, which if some products be placed under other products, that the product might wont able be shown inside the picture. The second one is as this system bases on a camera-implemented cabinet, which limits its possibility to only this cabinet. If user forget where did they put a item and have many other containers at home, its kind of doubtful that how much time can be saved by using this system.

**DIY Add-on SMARTKIT**

Another research did by Ling Ding [2] creates a system called DIY Add-on SMARTKIT, which also tries to help with item finding issues from encouraging people DIY and hack their hangers or containers, as a result to help with better checking where are the clothes and belongings.

The system provides a full set of wires, Radio-frequency Identification (RFID) tags and readers, antennas, LED lights and description menu. Whenever user wants to hack to its hanger or container, he can simply follows the menu and
make the normal furniture and hangers become smart furnitures. After that, if user puts tags onto items he wants to check, such as clothes or fruits, the smart devices will detect the items situation, therefore user can get the information of where the item is by using application on smartphone.

This research aims to prove that this DIY smartkit can be easily used by normal public, as a result the contents of the kit are prepared as simple as possible, so that even users who is not familiar with DIY or technical parts, they can follow the menu and finish implementation by themselves.

Also because this research focuses more on the relationship and easiness of promoting DIY into normal peoples life, its actually not that focuses on find an item itself. Without a doubt this researchs outcome will helps with item detecting, but as it doesnt really focuses on the problems such as the design of applications user interface, or how can this system interact and communication with users, this research still has its limitations in item finding process and product-user interaction design genre.

Find My Stuff

Find My Stuff [5] (FiMS) is another system designed to help with in-door item findings. FiMSs researchers created a smart living environment with a set of WIFI, RFID and ZigBee implemented smart furnitures, such as smart sofa, smart dresser and smart containers, so that when users lose a thing in-door and cant find
it, the system will provide relative positioning information to users. For example, a wallets location could be between dresser and smartkit, near dresser [5]. After users get this information, they can just easily follow the guide and search a certain area to find the losing item. By implementing multiple antennas inside the environment, a certain items place accuracy can be raised to a comparatively accurate level.

The technical part of FiMS was well developed. With the combination of different technologies like RFID and ZigBee, items location will be collected and sent to cloud, so that the relative position will be calculated and a conclude information will be provided to user.

But for the relative positioning and information providing part, as the target items location is not directly provides to user, it is really hard to say that if this is a good way to communicate and pass information to user. As everytime user wants to find a product, he always needs to look at other places and items first, and then gradually goes to the wanted product’s location, which may creates some troubles in this finding process. If we have the technology to locate an item, what could be an appropriate way to user, especially how should designer provide information when users are looking at beauty product should be a main research...
direction of this research.

## 2.3 Summary and contribution

As mentioned, the goal of this research is, with a focus on women’s beauty product, creates a system to help women simplify beauty product finding process in an enjoyable and interactive way. From related work studies, designer collected information from both women’s traditional organization habits and also take a look into new techniques implemented current item finding related products. When comparing the differences between goal of this research and other products, the basic guideline of what should Beauthy do and how can Beauthy really accepted by users gradually abstracted from these comparisons. A helpful and at the same time easy to adapt system is expected from designers mind. The points listed below are key points of this guideline that mainly support Beauthy’s design.

- **In-home product finding**

  Beauty product finding problem is mostly happened in-door and in-home, which leads to a conclusion that this system needs to be designed to use in-home, so that to really help with this finding process. It should be able to help women simplify product finding, no matter what kind of containers they are using, or how much organization skills they have.

- **Detailed and viewable information**

  When women buy beauty product containers, they prefer to purchase containers that can help them easily view how many categories are there, and what kind of beauty product they have. They prefer to organize and distinguish beauty products in their own ways, so that to become more easier to remember and clean up. So when designing this system, instead of breaking women’s normal rules of organization, the system needs to follow women’s preferences.

  Related product Find My Stuff also helps with item finding, but it chooses to give information in a more literal and verbal way, which doesn’t serve women’s needs and preferences in this case. As women like to see and view, when technical parts of the system get the location of an item, a more viewable and visualized information should be provided to users, so that to make this system more user-friendly and more welcomed by target users.
• Doesn’t limit to only 1 container

While related product TansuBot tries to solve product finding problem by designing a cabinet system, the Beauthy system needs to detect items in more than one container. The reason under this decision is that women wants to use their own containers, so its really hard to push women to use a cabinet with their dislike surface design or style design. More importantly, as women usually carries beauty product here and there, they frequently forget the product is in which container or be placed at which place, the system needs to fit to womens needs, help users to locate the item is at which certain area.

Figure 2.8: Concluded Guidelines for Beauthy

Notes
1 https://www.amazon.co.jp/gp/bestsellers/beauty/2356852051/ref=zg_bs_nav_beauty_ 3_170247011
2 https://www.sortly.com/
3  http://mybeautycache.com/
4  https://www.nutfind.com/
Chapter 3

Design

3.1 Design objective

The goal of the system of Beauthy, is to help women solve beauty product finding problems at home. The system needs to be able to check multiple frequently used beauty product containers such as bags or in-home containers, and then locate a certain beauty product is belongs to which container right now. After gathering the location information, Beauthy system should communicates this information in a women preferred interaction way, make this locating information more easy-understanding and viewable to user, in order to create enjoyable user experiences while using this system.

3.2 Design process

To really make Beauthy fits with target users needs, solve the problem target users facing, create a easy-to-adapt and easy-to-user system, during the whole design process, human-centered and user-focused design tools were used in every step, thus to better understand users feelings and identities. After finishing or even repeating steps, the realistic data can be applied to the product and interaction design itself. The whole design process of Beauthy includes 6 steps, each of the step relates to each other and support by each other, as a result step by step leads to the final design and final result.

- Related works

After having the idea of create a new solution for beauty product finding, related products and researches were investigated at the beginning of the design progress. Also, useful and new trend technologies which can be used in this research were researched during this step.
• **Observation**

There are information cannot get from only looking at research data, but from own observations. In this step, fieldworks of visiting target users home were conducted, their normal way of beauty product organization and product finding process were also observed, so that to find if there is any opportunities for create a product really fit with their needs and solve their worries.

• **Qualitative data**

Besides observations, to understand users minds and true worries, in-depth interviews were conducted to target users, so that to get more insights to support designer improve the concept and idea to better suit for users needs.

• **Ideation**

In ideation step, concept and unique point of this system was sketched. Based on collected data, the target persona and how the target persona suppose to use the system was also sketched here. The flow of the use case was abstracted and concluded.

• **Prototyping**

To test if the idea really works for target user in real life, prototype was prepared and created in this step. The process from check and test available technology for item tracking to create user interface for user was proceeded in this step.

• **Evaluation and conclusion**

In order to see if the design really works for users, prototype was given to target users, and the responses from both designers observation and target users direct feedbacks are recorded. The proof of concept and design will be given as a conclusion at this step.

### 3.3 Fieldworks

To solve these challenges and fulfill users needs, designer started the design process by firstly doing fieldworks and in-depth interviews to women in different demographics, so that to gain useful feedbacks for following design processes. The
fieldworks and in-depth interviews were conducted with participants from 20s to 50s, for better understanding users current situation and to see what are the challenges and chances according to their daily life observations.

### 3.3.1 Fieldwork design

The purpose of doing fieldworks in this research is make observations of beauty product users daily life and their current ways of organizing and finding beauty products. Also, by doing simple interviews to participants, designer can better understand their characteristics, lifestyles, so that to find out pain points and chances to design a better interaction towards beauty products and women.

### 3.3.2 Fieldwork flow

#### Fieldwork Observation Structure

**Storage of beauty products**
- Organization ways
- Places of storage
- Amount of owning
- Types and Sizes of products

**Process of finding beauty products**
- Finding skincare products
- Finding makeup products
- Finding beauty tools and supplies

Figure 3.1: Fieldwork Observation structure: Storage of beauty products and Process of finding beauty products

As mentioned before, the fieldworks conducted in this research includes two
parts, observations and simple interviews.

As Figure 3.1 shows, in observation part, participant were firstly observed of current ways of storing and organizing beauty products in several different aspects. Also, how many beauty products they have, what are the categories of these beauty products were also observed during this step.

After this, designer asked participants to think and act if they need to find out skincare products, makeup products and beauty tools of both their frequently used products and not-frequently used products. The aim of this step is to see if there are any differences of feelings they have when women finding different products, also at the same time reminds participants’ of what they are normally doing in daily life.

After observation step, the second part of the fieldworks was to ask participants simple questions of their beauty product using habits and worries toward beauty products. The data showed in background research and related works were also used as references to see what are the commons and differences in different ages.

Questions be asked includes:

- Basic information: age, background, living area, occupation, etc.
- What’s your worries about beauty products finding process and how do you solve it
- What are the barriers for you to organize beauty products
- When will you feel it’s hard to find the beauty products i need
- What are the difficulties when you try to find products

In total the fieldworks were conducted to every participants around 30 minutes, and there were in total 3 beauty product users participant in this fieldwork, 2 aged in 20s, and 1 aged in 40s. According to participants demand, as the organization and product finding are personal issues, name and picture of the participants won’t be shown in the following contents.

3.3.3 Results gain from fieldworks

Participant 1

- Masters program student in Keio University
Participant 1 is a 24 years old masters student who lives in Tokyo. She raised her interests of skincare products from middle school and start to take care of her skin seriously such as use a set of skincare products from high school period. She started to buying makeup products from 18, when she entered university. She considers herself a beauty product lover, she feels that beauty products are helping her to become more confident about her appearance, she normally wont go outside without skincare and makeup, or she will put on a mask to cover her face if she must go outdoor.

Her worries toward beauty products are mainly focuses on she don't know if she should follow the trend and buy more beauty products, as she already owns many products already at her home, she don't know which should she give up and which new products should she buy.

She don't consider herself as a good organizer, therefore she is also not good at finding things. Because she has many beauty products, she frequently forget which item is put at which place. Also, owning many similar shape and brand products increases the hardness for her to find a certain product she wants.

According to the observation, participant 1 owns around 150 beauty products in her Tokyo’s living space. Most of the products she placed in a cabinet near to
her bed, and some frequently used items are either on her table or in her daily 
backpack.

She didn’t feel difficult when she tries to find out some daily using skincare 
products, but when she tried to find small size products, like a smaller size of face 
cream and a lipstick, no matter it is a frequently used product or not frequently 
used product, she took longer time to detect where was it.

Participant 2

![Participant 2's beauty products' organization](image)

Figure 3.3: Participant 2's beauty products’ organization

- Masters program student in Keio University
- Age: 27
- Current living in: Tokyo, Japan
- Conducted date: 2018. May 3th

Participant 2 is a 27 years old masters program student in Keio University. She raises her interests about beauty products since she was elementary school students, but she started to take it seriously and use skincare products from middle school. She started to use makeup products when she was in high school, currently uses skincare products everyday, and do her makeups around 5 times a
week. Even though participant 2 doesn’t regard herself as a beauty product lovers, she believes that beauty products can help women become more attractive and beautiful.

Her worries of beauty products mainly comes from skin care products. She has a sensitive type of skin, as a result all the beauty products, especially the skin care products need to be low-allergic and low-stimulate products. Even though sometimes she wants to change to some new products, she doesn’t know if the reviewer has the same sensitive skin as hers, which stops her to buy new products. Also because of this, when she can’t find a certain beauty product, she will becomes really sad as it’s really hard to find a replacement.

She regards herself as a comparatively good at organize person, but if she feels she’s not in the mood of organize or she doesn’t have motivations, she will keeps herself from organizing. As she drives by her motivations, she said sometimes she cannot find where did she placed her beauty products last time.

According the observation, she owns around 65 products in her living space. As shown in figure 3.3, she places most of her beauty products on her dresser as almost all of them are frequently used items. Compares to participant 1, participant 2 owns more products in fragrances and hair products.

When she tries to find out the thing she wants, no matter is a frequently used item or not frequently used item, she didn’t take that long times to find. This may relate to she is a comparatively organized person. The only thing she can’t find during the observation is her hair band, as she placed a hair band in bathroom but she thought its on her dresser. But she mentioned in the short interview that if she want to change a look at weekends, she said she can’t find some new or less used products she wants.

**Participant 3**

- Insurance company head manager
- Age: 48
- Current living in: Guangdong, China
- Conducted date: 2018. May 16th

Participant 3 is a 48 years old insurance companies head manager who lives in Guangdong, China. She raises her interests in beauty products in her 20s, and
started to regard it as an important part of her life from her 30s. To participant 3, skincare products are the main way to reduce her wrinkles and make her skin looks healthy and young. She uses makeup products 3-4 times a month, when she needs to go to some formal events and dress differently. She considers makeup products as magics to add colors and cover weaknesses on her skin, so that makes her feel happy when using beauty products.

The worries of beauty products from participant 3 are mainly about her wrinkles and her eyes. She said she always looking for new products can help with reducing wrinkles, but usually wrinkle-treatment products are comparatively more expensive than other products, so if she lose her wrinkle-reduce product, she will becomes really mad at herself as she needs to spend a good amount of money to get a new one.

She considers herself doesn’t not good at organization and finding beauty products. Same as research results showed previously, participant 3 also feels that its easy to mess up after cleaning, so that she loses the motivation to organize. In her living space, there are around 100 beauty products stored separately in containers. She also have some frequently used products on the surface of her desk. When she tried to find things, she spent longer time on finding makeup products, especially smaller size products not on the surface of containers.
Participant 3 also complains that as she has a busy job, she only has a limited amount to think about beauty and beauty products, which lets her memories about beauty products become shallow and not reliable. When she believes a product is at her desk, it could actually stays in her bag. She thinks it will be really great to have some systems to help her remember where’s the product.

3.3.4 Short Summary

Style of storage beauty products

After observed all participants beauty products storage areas, its obvious that all participants tried to put beauty products at the places they can view, such as containers without covers, clear containers or put them on the surface of table. The goodness of doing it is to make every product can be easily seen from owners eyesight, means that to visualize and to let owner actually viewing where are the beauty products is really important during design process. But oppositely, if their container is too big or they put too many products in it, smaller size products or not frequently used products will be comparatively hard to find out, so that increases the difficulties of make sure the product is at which area.

Relationship between beauty product usage frequency and item losing frequency

According to 3 participants responses, its not hard to tell that the 3 participants frequency of beauty product usage is quite different with each other. Participant 1 is a absolute beauty product lover and almost does makeups everyday, participant 2 is a moderately enjoys using beauty products and do makeups 4-5 times a week, participant 3 also likes makeups, but she focuses more on skin care products and only put on makeups around 3 times in a month. But even the frequency of using beauty products is different, all participants reported that they lose beauty items normally, and were annoyed by cant find the products.

No matter which category of usage frequency a woman belongs to, she still has a huge chance to face the beauty item losing problem. From the observation we can make a conclusion that lose a beauty item happens to women normally, therefore this is a hurry and important problem that should be take more attention to solve.
Problems in beauty products finding process

As also discussed during fieldwork session, one main reason makes women spend longer time to find a certain product is they misremember the products location. For example, participant 2 thought her hair band was in her dresser, but actually it was in bathroom near the sink. Even though women may have wrong memories, as they dont have clue of wheres the current location of that product, they can only follow their wrong memories to search the product.

Another reason is that many beauty products have similar shapes or similar sizes, so that as women own a lot of beauty products, they become confused by similar items and take longer time to distinguish the items. This factor comes from the special characteristics of beauty products, which designer of this research believes we should also pay attention to help with the differentiation between beauty products.

3.4 In-depth Interview

3.4.1 Interview design

After finished the comparatively general fieldwork session, important characteristics of target users start to come out to designers mind. But for deeply understand potential target users thoughts, especially problems like what kind of interaction do they prefer and which kind of support is welcomed by them, these problems are designers most curious directions while designing the system. In order to design a more feasible and suitable system for target user, a second round of deeper understanding is needed. A 30 to 45 minutes in-depth interview was conducted to the 3 target users, which aims to collect more useful data for the following design process.

3.4.2 Interview flow

From fieldworks results, designer collected basic supported responses, which shows there are several important fields of feelings will influences users reaction to the system. To figure out what is the correct way to produce, questions listed below were given to target users:
Needs-related

- How are you solving your worries toward beauty products currently? In your imagination, what is the ideal way to solve it
- What kind of beauty products do you usually can’t find in your living space
- Base on your imagination, what kind of technology or system can help with your product finding process
- When will you change using different beauty products

Preferred interaction ways

- What is the appropriate way of an application/system communicates to you
- What’s your point of view of existing interaction ways and near-future interaction ways while using technical products
- How do you feel the current way of interactions with applications
- How do you feel the current way interact with intelligent home assistant (like amazon echo, intelligent refrigerator, etc.)

The in-depth interviews are conducted individually to all 3 participants at 2018, June 5th by gradually giving questions step by step, aimed to open their minds about what they actually do in their daily life and what they really think of what they want. Designer tried to be as neutral as possible to not influence participants’ point of views.

3.4.3 Results gain from interview

Needs

- Participant 1

Participant 1 changes lipsticks and eye-shadows based on her emotion changes almost everyday. Therefore sometimes she will also use some products that she didnt use for a long time, and she wants some applications can help organize and remember all products she have. She will uses different beauty
products also base on weather and seasonal changes, as she changes products so frequently, the products she carries with her are the most easy losing items, especially some smaller size products like lipstick.

Her imagination about how can technology help solve beauty product finding problem is that there could be an application to record what does her use everyday and which kind of products she carries with her, so that she can easily check with the system and find out the needed product that day.

- Participant 2
For participant 2, as she said in fieldworks, cant find a certain product usually happens when shes not in the mood of organization and her room is in a quite messy situation. As it depends on her emotion changes, every time the lost item could be very different, from hair band to eyeshadow palettes, any item is possible to be lost in her case. Thats also why she want a system can help to be able to check all items situations, so that she only needs to the lost item that day by using the system.

She also wants the product can provides more information about owned beauty products, such as provides the color of a lipstick or how to use a skin care product, so that she can check at whenever time she likes.

- Participant 3
Participant 3 usually loses her beauty items when she is in a hurry, such as before go to work, or have a sudden meeting. Especially shes not good at organizing, in a time limit makes her become more angry about her living space and herself. The beauty products that she mostly lose are brow pencil, lipstick and hair rings. Smaller size items like eye cream or face cream are also have bigger chance to be lost.

Shes also not good at using new technology products, as a result, she hopes every new product can have as simple as possible operation flows. She think if a system can tell her wheres the item then it will be the best thing. She loves to try out new beauty products which promote to suit with elder skin, so that even before she runs out of owned product, she will starts to buy new products, as a result she have plenty of similar products at home and many of them havent be finished before she switch to new items.
Interactions

• Participant 1
she thinks a good system or application should provide the information she wants, and doesn’t give too much unexpected notifications or voices if she doesn’t ask. instead of too many literal information, she preferred they system could provide a mixture of words and pictures.

She thinks her feelings about the current applications really depends on the type of applications, the most important part of an application is its function. Because even some of the frequently using applications are not that good, as she has the needs, like communicate to others or sharing, she will keeps using it. But even so, she believes a more user-friendly design of a system is more attractive to her, as she will definitely becomes more royal to an easy-using application or system.

She is not a believer of new intelligent home assistants like Amazon Echo. The most important reason is that she doesn’t like to talk to machines. She said usually she doesn’t have the needs to ask home assistant to do something for her, and she also doesn’t trust enough of home assistant. She think its OK to ask it to turn off the lights or turn on the TV, but it might be hard for them to do some other difficult things like actually help with locate a certain product.

• Participant 2
Participant 2 doesn’t like literal ways when devices sharing information, that’s also why she prefers to read fashion magazines or searching on social medias. She likes a more viewable contents and shorter sentences. She hopes the interaction to find beauty products can be simple and clear, it would be the best if the application can know what she wants without saying a word.

She think the current way of interactions with devices and applications is good, which she can do and search whatever she wants by using different ways. She thinks it could be interesting to talk with intelligent home assistants or intelligent refrigerators, but for her these communication actions are not a must, she can just simply use the existing products without talking to them. She feels the current trend is everything trying to talk with you, which makes she confused of is this can really help with doing things faster, or it’s just an annoyed add-on function to current products.
Participants

Participant 3 said she prefers both verbal and viewable ways for interactions. For her literal contents are difficult to read and understand especially in a short time, which will increases her whiny emotions, and may cause give-ups of that application/device. Her current feeling towards new applications and related devices is kind of negative. Because she said especially for comparatively older mobile phone users like her, the steps and menu are too many and too complicated, and keep making her face difficulties when trying to download contents or receiving information.

She feels excited of intelligent home assistant, as by talking she can get the things she want without dealing with the annoying menu, she doesn't need to adjust or manage by herself, which can save her time and energy for doing other things. But she worries about if they intelligent item can really understand what she wants especially if they gonna try to help her find things. It seems hard to describe a detailed place or positions in such a complicated environment by only talking.

3.5 Target users’ sketch

Based on fieldworks and in-depth interviews results, the main target demographic of the Beauthy system is preferred to be 25 to 35 years old, who likes using beauty products at the same time have beauty product finding issues, familiar or kind of familiar with new technologies and willing to use new technology-supported ways to help solving this item finding problem, so that can use beauty product less painful and more delightful.

To summarize target users characteristics, in this design a persona is created based on data gain from previous fieldworks and in-depth interviews, aimed to help designer better understand users needs by providing a more concrete image and more concluded information. Here in the figure 3.5 shows the personas basic information, worries toward beauty product organization and beauty item finding, and also with her ideal goal of how should her finding process works like.

See as Figure 3.5, the target persona Kelly is a 25 years old company manager who lives in Tokyo. She is a beauty product lover and she frequently changes and carries different beauty products with her. Because she owns over 100 beauty products with her, and many of them looks similar; at the same time she usually
**Name:** Kelly  
**Age:** 25  
**Live in:** Tokyo  
**Occupation:** Manager

**Description:**  
Kelly is a 25 years old company manager lives in Tokyo. She loves to play round with makeup products and tests different skincare products. She currently owns more than 100 beauty items at home. She carries and changes beauty products frequently.

**Problems facing:**  
Have daily issues of finding a certain beauty product  
Annoyed by spend a lot of times searching here and there  
Nobody can help with this finding process

**Wants:**  
A more relaxing beauty product using experience  
Easy-to-use helpful devices to tell beauty products' location  
Reduce the amount of time spend on lost item finding

Figure 3.5: Target Persona
forgets which beauty item is put to which container, she always have an issue of finding a beauty product which takes a lot of times and makes her annoyed.

She is looking for new ways to help her solve this problem, and as shes an easy-adopter of new technology, she wants to also looks at if theres any new technology implemented ways to help with this problem solving. But at the same time shes afraid of how will the system communicates to her, as she doesnt like a too vertical way while interacting with devices.

She hopes the interactions between the system and herself could become more simple, as she doesn’t like to be annoyed by neither the finding process nor the unfriendly devices. Shes not that willing to read a literal long contents on applications, a more visualized and viewable content is preferred. The interaction between she and intelligent products or services should better not includes too much talks, or she may becomes whiny and loses the interests of using it.

The persona will also becomes a guideline for this design, designer will keeps checking if the ideas come out fit with target persona’s needs, so that to upgrade and improve the ideas of design.

### 3.5.1 Target persona’s current finding process

![Figure 3.6: Target Persona’s current finding process](image)

Also, for better understanding target users’ pain points during beauty product finding process, based on 3 participants’ feedbacks, an abstracted target user current finding process is sketched.
From this sketch 3.6, we can know that normally women start with a mind of "I want a product", and then they will begin to think about where could that product be. Then, women will go to the most available place where their memory tell them. If the exact product is staying at the most possible place, women get the item and the finding process end. But if there are any other factors that make the product doesn’t stay at the most available place (such as wrong memories), women then need to search every possible places again and again, which creates a huge time loss and a huge amount of mad emotions.

The important message contains inside this sketch which be proved again is that women really need something to help them check beauty product’s location. As their memory are not reliable enough in many situations, a more reliable system needs to be designed for women to solve this problem.

3.6 Ideation

3.6.1 Basic structures

As discussed before, the 3 basic structures listed below which abstracted from related works researches build the fundamental parts of this research. They are:

- **In-home product finding**
  Beauty product finding problem is mostly happened inside of womens home, so this system needs to be designed to use in-home, therefore to really help with beauty product finding process. It should be able to help women simplify product finding, no matter what kind of containers they are using, or how much organization skills they have.

- **Detailed and viewable information**
  As target users prefer to organize and distinguish beauty products in their own ways, prefer to choose viewable containers and visual information, so when designing this system, instead of breaking womens normal rules of organization, the system needs to follow womens choices, provides user-friendly, concrete and viewable beauty product information to women.

- **Doesn’t limit to only 1 container**
  According to the fact that women store and carry beauty products in different containers, the Beauthy system needs to detect items in more than one
DESIGN

container. As women usually carries beauty product here and there, they frequently forget the product is in which container or be placed at which place, the system needs to fit to womens needs, help users to locate the item is at which certain area.

3.6.2 Concept

With the basic structures in mind, the ideation session starts with come out related ideas that has the possibilities of solving the beauty product finding problems. Based on observations and feedbacks from target users, the simplified finding process for women should be divided to two parts, the first part is Beauthy system detect a certain beauty item, and the other part is communicate this important location information to target user. As a result, the system design also be divided to two parts, so that to achieve the goal in two directions.

About the first part, as the basic structure shown, this is an in-door product design as the beauty product finding process mostly happens inside home, the device to detect a certain product must be able to use in a in-door environment. In this case, also considering the cost and complexity of implement, RFID devices could be a good technical solution for this design.

For the other part, as one of the biggest demand from target user about interaction is that the information is better to be a visualized and viewable contents thus user can view it. Base on that, after collecting a products location, the system should has a screen to show viewable information to target users, instead of using other unpreferred communication ways like by speaker or by sending vertical messages. Therefore, an application designed for in-door fixed tablet or smartphone is a necessary part of this design. Especially this design emphasizes on the enjoyable interaction between system and target users, user interface of this application should really satisfies target users needs.

3.7 Scenario and User journey

After having the initial ideas in mind, its really important to apply this idea into a comparatively realistic environment and create a use case, so that to continuously guide designer with a much more clear storyline. With considerations of the target persona Kellys character, worries and needs, a story of Kelly and her user journey of using Beauthy system is created.
Figure 3.7: User Journey
3.7.1 Scenario

Find lost thing is a commonly happened issue to everyone, but for women, find lost beauty product is also a especially annoyed and frequently happened thing. Kelly, a normal company manager, is actually going through this whiny issue almost everyday.

Kelly lives alone in Tokyo. As she loves to play around with beauty products, she owns more than 100 beauty products which she stores in her tiny single room. At the same time Kelly is not that good at organization, so that every time she forgets a beauty products storing place, she needs to search all possible places until she gets the item she wants.

Kelly feels annoyed of this endless everyday beauty product finding routine, so she starts to use Beauthy and see if this system can help solve the problem. During spare times, Kelly sets the sensing devices to her frequently used containers and tags her beauty products. And when she forget a certain products location again, this time Kelly opens the application, click the item she cant find, and then the system tells her wheres the items location, so that Kelly can just easily go and find the exact product.

3.7.2 User Journey

To clearly understand what should the system provides and interacts with user, also to figure out in each step which kind of technology is required so that to have a guide for the following prototyping session, a user journey shown in figure3.7 was created by designer. With user journeys guide, the trigger points in different steps between the system and user can be seen and be analyzed, thus to prepare a better user experience for target user.

During the preparation session, after user feels she has the need of using a system to help her check beauty items, she will buy the system and set up the system by herself. The sensing device needs to be easy use enough for non-technique background users, and compact enough to be placed in different containers. The tags which will be put onto beauty products also needs to be small, easy putting and easy register, so that target user wont already feel tired during the preparation step.

When user has an item that cant find, she will starts to use the application to search that item, so that the finding process begins. During the finding process, first the sensing system needs to detect the signal from tags, sense the items loca-
tion in a comparatively fast speed. According to which reader get the tags signal, the certain area of that item can be told base on the readers setting position.

The sensing system sends the position information to cloud, so that when user uses the application, she can know the certain item is sensed by which reader (such as backpack or dresser), and follows the guide provided by application and goes to that area to find the item.

To help user becomes much more easier to get her wanted item, while providing a certain areas information in application, the information should be clear and viewable, the certain items information and location should be listed and visualized in a simple way.

3.8 Prototyping

3.8.1 Technical support

The technical fundamental that support this system works is RFID (Radio-frequency Identification) system, includes RFID readers, antennas and tags. RFID is a technology that has rising it’s social status in the past decades as it has clear advantages in item identification area [1]. There are several main reasons for Beautyly system to choose this technique as the hardware part to achieve the goal of this design.

The first reason is because of the basic construction of this design. As mentioned before, one of the basic construction is this design aims to help with in-home beauty product finding process. Some technologies like Bluetooth devices and GPS devices are also helping item locating and findings. But in a in-door environment, these technologies either not good at detect item accurately, or cant be used in indoor positioning in total. Compares with these technologies, RFID performs really good in an indoor environment. The signal can go through most of the materials except metal, which can overcome by using anti-metal tags, and the accuracy is also good as expected.

The second reason links with the amount of beauty products women own. As mentioned at the beginning of this research, averagely women own over 40 beauty products, and they tries to increase the number every year. To make all beauty products detected by the system, the system needs to be able to track multiple tags at once. RFID system can track a huge amount of tags at the same time, normally over 60 tags at once, which really suit for this researchs purpose.
The third reason relates to the cost of the equipment. Because the beauty product finding problem is a commonly happening issue, if the technology supporting this design is too expensive, users won’t accept or willing to buy a over budget product. RFID, in this case, is a suitable and affordable technology for normal users. It is now started to use in unmanned supermarket, and with the improvement and development of this technique, cost of the basic equipments keep decreasing in recent years.

In conclude, designer choose RFID system as the technical solution to support the design of this research. For prototyping session, Arduino Uno R3, Sparkfun RFID reader and passive RFID tags are prepared and set for testing if the system really works for beauty product tracking.

3.8.2 Technical part testing

RFID Tags and Reader

![RFID passive tags and implemented reader](image)

Figure 3.8: RFID passive tags and implemented reader

The first testing started with only the Arduino implemented RFID reader and several RFID passive tags. With connected to laptop, activated the program of
tag reading, the RFID reader was able to read multiple passive tags in a really quick speed. Considers the equipment might be used in containers like bags, the reader and tag set was also put into a backpack to test if it still works inside containers. The result was also positive, the reader can read tags even there is a fabric layer between reader and tags.

But there are also problems that need to be solved. The biggest problem is the readers range is really narrow, which is only 2 to 3 centimeters in height, that only can detect item in a really close distance, which is not practical enough in real life. And because the readers chip is quite small, each time only 3 to 4 out of 5 passive RFID tags can be detected, which also becomes the barrier of detecting multiple beauty products at a time.

To solve these problems, an external antenna is necessary for making this system works in real life.

**With RFID Antenna**

![Image of RFID tags, reader with external antenna](image)

Figure 3.9: RFID tags, reader with external antenna

First, in order to see if antenna can really helps with solving the problem, a really simple wire antenna was tested right after the plain set testing. With
connecting the RFID reader antenna port to 2 connected wires, a simple wire loop was created. And when place the tags close to the loop not the readers sensor chip, all tags can be read, which showed a better result than only using RFID reader itself. As antenna could be a possible solution, an external antenna was prepared for further testing.

As shown in the right side of figure 3.9, a Ultra High Frequency (UHF) RFID antenna was connected to RFID reader, and then to test the possibility of the system. With the implemented antenna, the RFID system worked really good when detecting multiple passive tags. It read all 15 tags prepared for prototype testing in a fast speed, and its reading range was expanded to a much bigger genre, which is up to 14 meters if there is no coverage, and enough range for indoor positioning even with coverage between antenna and tags. The reading range of the antenna can be adjusted by programming if connects it to laptop. While put tags onto beauty products, the antenna can still read tags well, especially if the beauty product's side with tags is directly facing the antenna.

Figure 3.10: External antenna and tagged beauty product
Improved RFID device

As tests shown, the combination of RFID reader\(^1\), external antenna and tags already has ability to support the *Beauthy* system, but there are also some limitations that can be solved by using new RFID devices.

The first one is the antennas size. The one used in prototyping session is a comparatively bigger size which is about 23 x 20 centimeters, but actually there are many smaller size antennas already existing in markets, and depends on the size changes the reading range can be varied. Depends on the needed reading range and place to set the antenna, such as inside a bag or on the top of a shelf, users can choose and combine different antennas by themselves.

Also, as shown in figure 3.11, for set up the device easier, a more compact size of RFID devices\(^2\) was designed. With this 2 in 1 reader and antenna combined device, users can put it everywhere without adding another antenna to it. The size is about 8 x 8 centimeters so it can be put in most of the containers, and the reading range is up to 4 meters, which is good enough as the *Beauthy* system will use different readers to take responsibilities of different areas at home.

Another problem founded during the tests is some beauty products have liquid contents inside, which may weaken the normal RFID tags signal when its transmitting. Although usually the tags on beauty products should be directly facing
the antenna, if the antenna is set at the bottom or top part of a container, a good solution to solve this problem is to use anti-liquid RFID tags\textsuperscript{3} instead of using normal tags, so that to make sure every beauty product can be better sensed by antenna.

**System construction under technical support**

![Reader & Antenna (RA)](image)

Figure 3.12: How it works with technical support

Base on the support of working RFID system, the improved and revised system construction is shown in figure3.12:

- First, user puts tags on owned beauty products, register tags of each product, at the same time places different RFID reader and antenna (RA) to frequently used containers bottom or top sides. User can give names to each RA, such as backpack or dresser so that can pair RAs with different containers in a more clear way.

- Next, when user wants to find a beauty product, for example its a comb, she can search the item from the easy use *Beauthy* application.
• As different RA has its own responsible area (the adjustable range of each RA), the RA sensed the comb will gives response to Beauthy device.

• After user knows which container has her comb, she can goes directly to that container and find the item.

3.8.3 Final prototype

With the technical support, the design process can finally move to the most important part, the user interface design. As mentioned previously, designer of this research believes that if the Beauthy system cannot create enjoyable interaction between user and device, cannot provides simplified location and product information to user, user will not interested in and keep using this system, which will makes this system become a meaningless design.

Based on previous fieldworks and interviews, the target users needs and their attitudes about preferred interaction ways were concluded. Target users dont like literal information, they want to view the product information in a more visualized and clear way, and they also want to decrease useless movements while using the system. As a result, its necessary to design a user interface so that to show the collected viewable information to user.

But the problem is, should it be a tablets user interface, like home assistants interface which the tablet will stays at womens home; or should it be a carry-on devices user interface, like smartphone applications interface. To decide the direction, before actually creating the user interface, a group discussion with target users were conducted.

Group discussion

The group discussion was organized in June 6th, 3 target users aged in 20s were invited together via smartphone group chatting room. Designer first introduced concept and goal of this research, and then explain the technical supports of the system, finally ask and encourage target users to give their opinions about which type of tablet do they choose if they use this system.

The group discussion result is that all 3 target users chose smartphone application as their preferred tablet to show information if they use this system.

The first reason is because smartphone itself is easy to use and easy to carry. As they already familiar with their smartphone, instead of using another tablet
or watch TV to get information, use their smartphone with them and follow the
guide to get a certain item seems more easier for them.

The second reason is as the system contains all beauty products information,
the target users think they may not only use this system for product finding, but
also use it as a product list when they are shopping or just want to check how
many beauty products they have, which means an smartphone application is more
convenient to be used in any time they want.

Base on target users choices, the most important part of this design, the way to
deliver and communicate gathered information will be in a smartphone application
format, so that tries to satisfy users needs toward beauty product finding process
as much as possible, create delightful interactions for users.

User Interface

• Brief introduction:

Base on users needs, the final prototype for user testing is produced. The
main user interface is created in a home-like cartoon style and includes the
frequently used containers with settled RFID RAs.

The user interface only contains the minimum amount of necessary words,
most of the information such as menu and product are using pictures so that
to give a more direct view to user.

As users also want to view categorized information, beauty products are
clearly divided to categories, so that when click into one category, all prod-
ucts pictures belong to that category will be shown.

• Finding flow:

In figure 3.13 and figure 3.14, the finding flow of how to find a certain product
is shown in pictures. For example, user wants to find a red lipstick, then
after she opens this smartphone application, she can tap lip category. After
goes to the lip category, all owned lipsticks will pop out on screen. By
checking brand name and also color of all lipsticks, she can confirm which
one does she want and tap the wanted one. User Interface will jumps to the
detailed information page of that certain red lipstick. Not only the brand
name and color, and also with products name, when does user start to use,
and more importantly, where is it. Information of the area with that red
lipstick will be both shown in words and visuals, so that to really give clear
Figure 3.13: Main user interface and category
Figure 3.14: Products in a category and detailed product information
descriptions. Last, follow the application guide, search the certain area and get the exact wanted product.

- **Beauty product checking:**

To find a certain beauty product, without a doubt, is the main function of this system. But with all owned beauty products information in hand, users can also check product information at anytime they want.

By using this product list, users can prevent themselves from duplicate buying and money wasting, as they can know what beauty products do they have without remember information by themselves.

They can also just use the application casually, such as matching makeup products for changing style, or switching skincare products base on seasons change. Even by just play around with the application, user can know more about her owned beauty products and have ideas of how to use them. There are plenty of ways that can be developed in the future.
Figure 3.15: Simply checking product information at any time
Chapter 4
Evaluation

In the previous chapters, the reason to design this Beauthy system and the whole design process of it were presented. However, without users’ test, we don’t know if this design really suit in target users’ needs and do they accept and willing to adapt this system in their daily life. In order to prove the concept, the core of this system, which is the smartphone application prototype, needs to be tested by target user.

This chapter evaluates the concept and interaction design by presenting the prototype of the Beauthy application to 3 selected participants recruited based on the target persona created in Chapter 3, let them play and use this prototype to really find a beauty product, at the same time measures how much time do they spend on finding that beauty product.

The objective of the evaluation is to examine whether the target persona feels enjoy and interested in using this final prototype to solve the problems of hard to find beauty products at home.

4.1 Evaluation Flow

The flow of evaluation is shown in figure4.1 First, designer gave introduction and explanation of the project, make sure user understands the concept of the system, the functions of the application, and what should she do in the following steps.

Then, at the second step, working prototype was given to target users, and users were asked to play around with it. The main actions of the application, which is to help with women’s beauty product finding process was tested by user and observed by designer. Spending times of each finding process were also measured by designer.

Last, post-test discussions were conducted after using the prototype. Users were encouraged to give their feelings about the product, how did she feel during
the process, such as were the home-like UI environment and simple flow work to her, both positive and negative feedbacks from user were memorized by designer. After collecting all data from 3 participants, designer will gives a extracted conclude finding report.

4.2 Test setting

The user tests were mainly prepared and set by designer, but also with surrounding peoples help.

Base on target personas sketch, 3 target user was picked by designer to do the user test.

As mentioned before, lipstick is a beauty item that usually forgotten by owners, so the test was designed to let target users find a certain lipstick with and without Beauthys help.

First, without telling target users during the test they need to find a lipstick, a pre-survey was given to target users. One survey question asked them list several lipsticks they have, and they needed to provide detailed product information of
those lipsticks.

Next, designer randomly picked 2 lipsticks from their answers to become the targets they need to find. In a home-like environment, one lipsticks information was input into the application before and be placed in dresser, which the application will provide the location information to user; the other lipsticks information wasn’t input into application and was placed in another place which has a similar difficulty to find as dresser.

When the preparation finished, the true purpose and flow of the test will be given to users. After users understood both the concept of Beauthy and what should they do in this test, the test started.

The test included 2 rounds. In the first round users needed to find lipstick without Beauthy systems help, and the second round users used Beauthy guide them to the location. Necessary information of 2 lipsticks were given to users, such as brand and products name, color and shape.

Designer used smartphone timer to measure and record the using time. All records were memoized for later works.

4.3 Test and result

4.3.1 User profile

User 1

- Human Resource Assistant Manager
- Age: 32
- Conducted date: 2018. July 17th

User 1 is a 32 years old human resource assistant manager who lives in Tokyo, Japan. She thinks she is not a good organizer at home, and she cant find her beauty products some times, which makes her feel guilty and whiny at the same time. She feels that she doesnt have motivations to organize her beauty products, especially to categorize them when she buys new products. even though she says in Japan people usually think women are all good at organizing their belongings at home.
She always wants some system or product to help her determine where’s her products, but as she’s not that good at using new technologies, she gives up easily if the application is hard to use or understand.

User 2

- Sales Planner
- Age: 25
- Conducted date: 2018. July 18th

User 2 is a 25 years old sales planner lives in Beijing, China. She considers herself as a average level of organization skills. She doesn’t like leave too much things on the surface of table, so she prepared multiple containers and usually put her beauty products back to her some of her containers.

But she considers she may have some problems of her organization ways, as she frequently loses and can’t find where her product is. She thinks one reason could be she have too many containers and she forget the item she wants to find
Figure 4.3: User 2 in test
is in which container. Especially for those smaller sized items, she said she almost can’t remember how much of her time is spent on finding these things everyday, which also creates annoying emotions to her daily.

**User 3**

![User 3 during test](image)

- Company Manager
- Age: 40
- Conducted date: 2018. July 18th

User 3 is a 40 years old company manager lives in Guangdong, China. She thinks she is bad at organizing her stuffs, especially on distinguishing different products onto different containers. As she mainly wants her room looks clean, she doesn’t care that much of how it looks inside containers. As a result, she sometimes didn’t put beauty items back to its original container but to some other containers.
When she tries to find out a product she wants, she may takes a long time to determine where is it because she forget which container did she put last time. Some beauty products she usually can’t find are combs, hand creams and lipsticks, which are products in handy size and can ”sneak” into many containers.

4.3.2 Time comparison result

![Figure 4.5: Time comparisons gained from 3 participants](image)

The result of 3 target users lipstick finding time were recorded and drawn in figure. As the record shows, there was a really positive result if compares the ‘with using Beauthy’ and ‘without using Beauthy’ time usages. In total a average of 32.8 seconds were saved by using the system. As as it was their first time to use the application, a better performance could be expected if they practice more and adapt this system into their daily life.

The time reduction when using Beauthy shows the practicability from a functionality angle. As the system is designed to help women find beauty product easier, nothing better than a data can prove this system can really help users save their times spend on beauty product findings.
4.3.3 Observation result

Viewable relax and unhurried

During the test, a viewable relax and unhurried emotion can be told from users face and reactions. Compares with 'Without Beauthy' round, as users knew they would be guided by the system, they become clearly more relax and not in a hurry even though they knew the time was being measured. Especially after they started using the application and saw location information, smiles went back to their face and they also looked more confident when going to the certain area told by application.

This clear emotional relax reaction was not expected before by designer. But as when users facing beauty product finding problems, there usually accompanies a bad emotion such as mad or whiny, its really good to see this system not only physically helps with solving problems, but also at the same time helps settle users minds.

Easy to use, easy to adapt

When designer introduced Beauthy system to users, users took really short times to get used to the working prototype. Averagely less than one minute, they were able to play around with it and got ready to start the time measurement. Enjoyable emotions were shown from users reactions, and non of the participants asked questions of how to use or how can I search items after designer gave brief introductions.

The 3 target users are in different ages and have different problems of organizing and finding beauty products, even though they all belong to target users, they have their own conditions and need different length of time to adapt to a new system. But from designers observation, all users understood how the system works and used it smoothly. From the speed they got used to the system, designer has more confidences of the easy-to-use and easy-to-adapt characteristic of Beauthy.

4.3.4 Discussion result

Welcomed user interface and finding process

After finished the test, all users gave positive feedbacks of the system. They portrayed it as it will much simplifies their daily life routine of finding products. Users also like the idea of showing the detailed information and position of that
product they want to find, so that they doesn't need to worry about how should they get it, as they can just follow the guide easily.

They like the user interface that has more pictures and icons, and contains less vertical information. Especially user 3 believes too many literal information will confuses her and make the system becomes less helpful, therefore she enjoys the current interaction way presented by Beauthy.

**Can be promoted to more beauty product users**

Though the target user demographic of this design was defined as beauty product lovers, while discussing with test users, users think the systems user demographic should be expanded, not only targeting beauty product lovers but to normal beauty product users.

The main reason they believe this system can be promoted to more people is because they think no matter how many beauty products a woman have, she should somehow facing the problem of organize and find beauty items. And as normal people have the needs, they wont reject to use a system can help them simplified the finding process or even just to track their owned beauty products information.

**Seeking new product’s information**

An interesting feedback from test users which designer didnt expected is that users think the system should provides not only owned beauty products information, but also provides recommendations about new beauty products which users havent own. Users are seeking new useful functions to add on the system, show their interests of keep using this system in normal life.

Users show their interests of the designed potential function of this system, which is to use it as a product list and check it any time. And because they can use the system for this purpose, they want to also compare different products inside the application, such as the differences between owned product and new-coming products, and then to decide if they gonna buy a new product or not.
Chapter 5
Conclusion

5.1 Conclusion

In this research, designer proposed Beauthy, a system aims to help women simplify their beauty product finding process at home, create enjoyable interactions between the designed system and women, so that make them feel more delightful while using beauty products. With the support of current improving technology, this research tries to help with beauty product finding process by providing Beauthy as a possible solution for women.

By using this application, women can simply check where their beauty products are, receive detailed information of each beauty product in a viewable, non-verbal and visualized way, and is able to check different products in clear categories of different product types.

Based on research results, positive reactions and data were detected from users. Users understand the concept, feel delightful and enjoyable when using the application to find out beauty products, enjoyed the experiences find out a certain product in a fast speed. Target users who have difficulties on finding beauty products get used to the visualized and simplified application really quick, and show the preference of being motivated to use the application frequently.

Overall, when testing the working prototype, target users who are having difficulties on finding beauty products like the visualized and interactive Beauthy system, at the same time show the preference of expecting to use the application for more purpose than the basic product finding function, such as expect the system can help them do comparison between owned product and new products.
5.2 Limitation

According to the technology limitations, the prototype didn’t collect more users’ belongings’ data so that to create a much more realistic user interface to create empathy from users, which may somehow causes incorrect interactions between beauty products and users.

Besides, users were told their finding process and the time they use to find the target item will be measured before they do the test. As users knew their time would be measured, they may acted more efficiently than their normal finding process, which could also create different result of the comparison of With Beauty and Without Beauty tests.

Also, as the user test was designed to only find one lipstick, the data might be not that significant. Design a mixture of finding different size products user test may help to gain more useful data to support the system.

5.3 Future works

5.3.1 Potential possibilities

- Balance between cartoonish world and real world
  As designer tries to design a more visualized and simplified user interface, a more cartoonish virtual user interface was created in this research. But according to user’s feedback, a too cartoonish world may confuses user on beauty product finding process as they need to link cartoon icons to their furnitures. How to find a balance point between cartoon icon and realistic world can be a future discussion.

- Shop list
  As mentioned before, users want to use this system as a shop list while shopping or just for comparing different products at any time they want. The shop list related functions can be designed more careful and well done.

- Expired beauty product awareness
  Because the Beauty system provides detailed information of each beauty product, and can provide information of when does a product start being used. Another function of this system could be to remind users of when will
a product past the expiration date, so that to always keep their skin in a healthy situation.

• **Expand to other genre**

Even though this system is designed to solve beauty product finding problems, under a in-door environment, there are many other genres can use this system to help with. For example, in kitchen area, there are also many small size products and have many containers, maybe people also have needs of using a system to help them find spices or tools in kitchen area or even expand to other areas.
References


[8] Sirabee. ”so many 20s girls” an research about how many people cannot finish their lipcream.