Improving the shopping experience in large-scale shopping mall
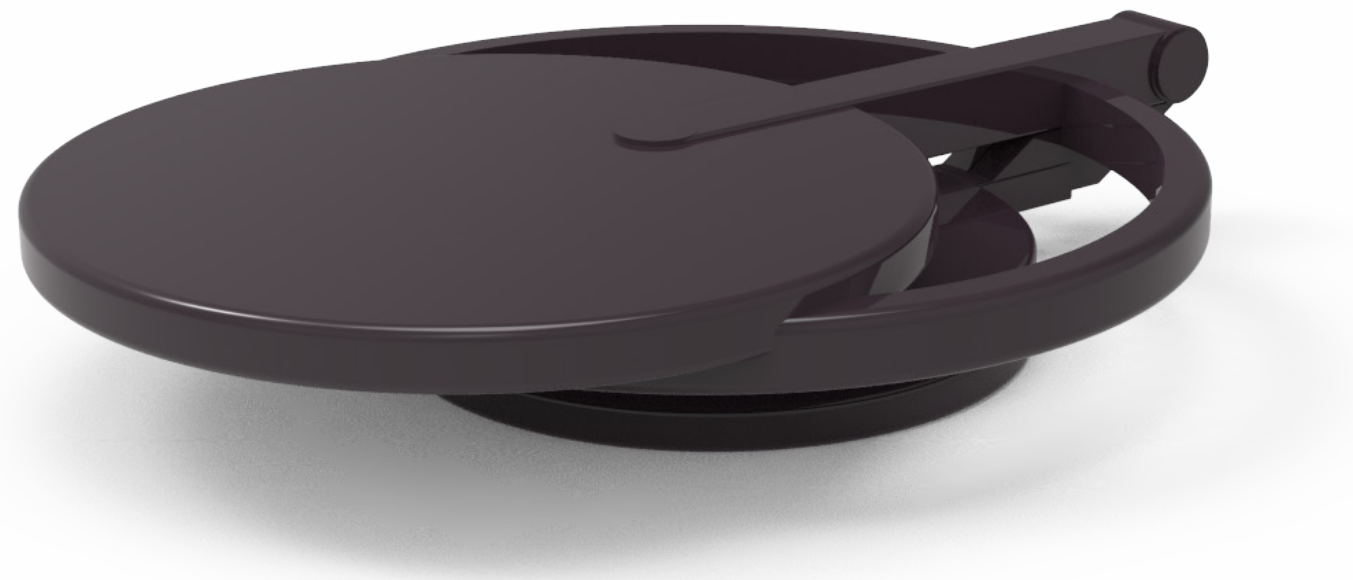
THE GLASGOW SCHOOL OF ART

MSc PDE Masters Project
Design Process Journal
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Discover

Define

Develop

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Deliver

Discover
Background research | Research method

What's the problem? When and where it happen?

Shopping mall is a commercial aggregation of various retail stores and service facilities concentrated in a building or an area to provide comprehensive services to consumers.

However, with the new pattern and design of various malls. Sometimes the sign and pattern make shoppers confused and unable to accurately find what they want.

Typical problems through preliminary investigation
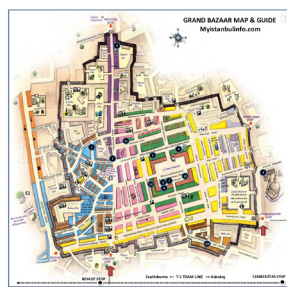
Complex   Crowded   Easy to get lost   Unclear navigation

Why it happen

The design of some malls makes shoppers confused

Examples from observation (Beijing Xidan Joy City)
1. The escalator leads to another floor in a Huawei store area, shoppers pass by that store when using the escalator, to attract more shoppers' attention.
2. Each floor has multiple elevators, escalators, and stairs. Their arrangement is very irregular. It's to let people visit various stores more randomly.

Some theme area of malls is not shown clearly

Each floor has a theme, such as Freedom, Avant guard. Stores are related to the themes. For example, the Muji store is on the Elegant floor.

But the sign of these theme are not conspicuous. I personally found them through this observation, but I didn't notice them before.

Some potential advertising distracts shopper

It's easy to attract shopper's attention by setting some eye-catching things, such as conspicuous words, cartoon dolls, or cars.

Even if people don't buy related goods, many of them are willing to stay here to have a look or take a picture.This can distract the shopper and lead to get lost in the mall.

How to research

Core requirement
Shopper cannot find the target goods easily. shopping navigation is a good way to help them to find satisfactory products.

Research method
First, sort out the necessary second-hand research and observation to get basic information, and focus on the navigation related part. Next, interview different stakeholders and observe them in the actual scenario. Get further insights and opportunities by identifying their potential needs for navigation.

Discover
Literature research with relavant obsearvation

"Examining the Influence of Store Environment in Hedonic and Utilitarian Shopping." (By Cristina Calvo-Porral)

The result shows that for both Hedonic shopping and utilitarian shopping(as the browser and targeted shopper), the merchandise layout is an important factor that affects shopper satisfaction. And browser pays more attention to the internal environment and atmosphere, which is more important than commodity layout.

Example of more people pursue the atmosphere and environment of the mall in the real shopping mall (Jin Tang shopping mall)

The third floor has a comprehensive area dedicated to children to create a fantastic atmosphere in line with children. When I went to observe at the weekend, there are at least 100 children accompanied by their parents.

An indoor swimming pool for children. It specially designed a glass wall to make it convenient for parents to observe their children outside. It is in the corner of this floor and is not easy to find.

Accordingly, several shops related to children are opened on this floor. However, many shopping malls don't make such a unified theme store classification.

It provides services for children to clean their bodies. This is the first time I have seen these services in the mall. And I can see it popularity through the window.

I have been to this mall several times before because it's near my home, but I have never been to the third floor because I was not interested in children's shops. But when I found the difference of this floor, I can even imagine the picture of me bringing my children here to play in the future. Sometimes, there may be unexpected and interesting things in the mall that have not been noticed before. If there is a more intelligent navigation system, maybe I will have more opportunities to find this floor.

Stakeholder research and analysis

Shopper: they care about buying what they want, their interest, relax, and have a rest when they are tired.
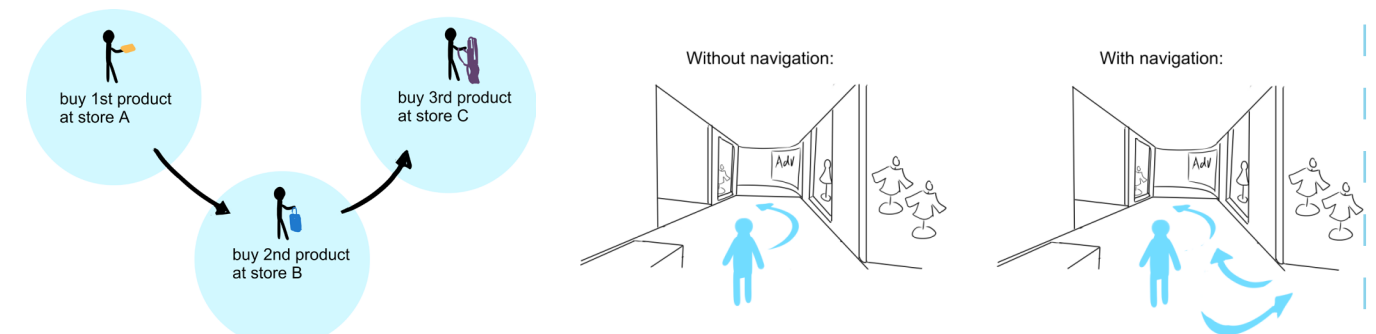

Shop owner: they care about attract shoppers, make a profit, and create an attractive atmosphere.

Mall owner: they care about attracting good taste shoppers, shaping the high grade impression of the mall.

Convert their demand into elements in reality

For mall owner
Let the shopper be attracted by the stores and environment, to encourage them to continue to shop in the mall.

For shop owner
Let more potential shopper find their stores. So the navigation can attract more potential customers.

What if: considering the profit of mall and shop

The navigation system can guide users to find what they want, and it can also recommend more things they may be interested in, and ultimately provide users with sustainable shopping goals.

The navigation system does not obviously affect the user's choice, but in subtle help. Provide appropriate help according to the type of user.
Therefore, the next step will analyze several specific types of shoppers.

Discover
Specific types of shoppers

Interest-based browser
The navigation system should attract shoppers to see their interested store more easily.

"All the shops" browser
Their dependence on navigation systems is limited, so such people will not be given priority.

Type-based targeted shopper
The navigation system should help shoppers see the store that meet their needs more easily.

Single targeted shopper
The navigation system should recommend potential alternatives for them.

Type-based targeted shopper and Interest-based browser are more common shopper types, and Single targeted shopper is a specific type of Type-based targeted shopper.
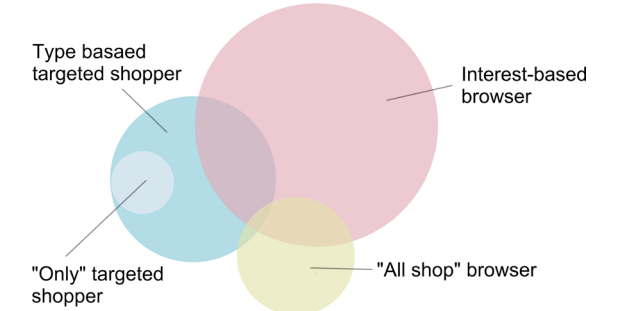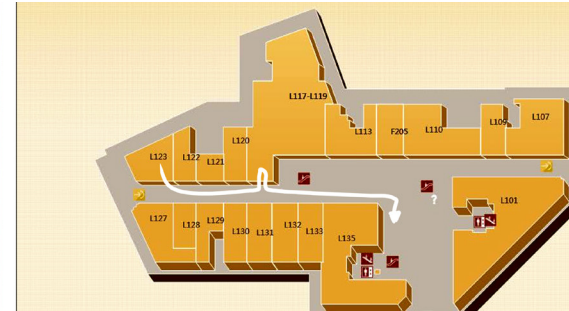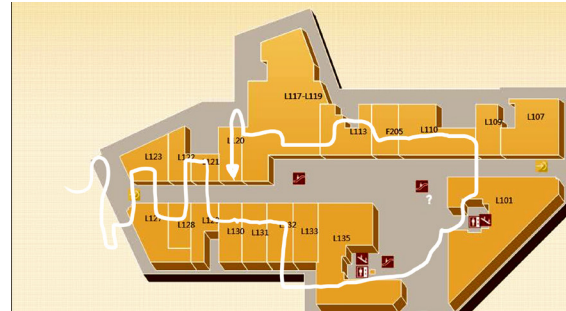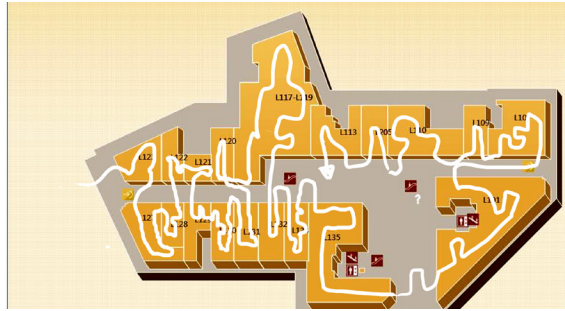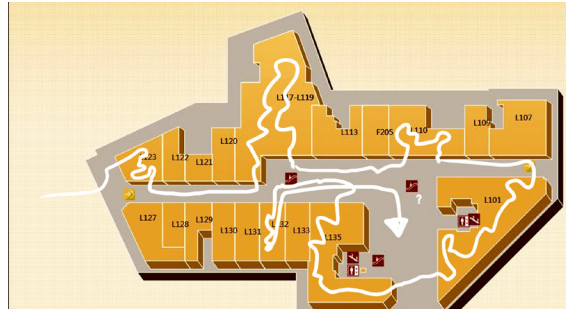
Real world observation and interview

Scenario 1 Observation scenario
Elderly disabled single targeted shopper
Age: about 70, Gender: male
Aim: repair or buy a new phone
Problem: don't familiar with both the mall and mobile phone. It takes more energy and time to find the store.

Fundamental requirement:
He needs an intuitive and effective navigation to help him find the store corresponding to his mobile phone, to ask the salesperson.

Scenario 2 My personal experience
Young type-based targeted shopper
Age: 25, Gender: male
Aim: buy a new backpack
Problem: The types of bags in different brand stores are few and scattered. And lunch was crowded, he couldn't find his favorite restaurant in time.

Fundamental requirement:
He needs more accurate route guidance to help him find the backpack he may like. Or find a suitable restaurant. Its implementation should be the shortest route or more reasonable sequence planning.

Scenario 3 An interview with a browser
Middle-aged interest-based browser
Age: 50, Gender: female
Aim: hanging out to find her insterested product or other things
Problem: Sometimes she encounters the change of shopping mall's layout, and she thinks she missed some interesting things in the mall.

Fundamental requirement:
She needs a smart navigation that updates every day to keep up with the trend. It should be in line with the layout changes of shopping malls and market trends. For example, recommend the recent hot spots stores.

Define
Insights & opportunities from user research

Insights:

From the first observation, I found that not everyone comes to buy & find goods. They may want clerks to provide better services or other different things. Especially for some people who may not have a clear understanding of goods for various reasons.

From my personal experience, I am very clear that what I need most is the shortest time, with the nearest distance, see the most backpacks and choose what I want.

From the interview of a browser, I found that they not only care about the product itself, but also experience the culture and trend behind it.

Opportunities:

The potential design opportunity is navigation should first be able to identify the user's intention. If a person comes to the mall to repair or solve problems, the navigation in the form of recommended goods would not be effective because it isn't the real aim of the shopper.

Products can formulate different using modes for different types of users. In my case, it should be multi-stage "straight-line" guidance focusing on efficiency.

High synchronization between the navigation system and shopping malls is needed. Navigation can accurately reflect the trend changes of shopping malls.

Extended design criteria

1. Detect the shopper's real intention

2. Guide the shopper with a vague target to find the determined target

3. Different navigation use mode to provide well-directed help

4. Build an associated network of shopping malls and stores, then explore their strengths

Explanation

The navigation in line with the user's real intention is the premise of everything.

Sometimes users themselves are not very clear about their real target, the navigation provides accurate help on the premise that users provide limited information.

In my case, the shortest route mode is most suitable, so there will be other more suitable modes for users with other needs. Providing users with the correct service mode directly affects the user experience.

Like the example of the browser and the Jin Tang shopping mall mentioned earlier. Shoppers may miss areas of interest. After integrating the information of the shopping mall, It is easy to show some aspects of the mall to people who will be interested in it.

Current product analysis

Navigation app: google map
Strength: Easy to find how to arrive at a place, such as a new shopping mall.
Weakness: Hard to shows what is inside the shopping mall, cannot provide enough help for shopping itself.

Signage
Strength: It provides specific direction and distance.
Weakness: Sometimes it can't see clearly, such as dim vision, or the influence of surrounding lights.

Navigation equipment
Strength: The information provided is more comprehensive than signage.
Weakness: There might be obstacles for some people. When they see these machines, they may instinctively resist using them.
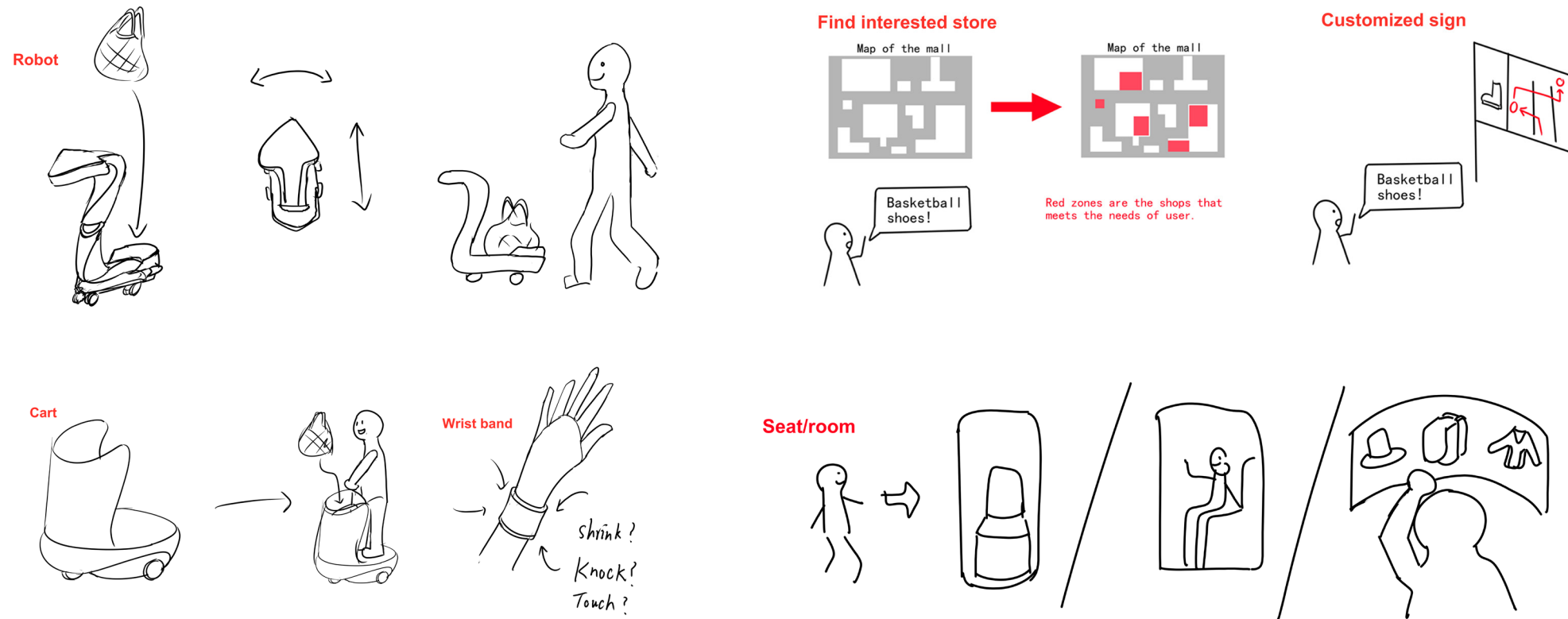

Preliminary design orientation
Depending on the design criteria developed from the research, The new navigation system needs to pay more attention to its systematic and functional aspects. There is no big demand for the corresponding appearance and shape. And it still needs to meet the basic ergonomic standards. For example, some disabled or elderly people may have some obstacles to use.

Define & Develop

Preliminary Brainstorming & Ideation

Robot

Cart

Wrist band

shrink?
Knock?
Touch?

Find interested store

Map of the mall

Map of the mall

Basketball
shoes!

Red zones are the shops that
meets the needs of user.

Customized sign

Basketball
shoes!

Seat/room

Narrow the scope
Wearable device is the main design carrier

The help of public facilities to people is not stable, because it's hard to exactly fit the user's intention. It is more general, so that difficult to provide targeted services.

Mobile phones may cause distraction when shopping, It makes shoppers ignore the potential goods or interest facilities in the mall.
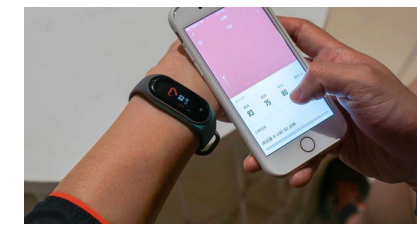
The function of wearable devices is more pure and simple, which is more suitable for going out than mobile phones.

Prototyping 1

Navigation wrist band

Producing tactile feeling to guide the target or potential interest thing. The product feels like a bracelet or a watch, so it won't cause a lot of carrying a burden.

When the user perceived the tactile feeling, they can see the arrow image, to judge the direction of the next step.

Tap with a stick to simulate tactile sensation. It is not clear enough, Shaking of electric bracelet might be better.

User feedback

Type-based targeted shopper
·It's very annoying when knocking the wrist.
·Tactile is not that clear to point out the correct direction.

Interest-based browser
·Confused about how to use it.
·Nothing to remind if she arrived at the interesting place.

Standard evaluation

Criteria key words	Grade(0-5)
Real Intention	3
Vague→Determined	1
Different Mode	4
Associated network	4

In terms of the user's needs and functions, it basically meets the user's needs. However, in practical use, through the user's feedback, it is not concise enough, which may confuse the user.

Develop

Prototyping 2

Adding the navigation function to the bag for shopping. Many people have the habit of taking bags when shopping, so putting the navigation on the bag doesn't add extra burden, and it doesn't need to be held like a mobile phone. In this test, I made two types of bags, one is a waist bag and the other is a women bag.

Navigation waist bag

A simple bag made of cardboard, and an iPad to simulate the screen. The iPad is just easy to test, which is not required.
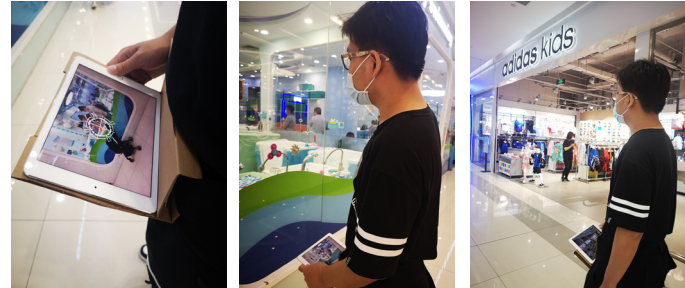
One test is to see the screen to find a store for children to take a shower. And the other one is to find a store that sells kids' clothes.

Another prototyping with women bag

When carrying the bag, it's flashed, she is aware of some interesting things nearby. After she opens the bag, a screen appears.

After seeing the screen, she noticed that there are two trendy clothes with a natural theme nearby.

Circle and crosshair in the screen

The screen shows the images of the specific recommended scenario and points out the relevant location of the product or any interesting thing. Provide different services according to different types of shoppers. For example, the white crosshair is for goods, the blue crosshair is for interesting things.

User feedback

Type-based targeted shopper

· Looking at the screen once may not be able to remember the information completely, and it also brings a little burden.
·May repeatedly look at the screen again.

Interest-based browser

·There are still some additional operations in use, which are not simple enough.
·Happier when they look at the screen to find the target and reach it.

Standard evaluation

Criteria key words	Grade(0-5)
Real Intention	5
Vague→Determined	3
Different Mode	4
Associated network	4

This prototype can find the target more accurately because it provides an image of the destination. However, according to the test results, it will increase the amount of information received by users. It's a burden for some people. Therefore, it is necessary to reduce the amount of operation on the premise of preserving accuracy.

Develop

Organized feedback
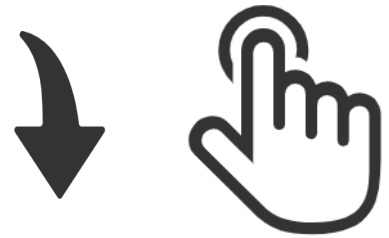
Fewer operations

Fewer thinking

Improvement points

1. Removing the vibration of the wristband because of bad feedback.

2. Removing the sceen shows target, replace with simpler lights.

3. Simplify from the actual actions of users. Users only need to consider three points: go forward, turn left and turn right.

Straight & turning

Redesign sketches

The product can be installed on the bag or on the hand, chest, and other positions. For example, it can be used as a watch or decorate badge.

Waist bag for targeted shopper: find a seat to have a rest

Women bag for browser: find a advertisement with trendy clothing

NOTES: both of them need to open an app and speak the target at first.

Finial prototyping

How to make?

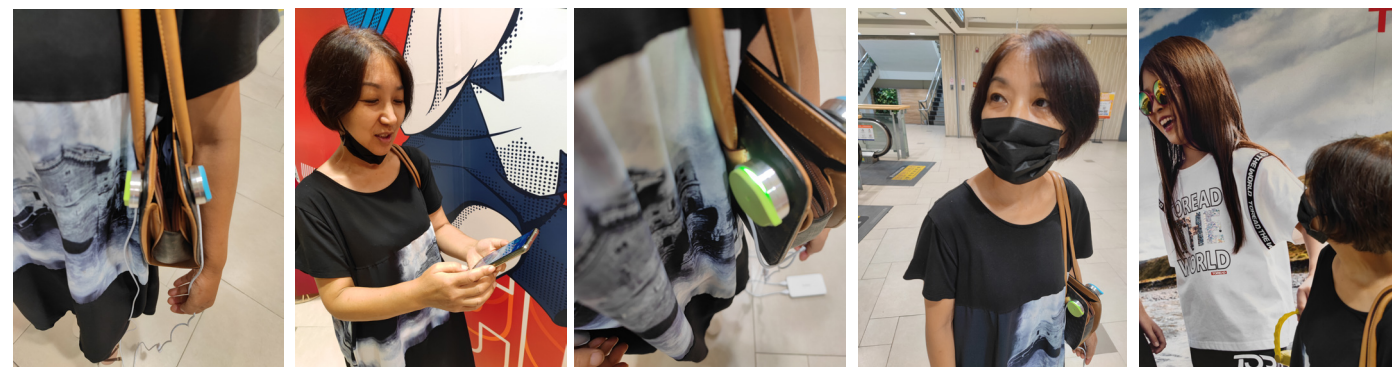The switchable small bulb is simply packaged to simulate the automatic pathfinding badge. Stick it with double-sided adhesive tape, and use the switch to control the left or right lights respectively.

Other using mode

Be a Watch or on small bags.

New improvement points
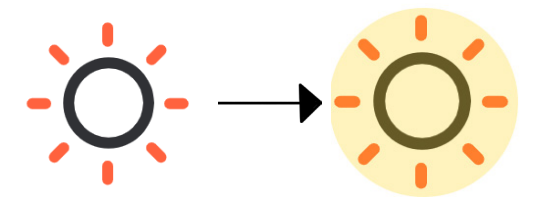
The brightness of the light is not conspicuous, it still needs to be strengthened under the strong light in the mall.

Deliver
Technologies and how they embodied in practical application

Solving inconspicuous problems:

1. Enhance the brightness of the light same as the last page.
2. The light is upward, making it easier for the user's eyes to find.
3. Add a rotating shaft to make the product itself movable and become a special "light source".

Fast and stable network

Faster transmission speed with stronger signals, to ensure the real-time transmission of signals in shopping malls. So signals can be transmitted in the WiFi erected in the mall, and each store's own WiFi can be used as a sign to transmit signals and establish coordinate points for shoppers.

5G technology is also another good choice. it has wide area coverage, high capacity, low power consumption, and low delay.

A Practical example

A targeted shopper only need to go straight and turn left or right 4 times. When he arrives at the blue circle area(where he need to turn), the relevent light will light up and give him feedback.

楼梯
电梯
自动扶梯

钻石世家
帕帕珍珠
小马哥 乌托邦 优衣百汇
鸿记
当打牛肉火锅店
海底捞 茶餐厅
萨贝尔
当打牛肉火锅店
满记
燕窝公馆 千羽寿司
村镇银行 千福粥点
私人订制 华为 伯尔曼西餐厅

Ergonomics consideration

Core aim: Easy to see the product
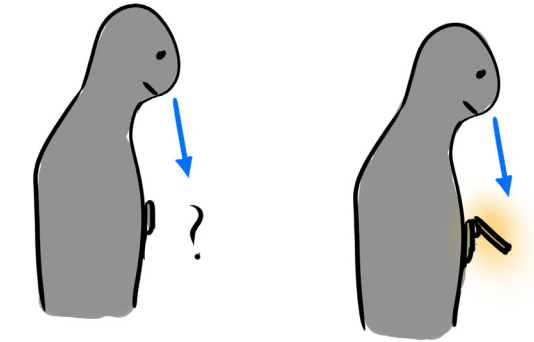
1. Users usually need to lower their heads or look down their eyes to notice the changes of product.

Upper shaft

Lower shaft
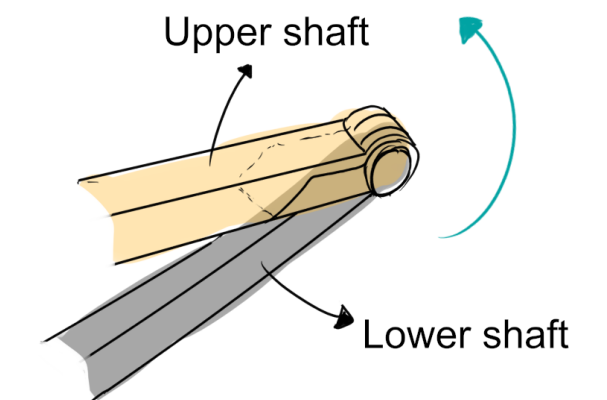
2. The rotation of the product makes it easier for users to detect, so add a movable shaft.

Preparation before using

1. Necessary preparations with the host server. Three stakeholders are required to provide data on a regular basis.

2. Magnet clip is needed. For the thinner carrier, the magnet can be disassembled for use. For thicker ones can be closed as clips for better stability.

During the using process

1. Gyroscope is needed, it is used to balance the direction and determine whether a left turn or a right turn is provided based on the reference direction.

2. And the product needs to update the information immediately. It transmits with the server, calculates a more appropriate scheme in real-time, and provides feeds back to the user through product deformation and lighting in time.

After finding the target

1. The product determines the next target according to the user's previous preferences and starts to indicate the direction again.

2. Shut down the app by clicking the turnoff button on the cellphone or turn off the switch. If five times that the user doesn't follow the recommendation of the product, it will shut down automatically.

Deliver
Rendering

Inactive status

Rotating shaft

Main area

Magnet clip to fix
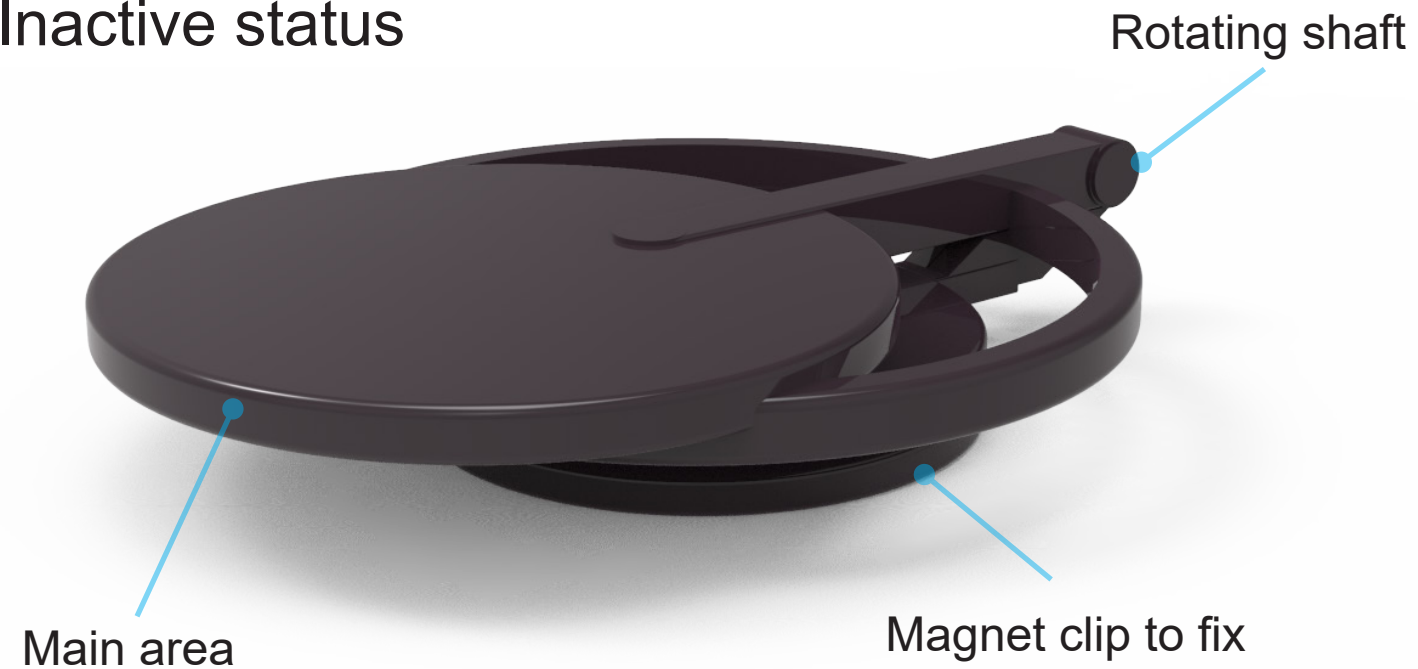
Product parameters
Size: 4.15cm x 2.88cm x1.05cm   Weight: 94 g
Fixed ring radius: 1.39cm/1.44cm Main area radius: 1.36cm
Magnet thickness: 0.33 cm x2   Main product thickness: 0.33cm

Activate status

Left light is yellow color, right light is wathet blue color, to make it easier to distinguish.

Expanded structure

Light is generated after active the product

Using example of a pair of products

One left and one right represents two directions. The fixed angle can be adjusted according to the medium it fixed, such as bag, clothes, trousers.

The light is emitted in an upward circular arc, which is easier to be noticed.

Look down and notice the right product is activated, then turn right.
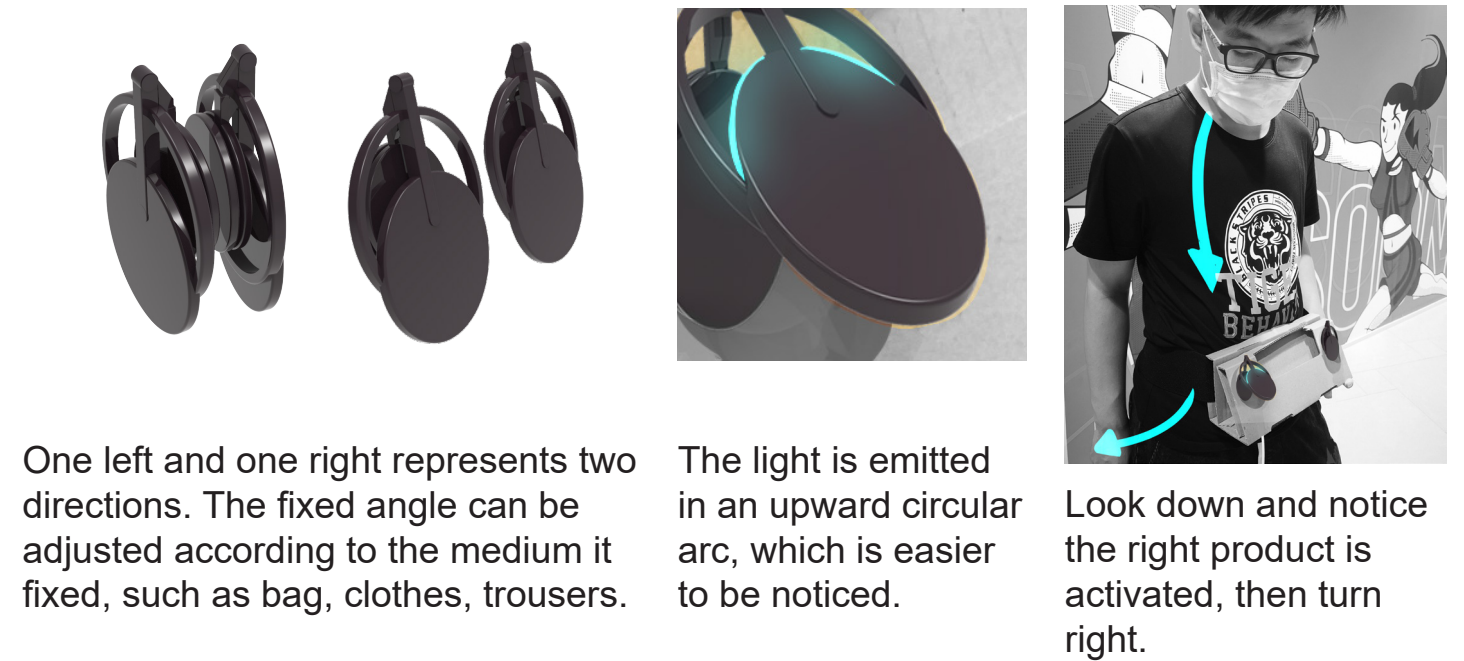
Decomposed designing & parts references

LED lights

Main board

Switch

Rotating shaft

Fixture

Magnet

Gyroscope

Stable fixed ring

Main chassis

Charging port & Battery
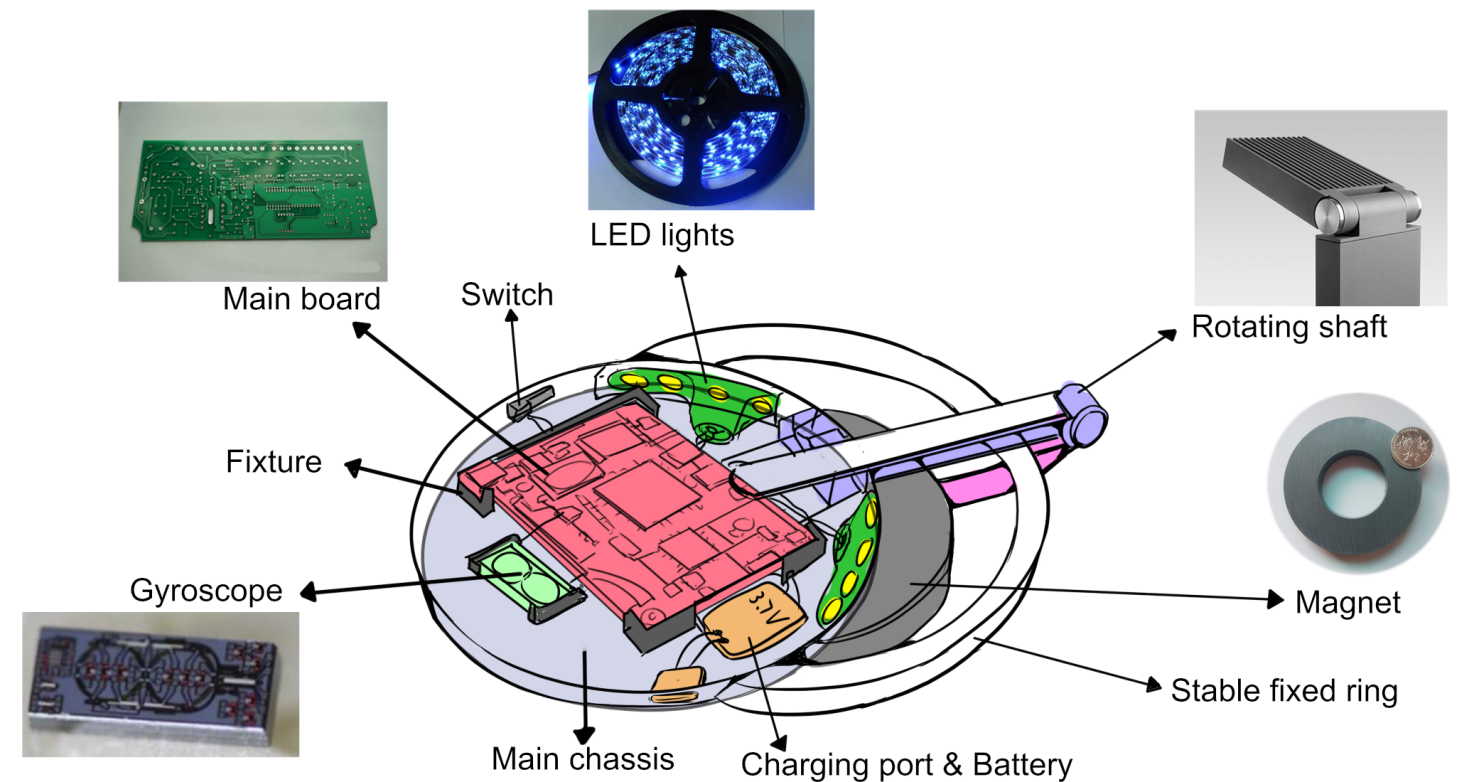
Internal structure details:
the charging port is connected to the battery on the left side, the same position of the right side is a switch. Most of the area in the center of the disc is the chip and the sensor receiving the wireless network signal. The end is connected to the rotating shaft. The mainboard is connected to the gyroscope. Two groups of LED lights are on the inner side so that the user can see the light easily.

Deliver
General system map and scenario of how it help stakeholders

Benefits

Improve the purchase rate and the status of mall in shopper's mind.

Profits and invisible advertising benefits

More efficiently guide customers who may be interested in this shop.

Easier to find the target goods or places of interest base on the shopper type.

Mall → Upload indoor environment and advertisement information of the mall

Shop → Upload information of the characteristics of commoditiesand shop environment

Host system

Collect, classification, and storage information uploaded by shopping malls and stores.

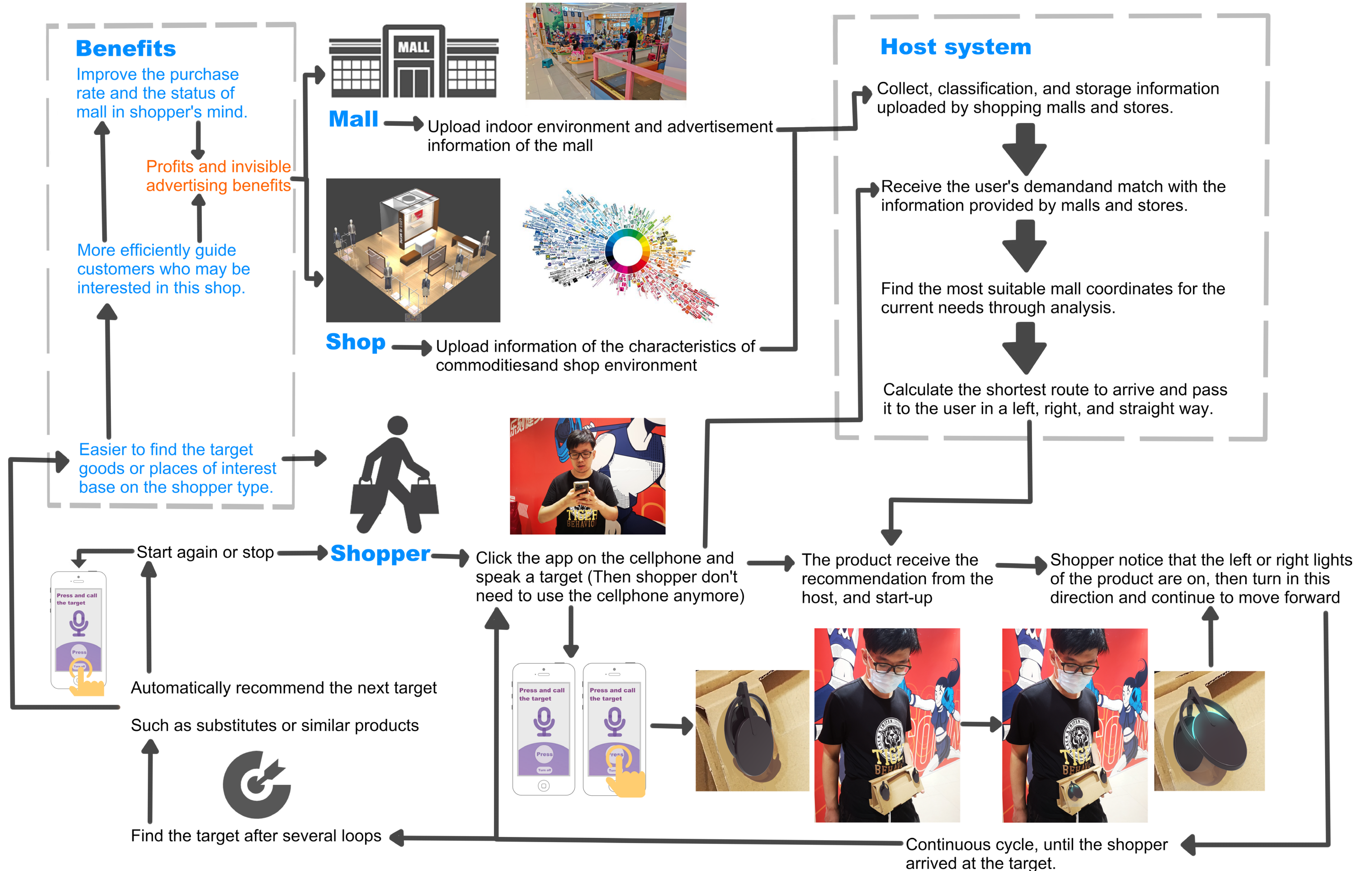Receive the user's demandand match with the information provided by malls and stores.

Find the most suitable mall coordinates for the current needs through analysis.

Calculate the shortest route to arrive and pass it to the user in a left, right, and straight way.

Start again or stop

Shopper → Click the app on the cellphone and speak a target (Then shopper don't need to use the cellphone anymore)

The product receive the recommendation from the host, and start-up

Shopper notice that the left or right lights of the product are on, then turn in this direction and continue to move forward

Automatically recommend the next target

Such as substitutes or similar products

Find the target after several loops

Continuous cycle, until the shopper arrived at the target.

Summary & Reflection

What is the biggest gain for me from this work is I have a new understanding of the definition of a product. The establishment of indicators in many places can not be too general and direct, such as simple and fast, which cannot provide any substantive help. After re-establishing the criteria and standards, I can see that the direction is clearers. However, during the actual test, I found that these refined criteria still cannot comprehensively summarize all the situations. For example, these criteria are more reflected in the systematic and functionality of the product. While in the actual prototype test, users' feedback is more about problems in information transmission such as unclear messages. Even if the products with good performance in these criteria, I can still find the dissatisfaction of users in other aspects after testing. This may be because my standard setting is still not comprehensive enough. Therefore, in the next step, I will not focus on specific outputs, but continue to think about how to set up a specific and reasonable definition of products in the early stage.

For the product itself, there is still huge research space for its wearing mode. What I finally showed was a pattern similar to the pendant on the market, which was hung on the bag or body. But I've also considered other ways, such as a pair of wristbands, but it's unnecessary to wear it on both hands. Even if we consider the future design, flight devices such as UAVs may also be a good way to provide navigation support.

Another thing is how to further simplify operations, such as canceling mobile phone input information. Perhaps it can be achieved by taking a supporting thing like a microphone or necklace to receive the sound. However, it is not as convenient to use multiple products together at the same time just for navigation. If there are more integrated products that can simply input information and provide navigation, it will be a more suitable choice.

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