

Research on Interface Design of Intelligent Shopping APPs Based on User Experience

Shuying Chen¹ Mengqian Liu² Mingkun Luo³

^{1,2,3} School of Art, Sichuan Technology and Business University, Chengdu, Sichuan 611745, China

²Corresponding author.

ABSTRACT

In the context of the widespread popularity of the modern Internet, it has become an important task to explore the interface design market strategy of the new online shopping APP. With the rapid development of mobile Internet technology and the popularization of intelligent devices, online shopping has become an indispensable part of people's daily life. Therefore, designing a visually appealing and practical online shopping app interface is of great significance for attracting users, enhancing user experience, and promoting business growth. This study first analyzes the reality of online shopping in China, and then summarizes the user's inner needs and modern market pain points, thereby introducing the consumption psychology and purchasing habits of the online shopping user group. It is found that modern users crave more thoughtful and personalized services when shopping online. Based on this, it extends to explore the design attempts of modern intelligent shopping apps in terms of visual, emotional, and interactive aspects under the influence of these needs, and summarizes the design ideas and strategies that can better meet the shopping needs of modern online shopping users. Through this study, Wuxian app has completed the transformation and upgrading of modern online shopping app, optimized the interface design of online shopping app based on user experience, and brought better user experience.

Keywords: APP interface design, Online shopping, User experience, Personalized service.

1. INTRODUCTION

In this era of rapid development, the popularity of Internet technology has changed the lifestyle of modern people. The rise of intelligent technology has not only greatly improved the work efficiency of modern people, but also enriched their life experience [1] [2]. With the continuous improvement of people's requirements for quality of life, their expectations for technological products and services have also been upgraded. Especially in the field of online shopping, users are no longer satisfied with just being able to purchase goods online, but are beginning to pursue more convenient, personalized, and innovative shopping experiences. The "Wuxian(无限)" intelligent online shopping app has emerged in this context, not just as a simple shopping platform, but as a product that perfectly integrates artificial intelligence technology with modern online shopping experience. Through deep learning and big data analysis, "Wuxian" can accurately understand users' shopping habits and preferences, providing

personalized product recommendations and making shopping easier and more enjoyable. By combining artificial intelligence technology with innovative interface design, we have created a comprehensive, intelligent, and personalized shopping environment for users, allowing every user to enjoy an unprecedented technological shopping experience.

2. SHOPPING APPS AND INTELLIGENT INTERFACE

As an important medium for modern users to shop online and immerse themselves in shopping, online shopping apps have become one of the essential software on most people's smartphones. The APP interface is the first experience that the APP provides to users [3], and designing the interface centered on user needs is one of the core concepts of APP design [4]. After preliminary market research, it is found that although online shopping apps on the market have complete functions, their interface design cannot meet the personalized needs of users, and they do not have

online fitting and other functions. It is difficult for users to understand the full picture of the product through the screen and do not know whether the clothing meets expectations. And now emerging AI technologies can create a virtual space for users, allowing them to immerse themselves in the convenience and intelligence of online clothing purchases. AI virtual technology is ubiquitous in modern times, and artificial intelligence technology is gradually maturing. The most common AI applications in daily life are voice assistants, such as Apple's Siri, Amazon's Alexa, autonomous cars, AI medical devices, and so on. AI is increasingly sought after and loved by modern people, gradually integrating into people's daily lives. Incorporating artificial intelligence technology, the interface design of intelligent shopping apps will enhance the interaction between users and software, helping users select satisfactory products with more technological and intelligent interfaces and functions.

3. COMPETITIVE PRODUCT ANALYSIS OF ONLINE SHOPPING APPS

There are various types of online shopping apps available on the market, each with its own unique interface design and innovative points, which not only solve the problem of users purchasing clothes online, selecting clothes for users, and matching clothes. Through preliminary research on user needs, several representative online shopping apps that are widely known to modern users are selected, including Taobao, JD.com, Tmall, Little Red Book, Pinduoduo, and Dewu. The authors summarize a competitive product analysis chart, as shown in "Table 1". The chart analyzes the factors that affect the interface design of online shopping apps from three aspects: app interface color, style, and layout.

Table 1. Competitive product analysis chart

Terrace	Element					
	Style	Pigment	Layout	Advantage	Shortcoming	
Taobao	The interface style is simple and modern	Mainly with white, orange is auxiliary	The basic layout is very many, and the content is very rich, But the single design, easy to visual fatigue	The content covers a wide range of goods and is convenient to use	Function ICONS are slow to update and difficult to distinguish from different functions	
JD.com	Neat interface, simple and fashionable style	White is mainly used, supplemented by red	Goods cover a wide range, rich content, But the personalization is not strong, and the push is not targeted	Commodity is rich in quantity, high-quality, Easy to use, efficient, and great reputation	The design is relatively single, the lack of innovation point, The function keys are not distinguished from each other	
Tmall	The interface is simple and tidy	White is the main color, red is supplemented by	There are many functional keys and the layout is reasonable, but the design is not new	Many variety of goods, the interface is very attractive	But it is poorly targeted, with no memory points	
Little Red Book	Simple interface design, popular style	White is mainly used, and red is the auxiliary	The layout of the block, clear, reasonable layout	Many content, covering a wide range of keys, perfect function key	The push content is lack of pertinence and innovation	
Pinduoduo	The interface is neat and modern	White is mainly used, supplemented by red	Large plate design, plate difference between obvious	For both old and young, "Yiwu Store" in the APP	The content is not targeted, very messy, and does not show its uniqueness	

Dewu	The interface is modern and simple, in line with the preferences of modern young people	Mainly white	Clear classification, reasonable layout	Design for the modern young generation, modern fashion, There are many trendy products	Commodity classification is not clear, different types of goods do not distinguish, And the design is single
------	---	--------------	---	--	--

3.1 Interface Color Factors

The colors in interface design can to some extent bring emotional implications to users and establish the emotional tone of the entire app. For example, blue represents calmness and quietness, etc.; Purple represents mystery, technology, intelligence, etc. Each color brings a different visual experience to some extent. The combination and arrangement of different color blocks, as well as the size, brightness, and range of colors, can convey the emotions and feelings that the interface wants to be perceived by users.

During the use of online shopping apps, it is important to avoid overly bright and dazzling colors. Colors should not be too cluttered, and personalized products should be recommended based on the needs and preferences of different users, clarifying the true needs of each user. Taking Taobao as an example, the color combination of Taobao interfaces is mainly simple, with a pure white background. However, the specific functions and usage differentiation of each section are not strong, and some functions are not very practical.

3.2 Interface Style Factors

Interface style is the foundation and key of the entire APP interface design, which can most intuitively convey the feelings and experiences that interface design aims to bring to users. Through the interface style of the app, users can quickly and comprehensively understand the concept that the app wants to convey and feel its uniqueness. In this survey, it is found that the interface style of most modern online shopping software is straightforward, with diverse recommended content and a focus on the general public. Introducing artificial intelligence (AI) technology into app interface design has a certain degree of innovation and challenge, which can make users have a visual impact and a sense of intelligent technology in their visual experience. It is also more likely to arouse users' curiosity. At the same time, artificial intelligence can better serve users. Users can have a

comprehensive and in-depth understanding of all product information while selecting and purchasing products, and tailor virtual images for users to display the effect of clothing on the body, improving users' dependence and trust in the apps.

Taking JD.com as an example among competitors, clicking on the initial interface presents users with homepage recommendations, browsing, new products, shopping cart, and "mine". Clicking on any one of the five options below will redirect the users to different interfaces to meet their shopping, social, and browsing needs. The entire interface design presents a simple and direct style, with relatively reasonable distribution of functional buttons. However, the interface style lacks innovation and intelligence, lacks product uniqueness, and lacks certain competitiveness in the market. Although modern online shopping apps have comprehensive functions, some of their ancillary features are not very practical and cannot perfectly meet customers' shopping needs.

3.3 Interface Layout Factors

The interface layout has a significant impact on the user experience in the entire interface design and is a very important part of interface design. Whether the division of sections, service functions, and button function layout is reasonable will directly affect the user's experience in using the APP. A logical and reasonable interface layout that conforms to user habits can allow users to experience convenience and speed during the use of the app, and find the products they want and make purchases in a fast and comfortable way. A reasonable and thoughtful interface layout can not only provide users with a better experience, but also create a certain dependence on the interface operating system. The frequency of using the app will increase, and at the same time, user feedback will continuously drive the development and upgrading of the app, constantly improving its market competitiveness. Therefore, when designing the layout of an online shopping app interface, more consideration should be given to how to

design from the user's perspective. Through preliminary market research, analysis of user habits and thinking patterns, respect for user operation methods, and providing corresponding high-quality services according to the different needs of different users. Adding AI technology to generate virtual portraits can enable many users to intuitively see the effect of clothing on their bodies during use, and make autonomous combinations, providing users with a good user experience.

4. USER EXPERIENCE ANALYSIS OF ONLINE SHOPPING APPS

User experience is one of the important factors in measuring the success of an app in the market. Good user experience can bring stable user traffic and a solid market position to an app. Through preliminary user research, the interface design elements that affect user experience are extracted into three main parts: user visual experience, user emotional experience, and user interaction experience. In terms of visual experience, the color icons and layout of the interface design can bring users a different feeling. Through a good visual experience, users can develop a good impression of the product, thereby stimulating their desire to use and increasing the number of using times the app; User emotional experience refers to the emotional impact that users have on a product during its use. Therefore, in interface design, not only should user needs be met, but also their emotional needs should be considered to build brand awareness, establish brand image, gain a good reputation in the market, and enhance product competitiveness; Interactive experience refers to a series of autonomous operations performed by users while using an app, such as selecting products to view, clicking on product information, selecting products for payment, and so on. Good interactive experience will directly enhance users' favorability towards the app and effectively improve their user experience.

4.1 Visual Experience

In terms of visual experience, the color icons and layout of interface design can bring users a different feeling, allowing them to perceive [5] and receive information more intuitively. Users have independently formed a visual experience of the APP through their perception of factors such as color design, icon layout, page layout, and graphic arrangement in the APP interface design. There are significant differences in interface design between shopping apps that integrate artificial intelligence

technology and existing shopping apps on the market today. The selection of colors, layout of the interface, and further upgrading of functions make the shopping app interface more modern and technological.

4.2 Emotional Experience

The sense of identification, dependence, and trust generated by users during the use of apps are all emotional experiences of users. Emotional experience requires interface design not only to meet the most basic needs of users, but also to convey the design philosophy, service purpose, and cultural connotation of the product to users, creating an emotional connection between users and the product. The introduction of artificial intelligence enhances the interaction between users and apps, using smarter technology to strengthen the connection between users and businesses or others, making apps truly a tool for connecting all parties and a bridge to break through the limitations of time and space.

4.3 Interactive Experience

Interactive experience is the most direct experience for users during the process of using an app. For digital interactive systems, the human-computer interaction interface is the main channel for information transmission and functional operation between staff and system equipment [6]. Interactive experience is the most direct experience for users during the process of using an app. The design of an app incorporating AI technology requires accurate, clear, and intelligent generation of portrait information. Users can analyze, select, and purchase products based on the AI generated results. Not only can it intuitively understand all the information of the product, observe the details of the product in 360 degrees without any dead corners, but it can also simulate usage scenarios, usage methods, etc., improving the user shopping experience.

5. INTERFACE DESIGN OF INTELLIGENT SHOPPING APPS BASED ON USER EXPERIENCE

The authors have analyzed the visual experience, emotional experience, and interactive experience of user experience. After discovering the integration of AI intelligent technology into the app interface, optimizing and upgrading its color matching, function distribution, etc., it can effectively

improve the user's efficiency and interaction with the product, and enhance the overall user experience when using the app. Taking the self-



Figure 1 LOGO Design.

5.1 Analysis of User Needs

Before designing the interface of this app, market analysis has been first conducted to determine the

designed intelligent shopping app "Wuxian" as an example, the icon of the app is shown in "Figure 1".

target customer group. Through market customer visits and surveys, people can understand the needs of modern and contemporary people when using online shopping apps.[7] The authors observe and analyze a series of psychological activities, purchasing needs, and shopping behaviors of different users before purchasing items, and construct a virtual model of user shopping behavior based on this, as shown in "Figure 2". The analysis can lay a solid foundation for the design of intelligent shopping interfaces based on user experience in the future.

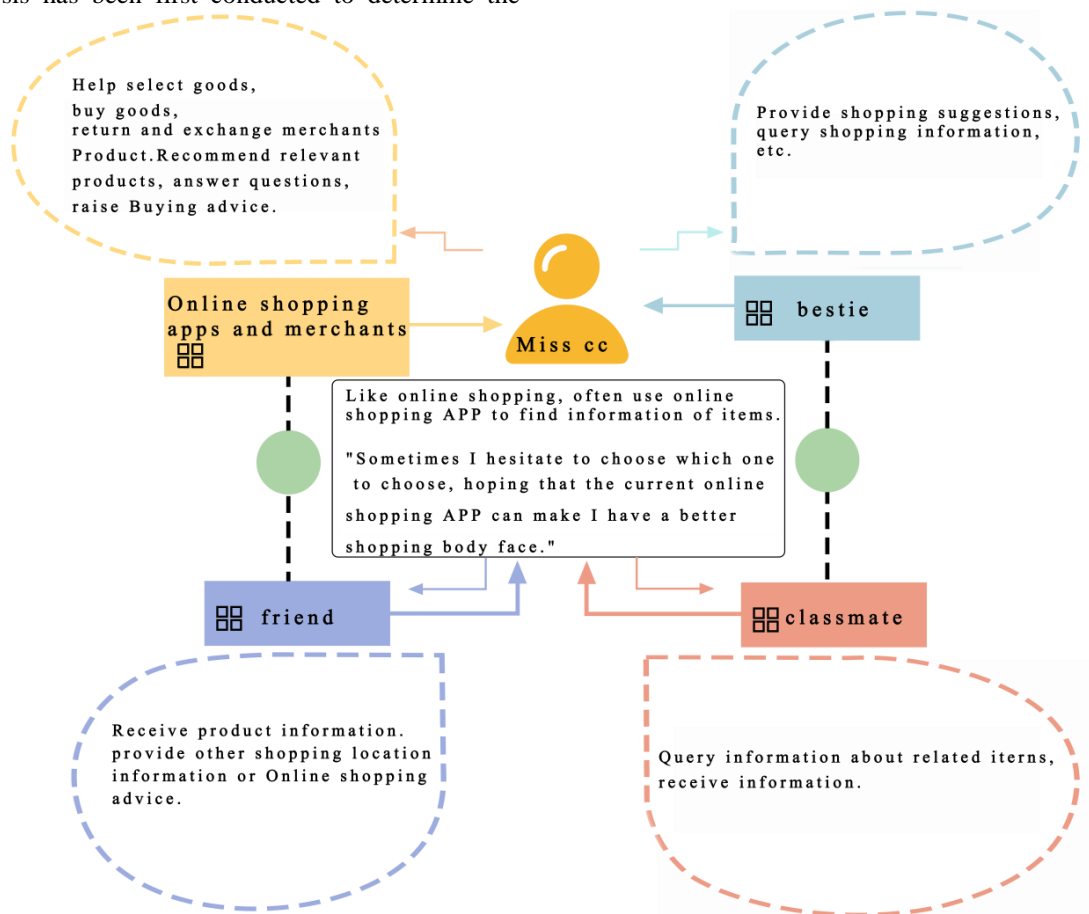


Figure 2 Interactive model.

Through the construction of virtual models, it can be seen that users mainly purchase goods through two ways when they have the desire to purchase: online purchase and offline purchase. Offline purchases are made by going out to physical stores with others or obtaining product information through introductions from others.

Online purchases, on the other hand, involve using online shopping apps. The first method of purchasing goods requires a longer time and many stores, making it difficult to find the target product at a glance. It requires visiting multiple stores or markets to select the desired product. Choosing to purchase items through online shopping apps is

more convenient and efficient, taking less time and improving purchasing efficiency. Based on this model, the target group has been further identified, and the purchasing behavior patterns of different groups of people have been studied and analyzed, as shown in “Figure 3”.

After the above analysis, it is found that online shopping apps can break the limitations of time and space, allowing users to shop anytime and

anywhere they want, and buy whatever they want. At the same time, during the use of the app, users hope to enhance interaction with the app, make the app functions more intelligent, efficient, modern, comprehensively reflect product information, intuitively observe product details, etc., so that users can purchase products more targetedly and purposefully, and obtain a better purchasing experience.

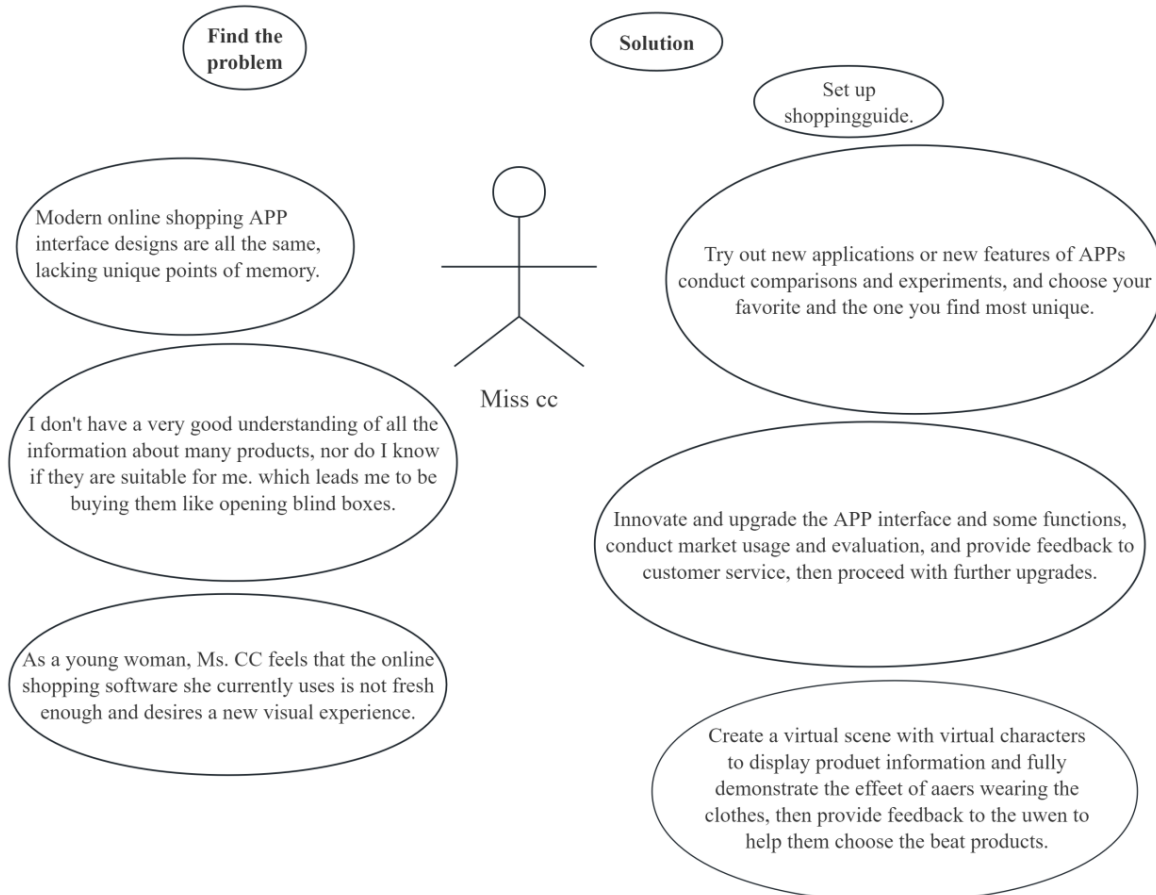


Figure 3 Behavior pattern analysis.

5.2 APP Framework Design

Framework design is the interface process design of an app, which determines the basic functions, personalized design, and innovative points of an online shopping app through page process design. After analyzing the user's habits related to using the app, the interfaces and instructions that the user touches and makes when operating the app are arranged in the order of user operation, as shown in “Figure 4”.

According to the logical sequence, the direction indicated by the arrow was used to simulate in real

time the order in which users obtain information when using the smart shopping app. Through the flowchart, the sequential relationship between interfaces can be expressed very intuitively, providing users with accurate operation guidance, helping them understand the design concept of the smart shopping app, and ensuring that users can easily get started using the app and develop a strong liking and interest in it.

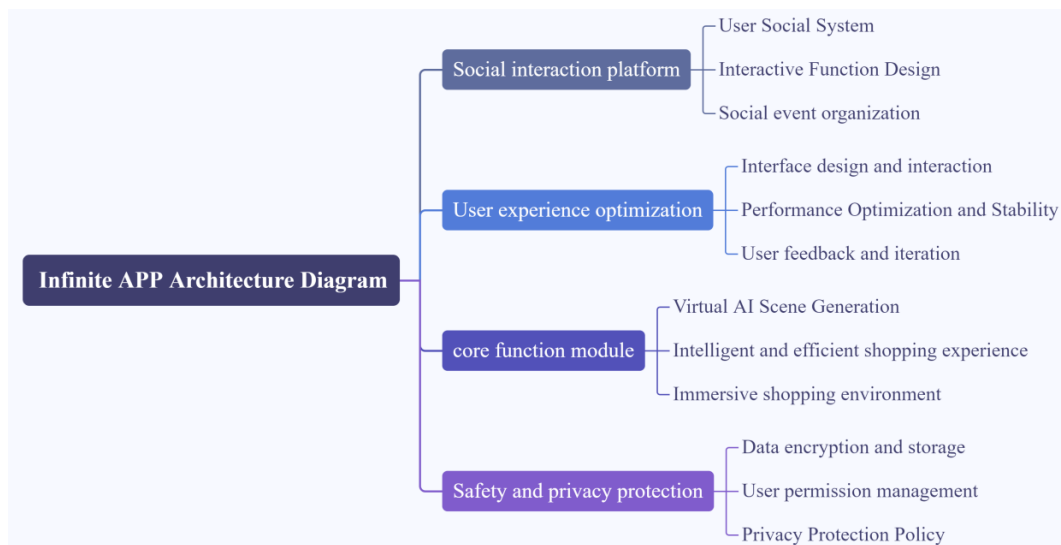


Figure 4 Wuxian interface design framework diagram.

5.3 APP Prototype Design

Prototype design is a key activity in interactive system design [8]. After simulating the user's usage process and sorting out its functions, the authors have initially established a prototype of an intelligent shopping app [9]. Key information and functions are placed in the most prominent position on the login or registration page for easy operation; The icon design adopts modernity as the design concept, as shown in "Figure 5". In the design process, the authors always

take the user's perspective to enhance the interaction between users and the app, improve user efficiency, shopping efficiency, and shopping experience. Users can use artificial intelligence technology to generate virtual portraits on the page, and during the shopping process, they can use customized virtual portraits for online fitting and immersive clothing purchases. Each block has independent functions, and each block is interconnected and inseparable, to satisfy users' shopping needs and promote the development of online shopping.

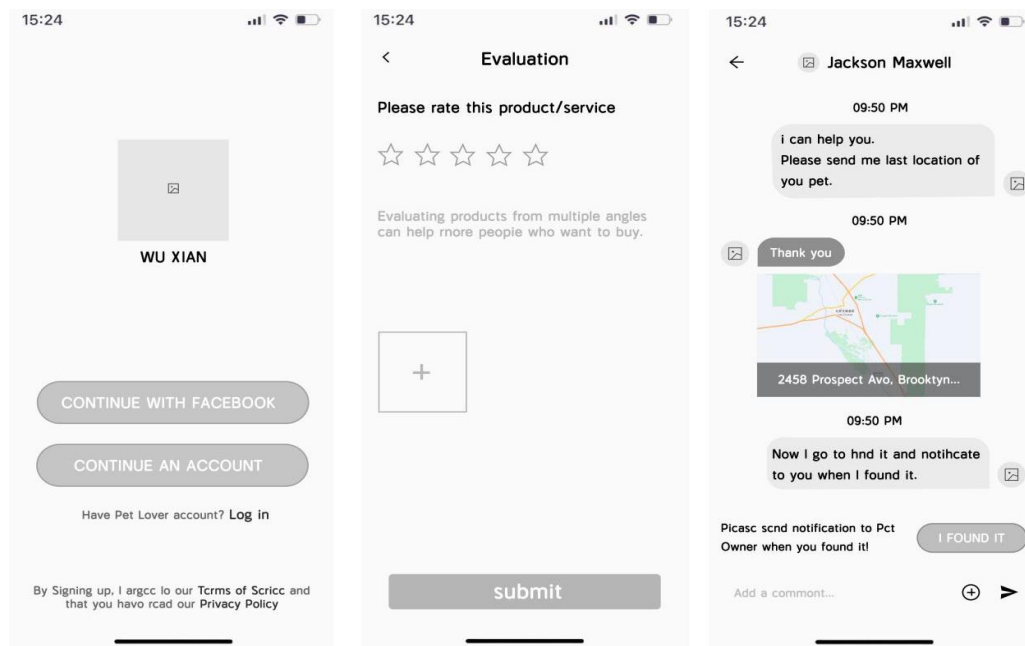


Figure 5 Low fidelity image.

5.4 APP Visual Design

Visual design plays a very important role in app interface design, and the first thing users encounter when using an app is its visual design. However, the interface design of most modern online shopping apps lacks personalized design and innovation. The interface design of smart shopping apps will make great innovations based on this, which will be refreshing. In the design process, the main design concepts are conveyed as a sense of intelligent technology, futurism, and modernity. It is necessary to create an intelligent shopping "metaverse" to improve users' online shopping efficiency, and an exclusive shopping virtual space for users to immerse themselves in the fun of online shopping.

5.5 Practical Application

Based on user experience, the interface design of intelligent shopping app takes user visual experience, user emotional experience, and user interaction experience as the starting point. The authors analyze whether the use of patterns, colors, and other content in the app is appropriate. In the design of the app interface, emphasis is placed on modernity, technology, and intelligence. In terms of usage, multiple personalized modes are introduced to guide users to use the app. Through high-quality service and humanized design, users can develop a sense of dependence and trust in the product.

5.5.1 Rationalization of User Visual Experience

A novel visual experience can attract users' attention and make them curious and passionate about the product during use. The authors modernize the layout, patterns, text, colors, and other aspects of interface design. When choosing colors for the "Wuxian" interface design of smart shopping apps, it is necessary to avoid overly dazzling and complicated colors, and instead choose colors that are comfortable, modern, and technologically intelligent. By combining different shades of light, dark, and pure gray colors such as blue and purple, it can create a mysterious and comfortable visual experience.

5.5.2 Diversification of User Visual Experience

The content of online shopping apps on the modern market is gradually increasing, covering a wide range and gradually becoming more powerful. However, most online shopping apps have uniform interface designs, which make people feel tired of aesthetics, lack product personality and innovation points, and have no memory points. Incorporating artificial intelligence technology to generate AI virtual avatars is a major innovation based on the existing foundation of online shopping apps. Users can try on clothes online based on their own virtual avatars, establishing an emotional bond between the product and the user in this way. ("Figure 6")

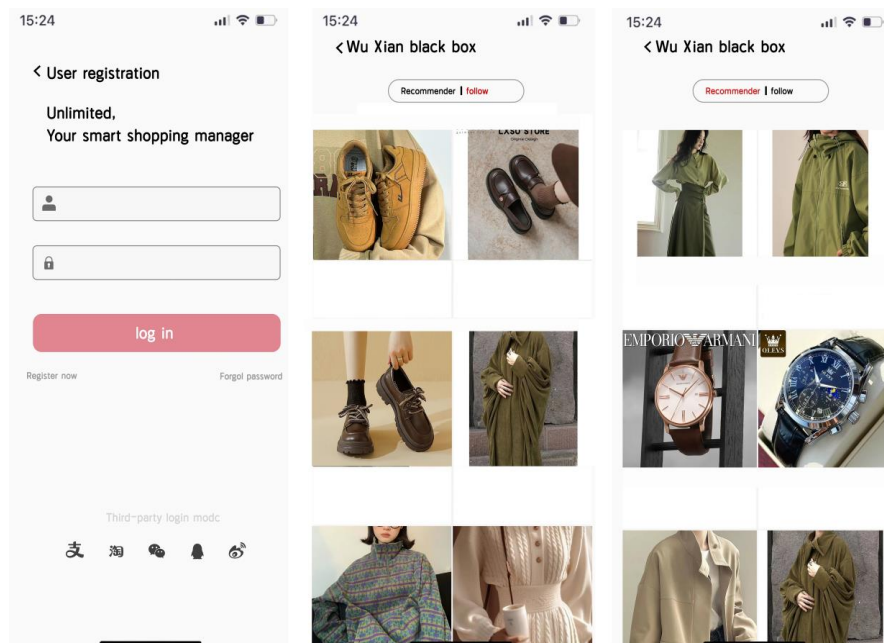


Figure 6 High fidelity image.

5.5.3 Humanization of User Visual Experience

In interface design, convenience and speed should be the main focus, and from the user's perspective, overly cluttered and cumbersome interfaces should be avoided, which may prevent

users from operating quickly and reduce shopping efficiency. There is a must to design complete work instructions based on the important functions of the app to facilitate modern users' online shopping, winning hearts and markets with thoughtful service. ("Figure 7")

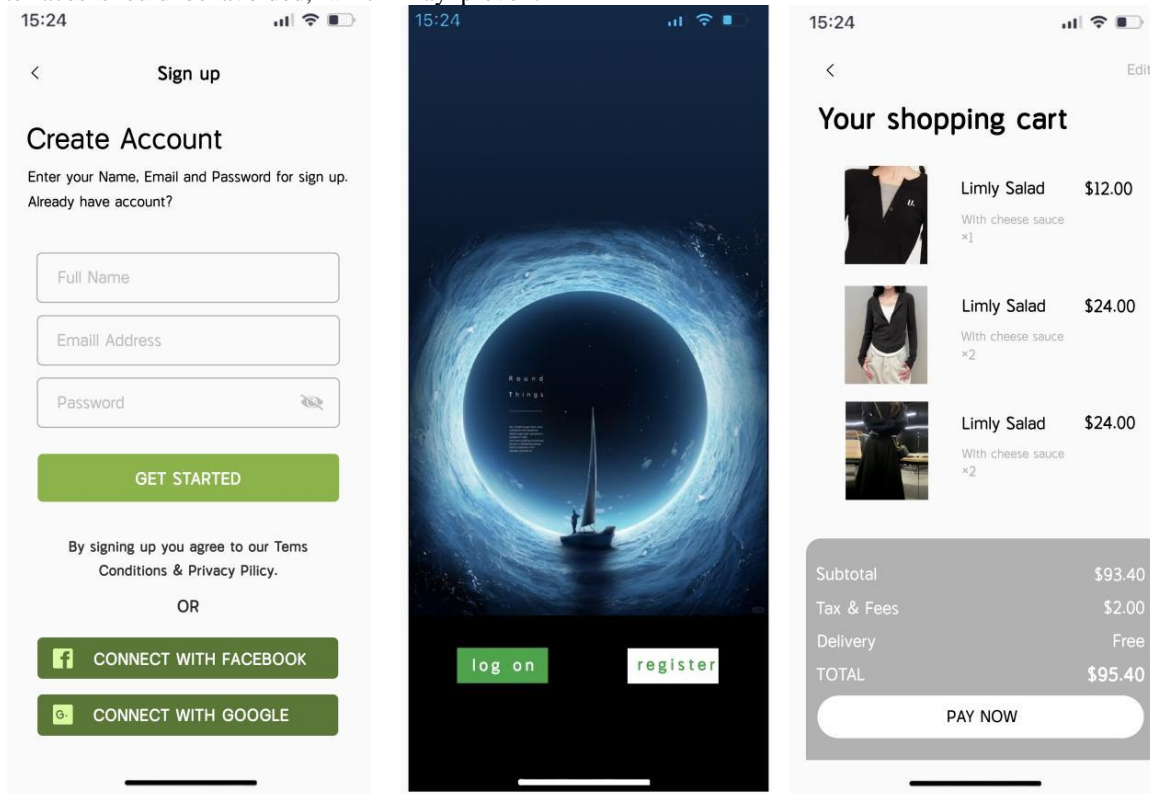


Figure 7 Function interface.

6. CONCLUSION

As one of the important factors determining whether modern app interface design meets contemporary needs, user experience has an increasingly significant impact on the development of modern apps. The future design of intelligent apps will increasingly focus on the design concept of "people-oriented". The interface design of intelligent shopping apps integrated with artificial intelligence technology meets modern market demands and conforms to the development of the times. In the process of app design, it should also be more personalized, innovative, and modern, bringing users a better user experience. In the future, the interface design of online shopping apps will also conduct more comprehensive research and analysis on the psychological needs and usage habits of different users, gradually optimizing the design of the app.

ACKNOWLEDGMENTS

Funding: The paper is supported by the 2022 Sichuan University Student Innovation and Entrepreneurship Training Project (S202213672036X) and the 2023 Research Project of Sichuan Private Education Association (MBXH23YB499).

REFERENCES

- [1] LI Hui, LI Tao. Application of Artificial Intelligence Technology in Footwear Industry [J/OL]. China Leather, 1-5 [2024-08-26]. <https://doi.org/10.13536/j.cnki.issn1001-6813.2024-009-011>.
- [2] Lin Ziqin, Huang Hongyang. Application Research of Virtual Fitting Technology in Clothing Online Shopping Platform [J].

- Investment and Cooperation, 2020, (05): 146-148.
- [3] ZHANG Ying, YANG Liang, SHEN Yanfang. APP Interface Design and Mobile Interactive Experience Design [J]. Modern Electronics Technique, 2020, 43(23): 182-186.
- [4] Qiu Zhiru, Liu Mengyan, Yang Shujun. Shopping APP interface design based on user experience — Take the interface design of crazy business APP as an example [J]. China Packaging, 2024, 44(07): 101-104.
- [5] WANG Congcong, YANG Mei, ZHANG Yehui. Navigation Interface Design of Children's Audio Book APP Based on Multimodal Perception [J]. Industrial Design, 2024, (05): 108-112.
- [6] Liu Tao. Design of Navigation Display Interface for Agricultural Machinery Based on Visual Attention Mechanism [J]. Journal of Agricultural Mechanization Research, 2024, 46(11): 110-115+190.
- [7] CAO Guo-zhong, SHI Kai, WANG Ting. Research on user requirement analysis method based on multidimensional sensibility [J]. Packaging Engineering, 2019, 40(06): 119-127.
- [8] HE Liwen, SHAN Boxue, WANG Dangxiao, WANG Yunbe. Design of Interactive Prototyping Tools for Social Affective Haptic Interfaces [J]. Packaging Engineering, 2024, 45(12): 56-66.
- [9] LV Shiyang, DING Lingyun, The Symbiosis of Emotion and Intelligence in Industrial Design [J]. Industrial Design, 2024, (07): 102-105.
- [10] PIAO Meishan, HUANG Baofeng, QING Feng. Research on user experience of generative AI service ERNIE Bot [J]. Technology and Market, 2024, 31(06): 173-176.