INFSCI 2300 -- Human Information Processing

Final Project Report

Group: Feiyang Qian; Yanbing Yang; Ke Jiang; Tianqi Xie; Ruoxi Zhang

Celebrity Fashion Shopping Website

In this project, we are planning to design a shopping website for celebrities' fashion goods. This idea came from our own needs as from time to time, we found some celebrities' fashion goods attractive but we had no idea what brand that is, how much is it, and most importantly, where to purchase them. That is why we want to design a shopping website like this to help the people who are interested in following the celebrities' fashion but have been struggling with how to do so.

The target user of our website is celebrity fans ages from 15 to 40. This would be a reasonable assumption because the ones under 15 years old might not be financially capable of purchasing the celebrities' fashion goods while the ones above 40 years old might not be that interested anymore. Although there could be people using this website to look for clothes without a celebrity in mind, we still assumed the vast majority of our users will be the actual celebrity fans.

Although we did not talk with real users of our website about what their goals would be and what their typical tasks would be, we made assumptions based on our own experience and expectations as potential users of the website. We assumed that there might be three different kinds of users of our website with different goals. The first kind of users are the ones with a specific celebrity in mind such that they will highly likely to directly search for the celebrity and

find his or her fashion goods. The second kind of users are the ones who want to see celebrity goods but with no interest in a specific one or two. Hence, they might need a hint of celebrity names to help them decide whose fashion goods to take a look at. The third kind of users is not as into celebrity fashion goods as the previous two groups; they just want to shop for good clothes. That way, they will likely to navigate our website as if with typical websites (i.e. browsing through clothing types).

In our design of this website, we focused on the application of Gestalt Principles (such as proximity and similarity), limitation of short-term memory, recognition in Long-term memory, perception, and pre-attentive procession. We will discuss each application of the concepts in details in the rest of this paper.

## Mock-Up Visualization

### Homepage

Figure 1 shows a mock-up visualization of the home page for this shopping website. We incorporated the concepts of pre-attentive effect, perceptions, and semantic memory.

Before we began to design our website, our group closely discussed what would the user's goal be. We wanted to design accordingly to the user's goals such that it saves user's cognitive burden and enhance the usability experience. Since the project was dedicated to being not only a shopping website but also a website with the main purpose of celebrities' fashion, we would expect the most users come to this site with a specific celebrity in mind. As we run a cognitive walkthrough during the designing process, we find that use search bar would be a immediate action of such users. Hence, the search bar would be one of the main features on our

website. The position and the appearance of searchbar would be important to determine if the user could detect this target within only a few or just one eye-movement.

We decided to place the search bar at the very top of the page since this is consistent with most of the people's prior experience with a search bar. According to Boutonnet (2018), Prior knowledge impacts early stages of perceptual processing, such prior experience would naturally guide the eye movement of the user to search at the top of the page. Also since we are more prone to see things that contrast with its environment due to the pre-attentive of our perception process (Ware, 2008), hence we designed a large search bar in the middle top of the page.

This website also serves for a few different user goals, for instance, for the users who want to explore different celebrities, we have the "Celebrity" tab on the menu bar. For the users who only want to shop items regardless of celebrities, we have the "Clothes" tab for this purpose. For those who are completely new to this website, the initial goal could be to figure out what this website is for. Hence in the middle of the website, we designed a feature of the promotion panels, which contains a short slogan for a brief introduction of this website. This promotion panel uses the pop-out effect to attract user's attention immediately after the user sees the page.

Since the consistency in design can increase usability and eliminates confusion (Maria 2018), we tried to keep the consistency of our design by using the same color scheme, and we made sure that the layout of main features are consistent in each page ( e.g. menu is the same and accessible in every page). To enhance the usability of our website, we designed features that provide feedback to user's behavior. For instance, the black bold out-edges of the subsections of the promotion panels not provide you how many pages are there but also current position. We expected our user could make this inference because of the similarity principle in Gestalt

Principals (Hensley, 2016). Our brain would group things together if they are alike. The user should be able to distinguish the black edges and the white ones and make an inference that the white edges indicate a group of pages that are not the current page.

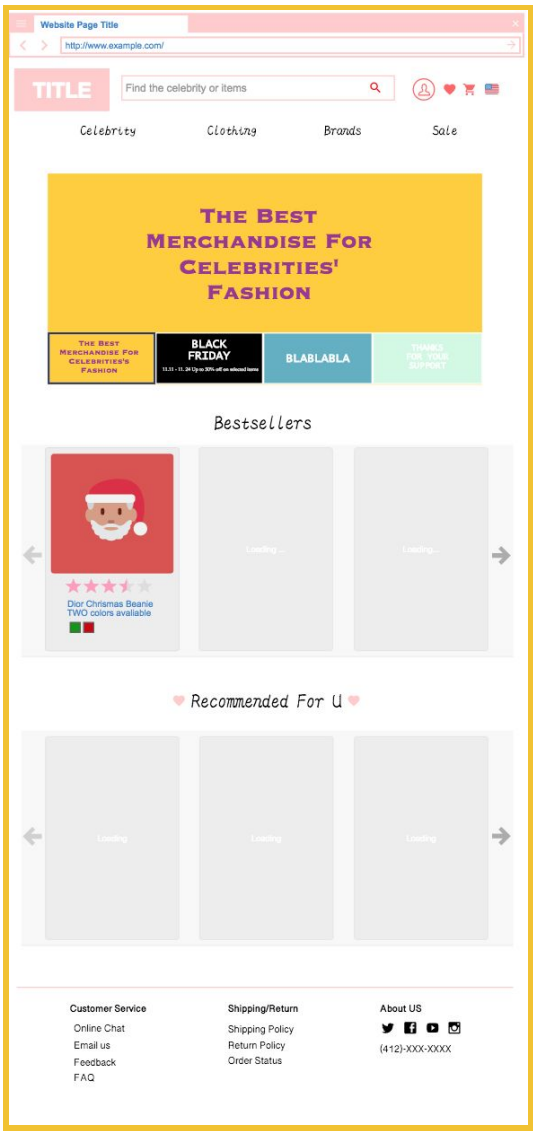


Figure 1. Homepage

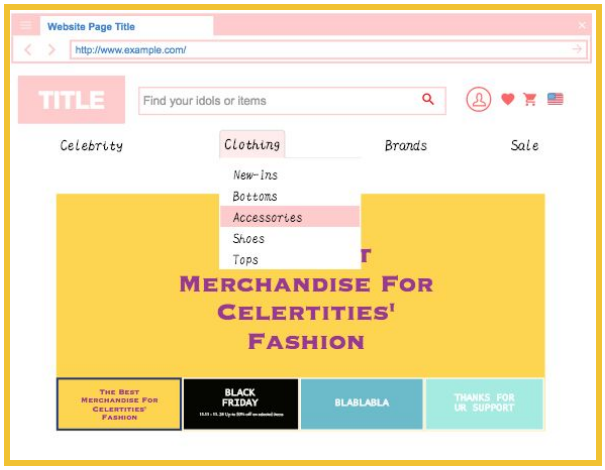


Figure 2. Drop down menu on the homepage

Figure 2 is a more detailed example of how we applied the Gestalt principles and pop-out effect to provide feedback. In figure 2, our design of the drop-down menu gives

feedback to where the cursors currently at by using pop-out effect (i.e. color contraction ) on the selections. Due to the Gestalt principle-- figure&ground, you are able to focus on the foreground. Because of the similarity principle in Gestalt principles, you are able to distinguish that the pink part is where your cursor is currently at.

Our design also applied the concept of semantic memory, as the semantic memory can be used to interpret possible new info based on an old memory. We design the buttons of user page as a graph of a person, shopping cart as a graph of the shopping cart, and a graph of heart to represent the items that used liked. We expected users can easily understand these features without further explanation based on the prior knowledge of users.

**Sign-in and Registration Page**

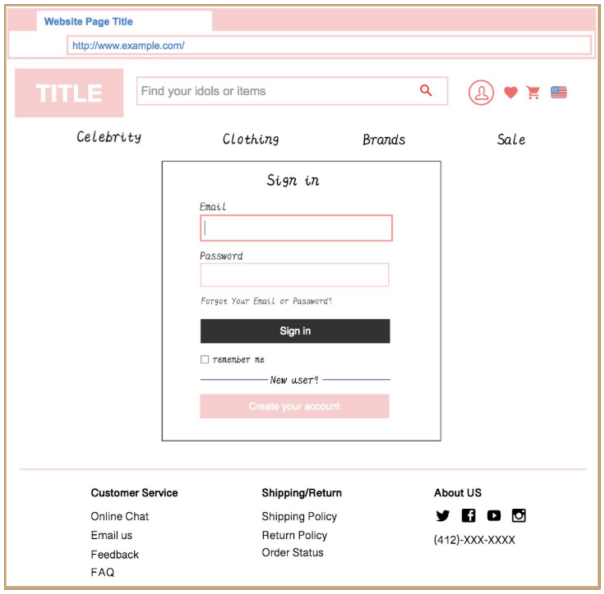


Figure 3. Sign-in Page

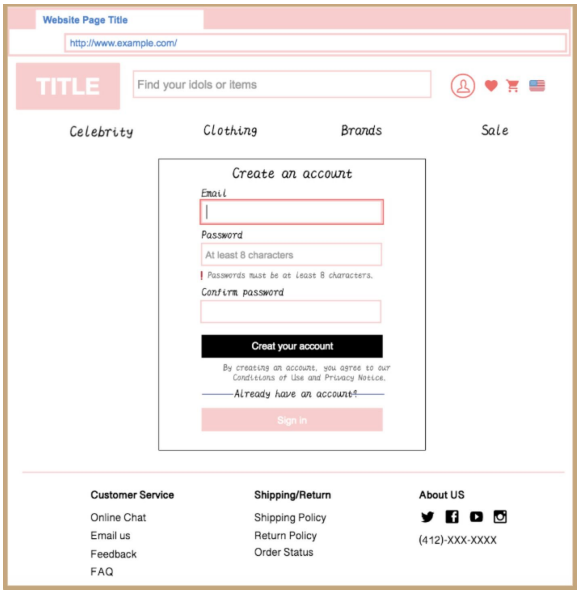


Figure 4. New-User Registration Page

Figure 3 and 4 provide pages for signing in and creating an account. When designing the "Sign-in" and "New-User Registration" pages, we applied short-term memory, Gestalt Principle, perception and pop-out effect.

First, we figure out what users' goals correspond to design. Users should input email and password to login based on their prior experience. Also, users may forget their email or password. In order not to fill out the login information every time, they may have a need for remembering the sign-in status. If users are new to the website, they also need to create new accounts.

Because of the limited capacity of short-term memory, people may get lost where they are without strong feedback. Also, the focus of attention has a limitation in both capability and time (Muter, 2001). In order to overcome the weakness of short-term memory, we use strong feedback to remind users. The title will show whether "sign-in" or "create an account" mode you are in currently so that users will not get lost. In addition, in order to remind which input box they are filling in, we use the pop-out effect to turning the current input box into dark pink, which will be a strong feedback for the users.

We also using Gestalt Principles to design our pages, especially similarity. The buttons and the input boxes are in the same size and in the same pattern, which will make them look similar and could form into one group. The scheme of the button and the input box are consistent with the overall page.

In order to reduce perception bias, we should understand users' goal. Users may forget their email or password so there is a button "forget your email or password" to remind users. If a user is new to the website, there is a hint text "new user?" and below the hint text, there is

“Create an account” button which could help this new user jump from sign-in page to create an account page.

There are some elements which users need most so that we use the pop-out effect to let users find those elements easily. Because the overall style of the page is pink and white, the black color will draw users attention. We use black to pop-out the button “Sign in” in the sign-in mode and “Create an account” in the New-User Registration mode so that we will notice the button after filling out the input boxes. We using the pop-out effect to turning the current input box into dark pink, which will make the current input box striking.

**Search Result Page**

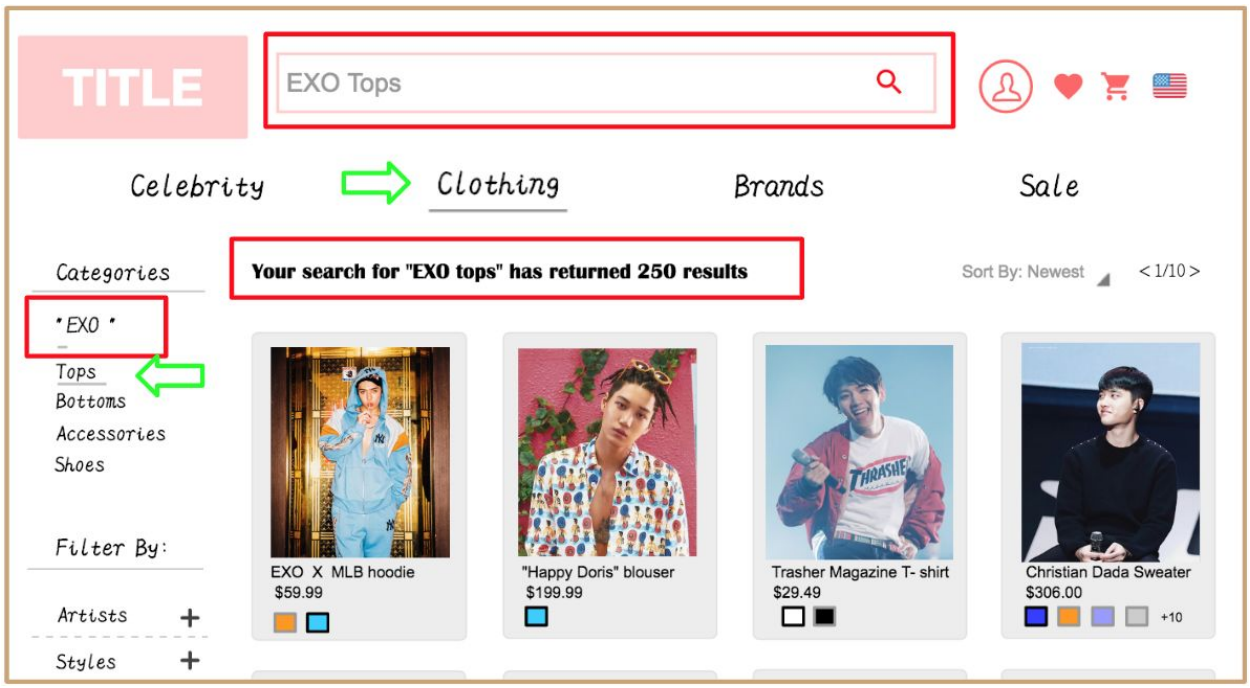


Figure 5. Searching result based on keywords “Exo Tops”

Figure 5 presents a page with shopping items which are the searching results according to the keyword entered. The design of this pages involves the application of prior knowledge in perception, attention expense and the limitation of short-term memory.

To maintain the consistency in our design, we maintained the same features in the same layout for all the shopping-items page. Those features include but are not limited to a navigation bar on the left side of the page, a sorting mode button and page number above all the items on that page. The design of navigation bar involves manipulating user's prior experience/knowledge. For instance, the plus sign ("+") behind a text can be obvious to the user that it means to expand the column. This inference is based on their prior knowledge of the meaning of a plus sign or is based on prior experience of similar features on other websites. In stead of place a "SortBy" section in the navigation bar on the left, we introduced the mode button for different sorting criteria. This design was aimed to reduce eye saccade and save the time of searching.

Because the user's goal may switch as one browses through the website. Consider the limited capacity of short-term memory, we designed a feature that reminds the user what action he/ she has performed. After the user searched for "EXO tops", a shopping page containing the search results would be generated. The search bar on this page contains the keyword used to generate this page as a reminder of what the user has just searched. We also designed a line of text using pop-out effects on top of all the items, which states what the user has searched and how many results were found.

Similar to all the other shopping pages on this website, we have designed features in a fashion of using similarity principle to provide feedback to users so that they could understand

their current stage. For instance, since the user, in this case, searched for specifically tops, logically we should end up into a shopping page under the category of clothing, more specifically, under the "tops" section. Hence, we underline the Clothing tab in the menu bar and the Tops tab in the navigation bar on the left side of the page. Since our brain group things that are structurally similar together, we would make the reasonable assumption that the users can understand that the tabs underlined are different than other tabs as underlined tab are the accessed ones according to actions performed.

**Item Page**

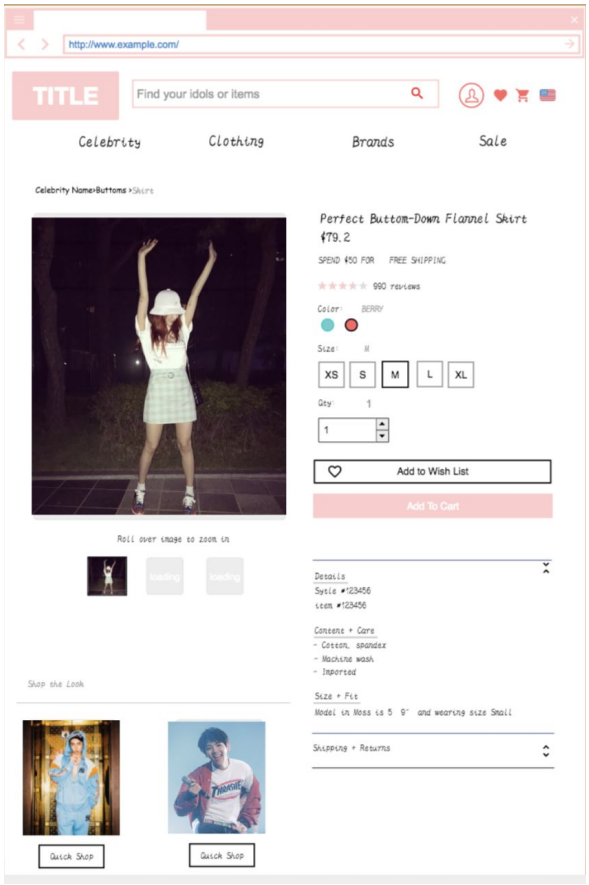


Figure 6. Item Page.

Once the web user found an item that he or she interested in, the user could click the item and turn to the item page. On this webpage, we applied five concepts when we design it. First, As figure 6 shown, the color and font size of the header and footer are always consistent with other pages in terms of reducing perception bias. With Regard to reducing perception bias, we also recommend the other looks by using relative recommendation algorithms, which can recommend looks based on our user's goal (Rose, 2004). So we designed a section called 'Shop this look', and the user could explore a similar outfit based on what they interested. Second, what we put on the right side of the page are color, size and quality options about this item. For example, if the user clicks on the M size button, a black bold square will frame it. By doing this, the user could be reminded what she or he just chose. Moreover, we also did the same function on the thumbnails under the large picture on the left side of this page. If the user clicks on one of the thumbnails, besides a black square will frame it, the large picture will also be changed to the thumbnail picture. The concept we used to design this function is the heuristic evaluation, which gives the user an immediate feedback to remind the user what she or he just did(Nielsen & Molich, 1990). Third, we designed a small navigation bar to remind users what section of the shopping webpage they are in. Because we know that the short-term memory of human is time and capacity limited. If we do not remind the user which section they are in, they might suddenly have no clue what they are browsing. Forth, what the users would notice when they look at this page at first glance must be the huge picture of the celebrity wearing a fashion item (Wang, Cavanagh & Green, 1994). At this part, we apply the pop-out effect in pre-attentiveness concept to implement this function. Last but not least, we used two gestalt principle concepts on designing the layout of this webpage: proximity and similarity. For example, the text and radio

button of item colors are placed altogether and has obvious distance between color and other options. Then the users will not be confused about the content of each part in this page.

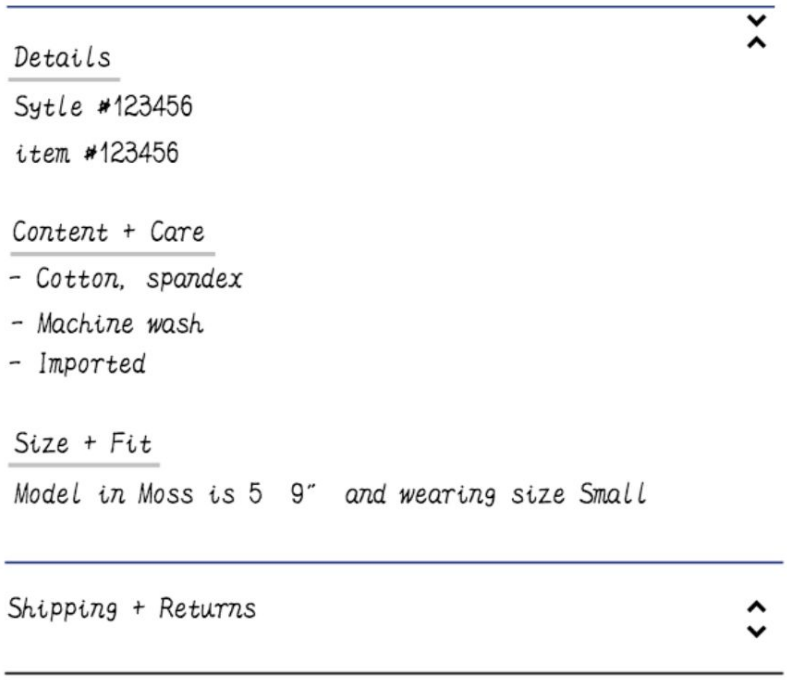


Figure 7. Information Boxes.

Another important part in the item page is the information box of the item. We can see from the figure 7 that the information box has two parts: information about the item and shipping and returns policy. In order to make users distinguish these two parts easily and immediately, we used foldable boxes to contain the information. In addition, the words in each box are also placed as groups, and users could figure out which information is related, and which are unrelated based on the layout. The concepts we used to design this layout are proximity and similarity from gestalt principle. We show all the content of item information box because we found out that users are more interested in the information about the item than the shipping and return policy. In

another word, we know our users' goal - information of the item. On the top right side of this page, there are two folded and unfolded arrows, which are the icon to let users click on to fold the information box or show the content in the box. We do not put any text around the arrow icons to explain the usage of them. Because we designed the icon based on web page users' prior knowledge. Our target users are young people who follow the fashion trend and have basic internet knowledge. So they could figure out the meaning of these icons without our explanation. The last concept we used in this page is what we tried to apply on the whole website – use same font size, color and theme in each page. Doing this is because we want to be consistent through whole website.

**Shopping-Cart Page**

First, we analyzed the user goals when they are using this page. User goals guide their perception apparatus (Designing with the mind in mind, Second Edition). It will influence where they look and they become sensitive to certain features. So understanding user goals is important to make the design more user-friendly. We assume that our target users have goals including viewing items and their basic information, changing the cart information like editing quantities, deleting or removing items, applying promotion codes if possible, and checking out to payment. Then we use several concepts to design this page based on user goals which are pre-attentive, gestalt principles, long-term memory, and heuristic evaluation of usability testing. (The page is shown in figure 8.)

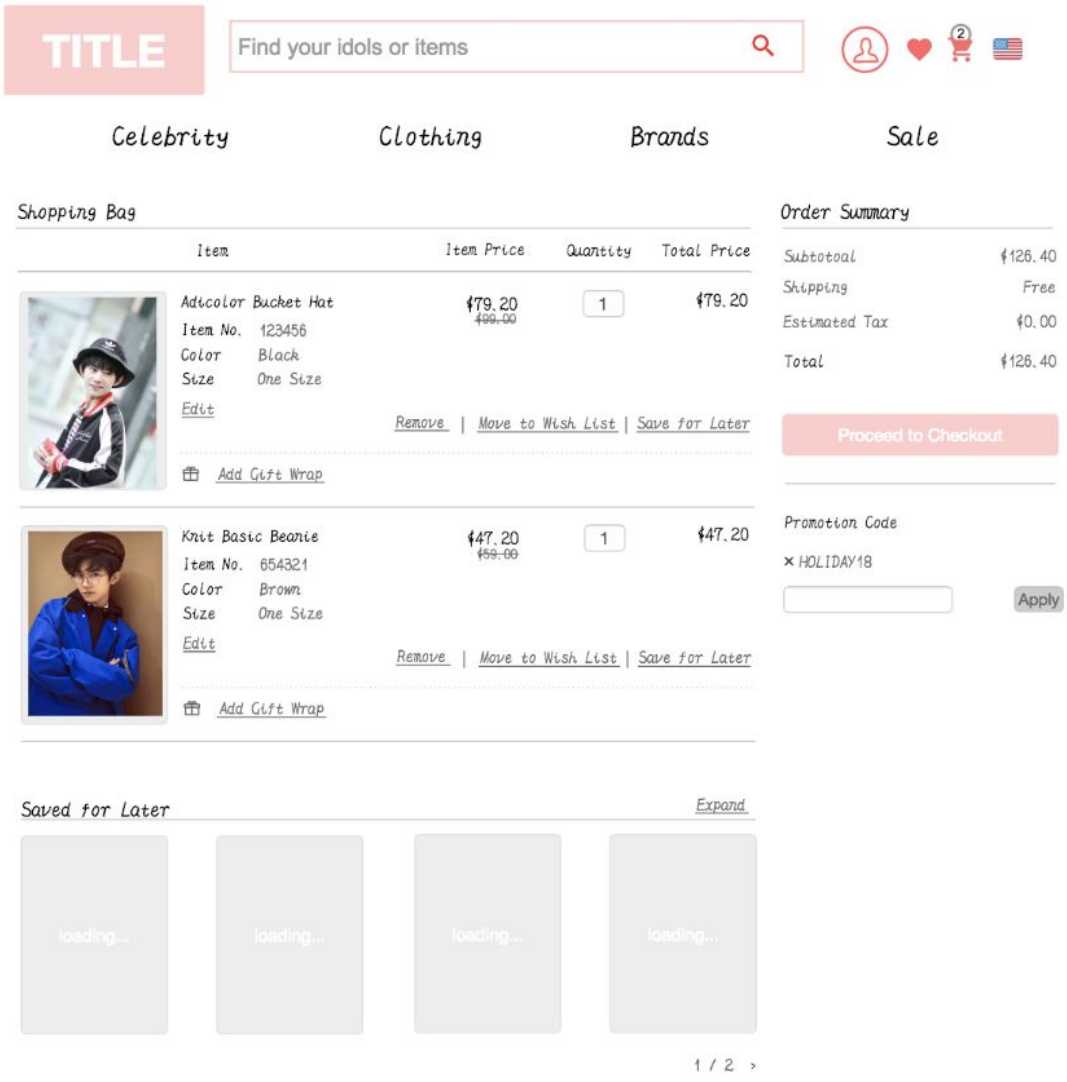


Figure 8. Shopping Cart Page

To start with, we apply the pop-out effect to the checkout button and apply button that contains the main functions which users are most likely to use in this page. Their colors are different from the background to make them pop out, so users can find them at first glance.

In terms of gestalt principles, we mainly use proximity to this page. Proximity means that the distance between objects affects our perception of whether and how objects are related or organized into subgroups. This shopping cart page has three parts which are “shopping bag”,

"order summary" and "saved for later". We leave enough space between different parts and use lines to help users distinguish them easily. In the shopping bag part, the distance between all the information for one specific item is relatively closed to be recognized as a group. In addition, in the order summary part, the delete button is right next to the promotion code. The code and its corresponding delete button will be automatically organized into a group when users have more than one codes, and thus they will not delete a promotion code they want to keep by mistake.

A basic principle about long-term memory is that recall or recognition from long-term memory increases the more the original context is supplied. So we try to give as many cues as possible to reduce users' memory load. The number above the shopping cart button means how many different items is in the cart now. The number remains consistent in all pages. We give this cue to help to recall how many or what items have been chosen. If users browse many pages of items and add products to the cart randomly, they can make sure how many items they have selected without clicking into another page and losing the current position. We also provide original prices and pictures for items as right cues to help recognition from long-term memory. The original prices give a clear sense of how much money can be saved. Though pictures does not contain many details of an item, users tend to encode an item using its pictures to visually represent it in memory, since we make pictures pop out in the item pages. Hence, pictures are good cues for recognition.

In the heuristic evaluation, we talked about three rules about how to reduce perception bias. A theory called aesthetic-usability effect describes a phenomenon that people receive more-aesthetic designs as easier to use than less-aesthetic designs (William Lidwell, Kritina Holden, Jill Butler, 2010). So, to be consistent, we underlined all the links that can be clicked to

make them consistent on styles and different from other contents. And to avoid ambiguity, we make sure that all the related contents are aligned. For example, the label (quantity) and the content (the number). Besides, we have already made assumptions to understand the user goals.

**User Profile Page -- My Orders**

When designing the "My Orders" page on the user profile page, we applied short-term memory, long-term memory, and Gestalt Principle (proximity, in particular; Figure 9).

Because of the storage limitation of short-term memory such that that the number of objects which a person can remember at once is on average seven for digits, six for letters and five for words (Shiffrin & Nosofsky, 1994), we would like to present the information one has to remember at once under the threshold. At the same time, we also provided feedback to remind users what page they are in and the mode they have selected. We underlined "My Orders" tab when it is on this page to reduce users' short-term memory load. In addition, we kept showing the users what sorting method they've chosen at the current page on the top right corner so that they won't have to remember by themselves. It also serves as an indicator that helps reduce users' short-term memory load.

In terms of long-term memory, Budiu (2014) has suggested that an application or a website should have two components to promote recognition. One is the chrome or the interface so that designers need to name and label the elements in the page to help users recognize. Another one is the content so that designers need to make the information related to the task to help users recognize and retrieve long-term memory. What we have incorporated here is the latter approach. We used features including pictures, date ordered, the total amount spent, etc. to

help users recognize the order. The varsity of related information we provided could serve as cues to reduce the difficulty for users to recognize the features and retrieve related information from long-term memory.

We have also used the Gestalt principle, in particular, proximity, to reduce perception ambiguity in our design. We made use of white space and the assistance of a delimiter to separate the two orders. Since proximity is a very strong principle in terms of organizing objects, it can actually overweight other elements of variation (Hensley, 2016). Therefore, even the pictures of the two orders are displayed in different color, users gonna still perceive the grouping horizontally as rows rather than as columns. The grouping introduced by proximity can help avoid ambiguity so that users would not perceive the grouping of the orders any other way.

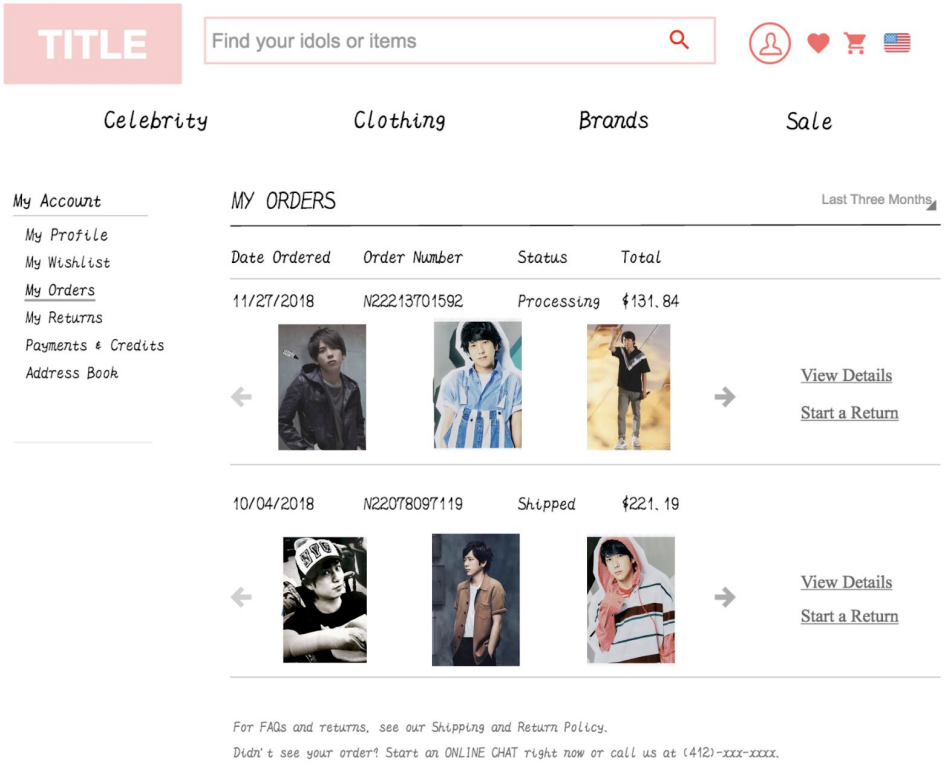


Figure 9. “My Orders” on User Profile Page.

## Challenges

We have encountered two major challenges when we designed our website. First, our shopping site is very different from typical shopping websites because the user goals and tasks differ so that we cannot simply "plagiarize" good features from other sites. We had to take into account user goals when using our app and what the typical tasks could be derived from their goals. Based on the assumption that the dominant goal of people using our website is to look for celebrity fashion goods that they have seen somewhere else, they will likely to achieve this goal in the following steps. First, searching for the celebrity with his or her name; second, using filtering or sorting to find the specific item of interest; third, clicking on the item to view the details; fourth, adding it into the shopping cart; fifth, checking out; finally, checking the shipping status of the order on the user profile page. We have applied different concepts that we learned from the class to make each of the step easier. For example, we used pre-attentive theories to have the search bar pop out as it is one of the most important features that should catch users' attention. In addition, we simplified our navigation bar to only four tabs, which is a quite small number in comparison to other shopping sites. The reason we did not map out the navigation bar in detail is to reduce the noise that might distract the users from their intended tasks.

Besides, we also had trouble introducing our website to new users. Again, our website is very different from typical shopping websites; hence, we would have to make it clear to the new users what the main function of our website is. In order to do so, we designed a slogan for our website and made it pop out on the home page: "The Best Merchandise for Celebrity Fashion". Although it might not be perfect, it should give new users an idea about what our website is for.

## References


Budiu, R. (2014, July 6). Memory Recognition and Recall in User Interfaces. Retrieved from https://www.nngroup.com/articles/recognition-and-recall/

Hensley, J. (2016, May 03). Improve Your Designs With The Principles Of Similarity And Proximity (Part 1). Retrieved from https://www.smashingmagazine.com/2016/05/improve-your-designs-with-principles-similarity-proximity-part-1/

Johnson, J. (2013). Designing with the Mind in Mind: Simple Guide to Understanding User Interface Design Guidelines. Elsevier.

Lidwell, W., Holden, J. & Butler, J. (2010). Universal Principles of Design, Revised and Updated: 125 Ways to Enhance Usability, Influence Perception, Increase Appeal, Make Better Design Decisions, and Teach Through Design. Rockport Publishers.

Nielsen, J., & Molich, R. (1990, March). Heuristic evaluation of user interfaces. In Proceedings of the SIGCHI conference on Human factors in computing systems (pp. 249-256). ACM.

Riva, M. D. (2018). Why Consistency Is So Incredibly Important In UI Design. Retrieved from https://careerfoundry.com/en/blog/ui-design/the-importance-of-consistency-in-ui-design/

Rose, D. E., & Levinson, D. (2004, May). Understanding user goals in web search. In Proceedings of the 13th international conference on World Wide Web (pp. 13-19). ACM.

Samaha, J., Boutonnet, B., Postle, B., & Lupyan, G. (2018). How prior knowledge prepares perception: Alpha-band oscillations carry perceptual expectations and influence early visual responses. bioRxiv, 076687.

Shiffrin, R. M., & Nosofsky, R. M. (1994). Seven plus or minus two: A commentary on capacity limitations. Psychological Review, 101(2), 357-361.

Wang, Q., Cavanagh, P., & Green, M. (1994). Familiarity and pop-out in visual search. Perception & psychophysics, 56(5), 495-500.

Ware, C., & Mitchell, P. (2008). Visualizing graphs in three dimensions. ACM Transactions on Applied Perception (TAP), 5(1), 23-37.

Muter, P. (2001). The nature of forgetting from short-term memory. *Behavioral and Brain Sciences, 24*(1), 134. http://pitt.idm.oclc.org/login?url=https://search.proquest.com/docview/212302097?accountid=14709.