

Exploring Intuitive Ways To Recognize Escalators' Directions

Fei Gao

Depaul University

April ~ June, 2016

Part 1	4
Identifying The Need - First Round Observation	4
Observation	5
The Need	5
Logistics	7
The public space	7
The recording techniques	7
Reflections	8
Learnings from observation	8
Concepts	8
Identifying needs and opportunities	8
Dimensionality	8
Correspondence	9
Inter-action	9
Opportunity	10
Part 2	11
Thick Description – Second Round Observation	11
Observation Description	12
Excerpt	12
Explain a preliminary question to address the need	13
Behaviors	13
The two behavior modes	14
The Mover	14
The Judger	14
Rethinking of correspondence/inter-action	15
Correspondence	15
Inter-action	15
A Strange phenomenon	15
The phenomenon	16
Speculation	17
Sequential diagram	18
Reflection	18
Part 3	21
Design Plan	21
Schedule	22
Personas	22
Storyboard	23
Requirements	24
Part 4	25
Prototype and Final Report	25
Abstract	26
Correspondence and Interaction	26
The reasons why people make mistakes	26

Solutions	27
Final Design	27
Design Logistics.....	27
Constraints and problems.....	29
Prototype	29
Evaluation	32
Conclusion and Further Work.....	34
Conclusion	34
Further Work.....	34
Reflection.....	35

Part 1

Identifying The Need - First Round Observation

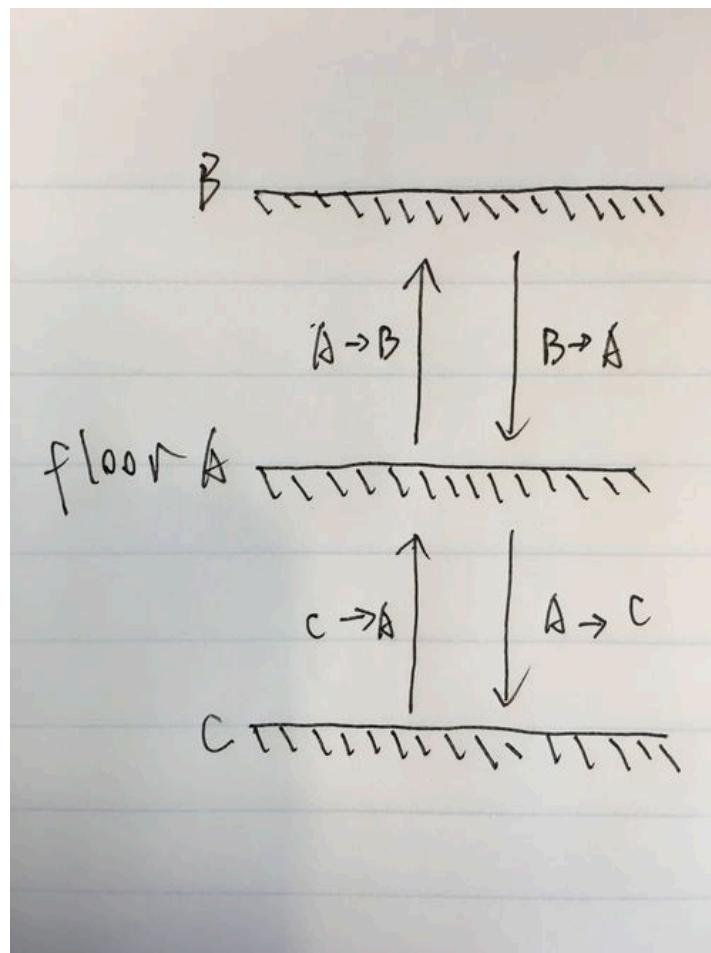
Observation

Water Tower Place is a large modern shopping mall located in the central area of Chicago, a lot of people shop here every day and every minute. it has 8 floors, and on each floor there are numerous shops. What I observed is that:

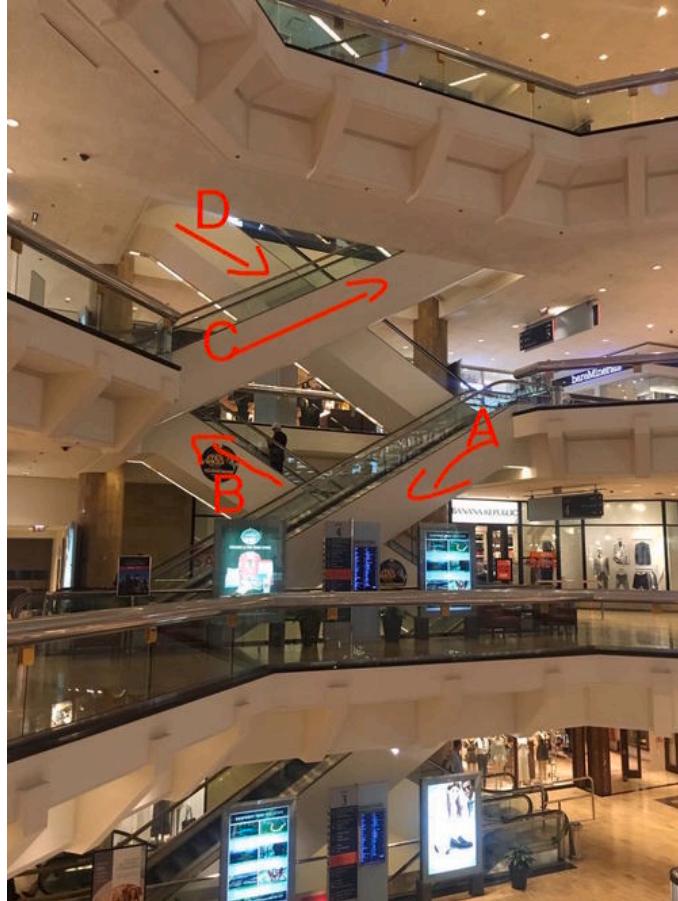
- when people come out of some shops and want to go upper/lower floor, because of the building structure they can not recognize the direction of the escalators, they have to try their luck and go more steps to another escalator if they made a mistake.
- some people who are absent-minded or chatting happily with friends will occasionally go to the wrong escalator until they are about to take it and see its direction.

The Need

There are four directions of the escalators on each floor: this floor to next floor, next floor to this floor, previous floor to this floor, this floor to previous floor. As demonstrated by the image below.



In the Water Tower Place, the four directions are placed closely, which makes it convenient for shoppers to go to their destinations directly.



However, there is a problem in recognizing which direction the escalator is going. Imagine you want to go to the upper floor, and you are wondering which escalator you should take, you look at the escalators from this direction:



You can see two escalators connected with the upper floor, but how can you figure out which one goes to the upper floor from your floor and which goes from upper floor to your floor? From this direction, you can't see the movement of the escalators, you will be at lost and the only thing you can do is to guess and try your luck.

Logistics

The public space

In my two observations, there are much more people in the Water Tower Place than in the gym. With a large number of people, I can get more information and enough feedback on how people interact with the escalators, that's why I noticed some people had difficulty in recognizing the directions of different escalators after watching for some time. However, when I want to eliminate all the social aspects, I had to wait for the moment when people are all gone or there's nobody on the escalators, so the second time I went to the shopping mall, I had to choose an early morning when few people are there.

On the contrary, there are not many people in the gym. In fact, I spent one whole night (because there will be more people coming to gym after work) staying in the gym and only 3 people used that equipment. In a public place like this, you will even feel uncomfortable when taking photos of others. One of the main advantages of this kind of place is you can do experiment with the equipment yourself more often.

A public place with more people will probably provide the richest source for observation, meanwhile, the social pressure for observation may also be the lowest because there are many people around. But it won't be easy if you want to observe what it will be like when there are fewer people.

The recording techniques

Personally I'm not good at drawing, I'm not a quick thinker either, so I would prefer collecting information with photos and videos and analyze them later.

Photos are more helpful for recording the true environment, they provide great details for analysis. Videos are essential if you want record moving objects. When sketching, we need to draw the people and the environment personally, it is more likely that we'll notice something that are not so obvious.

Thus in terms of enlightening, perhaps sketches would be the best choice. I didn't found photos or videos to be very enlightening.

Reflections

Learnings from observation

Even in the real 3D world, not everything happens in 3D, many things like the movement of an object happens in a 2D surface. Besides, even when something happens in 3D, it appears to be 2D in human eyes when looking from a certain direction. Ignoring such a transform would often result in defective design.

Concepts

The concept of "correspondence" really helps a lot, as well as the "transducer" and "interaction". With these concepts, I realized that interaction happens every where and in various forms.

Take this observation as an example, identifying the correspondence and inter-action helps to set the boundary of the action, and keeps me focusing on the people, the floor, and the escalator. Since transducer is the thing that makes action happens, I was thinking that if there were interactions, there would probably be some problems with the transducers. Thus even though I came up with several solutions when I was considering the opportunities, such as giving instructions to people (which will probably expand the scope of correspondence or inter-action), or change the whole building structure of the mall (impossible, though, will change the identified correspondence and probably cause new inter-actions), I think doing something about the transducer -- the escalator, is a much more efficient and safer way to solve the problem.

Identifying needs and opportunities

The need for improving the escalators is not easy to identify. As stated above, the problem only occurs at a certain location of the floor, I noticed the need after walking around the whole mall for several times. Besides, it was also difficult to identify whether the shoppers had encountered the problem of recognizing the direction of the escalators. I had to keep close on the them and see whether they would finally take the escalator they were heading for.

Dimensionality

I realized that in real world interaction, dimensionality is a crucial factor to consider. While the

things I observed are both in 3D, the inter-actions happened in 2D.

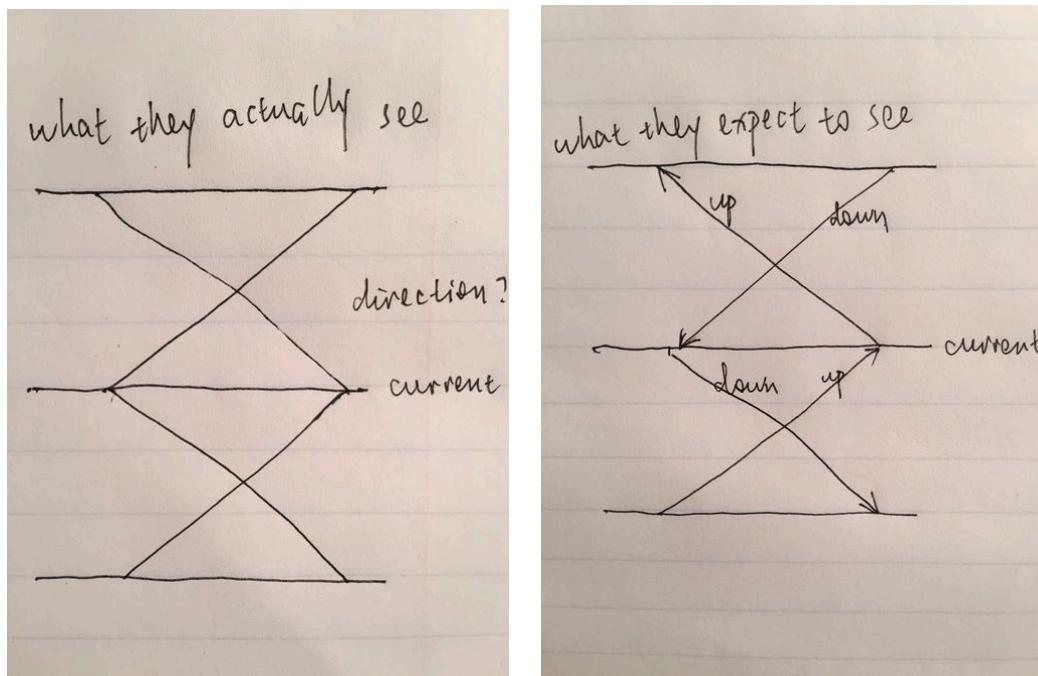
In this observation, there is a certain position from where the movement of the escalators are invisible, which transforms the 3D escalators to a 2D shape, the missing dimensionality contains important information for people to judge, thus when the 3D attribute disappears, there is no clue can be used to make judgements and people get confused. We should always be aware that there are dimension conversion in real world, and when 3D transforms to 2D, there will be a significant loss of information.

Correspondence

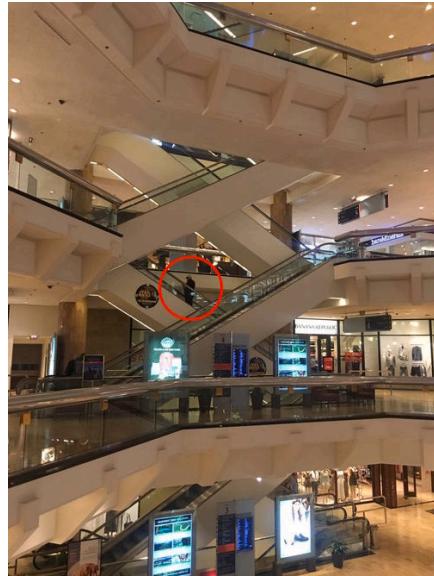
In this situation, the correspondence is the attraction between the shopper and his destination floor, the escalators serve as passive transducers.

Inter-action

Although the escalators exist in 3D world, people make judgments in a 2D surface(the image below), the most disadvantage of 2D here is that people can not see the movement of the escalators, which is a 3D property, thus they have no idea which directions the escalators go. This is when the inter-action happens.



However, there are social aspects which would help people make decisions. Look at the picture below, there is a man taking an escalator going up, although you still can't see the movement of the escalators, you realize immediately the directions of the two escalators connected to the upper floor and which one you should take.



Opportunity

The shopping mall needs a solution to help shoppers recognize the directions of escalators easily.

Shopping malls like this should provide an indicator to show the movement of the escalator, the indicator could be lights, arrows, lines, etc. People should be able to see the indicator at any position, thus even though they still can't see the movement of the escalators, they still know which direction the escalators are moving forward. The indicator transforms the inter-action to correspondence.

Part 2

Thick Description – Second Round Observation

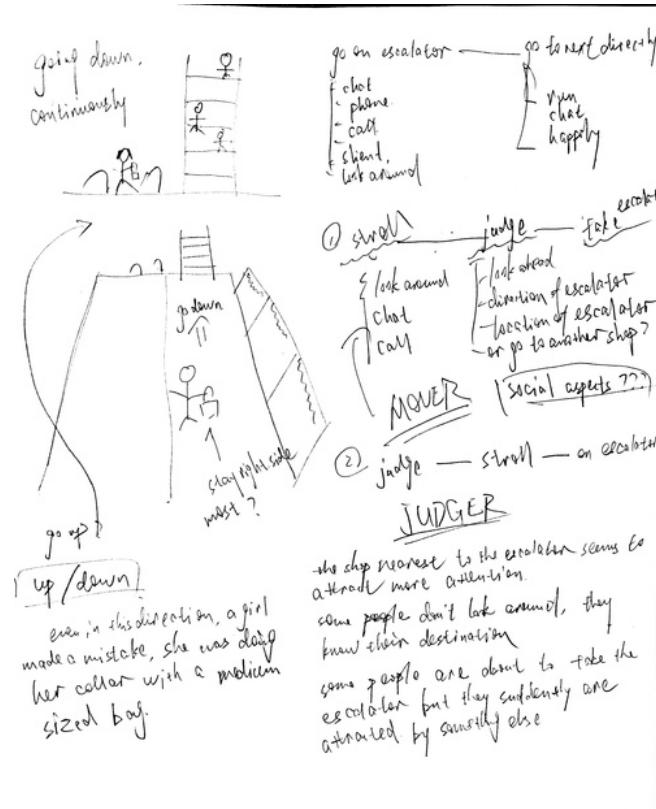
Observation Description

Escalators are now widely used in all kinds of buildings, while they help people go to upper/lower floor, it is sometimes difficult for people to recognize their directions (going up or going down). In the previous assignment, I've explained part of the reasons why they are not so user-friendly: in a certain location of the shopping mall, the 3D escalators will appear to be 2D, and the missing dimension contains the information of directions, which means that people at the certain location lacks information to judge which escalator should they go to. Having said that, a social aspect will certainly help users to identify the escalator directions: when there are other people on the escalators going up or down.

In this assignment, however, after more observations I've discovered that the problem is much more complicated than I've ever thought before. The correspondence and inter-action appears to be too limited in A1. The social aspect, in fact, has little help when identifying the direction. The dimension conversion is only one reason that people make mistakes. In this assignment, I'll explain these problems in detail.

The methods include thick descriptions about how people use escalators in real world, and horizontal and vertical slicing of the process.

Excerpt



Explain a preliminary question to address the need

To understand why people make mistakes when taking escalators, we need to answer this question first: why people go to Water Tower Place (shopping malls)? Needless to say, the main reason to go to shopping malls is to buy things.

But is that true? I spent quite a long time in water tower place watching people come and go, I found there is definitely a deeper reason for shopping, that is people need to social with friends, and shopping malls provide a good environment for relaxed social activities. I would claim this because most people in shopping malls are with friends, they chat, drink coffee together, and laugh (isn't this the most common situation?), compared to the time they spent in buying clothes or other things, they spent much more time in their social interaction (also demonstrated in the sequential diagram). This is not to say buying things is not the reason to go to malls.

You can still find a lot of people, who are by themselves, go from shops to shops looking for a T-shirt. But these guys also have other reasons to come to the shopping mall, perhaps they really want to buy something, or perhaps they just want to relax. In this case, they're actually interacting (this "interact" has similar meaning of "communicate", it's not the same as the concept of "interaction") with themselves.

Knowing such kind of social aspects is important, because it means that when people make mistakes in inferring the escalators' directions, they're not under the context of "want to buy something", instead, they are under the context of "social with friends" or "interact with themselves".

Behaviors

After clarifying the preliminary question, describing customers' behaviors will help us better understand their contexts. When people go around malls and look for escalators, there are several behaviors they'll perform. While these behaviors are performed by almost everyone, different people have different focuses, based on this analysis, we'll define two kinds of behavior modes.

Interact with the environment: When people first enter the mall or are just out from a shop, they seldom go to the escalators directly even though they know where the escalators are and they want to head to the next floor. Instead, they'll look at other shops on their right or left side when they pass by, look at the goods from outside and decide whether or not they should go in. If there is not enough trigger for them to go into the shop, they'll just leave, look around again, search for another shop, and decide. If they found something interesting or are just interested in the shop, they'll stop and go into the shop and take a deep look, but this doesn't mean they'll buy something for sure. When they are looking around, they may also pay attention to other things, like the building, the environment of the mall, the people around them.

Interact with friends: Most of the people will be chatting with their friends, they talk about various topics such as rumors, news, films, etc. When they are looking around (as mentioned above), they'll also talk about the interesting things they've just found. Deciding whether they

should go to a shop is also topic. Some people go to malls by themselves, these people usually have a strong purpose such as buying a certain suitcase, take photos, get some coffee, etc. Although they will also look for interesting things and pay attention to their surroundings, they usually just have a simple look and will not change their routes. They have no friends to chat with, but it does not mean they are not doing anything, they will probably be thinking about if there are any suitcase shops on this floor, or whether this floor can provide a good view if they want to take a photo, or what they are going to do after they finish shopping.

Interact with escalators: If one is at the escalator of the 1st floor and is going to 3rd floor directly, without any stop at the 2nd floor, then this people won't have the trouble looking for the correct escalators, because once they get to the 2nd floor, another going-up escalator is just at their left hand. However, in other cases when customers just left a shop and want to go to the next floor, they will look for a cue to judge the direction of the escalators. Even if they are interacting with the environment or with friends, they'll stop, turn their eyes to the escalators, look at the people on the escalators or examine the movement of the escalators, then determine if there is a desired escalator in his sight.

The two behavior modes

Among the three actions discussed above, interacting with the environment is the thing that everybody in the shopping malls will do, and this action is carried out more unconsciously. However, when it comes to interacting with people or interacting with escalators, based on their priority, there are two different behavior modes, I define them as the Mover and the Judger.

The Mover

The first priority of the Movers is to interact with friends, they will not care much about how to choose the escalator. Even when they know they need go to the next floor, they do not look for cues until they are right at the escalator. The movers do not plan ahead because they are busy talking or doing other things. They are also easily distracted by the environment, once they saw something interesting, they'll probably stop going to the escalator and go to watch the thing that interests them. The Movers are often a group of people, however, if one person is doing something, e.g. thinking while he is walking, packing his bags, this person can be regarded as interacting with himself, thus he is also a Mover.

Obviously, Movers tend to make mistakes in choosing the correct escalators. In fact, they do not choose, they just run into any escalators and see if they are in the right direction. They do not pay any attention to the dimension conversion or the social aspects that indicate the escalators' directions, even when there are many people on the escalator which clearly shows which direction the escalator is going, Movers will still make mistakes because they are either interacting with other people or interacting with themselves.

The Judger

The Judgers concern more on interacting with the escalators than interacting with people. They look for every cue to judge the correct location of their escalators. It does not mean that they'll do

this with first priority every time, instead, they'll probably look up, watch the escalators for seconds, then infer how to get to the right one. After doing this, they'll return to what they were just doing or interact with the environment, but head for the escalator he had just determined to take.

It's true that people who go to malls alone are probably in the Judger mode when choosing escalators, but even among those who are with friends, there will probably be someone who act as a Judger when others being Movers.

Rethinking of correspondence/inter-action

In my previous assignment, I've claimed that "the correspondence is the attraction between the shopper and his destination floor, the escalators serve as passive transducers", and inter-action happens when "people can not see the movement of the escalators, which is a 3D property, thus they have no idea which directions the escalators go".

However, after defining the Mover and the Judger, we know that people go to shopping malls usually with friends, so the subject of correspondence should be a group of people, rather than single ones. As for the dimension conversion of escalators and how people use social aspects to make judgements, we can also see that only the Judgers will be influenced by these two factors, they'll get annoyed if they can't see the movement of the escalators, and they'll infer the correct escalator based on the people's movement on the escalators. However, on the other hand, these two factors have nothing to do with the Movers, because the Movers seldom pay attention!

Thus, we need to correct the correspondence and inter-action as the following:

Correspondence

the correspondence is the attraction between the shoppers and their destination floor, the escalators serve as passive transducers.

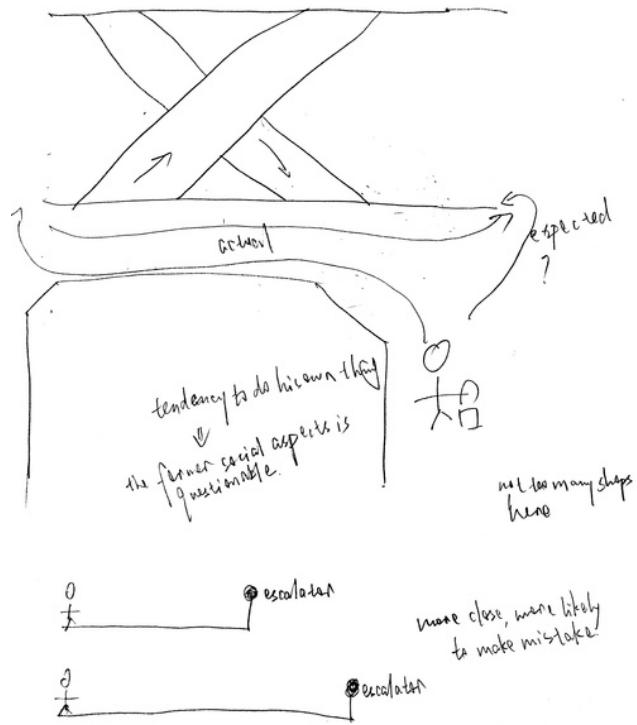
Inter-action

For Movers: when they are so immersed in talking with friends, they'll forget looking for their escalators.

For Judgers: people can not see the movement of the escalators, which is a 3D property, thus they have no idea which directions the escalators go.

Similarly, some potential design solutions, such as giving indicators to show the escalators' directions (which is demonstrated in the storyboard in the previous assignment), will not be useful at all for Movers. An embodied solution is definitely needed and we should come up with some ideas that require no proactive attentions.

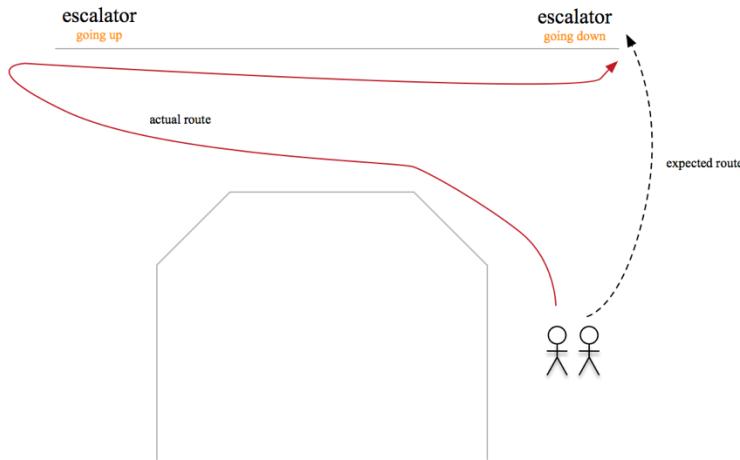
A Strange phenomenon



The phenomenon

The picture below shows the plan of one floor curtly in water tower place. The escalators are distributed on both the left (going up) and the right side (going down). Imagine there are two Movers wanting to go to the lower floor, they start from the location shown in the picture, they are talking happily. Which escalator will they go to first?

Usually, we may think that these two guys will just go to the escalator on their right hand directly because it is going down. Even if they can't see and don't infer the direction of the escalator, this escalator is also the nearer to them, they should at least have a look and see if they should take this escalator. It seems they have plenty of reasons to head for this escalator.



However, this is not always true. Some people I observed didn't go to the escalator on the right side directly, instead, they went to the escalator on the left side first, which was going up, when they were at the escalator, they realized this was not their direction, then they went back to the escalator on the right side (as shown in the picture, the red line is the route they actually went through)!

This is really a strange phenomenon that you can never imagine without observing on the scene. You'll also be surprised how frequently this happens!

Speculation

I've no idea why this phenomenon happens, but obviously this is quite important to the final design solution. It clearly shows that anything requiring proactive attentions will fail to attract people.

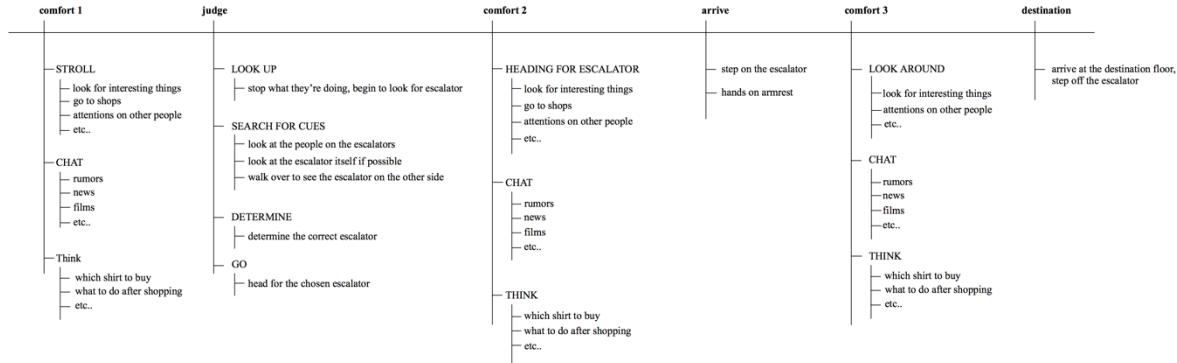
I have two speculations:

People may tend to maintain their current mode: as demonstrated by the picture above, the two movers' current mode consists of "walking and talking", if they go to the nearest escalator and take it to the lower floor, their mode will be changed to "standing and talking", they need to stop walking to stand, there is a small interrupt during the process.

They enjoy the talking and want to talk more: this occurs usually when the two Movers are interacting with each other and almost ignore everything else, including the environment. They may probably have noticed there is a nearer escalator, but subconsciously they want to maintain the talking and hang around for more time instead of going to their destination directly.

Although there are two people included in this example, in fact, even those who are alone will also have the same experience. I observed one man who was packing his bag while walking towards the escalators, he was so focused on his own stuffs that it seems he was not paying any attention to his surroundings, and finally he chose the left side escalator prior to the right one.

Sequential diagram



Reflection

How did the design ethnography approach of A2 differ from A1?

In A2, the observation is in detail. I watched the whole process of people using the escalators, from strolling the mall, looking for escalators and finally reach their destination floor.

In A1, the observation is quite general. I went to the shopping mall, watched people using the escalator and identified the problem. I only observed the result, that is, people make mistakes in recognizing the directions of the escalators, but I only tried to explain the problem in a rational way, which is mainly the dimension conversion. I only noticed that losing information in the real world would result in problems, but I never realized that the lost information may be useless for people to make judgements, and there are more subjective reasons that people make mistakes.

In A2, the observation is in detail, I mainly focused on observing how people actually used the escalators -- from strolling the mall, looking for escalators to finally reach their destination floor -- to find out the reasons why they make mistakes instead of trying to explain it rationally. I found two kinds of people in the shopping mall, the Movers and the Judgers, whose behavior modes differ from each other, and thus the possibilities of making mistakes in judging the escalators directions of the two are also different. I also observed a strange phenomenon which can hardly be explained by any rational thinking.

In conclusion, in A1, I only identified the problem and tried to solve it theoretically while in A2 I tried to explain it empirically.

How did approaching A2 differ from approaching A1

In A1, I used cell phone to take photos and videos of the scene, because the main task is to identify the problem, for me, photos and videos can reflect what I saw in the shopping mall and

help me analysis afterwards. I only tried to identify the problem by observing how many people made mistakes, after I saw one man encountered the problem, I just simply ignore him and wait for another people to make the same mistake. I only did the analysis theoretically with my own experience and didn't consider the different process that different people went through.

In A2, I mainly used sketches because this time I was trying to record the actual process that people went through and dig out the reason behind the phenomenon, sketches and descriptions are convenient to note down such process and your thinking during the observation, while in photos there is only a picture and you'll probably forget what you've found and what you were thinking at that time. Also, unlike in A1, I observed the whole process of the customers from shopping, strolling, chatting, to going to escalators. I even followed some customers and tried to understand what they were actually doing, and I changed many positions in the shopping mall to conduct my observations.

The most challenging part of the observational portion

I didn't encounter any specific challenges during my observation. There is enough traffic in the mall, and there are really a lot of people who made mistakes in recognizing their escalators, it's also quite convenient and interesting to sit there and watch people to make mistakes. The only challenge for me is that it's almost impossible to identify the users' mental process. As I've explained, after observing more carefully in this assignment, I think people make such mistakes not only because of the design of the escalators, but also some psychological or social reasons (the social aspects appear to be too strong according to what I've observed), which the customers themselves can't even understand, it looks like there is something that's encouraging people to make such mistakes. However, to observe the psychological and social reason is almost impossible for me.

How easy or hard to tease out the sequencing

It is not too difficult, but because of the nature of my topic, the process of looking for an escalator is actually really short, it may only last for several seconds, you have to think about it in micro level and break down all the actions the users take.

Besides, while customers may spend a whole afternoon in the shopping mall, they are actually just repeating some simple actions -- talk, walk, look around, go to shops -- again and again. This is especially true in terms of looking for escalators, that's why I found there are three "comfort" stages in my sequence diagram, they are keeping comforting themselves until they realize they should do another thing, upon finishing that thing, they just return comforting themselves again.

Gaps

The first time I went to the shopping mall, I identified the two kinds of customers and the actions they will perform: interact with people, interact with the environment, interact with the escalators. But when I was trying to identify the actual order when making the diagram, I think I may miss something if I just prioritize these actions. So I went to the mall again and that's when I found that the action of "interact with people" (in the diagram I transcribed as "comfort") is actually the main thing that people do in shopping malls, that's why you can see there are

actually three stages of "comfort" during the process of looking for an escalator.

That said, I must admit that this diagram demonstrates only the Judgers' process, and different Judgers have different orders to do all the actions. The Movers will probably only have a "comfort" action throughout the whole process.

How is the sequential diagram helpful

It definitely helps to better understand the whole process that customers go through. Through the diagram, we can clearly see that the action of looking for an eacalator is really not a final action, instead, it's only a small interruption which happens when users keep themselves in a comfort zone. Understanding users' comfort zones and how willing they are to keep it is just as important as studying the mistakes they make when inferring the correct escalators.

Part 3

Design Plan

In A1, I observed people often made mistakes when recognizing the directions of escalators in Water Tower Place, I also pointed out that this happens mainly because in a certain location of the shopping mall, the 3D escalators will appear to be 2D, and the missing dimension contains the information of directions, people have no clue to infer which escalators they should head for.

However, in A2, I found that the main reason that people make mistakes is not because of the loss of dimensions, instead, it's because they are always socializing with friends and they actually didn't pay attention to judge the correct escalator.

While the conclusion in A1 still works, the final design should be focused on how to deal with this social property.

Schedule

Sequence	Estimated Dates	Methods	Resources	Notes and Comments
1	Week 1: 5/22 - 5/23	personas	—	Use personas to model the two behavior modes identified in A2: the Mover, the Judger. Revisit Water Tower Place and find the two kinds of customers to base the personas
2	Week 1: 5/25	Additional round of observation	—	Mainly observe the building structure of Water Tower Place, identify the difference of escalators between different floors
3	Week 1: 5/24 - 5/26	Storyboarding	—	Use storyboard to illustrate the entire process people experience when looking for escalators
4	Week 1: 5/25 - 5/27	Requirements	—	Use to identify users' needs
5	Week 2: 5.27 - 6/2	Iteration 1: prototype and evaluation	cardboard, construction paper, pins, tapes, glue, scissors, knife	Use to rough out the physical model of solution, test the idea with friends, and find out potential chance to improve it
6	Week 3: 6/3 - 6/10	Iteration 2: prototype and final evaluation	—	Fine tune prototype, complete A4 final report

Personas

Persona 1:

Name: Kelly

Background:

Age: 20

Gender: Female

User role: Mover

Education: BS in Accounting

Familiarity with shopping malls: go to shopping malls at least twice a month

Frustrations and pain points:

Talking with friends is so interesting that she often forgets to look for escalators.

Narrative:

Kelly is an undergraduate student in Accounting. Like other peers, she loves fashion, she always goes shopping with her friends on weekends, they talk about assignments in school, new people they've met, and rumors about some celebrities. Kelly doesn't care too much about whether she could come by beautiful clothes, she just enjoys the time with her friends. When walking around the shopping malls, they often go to the wrong escalators, sometimes Kelly feels annoyed by this situation, but in other cases, it also seems interesting to make such a mistake with her friends.

Persona 2

Name: Brown

Age: 30

Gender: Male

User role: Judger

Education: BS in Marketing

Familiarity with shopping malls: only go to shopping malls when he wants to buy something

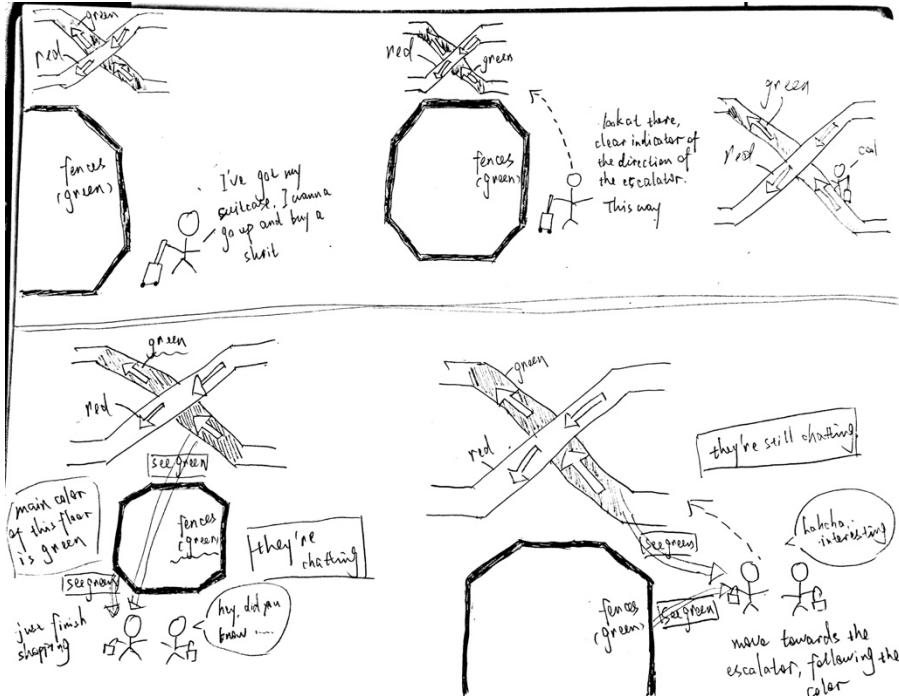
Frustrations and pain points:

Looking for the correct escalators often requires too much effort.

Narrative:

Brown works for a marketing department in a corporation. He has a tight schedule on weekdays and often travels to see different clients. He likes to hang out with friends when he has time. He doesn't often go to shopping malls unless he has to buy a new suit, or a new suitcase for certain business cases. When looking for a suitcase, he often searches for suitcase shops in the shopping mall and head for the shops directly. "I don't have a lot of time, I'll do it quick.". Sometimes Brown also finds it difficult to recognize the directions of escalators, he may have to walk extra ways so that he can judge which escalator he should take. He hopes there is a better way to recognize the escalators directions.

Storyboard



Requirements

- As a customer who will look for escalator actively, I want more obvious cues so that I can find out the directions easily.
- As a customer who will look for escalator actively, I want a way to find out the escalators going from my floor easily so that I don't have to spend many efforts distinguishing among others.
- As a customer who mainly chat with friends and walk around, I want a method to guide me to the correct escalator so that I don't have to look for it proactively.
- As a customer who mainly chat with friends and walk around I want to be prevented from making mistakes in looking for my escalator so that I won't walk extra ways to the correct one.

Part 4
Prototype and Final Report

Abstract

Escalators are common tools in shopping malls, while people use them quite frequently, they would always encounter problems in recognising the escalators' directions due to various reasons. Solving this problem can improve customers' overall experience while shopping, and result in an increase in the traffic of the shopping malls and may help to increase their profits.

In order to address the needs, I conducted two rounds of observations, based on what I found, I created two personas and a set of storyboards, I further concluded some requirements and then developed a prototype. With the rough prototype, I test two users and see their reactions to the design.

The idea of the final design is to provide various cues for users to judge the escalators' directions, and guide them to the correct one subconsciously. With this purpose, I made the prototype with cardboards, construction paper, pins and many other tools, and used colors (green and red) as cues. The prototype is based on one of the floor plan of Water Tower Place, with a focus on the escalators. In the evaluation, I tested two customers, first, I used uncolored prototype and asked them to find the escalator to the upper floor. After that, I changed the escalators' positions and colored the escalators, and asked them to find the one going up again. One of my subjects didn't perform as I expected, but the other one found the correct escalator in the second test quite easily.

With only two subjects, the sample size is too small. In future, I would test more people with the prototype and see if using colors is a good idea to indicate the directions and ask users for more advice. Meanwhile, looking for more useful cues and exploring how to make them helpful to users is another major topic.

Correspondence and Interaction

In previous assignment, I thought the correspondence was "the attraction between the shopper and his destination floor, the escalators serve as passive transducers".

However, after finally defining the problem, the correspondence appears to be inappropriate. Such correspondence happens only when "users go from this floor to another floor using escalators", but it does not address the process when users look for escalators.

Considering the problem identified above, I redefined the correspondence as "the customers go to the correct escalator which goes for their desired direction", the transducers are "the cues which guide the customers to go to their escalators". Any of the three main reasons (dimension conversion, social property, misposition) would make the cues fade, which result in the situation that it's difficult to find the correct escalator, this is when inter-actions happen.

The reasons why people make mistakes

As addressed in previous work, there are three main reasons why people make mistakes in judging the directions of the escalators:

1. Dimension conversion results in loss of key information for judging the directions.
2. Strong social property in shopping malls that prevents people from searching for cues to judge the directions.
3. Escalators are not positioned properly for customers to get their directions. (this is my another assumption after observation in A3, but I haven't clearly explained it yet)

Solutions

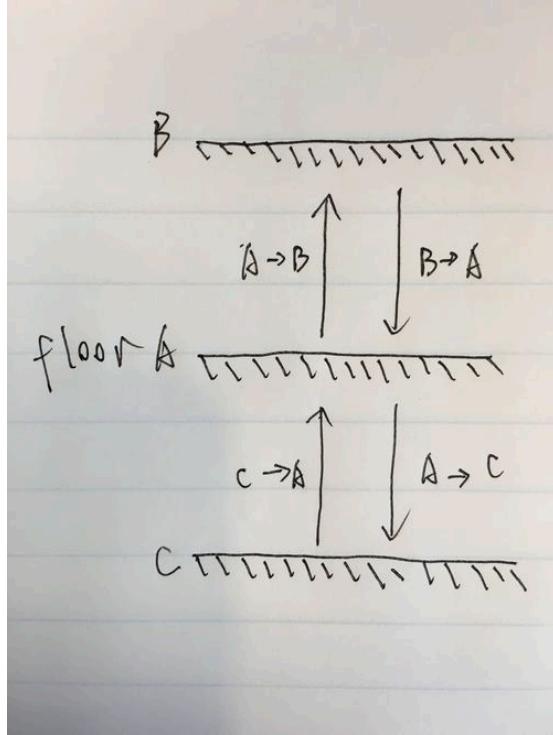
In the current state, the only transducer (cue) is the movement of the escalators, before customers can go for their escalators, they need to stop, look at the escalator, try to find out the escalators' movement directions. However, because of the three reasons discussed above, it's difficult for customers to find this transducer.

The main idea of the solution to this problem is to provide as much cues as possible for users to find out the directions. Instead of only depending on the movement of the escalators, customers could use many other things as cues, such as colors, arrows, lights, etc. The cue should be efficient enough so that customers can notice it without looking for it proactively, customers should also be able to see the cue from anywhere on the floor. The ideal result of this solution is to transfer the whole floor (or environment) to a transducer which helps users correspond with the escalators.

Final Design

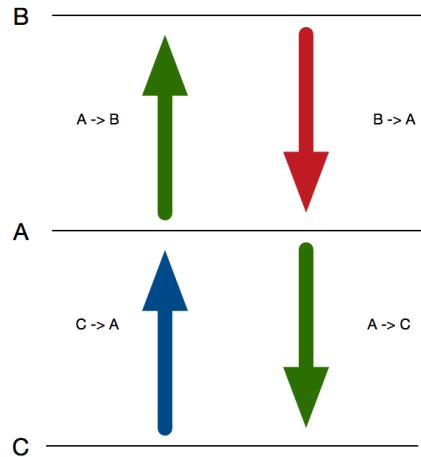
Design Logistics

The picture below is from the first assignment of this project which demonstrates how escalators are organized in shopping malls, each floor is connected with four escalators: from lower floor to this floor, this floor to upper floor, upper floor to this floor, this floor to lower floor.



This picture shows clearly that for each floor (except the first floor and the last floor), there will be at least four escalators going different directions.

While the purpose of this project is to look for ways to recognize the directions, we should first address which directions are needed by users. Consider this, when users are on this floor, which escalators are actually useful to them? It should be the escalators from this floor going up and going down, as for the other two escalators, customers can't use them. From the picture above, if users are now at floor A, he can only use two escalators: A - B (this floor to upper floor), and A - C (this floor to lower floor). This is demonstrated by the picture below:



when customers are at the floor A, only the two green arrows can be used by them, thus, these two escalators should be clearly distinguished

In a word, the escalators going from this floor are the only two that can be used by users. Thus, combining the three main reasons, the problem of recognizing the correct direction can be further explained as: **Are there any ways to eliminate or minimize the impact of dimension conversion, social property and misposition of escalators so that users can easily identify the two escalators which are going from his floor to other floors.**

Constraints and problems

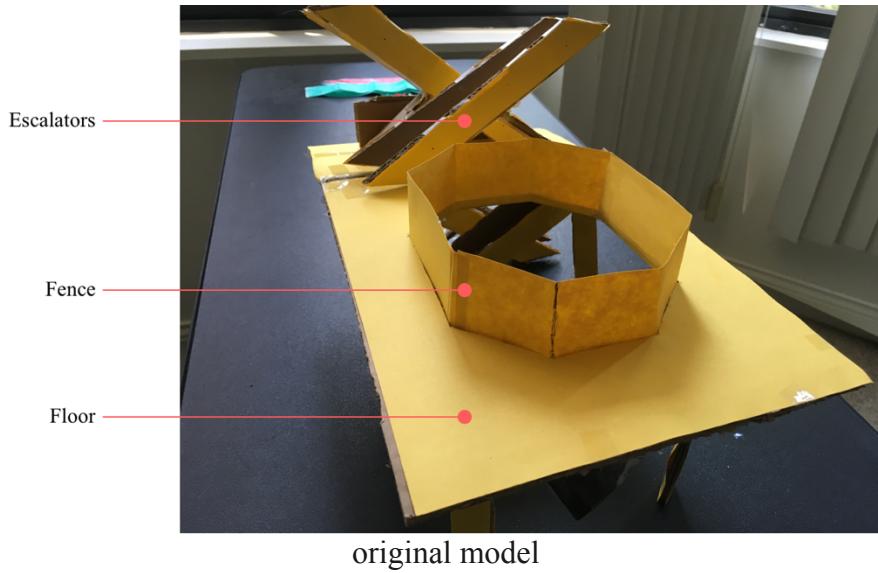
Except for the three identified problems, this solution still has to deal with other issues:

- Figure out what other cues could be used.
- How to relate different cues to the escalators and make sure customers understand them.
- How to make these cues more recognizable for users.
- Will these cues influence the interior design of the shopping malls.

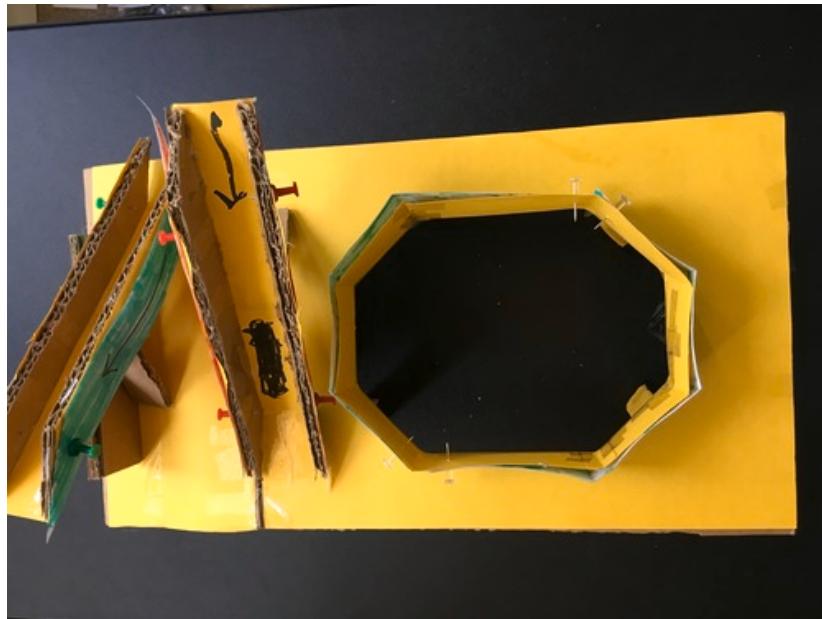
These problems will be addressed in further research.

Prototype

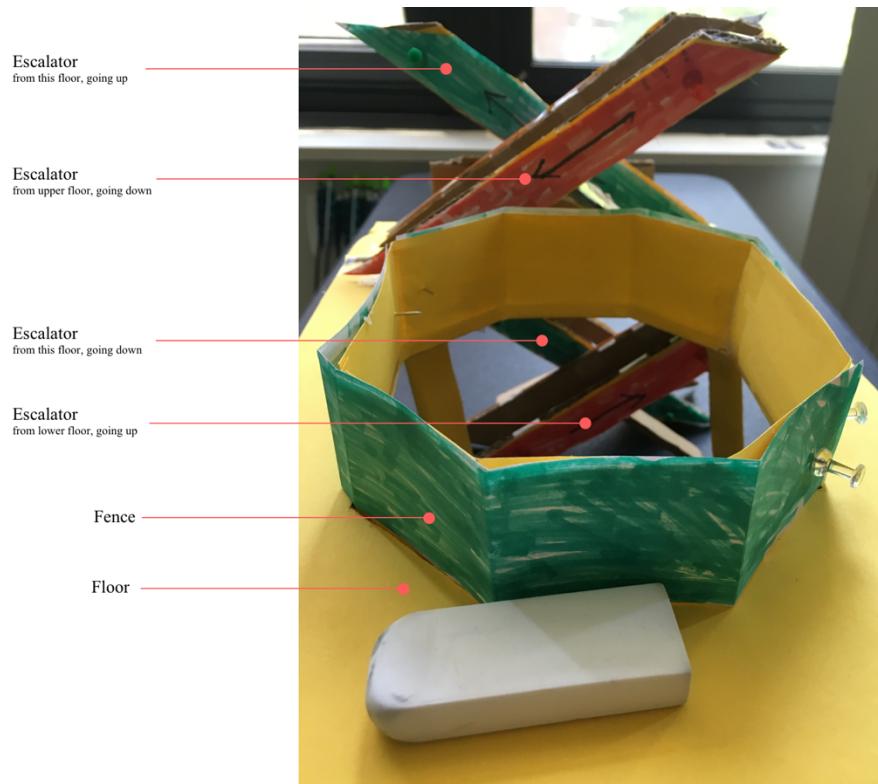
In terms of prototype, I made a model of the floor plan for the Water Tower Place, and designed the solution based on it. The prototype is made with cardboard, construction paper, and some other tools.



The original model consists of fences, floor, and escalators. They are in same color, and the only cue is the arrow drawn inside the escalators, as shown in the picture below:



Apparently, it's almost impossible to identify the directions from anywhere of the floor.



Solution Model

So I used colors as the cues. In my model, the escalators going from this floor are colored green, and the other two escalators are colored red. But I'm still concerned whether the Movers will notice the colors, or will they understand the meaning of different colors, so I made the fences green as well, which is the same color with the escalators going from this floor, hoping that customers will notice the relation between the escalators and this floor.

From the picture of the design solution, I think it should be much easier to distinguish the directions.

The main idea here is not about colors, it's about how to relate this floor to the two escalators which are going from this floor (to upper or lower floor), and there should be sufficient cues for people to use so that the Movers don't have to look for them proactively. That said, it is really difficult and I don't really know if there are any other efficient ways to do this.

After recognizing the two green escalators, one connecting to the upper floor, another one connecting to the lower floor, users can know the correct escalator without any efforts. If they are going up, just go to the one connecting to the upper floor, if they want to go down, then go to the escalator connecting to the lower floor.

Evaluation

Task:

Imagine you are going to buy a T-shirt, after seeing almost all the shops on this floor, you still couldn't find one that you like. Thus you decide to go to the upper floor. Please use this model of the floor plan in Water Tower Place and walk me through how you find the desired escalator.

Process:

1. ask users to conduct the task using the uncolored model.



2. change the positions of the escalators and ask users to conduct the same task again using the colored model.



(note: there's no arrows when this task was conducted by subjects. I added the arrows after the test because both my subjects recommended so.)

Subjects

- Subject A is a Depaul graduate student in Game development program, he is 24 and does not often go to shopping malls. Potentially he is a Judger when in shopping malls.
- Subject B is a Depaul graduate student in Human Computer Interaction program, he is 25 and would sometimes go to shopping malls with friends. He might be a Mover in shopping malls.

Results

- When doing the first task, subject A chose the right escalator at the first try, subject B chose the wrong escalator and tried a second time to go to the right one.
- When doing the second task after the positions of the escalators are changed, subject A went to the wrong escalator while subject B recognized the right one easily.

Debriefing

- Notice here that subject A is not notified that the escalators' positions have been changed, so when he is doing the second task, he was actually using his previous experience in the first task. That's why he made a mistake. Thus when I tested the prototype with the second subject, I told him specifically that the escalators had been relocated.
Even so, this may be a signal that some customers may not be able to recognize colors as cues for judging the directions.
- Both subjects recommended to add arrows directly on the escalators. While I agreed with

them, there are two reasons I didn't do this in the test: Firstly, I want to test whether the colors work or not, if there are arrows on the escalators, they may probably ignore the colors as cues. Secondly, customers, especially the Movers may probably won't notice the arrows, as explained in previous assignment, even when there are people on the escalators whose movement could absolutely indicate the directions, customers would simply ignore such an obvious cue.

But this cue may be very useful for the Judgers, so I added them after the tests.

- The first subject seems dissatisfied with the solution, he couldn't get what the colors mean at first, especially why the fences are colored green, until I explained to him, he thought arrows or something else to point out the directions should be much more efficient than colors.
The second subject could get the meaning of the colors, but he also thought this may not be a good solution because the shopping malls might not be willing to color the fences or escalators.

Conclusion and Further Work

Conclusion

In this project, I identified that people need a more intuitive way to discover the directions of escalators in shopping malls so that they could make fewer mistakes in looking for their escalators.

The ideal solution is to provide as many cues as possible for both the two kinds of users -- the Movers and the Judgers -- to easily identify the two escalators which are going from his floor to other floors, the cues should be efficient enough so that customers can notice them without looking for them proactively.

Based on the main idea of the solution, I made a model of the floor plan of Water Tower Place and used green and red colors as the cues. Subjects are asked to perform two tasks with both uncolored and colored model respectively. After the testing, users do not seem to be enthusiastic about this solution, and provided several useful opinions on how to improve the solution.

Further Work

While my subjects seemed dissatisfied with the prototype, I think this is mainly because I didn't come up with a better way to present the cues, besides, it might be better to make the prototype in a larger size or in the real environment. Using colors alone is also difficult to tell them the directions because they need to figure out what it means by each color.

In future work, I want to change cues to explore other potential solutions, and combine different cues together to make it more intuitive, for example, use lights of different colors to show the directions. Another important thing is to study how to organize and present these cues so that customers won't be confused and distracted by them, ideally these cues could also make the overall shopping environment more convenient.

Reflection

What was the greatest project challenge you needed to overcome?

The greatest challenge for me is to figure out how to make the prototype. I struggled a lot thinking about which cues to use and how to use them. I finally decided to use colors. I also spent a lot of time thinking about how large the model should be and finally decided to make a relatively smaller one for that I can make a full model with a small size, if the size is too large, I won't be able to show subjects the escalators connecting to the lower floors.

Making the model took me about two days, which is much longer than I've expected. I didn't know what tools might be used, so I only collected some before I start making the model, for other tools, I had to go to shops and look for them when I encountered certain problems.

Coloring the model was also another big issue, I could draw colors on the escalators with a color marker after I tested one of my subjects, but if so, I wouldn't be able to test the prototype with another subject since it was already been colored. I wanted to make the model reusable, so I made several colored strips and used pins to pin the strips to the model. Through this way, I could use it again and again to test different conditions(both colored model and uncolored model) with different subjects.

What was the most surprising thing you discovered by doing the project?

The power of thick description surprised me most. I never thought just observing people doing actual things could help me find a lot of useful information. I knew people would have problems in recognizing the escalators directions, but only after I observed what people actually did in the shopping mall before and after they began to look for escalators did I noticed that the cause of this situation is much complicated than I've thought before.

What was the most enjoyable part of the project? The least enjoyable?

Most enjoyable part was observing people using the escalators and sketching out their process, it was interesting to see how they actually interact with escalators. Least enjoyable was evaluating the final prototype with users because it does not work out as what I've expected.

What is the most valuable lesson or take-away that you have from the project?

From this project, I've learned that in HCI field, thinking about the problem by yourself will not yield a good solution. Only observe how people actually do things can we find the true problem and thus go to the right track in finding out the solutions.

If you did the project over again, what would you change? What would you keep the same?

I'll keep most of the part the same, the only thing I want to change is the cues in the final design. I won't use colors again, instead, I want to make a larger model and use lights to indicate the directions. For example, we can install the lights on the handrail of the escalators so that they can move along with the escalators. This might act as another cue.

However, the biggest issue of the solution is still figuring out how to organize these cues to make them intuitive and find out more potential cues.