

Retraction

Retracted: Cultural Product Appearance Design Based on Improved Multiobjective Optimization Algorithm

Security and Communication Networks

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

- (1) Discrepancies in scope
- (2) Discrepancies in the description of the research reported
- (3) Discrepancies between the availability of data and the research described
- (4) Inappropriate citations
- (5) Incoherent, meaningless and/or irrelevant content included in the article
- (6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

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- [1] W. Zhu and S. Han, "Cultural Product Appearance Design Based on Improved Multiobjective Optimization Algorithm," *Security and Communication Networks*, vol. 2022, Article ID 7063303, 9 pages, 2022.

Research Article

Cultural Product Appearance Design Based on Improved Multiobjective Optimization Algorithm

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Cultural creative products are important carriers of cultural heritage and play a very important role in the inheritance, innovation, and dissemination of culture. At present, cultural and creative products emerge in an endless stream with a variety of patterns. No matter in function or form, most of them still follow the traditional design method, and the product style is relatively single, the identification is not strong, and the heat is not enough. Therefore, in the design of cultural and creative products, it is far from meeting the requirements of the flexible and changeable market to only use culture to conform to the consideration of product form. Instead, it should also take into account the personalized and diversified needs of users for products and carry out in-depth practical research on their functionality and imagery. Therefore, this study proposes an improved multiobjective optimization algorithm, combined with the VGG (visual geometry group) model, to study and design the appearance characteristics, color collocation, and design aesthetic feeling of cultural and creative products. This study hopes that through the continuous attempts of cultural and creative product design, people can feel the splendid cultural connotation civilization again and provide new ideas and good for the advanced theme design of traditional Chinese culture.

1. Introduction

In the past 30 years, China's cultural entrepreneurship has experienced a slow start to a rapid development period and gradually developed into a pillar industry, playing a positive role in promoting China's economic and industrial transformation and upgrading the whole process [1, 2]. However, nowadays many local cultural and creative industries have appeared in a kind of blind development, and the development between quality and quantity is not coordinated [3, 4]. Since China is experiencing the third upgrading of consumption structure, which drives the economic growth of cultural industry, the cultural industry has gradually become a new driving force of economic growth. People's consumption focus gradually shifts from material life to spiritual and cultural life, consumers pay more and more attention to culture and life experience, cultural consumption increases rapidly, and the cultural quality and aesthetic taste of the people are greatly improved. Cultural

products play an important role in cultural life, and cultural and creative products gradually come into the public's view, leading to people's cultural consumption and becoming a new growth point of cultural consumption. At the same time, more and more young people pay attention to the aesthetics of life. In daily consumption, they will see their cultural value and pursue the cultural identity reflected in the products.

The development of tourism cultural and creative products breaks through the conservative production mode of traditional tourism commodities from the perspective of market and industry and greatly improves the economic benefits and market competitiveness of traditional tourism commodities. It is one of the important driving forces to promote the publicity of local characteristic culture and drive local tourism economy, which have distinct national characteristics and regional characteristics. This natural cultural difference can make up for the lack of cultural innovation and the homogenization of regional

development in China's cultural and creative industry to a certain extent. Regional culture mainly refers to the overall achievements and achievements of various materials and spirits shaped by the local people in a certain country or region through physical activities and mental work in the long-term social and historical progress and development, which are continuously enriched, accumulated, developed, and improved. Regional cultural development is closely related to local social and economic levels, scientific and technological achievements, and core values. At present, more and more designers are committed to taking regional cultural elements as the entry point for innovative design of tourism in the whole of China and even the world [5, 6]. The construction of cultural soft power has become an important part of the competition among countries around the world and is also an important measure for a country to enhance its cultural confidence and enhance its sense of national identity. Cultural heritage contains huge cultural resources and is a valuable wealth for the inheritance and development of national culture. The state and government attach great importance to the education, inheritance, and development of China's cultural heritage. At the same time, the state is now actively advocating cultural confidence, and the state has given a lot of policy support and financial input to the protection, publicity and re-innovation of traditional culture, cultural heritage, and the creativity of products.

However, many products are still in the initial stage of development, with single types and similar forms, ignoring their own characteristics and failing to interpret cultural connotations. Having something is better than having no embarrassment. It is difficult to stimulate consumers' desire to buy, and without dissemination, it is impossible to carry forward the cultural value behind cultural creation. What is more, they blindly follow the trend to develop so-called popular products, cater to the capital and market, and attract attention with spoof, losing the nature and character of culture. Due to the change in lifestyle, the market of cultural and creative products further shows an expanding trend. Tourism is neither no longer a simple enjoyment, nor is the way for tourists to buy local travel products. At present, our cultural heritage creative product design research is relatively weak, creative product design is relatively backward, lack of effective innovation inheritance mechanism, so can not well meet the current consumption demand. Due to the fast development of the Internet, a lot of online shopping platforms have emerged, which have also broadened far away, making it possible to find desired products without leaving home. On the other hand, it can also be concluded that creative products and related peripheral markets are very fast, which indirectly explains why people are willing to pay for so many products recognized by the public [7, 8].

Although China's cultural and creative product market has achieved certain success in some museums and obtained certain economic benefits, the current market of cultural and creative products in China is not very perfect, the development of product industry and design between different regions is not balanced, and the design works cannot be compared with excellent cultural and creative products abroad. However, in recent years, all circles of society, design

companies, and teachers and students in colleges and universities pay more and more attention. The academic papers on cultural and creative products also present a rising trend. Increasingly frequent international exchanges accelerate the collision and integration of different cultures in the world, and cultural influence plays a gradually prominent role in promoting economic strength. The level of cultural creativity of a country or region directly or indirectly affects the local economic growth and industrial development [9, 10]. The rise of China's cultural industry has attracted a large number of talents to participate in the cultural and creative field, committed to the transmission and development of local culture. With the acceleration of the pace of life and the progress of science and technology, smart terminals such as mobile phones and computers have brought great convenience to people's lives.

At present, the research on this field in China started late. However, after the commercial value and cultural communication value of computer image processing technology were discovered in recent years, China began to focus on the research on computer image processing technology, becoming an emerging research topic and has attracted wide attention. Whether it is to solve complex engineering design problems or painting product problems, computer-aided technology can be very effective. The computer provides a new way of thinking to solve problems for design, and the uncertainty of cultural and creative product design also brings infinite possibilities to computer. Based on this, this study aims to explore how to extract and apply the style by combining computer technology, so as to provide more possibilities for the secondary creation [11, 12]. How to retain the distinctive design elements and find a new computer technology to inherit and develop, so that domestic and foreign tourists can understand the profound regional cultural charm of the product. Therefore, the product design based on computer image technology becomes an important direction of this paper.

2. Related Work

Cultural and creative products are influenced by local cultural elements, the aesthetics of the current audience, the influence of celebrity culture, and the special meaning of symbols and graphics. Designers integrate these factors into cultural and creative products. In the first stage of "cultural creation," it is mainly manifested as "cultural industry," which is the process of cultural industrialization and commercialization. After this round of reform and exploration, it is found that not all cultures can become industries. In the second stage, "cultural industry" gradually changed into "cultural and creative industry," paying more attention to creative content on the original basis and turning creative content into products for public consumption. The concept of "cultural and creative industry" promotes this round of Internet economy, especially the development of Internet creative economy. In the third stage, cultural and creative industries gradually expand their scope, from the simple cultural field to gradually penetrate every aspect of people's life. Today, people's consumption and experience of life are

loaded with increasingly strong cultural needs, aesthetic needs, and spiritual needs, and more and more cultural values are attached to traditional products. Culture and life are closely integrated through cultural and creative industry, which is the performance of cultural and creative industry entering a new period [13].

Cultural Content: designers design creative products, creative images, and related derivatives with different cultural themes according to different cultural contents, for example, cultural and creative products of the Summer Palace, the Forbidden City, and Dunhuang. **Product Carrier:** the product carrier is the form of the product itself, such as the Palace Museum Taobao two-color watchband wristwatch, and the cultural creative content of the product itself is removed. At the same time, foreign scholars have conducted in-depth and systematic studies on localism and other regional cultures, showing the great significance and development potential of studying regional cultural elements. The place is a small part of a whole, since it has so many unique features that it can form a great whole. At present, with the rapid economic and social development, each region is constantly emitting its own unique charm. The study of regional culture is to provide impetus for the cultural development of these regions with their own characteristics.

Many scholars have carried out some early studies on the design of tourism cultural and creative products and analyzed its influential factors on the basis of putting forward its innovative concept [14, 15]. In recent years, the development of products has become the focus of attention of all countries in the world, and they also give great attention and support. Many developed countries regard open products as an important factor and component of leading the global national economy and cultural industry, which provides a solid and effective guarantee for promoting the development of various regions and countries in the world [16, 17]. Opened free of charge in 2000, the museum has carried out a series of research and development projects on some of its star collections. Various characteristic tourism and cultural and entertainment products of Mount Fuji in Japan skillfully integrate the traditional cultural image of Mount Fuji with the necessary daily necessities in people's daily life, such as Mount Fuji oil dish and cherry blossom combination dish. Nowadays, cultural tourism in Japan is developing rapidly, and there are shops representing local cultural characteristics in almost every scenic spot. And to draw a variety of products in different styles, is considered to be the most cultural characteristics of Japan's products. Japan also has a special regional culture, that is, animation culture. Anime culture is popular among young Japanese. Animation, as one of the cultural and creative industries, provides impetus for the development of local tourism and effectively drives the development of the Japanese national economy [18, 19].

In addition to Japan and the United Kingdom, South Korea has absorbed a lot of foreign cultural factors in its tourism cultural and creative products and formed its own characteristics by combining local regional cultural

characteristics and cultural characteristics. Most Korean products are mainly derivative products in the form of "IP." Derivative products in the form of "IP" are a series of products derived from a certain culture. IP is a popular network language at present, and they all have their own ownership rights. They are the crystallization of creative wisdom achievements of each right holder and the independent intellectual property rights and wealth rights of each right holder. The development of Korean digital media promotes the development of Korean animation industry, which differs from Japanese animation in that Korean cartoon images are more favored by consumers. This derivative culture also promotes a series of famous cartoon image brands to a certain extent. For example, among the cultural and creative products of the Louvre Museum in France, Mona Lisa has the highest appearance rate. Mona Lisa must not be invariable in front of the majority of consumers, so it will lose its appeal to the majority of consumers. Today, the Louvre has created a guidebook for children about the scenery of the Floating Palace. A cute, playful kitten quickly becomes the book's main character, and Mona Lisa quickly becomes a tour guide in these pictures, explaining the kitten's tour of the various period art collections in a playful way. Through this book, consumers can see a different Mona Lisa, different from the picture of her, but integrated into the cultural products. In addition to the replica, useful Louis XIV's head pattern, printed on the plate, after one or two years of use deliberately damaged the plate and then replaced it. The successful development of South Korean Line derivatives has provided a lot of innovative ideas for China, because each cartoon image of Line Friends is personified and full of cartoon vigor and vitality. They have their own personality and characteristics, and each has its own life circle and design circle, representing a certain group of people in their own life. Therefore, it has captured the heart of a large number of young consumer groups [20, 21].

At present, in the world, the development of cultural creativity is more prominent in Britain, the United States, South Korea, Japan, Italy, Germany, Northern Europe, and so on. Britain is the first country to promote the industrialization of cultural creativity [22, 23]. They attach importance to design and believe that design can increase the added value of products. The research on cultural and creative products started late in China. In 2017, under the policy of stimulating the cultural innovation and creativity of the whole nation, the number of literature studies on cultural and creative products increased year by year. The number of literature studies on "cultural and creative products" was searched on CNKI by keyword, from 554 in 2017, 837 in 2018, and 1330 in 2019. From this, it can be seen that the research on cultural and creative products develops rapidly. Research on the development and design literature of Chinese creative products can be divided into the following categories: the first category is museum-themed cultural and creative product research, the second category is regional culture-themed cultural and creative product research, and the third category is universities, urban space, libraries, and other cultural and creative

product research [7, 8]. However, at present, the design scheme is only evaluated by the subjective experience of designers and museum staff, which is not systematic and convincing. In addition, products are different from other products because of their cultural value.

Through the appearance design model of cultural and creative products, it evaluates the cultural value contained in product design, understands consumers' perception and preference for product cultural value, enhances the targeting of design, improves design efficiency, and provides systematic reference for design judgment and decision-making. Through timely evaluation and feedback, problems such as superficial design, lack of features, and neglect of market demand for some cultural and creative products are improved, which promote culture through products, enhance cultural image, build cultural brand, and promote the steady and sustainable development of culture. From the perspective of cultural value, the design method for the appearance of cultural and creative products is expounded, and the evaluation index system is put forward. At the same time, the weight of evaluation index is determined through investigation and calculation, and the design evaluation model is constructed. This study systematically combs the evaluation indexes of cultural and creative products of museums at all levels, highlights their cultural value, realizes quantitative, systematic, and refined evaluation, and avoids the defects of empirical evaluation. Deep learning and optimization algorithm are innovatively combined and applied to design model construction, which enriches the theory and method of appearance design. Finally, the main contributions of this study are as follows:

- (1) This study is the first to introduce the optimized VGG method into the cultural product appearance design field.
- (2) The research in this study not only has good theoretical results but also has great potential application value.

3. Proposed Design Method of Cultural and Creative Products by Improved Multiobjective Optimization Algorithm

3.1. VGG Model Introduction. This study uses the feature extraction model of VGG (visual geometry group), and the advantage of this method lies in its deep learning architecture, which can extract image features very well and solve the problem of appearance design for cultural and creative product, which is shown in Figure 1. Since the VGG model has been relatively mature, its theoretical knowledge and practical application can be easily found in the existing literature. Therefore, limited to the reasons of length, this study will not be repeated here. Although the structure of the VGG model can be designed in many ways, the model design chosen for this article is shown in Figure 1, mainly because it can achieve good model performance under this setting.

The function of the convolution layer is shown as follows:

$$\text{CONV}_{(ij)} = \sum_i^{m-1} \sum_j^{n-1} u_{ij} \times w + b \quad (1)$$

$+ b (i = 1, 2 \dots m - 1; j = 1, 2 \dots n - 1).$

Here, u_{ij} is the input image, m and n are the sizes of the input image, w is the size, and b is the bias constant. $\text{CONV}(ij)$ is the output after convolution.

Then, the description of sigmoid function is as follows:

$$f(x) = \frac{1}{1 + e^{-x}}. \quad (2)$$

The tanh function is as follows:

$$f(x) = \frac{e^x - e^{-x}}{e^x + e^{-x}}. \quad (3)$$

Since formula (3) is a tanh function, the range is the entire set of real numbers. The ReLu function is as follows:

$$f(x) = \max(0, x). \quad (4)$$

The leaky-ReLu function can solve the above problem.

$$f(x) = \begin{cases} x, & x \geq 0 \\ \alpha x, & x < 0 \end{cases} \quad (5)$$

Thus, the corresponding equations of sig and tanh are as follows:

$$\begin{cases} \text{sig}(x) = \frac{1}{1 + \exp(-x)} \\ \text{tanh}(x) = \frac{\exp(x) - \exp(-x)}{\exp(x) + \exp(-x)} \end{cases},$$

$$h_{w,b}(x_i) = \begin{bmatrix} p(y_i = 1x_i; w, b) \\ p(y_i = 2x_i; w, b) \\ p(y_i = 3x_i; w, b) \\ \dots \\ p(y_i = nx_i; w, b) \end{bmatrix} = \frac{1}{\sum_{j=1}^n e^{w_j x_i + b_j}} \begin{bmatrix} e^{w_1 x_i + b_1} \\ e^{w_2 x_i + b_2} \\ e^{w_3 x_i + b_3} \\ \dots \\ e^{w_n x_i + b_n} \end{bmatrix}. \quad (6)$$

Finally, the cross-entropy (CE) formula is as follows:

$$\text{loss} = -\frac{1}{m} \sum_{j=1}^m \sum_{i=1}^n y_{ji} \log(\hat{y}_{ji}). \quad (7)$$

The error calculated from the CE function is shown as follows:

$$\theta := \theta - \alpha \frac{\partial}{\partial \theta} J(\theta). \quad (8)$$

The description of a typical Adam optimizer is given as follows:

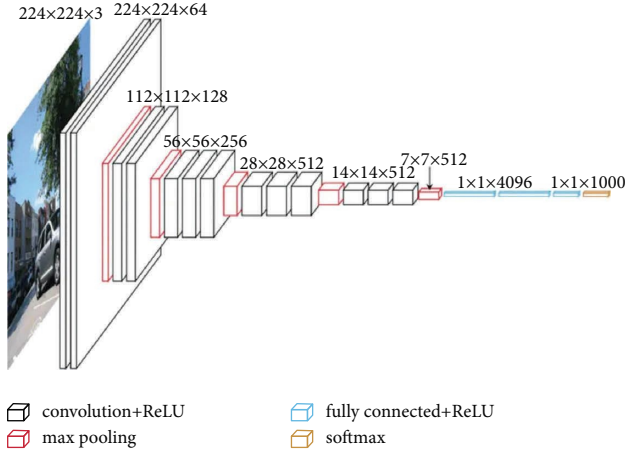


FIGURE 1: Structural framework of the VGG model.

$$\begin{aligned} m_t &= \beta_1 m_{t-1} + (1 - \beta_1) g_t, \\ v_t &= \beta_2 v_{t-1} + (1 - \beta_2) g_t^2. \end{aligned} \quad (9)$$

Therefore, the gradient descent update process is shown as follows:

$$\theta_{t+1} = \theta_t - \frac{\alpha}{\sqrt{v_t + \epsilon}} m_t. \quad (10)$$

3.2. Improved Optimization Algorithm. The key technologies of data processing represented by the VGG model can no longer efficiently and timely process the data generated by cultural product. To solve this problem, the optimized VGG model is introduced in this study. Particle swarm optimization (PSO) is simple and easy to solve, but it is prone to local extreme points, low accuracy, slow convergence, and stagnation. In this section, the differential perturbation is introduced into the PSO to form the differential perturbation particle swarm optimization (DPPSO) algorithm, which makes use of the advantages of fast convergence speed and good global performance of difference, overcomes the shortcomings of low precision and local optimal caused by the use of PSO, and builds an optimized VGG model. The multiobjective optimization model is as follows:

$$\begin{aligned} \min f_1(x_1, x_2), \\ \max f_2(x_1, x_2). \end{aligned} \quad (11)$$

s.t.

$$\begin{aligned} p_1 &< g_1(x_1, x_2) < q_1, \\ p_2 &< g_2(x_1, x_2) < q_2, \\ p_3 &< g_3(x_1, x_2) < q_3, \\ p_4 &< g_4(x_1, x_2) < q_4. \end{aligned} \quad (12)$$

Then,

$$\begin{aligned} 120 &< x_1 < 180, \\ 120 &< x_2 < 180, \end{aligned} \quad (13)$$

where f_1 represents energy consumption target, f_2 represents the output target, and g_1, g_2, g_3, g_4 represent the packaging quality of 4 indicators: crushing strength, wear strength, drop strength, and compressive strength, respectively. The optimization algorithm proposed in this study is used to optimize the parameters of VGG model to achieve the best model performance.

3.3. The Framework of the Proposed Method. Based on the above discussions, the optimized deep neural network and its application in fine sowing of crops are shown in Figure 2. It mainly includes input of cultural and creative product pictures, data preprocessing, image feature extraction and analysis, and optimal design results. In conclusion, it can be seen from the results of Figure 2 that the proposed method has reasonable flow and rigorous logic.

4. Experimental Results and Analysis

4.1. Data Collection and Processing. In this study, customers of cultural and creative products were surveyed by electronic questionnaire and paper questionnaire during April 1 to April 30, 2022. The questionnaire consists of two parts. The first part is the basic information of the interviewees, including gender, age, occupation, and income. The questions are presented in the form of objective multiple-choice questions. The second part is the aesthetic value of the appearance of cultural and creative products, including cultural value, innovation value, aesthetic value, functional value, situational value, social value, and perceived cost of 7 dimensions, a total of 20 measurement topics. During the survey, a total of 360 questionnaires were sent out, and 336 valid questionnaires were received with an effective recovery of 93.3%. The total number of valid questionnaires met the research requirements. The basic information of customers collected in this survey includes gender, age, education level, and monthly income. The details are as follows.

Gender: among the 360 valid questionnaires collected in this survey, 244 are female, accounting for 67.8%. There are 116 males, accounting for 32.2%, indicating that there are significantly more females than males in the customers of cultural and creative products. **Age:** in the age composition of the respondents, the number of people aged 18–25 and 26–35 is the largest, totaling 239 people, accounting for 66.5%. The number of people aged under 18 and over 56 is the least, accounting for less than 9%. **Educational Background:** in terms of the educational background composition of customers of cultural and creative products, the educational background level of respondents is relatively high in general, and the number of people with college degree or above accounts for more than 70%. This result indicates to some extent that people with the higher educational background are more willing to pay attention

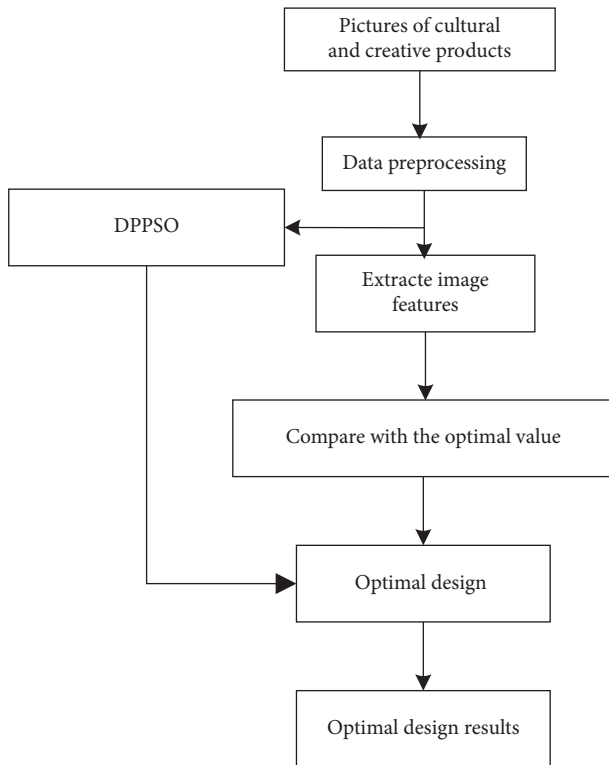


FIGURE 2: Schematic diagram of the proposed design scheme.

to and buy cultural and creative products. Monthly Income: among the total 360 samples, the number of people with a monthly income of 1,500 yuan is the least, accounting for only 4%. The number of people with the largest monthly income of 6,000–8,000 yuan is 154, accounting for 42.9%.

4.2. Experimental Result Analysis. To demonstrate the effectiveness of the model, Figure 3 shows the factors influencing the popularity of cultural and creative products in the market. As can be seen from the figure, appearance design is the most influential factor, accounting for 45.4%. Therefore, it is necessary to conduct in-depth research on the appearance design of cultural and creative products. Prices and materials accounted for 35.7% and 9.3%, respectively. Therefore, they are also the main factors affecting the popularity of cultural and creative products in the market. Other factors accounted for the least, which is only 0.3%. From the above analysis, it can be seen that appearance design is the most important factor affecting the popularity of cultural and creative products in the market. Therefore, good appearance design results will greatly affect all aspects of the product.

As can be seen from the above paragraph, appearance design is the biggest factor influencing the popularity of cultural and creative products. To enrich the diversity of the appearance design of cultural and creative products,

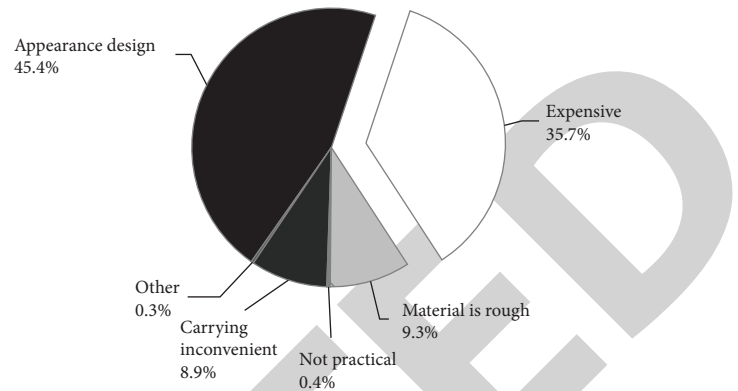


FIGURE 3: Factors influencing the popularity of cultural and creative products.

Figure 4 shows the requirements of different age groups for the appearance design of cultural and creative products.

Furthermore, Figure 4 gives the demand of different age groups for the appearance design. As can be seen from the figure, people aged between 20 and 30 have the highest demand for the functions of products, while those aged between 30 and 40 have the lowest demand. The main reason is that older people are more likely to pay attention to cultural connotations in appearance design. In addition, the right side of Figure 4 shows that with the increase in age, customers pay more and more attention to the cultural artistic conception of cultural and creative products, which is consistent with the actual situation. From the above discussion, it can be seen that different groups have different needs for appearance design, so it is necessary to carry out targeted design for different age groups, so as to meet the needs of different customer groups to the greatest extent. The left and right axes of Figure 4 are reversed to better demonstrate the implementation results.

Based on the above results and to further demonstrate the evaluation methods of cultural and creative product design in different age groups (as shown in Figure 5), it can be seen from the figure that all groups mainly evaluate the appearance by means of seeing, hearing, touching, and smelling. Although the frequency of use of these techniques varies among different populations. Therefore, it is necessary to design the appearance carefully to meet the needs of most users.

After that, Figure 6 shows the feature extraction results of products with different design styles. As can be seen from the figure, for these three different design styles, most of the features extracted by the proposed method are evenly distributed between the upper and lower limits of the mean, and a few number of characteristic samples are distributed outside this interval, thus demonstrating the effectiveness of the new method in feature extraction for different design styles. However, in real scenarios, there are many different types of designs. Only the three most representative design styles (style 1, style 2, style 3) are selected here to verify the validity of the proposed method.

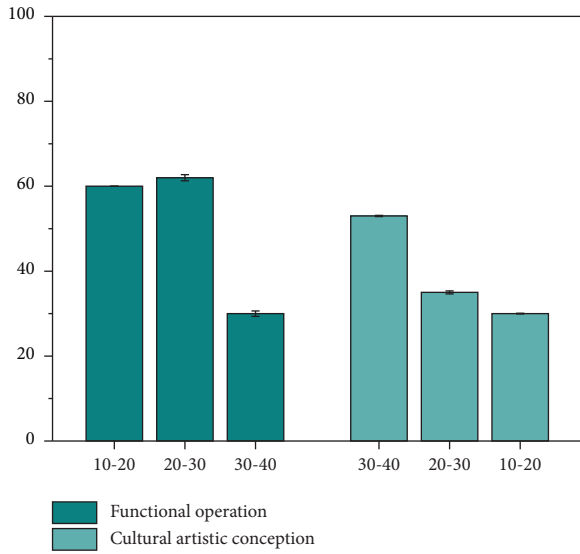


FIGURE 4: Demand of different ages for the appearance design.

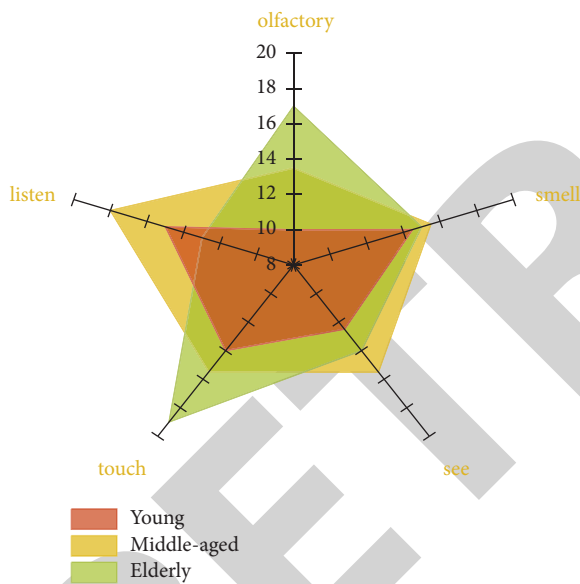


FIGURE 5: Evaluation means for the appearance of cultural and creative products by people of different ages.

Furthermore, Figure 7 shows the distribution of the appearance color of the designed products. As can be seen from the figure, different colors are distributed in different interval positions. The distribution of different colors has obvious differences, which shows that the color collocation is particularly reasonable, and will give people artistic beauty. In addition, different colors appear at different times in the appearance of products, and their distribution ranges are also different. Therefore, it is proved that the proposed method can design products with rich appearance and cultural content. Although there are many colors involved in the appearance design of cultural and creative products, here we only take the 5 most common colors as examples to illustrate.

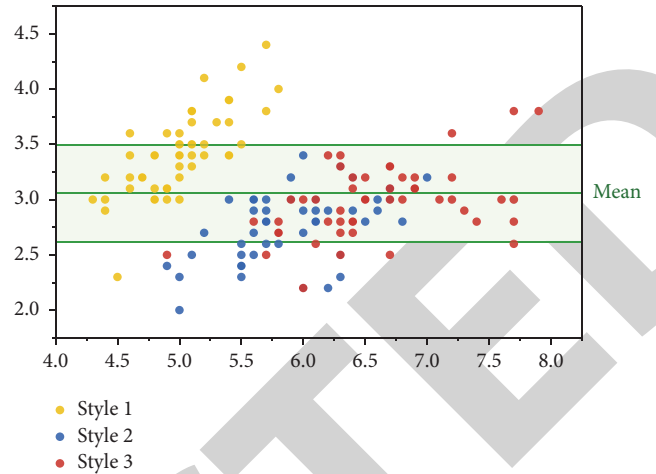


FIGURE 6: Feature distribution of different design styles.

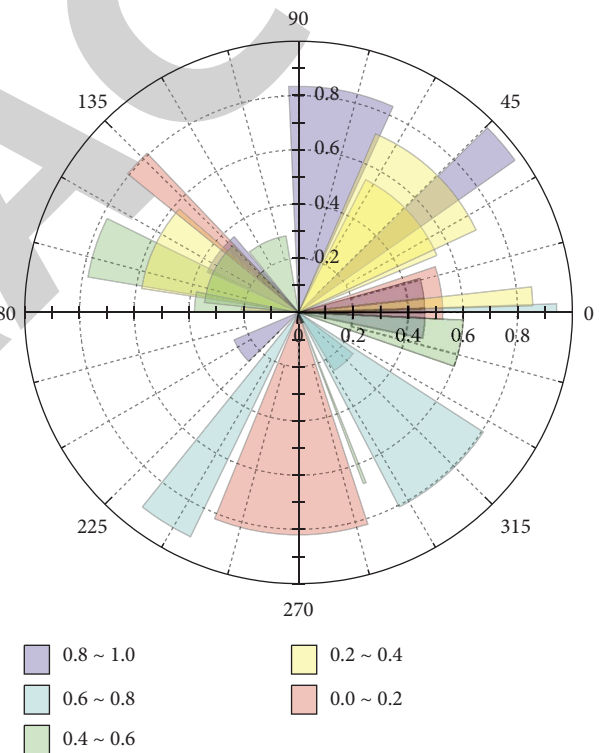


FIGURE 7: Distribution of the appearance color of the designed cultural and creative products.

Finally, Figure 8 presents the results of the appearance design of the products based on the method in this study. It can be seen from the figure that the designed appearance not only has a certain artistic beauty but also has cultural deposits. It is worth noting that the design patterns in different color backgrounds show a reasonable layout and color collocation. Therefore, the practicability and universality of the proposed method are proved from another angle.



FIGURE 8: Appearance design of cultural and creative products by the proposed method.

5. Conclusion

With the rapid development and strength of China's social economy, the climax of regional tourism has been set off in China, and the tourism industry has once again ushered in a new development opportunity. However, in the transformation and upgrading of the tourism industry, new changes have taken place in the new forms of tourism, and people have new and higher requirements on the content and mode of tourism. The development and promotion of products with rich connotation have become an important part of people's pursuit of quality tourism.

Through the investigation and analysis of the development status of cultural and creative products design, it is found that there is a big gap in the development of tourism cultural and creative products in various regions of China, and the common regional cultural visual elements and products have a low degree of integration, which is manifested as a single form, uneven good and bad, lack of innovation, and other problems. Therefore, this study takes the design of c products as an example, designs the VGG model based on the improved optimization calculation, puts it into practice in the design of products appearance, and finally obtains satisfactory design results. The research of this study is helpful to enrich the theories and methods of the appearance design of cultural and creative products and has potential application value. Since the evaluation is conducted from the perspective of cultural value, the evaluation content does not involve the product function, quality, benefit, and other factors. In the comprehensive evaluation, it can be combined with other evaluation dimensions. In the process of determining the index and weight of the questionnaire survey, the survey population is relatively limited, there are certain limitations, and there is room for optimization of the evaluation index and weight. At the same time, consumers' perception and understanding of product cultural value are very subjective, many factors will affect the evaluation results, and the quantitative method of evaluation model needs to be further deepened. Although the method in this study has achieved good performance, it is still a lightweight deep model. In the face of big data scenarios, depth-based resource optimization methods will be the focus of future research.

Data Availability

The datasets used during this are available from the corresponding author on reasonable request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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