Exploration of Cultural Heritage Content Creation and Industrial Innovation Model Based on AIGC

Gang Huang[1,a], Junjie Zhong[2,b]

[1]School of Literature and Media, Xinyu University, Xinyu, China

[2]Modern Service College, Hefei College of Finance & Economics, Hefei, China

[a]1306795691@qq.com, [b]404557668@qq.com

Keywords: AIGC; Cultural heritage; Content creation; Industrial innovation; Digital transformation

Abstract: With the continuous advancement of Artificial Intelligence Generated Content (AIGC) technology, the content creation and industrial innovation of cultural heritage are facing unprecedented development opportunities. AIGC can efficiently carry out digital protection, virtual display, and innovative dissemination of cultural heritage through technologies such as deep learning, natural language processing, and image generation. These technologies not only greatly enhance the display form of cultural heritage, enabling it to break through the limitations of traditional display methods, but also endow cultural heritage with new expressive power and dissemination potential. This article not only summarizes the application achievements of AIGC technology in cultural heritage creation, display, and dissemination, but also analyzes the current technological, ethical, and policy challenges faced. Finally, this article proposes policy recommendations for the application of AIGC in the field of cultural heritage, aiming to provide theoretical support for relevant departments to formulate effective management measures, promote the healthy development of AIGC technology in the cultural heritage industry, and promote the integration of inheritance and innovation of cultural heritage.

1. Introduction

With the rapid development of information technology, Artificial Intelligence Generated Content (AIGC) technology is playing an increasingly important role in the cultural industry. Cultural heritage, as a treasure of national culture, carries a long history and rich spiritual wealth. Its protection, inheritance, and innovation have always been core issues of concern in academia and industry. With the rise of AIGC technology, the creation, display, and dissemination modes of cultural heritage have undergone unprecedented changes. AIGC can efficiently generate cultural content such as cultural relic restoration and historical scene reproduction through technologies such as deep learning and big data analysis, and meet the needs of different consumers through personalized customization. This not only improves the efficiency of cultural heritage protection, but also opens up new avenues for its innovative dissemination and digital display, greatly promoting the innovation and transformation of the cultural industry.

2. Overview of AIGC Technology

2.1. Basic Concepts of AIGC Technology

AIGC (Artificial Intelligence Generated Content) refers to various types of content automatically generated through artificial intelligence technology. It covers multiple fields such as natural language generation (NLG), image generation, video production, music creation, etc. It can create highly complex and realistic content based on a large amount of data and algorithm models. Unlike traditional manual creation methods, AIGC can achieve automated creation processes through technologies such as machine learning and deep learning. AIGC has a wide range of applications, covering multiple industries such as news reporting, social media content, entertainment creation, advertising production, and art design. By continuously optimizing the generation model, AIGC

  DOI: 10.25236/gemmsd.2025.008

technology not only improves the efficiency of content creation, but also enables personalized customization of creation through data-driven approaches to meet the needs of different audience groups.

2.2. Development History and Current Status of AIGC Technology

The origin of AIGC technology can be traced back to artificial intelligence research in the 1950s. In the early stages, artificial intelligence focused more on basic logical reasoning and problem-solving, while content creation was relatively basic. With the improvement of computing power and the advancement of algorithms, especially the breakthrough of deep learning technology, AIGC has gradually gained a wider range of applications. In the 1990s, with the emergence of machine learning and neural networks, AIGC began to involve the field of text generation. Entering the 21st century, especially after 2010, the emergence of technologies such as Generative Adversarial Networks (GANs) and Variational Autoencoders (VAEs) has enabled AIGC to make significant progress in image, audio, and video generation. Nowadays, AIGC is capable of generating highly complex and personalized creative content, expanding its scope from traditional text generation to more complex visual and auditory art creations [1].

At present, the application of AIGC technology in the field of cultural heritage is gradually deepening. For example, AIGC technology can analyze large amounts of historical data through deep learning algorithms to generate digital images of cultural heritage, virtual reality (VR) models, interactive museum exhibitions, etc., providing new solutions for the dissemination and innovation of traditional culture. Although AIGC technology has made significant progress in various industries, there are still technical and ethical challenges in the application of cultural heritage that need to be continuously improved and standardized.

2.3. Characteristics and Advantages of AIGC Technology

AIGC technology has multiple unique characteristics and advantages, which make it have broad application potential in the field of cultural heritage. Firstly, there is efficiency. AIGC technology can complete a large amount of content creation in a very short period of time, greatly improving the efficiency of content creation. For example, through machine learning models, AIGC can generate hundreds of uniquely styled cultural and artistic works in just a few minutes, which has a significant advantage over the time required for manual creation. Secondly, AIGC has personalization and customizability, allowing for customized creation based on user needs or the characteristics of specific cultural heritage, thus meeting the needs of different audiences or markets. In cultural heritage creation, AIGC can not only generate content based on historical data, but also analyze audience interests and needs through algorithms to generate personalized cultural experiences [2].

3. The Application of AIGC in the Creation of Cultural Heritage Content

The application of AIGC technology in the creation of cultural heritage content not only provides strong technical support for cultural inheritance and innovation, but also opens up new horizons for the transformation and upgrading of the cultural industry. Through the application of practical cases such as virtual museums and AI composition, AIGC technology has demonstrated its broad prospects in the protection, display, and dissemination of cultural heritage [3].

3.1. Integration of Digitalization of Cultural Heritage and AIGC

The digitization of cultural heritage is an important direction for the development of the global cultural industry. It can not only effectively preserve and inherit cultural resources, but also promote the cross temporal and spatial dissemination of culture. The application of AIGC technology in the digitization of cultural heritage, especially in the fields of virtual reality (VR) and augmented reality (AR), provides a new way of creation and display. Through AIGC technology, historical relics and sites can be transformed into three-dimensional digital models or virtual reality scenes, allowing the public to directly "enter" history and experience the charm of ancient civilization in a virtual environment. For example, tourists can enter ancient palaces or sites through VR helmets, experience

the cultural atmosphere of the time, and even "converse" with historical figures, greatly enhancing the interactivity and immersion of cultural heritage display [4].

In addition, AIGC plays an important role in the restoration and protection of cultural heritage. Through deep learning and computer vision technology, AIGC can generate simulated images of damaged cultural relics, helping repair personnel restore damaged parts in a digital environment. By utilizing 3D modeling and simulation technology, AIGC can provide detailed digital archives for cultural relics and historic sites, thereby providing important basis for restoration work. For example, some lost murals and sculptures can be reconstructed from historical documents and fragments using AIGC technology, providing new possibilities for the restoration of cultural heritage.

3.2. Innovative Application of AIGC Technology in Cultural Heritage Communication

The traditional way of disseminating cultural heritage is mainly through physical display, usually relying on fixed venues such as museums, libraries, and cultural centers. However, this dissemination method is limited by time and space, making it difficult to reach a wider audience. The introduction of AIGC technology has broken these limitations and injected more innovative elements into the dissemination of cultural heritage. Through online platforms, social media, and mobile applications, AIGC is able to generate highly interactive content, making the dissemination of cultural heritage more diverse and flexible. For example, virtual cultural commentators based on AIGC can customize their presentation content according to the audience's interests and needs, providing personalized cultural experiences. Users can select the historical period or art style they are interested in through an interactive interface, and even gain deeper cultural background knowledge through intelligent algorithms and virtual assistants [5].

3.3. Case Study: The Practical Application of AIGC in Cultural Heritage Content Creation

The analysis of specific cases can more intuitively demonstrate the practical application of AIGC technology in cultural heritage creation, as shown in Figure 1.

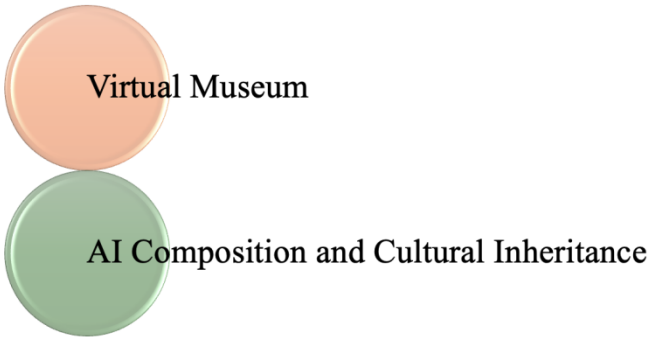

Figure 1: The practical application of AIGC in cultural heritage content creation.

3.3.1. Virtual Museum

Virtual museums are one of the typical cases of AIGC technology application. Through the digital display and interactive explanation of cultural relics generated by AIGC, virtual museums enable global users to appreciate and learn about cultural heritage without geographical and temporal limitations. For example, some famous museums, such as the British Museum and the Louvre, have begun to digitize their cultural relics through virtual reality technology. Visitors can not only browse high-definition images of cultural relics online, but also experience virtual tours to obtain in-depth historical background information. The interactivity and immersive experience of virtual museums greatly enrich the ways in which cultural heritage is disseminated, making it easier for the public to access and understand cultural treasures from different countries and ethnic groups.

3.3.2. AI Composition and Cultural Inheritance

AIGC technology also provides new ways of expression for innovative inheritance of cultural heritage. Through AI composition technology, traditional music and folk art can be combined with

modern elements to create works with a sense of the times. For example, virtual performances of traditional instruments such as guqin and flute generated by AIGC can blend ancient music with modern popular elements to create a new musical style. This innovation not only brings new vitality to traditional music, but also makes it easier for modern audiences to accept and love. Through this approach, AIGC helps traditional culture to be inherited and innovated in the new era, maintaining its unique charm in the wave of globalization and modernization.

4. AIGC's Model and Path for Promoting Innovation in the Cultural Heritage Industry

The application of AIGC technology in the cultural heritage industry not only promotes innovation in cultural creation, but also leads to profound changes in the structure and mode of the cultural industry. Through the integration and innovation of technology, AIGC is helping the cultural heritage industry move towards a more efficient and sustainable future, as shown in Figure 2.

Figure 2: AIGC's model and path for promoting innovation in the cultural heritage industry.

4.1. Integration and Innovation of AIGC and Cultural Industry

AIGC technology is not only an important tool for cultural creation, but also a significant force in promoting innovation in the cultural industry. Traditional cultural creation often relies on manual operation and linear production models, but with the introduction of AIGC, cultural content creation has begun to shift towards diversified and personalized interactive models. AIGC technology enables the creative process to be more intelligent, meeting the needs of different users through big data analysis and deep learning. For example, AI can generate personalized cultural content based on user interests and behavioral data, thereby enhancing the attractiveness and market competitiveness of cultural products. At the same time, AIGC has also promoted the digital transformation of the cultural industry, making cultural resources not limited to traditional physical displays, but more displayed and disseminated to global audiences through digital platforms [6]. This fusion innovation has prompted the cultural industry to shift from traditional production and dissemination methods to more intelligent, convenient, and interactive innovation models, breaking the limitations of time and space, and enhancing the accessibility and dissemination of cultural products.

4.2. Integration of AIGC and Cultural and Creative Industries: Promoting Industrial Transformation and Upgrading

The application of AIGC technology in the cultural and creative industry has promoted the transformation and upgrading of traditional cultural industries. The core of the cultural and creative industry is cultural creativity and innovation, and AIGC is an important engine of innovation. AI technology can significantly improve creative efficiency by automating the generation of storylines, character design, scene construction, and other creative content. Cultural creators can use AIGC not only to quickly generate a large number of creative elements, but also to carry out secondary creation and deep processing on this basis, thus meeting the market's demand for personalized and diversified cultural and creative products. Through the application of AIGC, the traditional cultural and creative industry has begun to transform into a modern cultural industry driven by technology [7]. Whether it is the creation of movie scripts or the design of virtual characters in games, AIGC has provided unprecedented creative tools for the cultural and creative industry. With the support of technology, creators can break through the limitations of traditional creative methods, explore new forms of expression and cultural product forms, which brings new vitality and market opportunities to the cultural and creative industry.

4.3. AIGC Promotes Sustainable Development of Cultural Heritage Industry

In the cultural heritage industry, AIGC technology not only improves creative efficiency, but also promotes the sustainable development of the industry. The protection and inheritance of traditional cultural heritage often rely on high costs and complex manual work, while AIGC can significantly reduce the cost of protection and inheritance through intelligent means and automation technology. For example, AIGC can assist experts in restoring cultural relics through digital means, which not only improves restoration efficiency but also reduces damage to original cultural relics. In addition, AIGC technology can also provide more vivid and interactive forms for the display and dissemination of cultural heritage through technologies such as virtual reality (VR) and augmented reality (AR), enabling cultural heritage to be disseminated more widely. Through digitization and intelligence, AIGC contributes to the development and utilization of cultural heritage resources, enabling them not only to be inherited in the present but also to adapt to the development needs of future eras [8].

5. Challenges and Countermeasures of AIGC Technology in Cultural Heritage Industry Innovation

Although AIGC technology provides many opportunities for innovation and development in the cultural heritage industry, technical challenges, ethical issues, and policy guarantees remain key obstacles in its application. Only by addressing these issues can AIGC fully unleash its potential in cultural heritage creation and promote the sustainable development of the cultural industry, as shown in Figure 3.

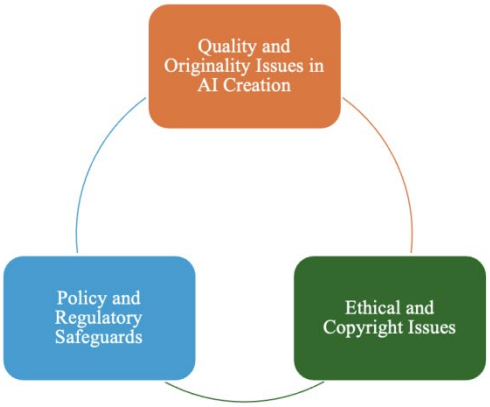

Figure 3: Challenges and countermeasures of AIGC technology in cultural heritage industry innovation.

5.1. Quality and Originality Issues in AI Creation

Although AIGC technology has shown great potential in cultural heritage content creation, the content it creates is often generated based on existing databases, templates, and algorithms, making the quality and originality of the creation an important issue. Although the content generated by AIGC can quickly meet the needs, it often lacks the uniqueness and emotional expression of human creators, which may lead to insufficient homogenization and innovation of the content. In the field of cultural heritage, this is particularly prominent because the creation and inheritance of cultural heritage not only require technical support, but also require profound cultural connotations and innovative expressions. Therefore, to enhance the quality and originality of AIGC's creative content, it is necessary to strengthen algorithm design and data training, incorporate more cultural features and creative elements, and combine the advantages of artificial intelligence and human creativity to create richer and more diverse cultural content.

5.2. Ethical and Copyright Issues

Another challenge for the application of AIGC technology in cultural heritage creation is ethical and copyright issues. AIGC technology often relies on existing cultural heritage materials when generating content, which may lead to copyright infringement issues, especially when the generated content directly uses or adapts existing cultural heritage. If AI creation overly relies on existing cultural relics, works of art, or cultural symbols, it may infringe on the copyright of the original author or owner and cause legal disputes. In addition, whether the cultural content generated by AIGC should belong to AI developers, cultural institutions, or other stakeholders is also a major ethical dilemma. Therefore, it is particularly important to establish a reasonable copyright protection mechanism and ethical standards. The industry needs to establish a clear copyright ownership system, clarify the intellectual property protection of AIGC creative content, and establish corresponding regulatory mechanisms to ensure that the application of AIGC technology meets the ethical requirements of cultural heritage.

5.3. Policy and Regulatory Safeguards

With the rapid development of AIGC technology, the current policies and legal system in the field of cultural heritage are not yet perfect. Especially in the digitization and creation process of cultural heritage, how to ensure the legal and compliant application of AIGC technology has become an urgent problem to be solved. Existing laws and regulations often struggle to adapt to the rapid development of AIGC technology, and policy innovation is needed to fill this gap. For example, in terms of copyright ownership, data usage rights, and technical review of AIGC generated content, relevant laws and policies need to be continuously improved to ensure the compliance of cultural heritage creation. At the same time, the government should promote the development of relevant industry standards, encourage participation from all parties, and ensure that the application of AIGC technology in the cultural heritage industry not only promotes industrial development, but also effectively protects the originality and legality of cultural heritage.

6. Conclusion and Prospect

6.1. Research Summary

This article explores the application of AIGC technology in the creation of cultural heritage content and analyzes its role in promoting innovation in the cultural heritage industry. AIGC technology has enormous potential in improving cultural creation efficiency, enhancing communication influence, and promoting industrial transformation. Despite some technical, ethical, and legal issues, with the continuous advancement of technology and improvement of policy environment, AIGC is expected to become an important force in promoting the development of cultural heritage industry.

6.2. Future Research Directions

Future research can delve into the application of AIGC technology in different cultural heritage fields, especially in innovation in art creation, museum management, cultural tourism, and other areas. In addition, the combination of AIGC technology with other technologies such as blockchain and big data can also be studied to provide more technical support for the development of the cultural heritage industry.

References

[1] Pan S, Anwar R B, Awang N N B, et al. Constructing a Sustainable Evaluation Framework for AIGC Technology in Yixing Zisha Pottery: Balancing Heritage Preservation and Innovation[J]. Sustainability, 2025, 17(3): 910.

[2] Wang W, Yang G, Liu X. Reflections on AIGC Empowering the Development of Guizhou's Intangible Cultural Heritage[J]. Journal of Social Science Humanities and Literature, 2024, 7(3): 38-41.

[3] Sun W. Research on English Translation of Intangible Cultural Heritage in the Age of AIGC[J]. Applied Mathematics and Nonlinear Sciences, 2023, 9(1).

[4] Liu Q, Wang X, Xie X, et al. Innovative Design Research on Jiaodong Peninsula's Marine Folk Culture Based on AIGC[J]. Int. J. Contemp. Humanit, 2024, 8: 17-27.

[5] Zi-yang H U. AIGC Related Context: A New Communication Culture For Human[J]. Journal of Literature and Art Studies, 2024, 14(10): 921-931.

[6] Ruijuan L V, Jingbei Z, Dan Y A N, et al. Innovative Development of AIGC and GLAM: Review of" Shaping the Future: AIGC and GLAM Innovative Development" Cutting-Edge Academic Forum[J]. Journal of Library and Information Sciences in Agriculture, 2023, 35(5): 27.

[7] ZHANG Z, Jianxun Z, Cuijuan X I A, et al. Information resource management researchers' thinking about the opportunities and challenges of AIGC[J]. Journal of Library and Information Sciences in Agriculture, 2023, 35(1): 4.

[8] Liu Y, Wu P, Li X, et al. Application and renovation evaluation of Dalian's industrial architectural heritage based on AHP and AIGC[J]. PloS one, 2024, 19(10): e0312282.