Research on the Design Method of Traditional Decorative Patterns of Ethnic Minorities under the Trend of AIGC

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Abstract: With the increasing trend of globalization, the application of AIGC (Artificial Intelligence and Generative Design) in the field of design has been widely concerned. This paper takes the traditional decorative pattern design as the research object, and explores the design method of the traditional decorative pattern of ethnic minorities under the AIGC trend. First of all, the traditional decorative patterns of ethnic minorities are sorted out and sorted out, and their characteristics and traditional design principles are analyzed. Then, combined with AIGC related technologies, how to apply artificial intelligence and image computing technology to assist the design process is discussed.

1. Introduction

With the process of economic globalization and cultural diversity, the importance and influence of traditional decorative patterns of ethnic minorities in today's era are gradually increasing. Traditional decorative patterns are the treasures of minority culture, which contain the wisdom and imagination of the nation. However, due to the rapid development of artificial intelligence and image computing technology, the design methods of traditional decorative patterns are also undergoing changes. Therefore, this paper aims to explore the design methods of traditional decorative patterns of ethnic minorities under the trend of AIGC(Artificial Intelligence and Generative Design), in order to provide reference for designers and related researchers[1].

2. The characteristics and design principles of traditional decorative patterns of ethnic minorities

2.1. The characteristics of traditional decorative patterns of ethnic minorities

Traditional decorative patterns of ethnic minorities usually use bright colors, such as red, yellow, blue, etc., to highlight the beauty and vividness of the decorations. The traditional decorative patterns of ethnic minorities often contain rich symbolic meanings. These motifs may represent a certain animal, a plant, or a specific traditional mythological story, reflecting the inheritance and values of the national culture. The traditional decorative patterns of ethnic minorities are often dominated by geometric shapes and abstract patterns, such as triangles, circles, straight lines, etc.,

showing unique aesthetic concepts and decorative styles. The traditional decorative patterns of ethnic minorities are usually made by hand, such as embroidery, weaving, weaving, wood carving, etc., reflecting the skillful hands and wisdom of ethnic craftsmen. The traditional decorative patterns of ethnic minorities can not only appear on fabrics, but also can be applied to the production of various materials such as porcelain, pottery, silver ornaments, cloth shoes, etc., fully demonstrating the diversity and creativity of national culture.

2.2. The design principles of traditional decorative patterns of ethnic minorities

When designing traditional decorative patterns of ethnic minorities, it is necessary to ensure that the design is in line with the traditional culture and values of a particular ethnic minority. Respect and follow their beliefs, symbols, symbols, and symbolism. Understand and apply the artistic styles and forms of specific ethnic minorities, such as geometric figures, curves, abstract patterns, etc. Use colors and materials preferred by specific ethnic minorities, which are often related to the local environment, resources, and cultural characteristics. Balance and symmetry are pursued in the design, so that the decorative pattern as a whole presents a harmonious beauty. Respect for tradition, but also change and innovation. Combine traditional elements with modern designs to produce fresh and creative patterns. In addition, taking into account the sustainability of the decorative patterns, it is necessary to avoid excessive consumption of resources or negative impact on the environment. At the same time, it ensures that the pattern is easy to implement and manipulate in practical use. Most importantly, communicate and collaborate with representatives of the relevant ethnic minorities or experts engaged in relevant cultural studies to ensure that the design truly represents and respects their traditional culture.

3. The design significance of traditional decorative patterns of ethnic minorities under the trend of AIGC

AIGC technology can be used to digitize and protect the traditional decorative patterns of ethnic minorities, so that they can be preserved and inherited in the virtual world. This is especially important for some decorative motifs that are on the verge of being lost, helping to preserve and pass on the unique cultural heritage of ethnic minorities. AIGC technology can bring new design ideas and presentation methods to the traditional decorative patterns of ethnic minorities. Through computer graphics processing technology, traditional patterns can be innovatively designed, adding more modern elements, so as to achieve personalization and fashion. AIGC technology can apply the traditional decorative patterns of ethnic minorities to different fields, such as clothing, household items, artworks, etc. This can not only achieve cultural exchange and integration, but also promote the development of ethnic minority cultural industries and promote economic prosperity and social progress. In addition, with the help of AIGC technology, the traditional decorative patterns of ethnic minorities can be more widely disseminated and displayed, and are no longer limited to specific regions and groups. Through the Internet, mobile applications and other channels, these patterns can be seen and understood by more people, so as to expand the influence of traditional culture and promote the development of minority culture[2-3].

4. The design method of traditional decorative patterns of ethnic minorities under the trend of AIGC

Under the AIGC trend, the design of traditional decorative patterns of ethnic minorities uses artificial intelligence and generative design methods to create more unique and personalized patterns.

4.1. The data collection and analysis

Under the trend of AIGC, the design methods of traditional decorative patterns of ethnic minorities need to be collected and analyzed in order to provide basis and inspiration for generative design. First of all, samples of traditional decorative patterns of various ethnic minorities were collected, including patterns of clothing, fabrics, ceramics, architecture, etc. It can be obtained through museums, cultural heritage protection institutions, and the collection of works by ethnic artists. Additional samples can also be obtained through site visits and interviews with folk artists. The collected traditional patterns are digitized, and the patterns can be converted into digital formats by scanning, digital shooting, etc. This facilitates subsequent data storage, processing, and analysis. Secondly, the work of classifying and labeling the collected traditional patterns, dividing them into different categories, such as the type, color, shape, etc. of the pattern elements. With the help of image processing and machine learning algorithms, traditional patterns can be automatically classified and labeled. In addition, algorithms such as machine learning and image processing are used to analyze the traditional patterns that have been labeled to discover patterns and patterns. The repetition, symmetry, and use of color in traditional patterns can be explored to provide a reference for generative design. Finally, using the collected traditional pattern data and analysis results, a new pattern design can be generated with the help of AIGC technology. Algorithms such as generative neural networks (GAN) can be used to generate new patterns with innovation and personalization, based on traditional patterns. Through data collection and analysis, we can deeply understand and grasp the characteristics and styles of traditional decorative patterns of ethnic minorities, which provides a foundation and inspiration for generative design. At the same time, it can also help preserve and pass on the cultural heritage of ethnic minorities.

4.2. The generation of neural networks

Under the AIGC trend, neural network generation is an innovative design method used to generate traditional decorative patterns of ethnic minorities. By collecting data on the traditional decorative patterns of ethnic minorities, including pattern elements, colors, textures, etc. This data can be collected from existing pattern samples, or through collaborations with relevant experts and artists. Data is organized, labeled, and formatted for neural network training. These networks can learn patterns and features in the training data and generate new patterns. In the process, you need to perform operations such as data preprocessing, network parameter adjustment, and training period selection. Through training, the neural network is able to learn and understand the characteristics of traditional decorative patterns of ethnic minorities and be able to generate new patterns that conform to these characteristics. Professional evaluation and optimization can be carried out through collaboration with designers, artists. Apply the resulting pattern to a specific product design. Patterns can be considered for use on clothing, home accessories, textiles, and other carriers. It can be combined with modern production technology, such as CNC engraving, digital printing, 3D printing, etc., to make the pattern into an actual product. Through the neural network generation method, under the premise of respecting the tradition, the traditional decorative patterns of ethnic minorities are endowed with more innovative and personalized elements. At the same time, this method can also provide designers with more inspiration and creativity, and promote the inheritance and development of traditional patterns[4].

4.3. The optimization and adjustment of the design

Under the AIGC trend, the generated pattern can be adjusted and transformed by elements, which can change the shape, size, arrangement, etc. By experimenting with different combinations

and variations, it is possible to create more individual and innovative patterns. Traditional decorative patterns often have their own unique color combinations and matching rules. In the design of AIGC, the color scheme of the pattern can be adjusted through color matching algorithm or artificial design to make it more in line with modern aesthetics and trends. Depending on the resulting pattern, the pattern can be made richer and more unique by adding, subtracting, or changing the texture and details of the pattern. You can experiment with different texture images to add natural, ethnic, or modern elements. The proportions and layout of the pattern are crucial to the overall effect. In AIGC design, the pattern can be optimized and adjusted by changing the size, proportion, and arrangement of the pattern elements. With the help of algorithms, multiple attempts and adjustments can be made automatically to get the best proportions and layouts. During the design optimization process, you can consider collecting user feedback and opinions. Through user testing, questionnaires, etc., we can understand the user's preferences and needs for the pattern, and further adjust and optimize the design. Through the above-mentioned design optimization and adjustment methods, the basic characteristics and cultural connotations of traditional decorative patterns can be maintained, and innovative and personalized elements can be injected to create traditional decorative patterns of ethnic minorities that conform to modern aesthetics and trends.

4.4. The production and application of pattern

When AIGC technology is applied to the design and production of traditional decorative patterns of ethnic minorities, firstly, the sample data of specific traditional decorative patterns of ethnic minorities are collected and collated. This data can come from cultural heritage such as traditional artworks, textiles, ceramics, etc. This pattern data can be processed using data analytics and machine learning techniques to extract key pattern elements, colors, and structural features. Secondly, through the generative design method, the data of the traditional decorative patterns of ethnic minorities were input into the neural network model. The neural network can be trained on the input data and generate new patterns. Using AIGC technology, new patterns with innovation and personalization can be generated based on the learned pattern features. Furthermore, the resulting pattern may need to be further refined and adjusted to ensure that it fits the culture and aesthetic perceptions of the minority. In this process, designers can be involved, adding human creativity and aesthetic judgment to modify and refine the resulting pattern. Finally, after the design is completed, it can be made and applied using a variety of modern technologies. For example, patterns can be created on different media using equipment such as CNC engraving machines, digital printing machines, or 3D printers. These patterns can be applied in many fields such as clothing, household items, decorations, etc., to show the unique charm of minority culture. Respect and care need to be maintained in the design and production process to ensure the accurate transmission and preservation of culture. At the same time, it is important to work with relevant ethnic minority groups, respect their intellectual property rights and cultural identity, and design patterns that meet their expectations and needs through a collaborative approach.

5. Conclusions

To sum up, under the trend of AIGC, with the help of artificial intelligence and image computing technology, the design of traditional decorative patterns of ethnic minorities can be carried out efficiently, and the design results have high artistic value and fashion sense. However, it should be noted that the protection and inheritance of traditional culture is still an important issue in the design process, and designers need to respect and understand the uniqueness of national culture in the design process.

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