Research on the Extraction and Digital Inheritance Mode of Cultural Genes of Art Design under the Background of Intelligent Age

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Abstract: With the advent of the intelligent age, profound changes have taken place in the field of art design, and the inheritance of cultural genes faces challenges but also opportunities. Focusing on the background of intelligent times, this article discusses the extraction and digital inheritance mode of cultural genes of art design. By analyzing the influence of the characteristics of the intelligent age on art design, this article expounds the concept and characteristics of cultural genes, and adopts various strategies to extract cultural genes from art design works, historical documents and field surveys of cultural anthropology. Moreover, based on the technical support system, digital display platform and educational inheritance system, a digital inheritance model is constructed. It is found that multi-channel extraction can obtain cultural genes comprehensively and accurately, and the constructed inheritance model can effectively promote their inheritance. This study can provide theoretical support and practical guidance for the inheritance and innovative development of art design culture genes in the intelligent age, and is of great significance to promoting excellent traditional culture and promoting the sustainable development of art design industry.

1. Introduction

The wave of the intelligent age is sweeping the world at an unprecedented speed, profoundly changing all aspects of human life [1]. The rapid development of information technology, artificial intelligence, big data and other emerging technologies has reshaped the social economic structure and mode of production, and also brought about earth-shaking changes in the field of art and design [2]. Under this background, the extraction and digital inheritance of cultural genes in art design has become an important research topic in the field of art design [3]. From the perspective of cultural inheritance, art design bears the historical memory and cultural heritage of a country and a nation. As the core element of art design, cultural gene is a unique spiritual symbol accumulated in the long development process [4]. With the rapid changes of the times, traditional art design culture genes are facing many challenges, such as the limitations of inheritance methods and the impact of modern lifestyles [5]. If these challenges cannot be effectively met, many precious cultural genes may gradually disappear in the long river of history.

The era of intelligence provides a new opportunity for the inheritance of cultural genes in art design. The application of digital technology makes the storage, dissemination and innovation of cultural genes more convenient and efficient [6]. Through the research on the extraction of cultural genes of art design and digital inheritance mode, we can better protect and inherit excellent cultural heritage and make it glow with new vitality in contemporary society [7]. This is helpful to enrich the connotation of art design, enhance the cultural value of design works, and enhance the sense of identity and pride of national culture.

On the academic research level, although some scholars have discussed the extraction and inheritance of cultural genes in art design, there are still many gaps and deficiencies in related research in the new context of the intelligent age. How to extract cultural genes accurately and how

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to build a scientific and effective digital inheritance model has not yet formed a systematic and comprehensive theoretical system [8]. Therefore, it is of urgent practical demand and important theoretical value to carry out in-depth research on the extraction and digital inheritance mode of art design culture genes under the background of intelligent age. The purpose of this study is to deeply analyze the extraction method and digital inheritance mode of cultural genes of art design in the intelligent age, hoping to provide support for cultural inheritance and innovative development in the field of art design, and contribute to promoting excellent traditional culture and promoting the sustainable development of art design industry.

2. Intelligent age and cultural genes of art design

The era of intelligence is characterized by the rapid development of information technology and artificial intelligence. Under the background of this era, great changes have taken place in the social production and lifestyle. Information technology makes information dissemination real-time and global, while artificial intelligence brings automation and intelligent innovation and change to various fields [9]. This feature of the times has had an all-round impact on art design. The creative tools of art design have gradually changed from traditional manual tools to digital software, and the creative concept has also changed from simple aesthetic expression to meeting the needs of intelligence, and the design style has become more diversified and personalized.

The cultural gene of art design is a unique cultural element accumulated in the long-term development of art design. The elements of cultural genes in art design are rich and diverse, covering traditional patterns, color symbols, modeling rules and other visual elements. In addition, it also includes spiritual connotations such as philosophical thoughts, values and aesthetic tastes. These elements are intertwined and together constitute the cultural core of art design. Artificial intelligence can analyze and simulate a large number of design cases through deep learning and data mining, identify potential design patterns and trends, and then provide designers with more objective creative basis.

The cultural genes of art design have unique characteristics. One is stability, which maintains a relatively stable structure and connotation in historical inheritance, so that art design always retains a unique cultural imprint in the development process. The second is variability. Cultural genes will constantly absorb new elements and undergo adaptive changes to meet the needs of contemporary society. The third is inheritance. Cultural genes can be continued through intergenerational inheritance, mentoring and other ways, and become a bridge connecting art design in different eras. These three characteristics work together to make the cultural genes of art design not only retain the traditional charm, but also innovate and develop continuously in the intelligent age. The aesthetic standard of art design can be driven by human aesthetics and artificial intelligence generative aesthetics, forming a more dynamic and multidimensional design aesthetic new pattern.

3. Strategies for extracting cultural genes from art design

(1) Extraction from art and design works

Art and design works serve as intuitive carriers of cultural genes. By analyzing works of different types and from different periods, we can distill representative cultural genes. When analyzing these works, one can approach from multiple dimensions such as form, color, and material. Taking traditional ceramic art and design works as an example, in terms of form, there are various shapes like vases, jars, bowls, and plates, each carrying specific cultural connotations. The plum vase, with its slender silhouette and graceful lines, is often imbued with cultural connotations of elegance and subtlety. In terms of color, the blue-and-white combination in blue-and-white porcelain reflects the pursuit of simplicity and freshness in traditional Chinese culture. Regarding material, the fine and smooth texture of ceramics reflects the Chinese people's admiration for subtlety and reserve. The analysis of cultural genes in traditional ceramic art and design works is illustrated in Figure 1. By dissecting various dimensions of art and design works, we can effectively extract the cultural genes embedded within them.

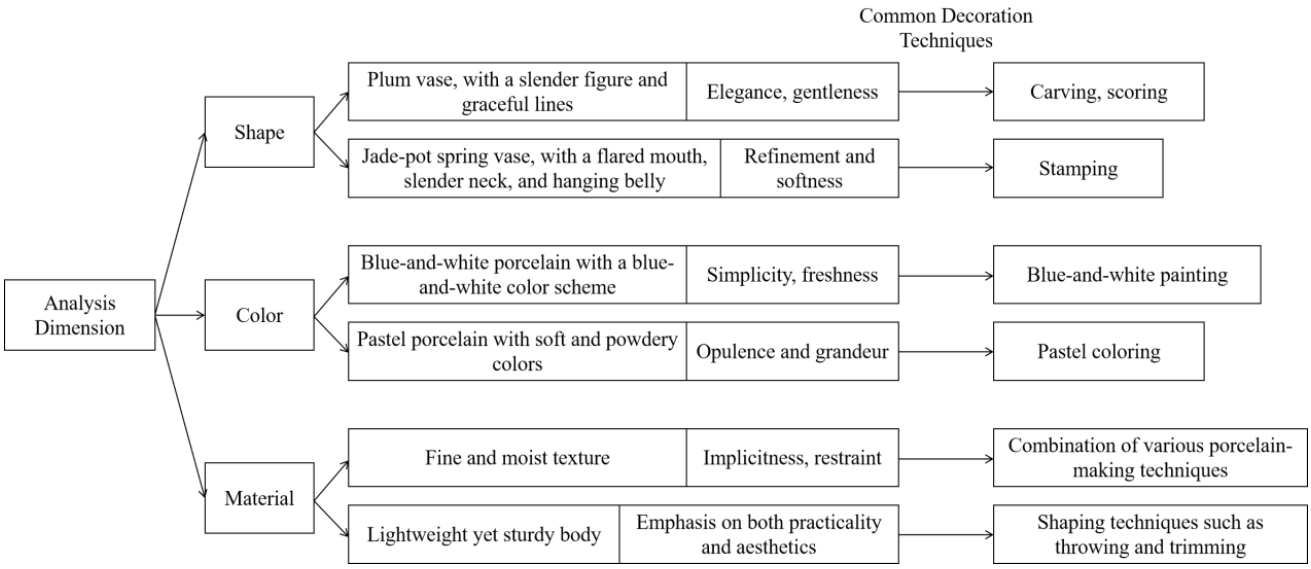

Figure 1 Analysis of Cultural Genes in Traditional Ceramic Art and Design Works

(2) Extraction with the aid of historical documents and materials

Historical documents are an important treasure house of art design culture genes, covering ancient books, local chronicles, notes and other forms. These materials record in detail the development of art design, production technology, cultural background and other information. From it, we can extract cultural genes about ancient architectural structure aesthetics, symmetrical layout concept and so on. For example, local records may record the unique skills and cultural customs of local folk art design, providing clues for extracting cultural genes with regional characteristics. By combing and interpreting historical documents, we can dig out the deep-seated cultural genes behind art design.

(3) Extraction based on cultural anthropology fieldwork

The field investigation of cultural anthropology provides fresh first-hand information for the extraction of cultural genes in art design. Researchers go deep into the birthplace and inheritance of art design, have face-to-face communication with local artists, artisans and ordinary people, and observe the creation process, use scenes and inheritance methods of art design. For example, in the field investigation of the embroidery art design of ethnic minorities, I learned the national legend and totem worship represented by embroidery patterns, as well as the cultural significance behind embroidery stitch and color selection through talking with embroidered mothers. This in-depth field investigation method can capture the real form of art design cultural genes in real life and obtain cultural information that cannot be directly obtained from documents and works.

4. Construction of digital inheritance mode

In the era of intelligence, it is of great significance to construct a scientific and effective digital inheritance model of art design culture genes for the protection and dissemination of art design culture. This model covers a number of key elements, and through the coordinated operation at different levels, the sustainable inheritance of artistic design and cultural genes can be realized.

(1) Technical support system

Digital inheritance mode can not be separated from strong technical support. The first is data acquisition technology, which accurately records the shape, color, texture and other information of art and design works by means of three-dimensional scanning, high-definition photography and digital drawing. For example, for ancient sculpture works, accurate 3D models can be obtained through 3D scanning technology, and every detail of the sculpture can be completely preserved. Secondly, data storage technology, using cloud storage, distributed storage and other ways to ensure that a large number of artistic design and cultural gene data can be safely and long-term. Thirdly, data processing and analysis technology, with the help of artificial intelligence algorithm to analyze

the collected data, mining the internal relations and laws between cultural genes. As shown in Figure 2, various technologies complement each other and provide a solid foundation for digital inheritance.

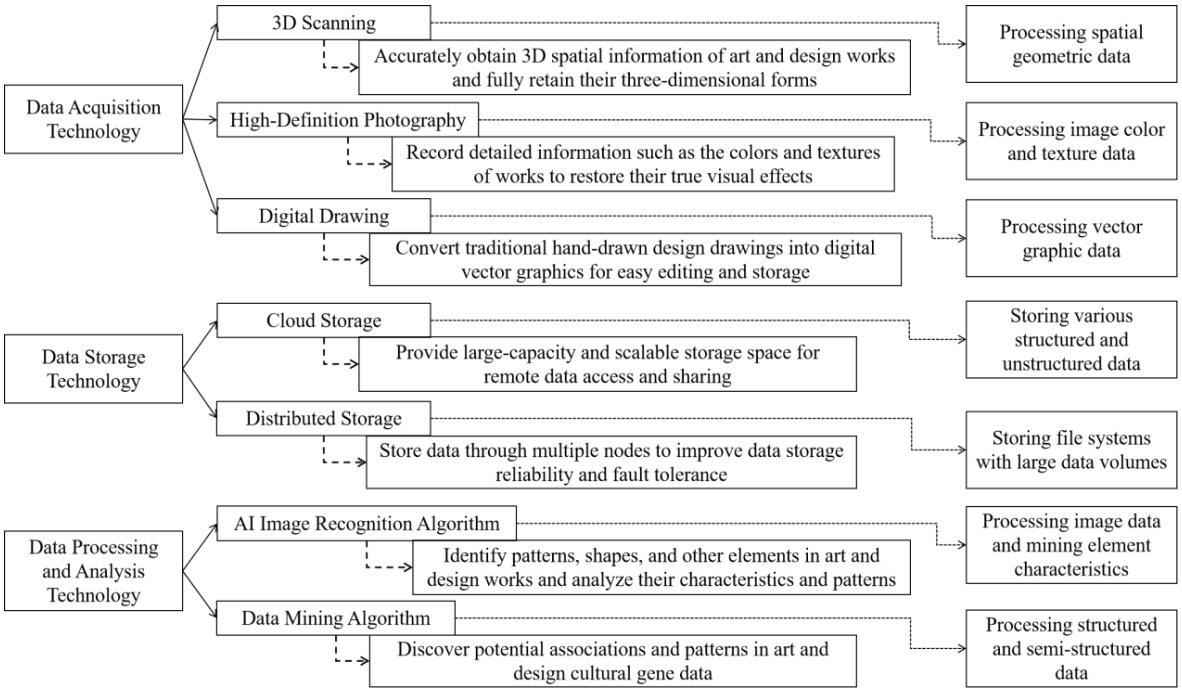

Figure 2 Technical Support System for Digital Inheritance of Art and Design Cultural Genes

(2) Digital display platform

Building a digital display platform is an important link to realize the wide spread of art design culture genes. This platform can be an Internet-based website, a mobile application, or a virtual reality (VR) and augmented reality (AR) exhibition space. Taking the website platform as an example, the artistic design works and their cultural genes are displayed in an illustrated way, so that users can browse and learn online. The VR and AR exhibition spaces bring immersive experience to users. For example, with the help of VR equipment, users seem to be in an ancient art design workshop and intuitively feel the production process of traditional crafts. The digital display platform breaks through the limitation of time and space, allowing more people to get in touch with and understand the cultural genes of art design. It can also enhance the interaction between users and cultural genes through interactive functions, such as user comments, sharing and participating in design.

(3) Educational inheritance system

Educational inheritance system is the key to ensure that the cultural genes of art design are passed down from generation to generation. At the school education level, the cultural genes of art design should be integrated into the education curriculum system at all levels. In the stage of basic education, students are taught basic art design knowledge and cultural genes through art courses. In the stage of higher education, special courses and practical projects are set up to train professional talents. Social education can't be ignored either. By holding various cultural lectures, workshops, training courses, etc., the cultural genetic knowledge of art design is popularized to the public. For example, the traditional handicraft workshop organized by the community allows residents to experience the application of artistic design and cultural genes in practice. Through the combination of school education and social education, an all-round and multi-level educational inheritance system is formed, so that the cultural genes of art design can take root in the broad masses of people. Through the construction of perfect technical support system, digital display platform and educational inheritance system, an organic whole digital inheritance model is formed. This can effectively promote the inheritance and development of art design cultural genes in the intelligent age, and make this precious cultural wealth continue and glow with new vitality.

5. Conclusions

Under the background of the intelligent age, the research on the extraction and digital inheritance of cultural genes of art design has made rich achievements. Through the analysis of the characteristics of the intelligent era and its influence on art design, this article makes clear the new environment faced by the inheritance of art design culture genes. As the core element of bearing the national historical memory and cultural heritage, the unique elements and characteristics of artistic design cultural genes determine the importance and complexity of inheritance.

In the aspect of extraction strategy, starting from art design works, historical documents and field investigation of cultural anthropology, we can extract cultural genes comprehensively and accurately by means of morphological analysis, literature interpretation and field investigation. In the construction of digital inheritance mode, the technical support system provides guarantee for data collection, storage and analysis, the digital display platform breaks through the time and space constraints to achieve extensive communication and interaction, and the educational inheritance system forms an all-round training path from school to society. The three cooperate with each other to build a scientific and effective inheritance model.

To sum up, this study has laid a theoretical foundation for the inheritance and innovative development of art design culture genes in the intelligent age, and is of great significance to promoting the promotion of excellent traditional culture and the sustainable development of art design industry. With the continuous progress of technology, the digital inheritance of cultural genes of art design in the future is expected to achieve innovative applications in more fields and further enrich the diversity of human culture.

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