Journal of Artificial Intelligence Practice (2024)
Clausius Scientific Press, Canada

DOI: 10.23977/jaip.2024.070409
ISSN 2371-8412 Vol. 7 Num. 4

Exploring the Path of Intangible Cultural Heritage and Protection Promoted by Artificial Intelligence: Taking the Eight Wonders of Yanjing as an Example

Ziyang Yan[1,a,*], Dong Tong[1,b,*]

[1]*Beijing Institute of Graphic Communication, Beijing, China*
[a]*18533538226@163.com*, [b]*td1202013@sina.cn*
[*]*Corresponding author*

Keywords: Artificial intelligence, Intangible Cultural Heritage, Inheritance and protection, Eight Wonders of Yanjing

Abstract: The article explores the application path of artificial intelligence technology in the inheritance and protection of intangible cultural heritage. Specifically, by constructing digital archives of intangible cultural heritage, we can utilize virtual reality and augmented reality technologies to enrich the interactive experience of intangible cultural heritage; Meanwhile, with the help of big data analysis and user behavior analysis, we can achieve precise dissemination of content related to intangible cultural heritage. Artificial intelligence has also promoted the innovative design and intelligent production of intangible cultural heritage products, broadening the inheritance path of intangible cultural heritage. Taking the Eight Treasures of Yanjing as an example, this paper analyzes the challenges it faces and proposes specific measures for artificial intelligence in data recording, intelligent recognition, innovative design, intelligent dissemination, and protection and repair. Finally, research has shown that the deep integration of artificial intelligence technology provides new impetus for the inheritance and protection of intangible cultural heritage.

1. Introduction

On June 2, 2023, our General Secretary delivered an important speech at the Symposium on Cultural Heritage and Development, emphasizing that at a new historical starting point, the key to continuously promoting cultural prosperity and building a modern civilization system for the Chinese nation lies in adhering to integrity and innovation, deeply inheriting and promoting China's excellent traditional culture, and striving to create more cultural masterpieces with Chinese characteristics in the new era to meet the increasingly diverse cultural needs of the people. Intangible cultural heritage, as a brilliant treasure of Chinese traditional culture and a vivid continuation of cultural context, is not only the core display of the country's cultural soft power, but also an indispensable component. [1]With the rapid development of artificial intelligence technology and its widespread application in various industries, it has also moved towards deep integration with the protection, inheritance, and dissemination of intangible cultural heritage. In view of this, fully

utilizing artificial intelligence technology to promote the digitalization process of intangible cultural heritage is of great significance for accelerating the revitalization and utilization of China's intangible cultural heritage and enhancing its international influence. [2]

2. The current status of cultural and creative products

2.1. Introduction to the Eight Wonders of Yanjing

The Eight Wonders of Yanjing are the eight traditional royal court crafts that have been passed down in Beijing, including cloisonn é, carved lacquer, gold lacquer inlay, filigree inlay, palace carpet weaving, Beijing embroidery, jade carving, and ivory carving. With a long history and exquisite skills, they constitute the unique arts and crafts system of Yanjing.

2.2. The Eight Wonders of Yanjing are Facing Challenges

2.2.1. Shortage of inheritors

The aging of the eight outstanding craftsmen in Yanjing is severe, and there is a shortage of young inheritors. Traditional handicraft learning requires long-term accumulation and precipitation, but the fast-paced modern society is affecting the learning and inheritance of young people. At present, Beijing has taken measures to restore the establishment of traditional craft majors, but enrollment is difficult, and due to the shrinking industry scale and low efficiency, the employment prospects for graduates are not optimistic. The modern education system attempts to integrate traditional handicrafts into it, but there are still problems of theoretical and practical disconnection and insufficient resources in actual teaching.

2.2.2. Low social awareness

With the development of social economy and changes in people's aesthetic concepts, the market demand for traditional handicrafts is gradually decreasing. Moreover, traditional handicrafts are mainly based on manual labor, with complex craftsmanship and low output, resulting in high production costs. This reduces the competitiveness of related products in the market and makes it difficult to attract consumers. Due to insufficient publicity and media attention, people lack understanding and recognition of traditional handicrafts such as the "Eight Wonders of Yanjing", making it difficult to form effective market demand and inheritance atmosphere.

3. The role of AI in inheriting and protecting

3.1. Data recording and digital preservation

By utilizing high-precision scanning and 3D modeling technology, Yanjing Eight Treasures Crafts can be digitally recorded in a comprehensive and high-precision manner, with detailed preservation of their appearance, structure, material, and color information, providing accurate data for subsequent research, replication, and inheritance. The digital archive library established by Yanjing Bajue through artificial intelligence technology has achieved centralized management of data. This digital preservation method not only prevents damage and loss, but also facilitates learning and communication among researchers and enthusiasts worldwide. For example, the Dongcheng District Bureau of Culture and Tourism has collaborated with relevant institutions to create the "1921 Yanjing Eight Non Heritage Meeting Living Room" in the Beizi Mansion of Wangfu Zhonghuan. Through 3D modeling technology, the collection details, characteristics, and

author information are displayed 360 °to the audience, allowing them to experience exquisite skills up close and reaching a wider audience through online means.

3.2. Intelligent recognition and analysis

Artificial intelligence can automatically extract the craft history, technical details, inheritor information, and artistic features of the Eight Treasures of Yanjing from ancient literature and crafts through natural language processing and image recognition technology, and deeply explore their cultural connotations and historical value, such as the extraction of cloisonn ês wire cutting and enamel firing techniques. Image recognition technology can also be used to analyze the images of the Eight Wonders of Yanjing, such as the dragon and phoenix pattern and gemstone blue glaze color of a certain Ming Dynasty cloisonn é bottle. The feature information of the pattern, color, texture, etc. can be extracted to help study the artistic style and production techniques of the crafts, providing theoretical support and inspiration for inheritance protection, research and innovation.

3.3. Intelligent Communication and Innovative Design

VR and AR technologies can be used to create a digital exhibition of the Eight Wonders of Yanjing, allowing visitors to experience their craftsmanship charm through intelligent terminals. At the same time, AI technologies such as intelligent chatbots can customize promotional information, popularize the cultural, historical, and craft characteristics of it through social media, official websites, and other channels, and enhance public awareness and attention.[3]AI can analyze user preferences and market trends, assist designers in innovative design, inject new vitality into traditional products of Yanjing Bajue, and optimize processes, improve efficiency, reduce costs, and ensure quality through intelligent robots and other equipment in the production process. [4]

3.4. Intelligent inheritance and education

In terms of cultivating inheritors, artificial intelligence can develop the Yanjing Eight Jue Intelligent Teaching Platform, which uses VR and AR technology to simulate real process scenes, promote interactive learning, simulated operations, and skill training. At the same time, establish an intelligent management system for inheritors to comprehensively record, track, and evaluate their skill levels, providing scientific basis for cultivating and selecting inheritors.

3.5. Intelligent protection and repair

Artificial intelligence technology can perform disease analysis on the Eight Treasures of Yanjing handicrafts, intelligently and conveniently measuring and calculating key information such as crack length and geometric radius data of each cross-section of cultural relics through three-dimensional models, providing quantitative support for the degradation analysis and restoration of cultural relics. During the restoration process, this technology can also extract cultural relic feature information, calculate feature similarity to obtain matching data indicators for splicing, and assist experts in accurately and efficiently simulating splicing and designing restoration plans. [5]

4. Specific measures of AI for inheritance and protection

4.1. Spread on short video platforms

With the development of AI and digitalization, short video platforms are popular due to their short duration, immersive experience, strong interactivity, and diverse content. According to the

"2023 China Network Audiovisual Development Research Report", the number of short video users in China is nearly 1 billion and continues to grow. The Eight Wonders of Yanjing can collaborate with popular bloggers and spread through short videos. For example, Jiang Xunqian who traveled across the country to learn various intangible cultural heritage skills, such as Miao silver jewelry making, dragon and phoenix candle making, iron flower making, ice sculpture, etc. For the Eight Wonders of Yanjing, she spreads intangible cultural heritage through short videos, and her professionalism and passion ensure her enthusiasm for promoting it. She has a great influence and numerous fans on short video platforms, which can attract traditional culture enthusiasts and help it quickly expand their popularity and exposure. She has rich experience in spreading knowledge and can vividly showcase the production process and cultural connotations of intangible cultural heritage skills, deepening the audience's understanding. As the first female inheritor of the blacksmith flower, she is brave enough to challenge and innovate, which is in line with the Yanjing Eight Wonders concept and helps to enhance the brand image and market competitiveness.

Therefore, Yanjing Bajue can invite blogger to visit the museum and record the production process, craftsmanship details, and behind the scenes stories of the eight skills through short videos. They will showcase unique techniques such as cloisonn é production, lacquer carving, and filigree inlay, design interactive segments to enhance audience participation, and embed cultural and creative product display recommendations to record the entire process from material selection to production, showcasing the integration of traditional and modern design, while telling historical and inheritor stories, adding humanistic color and emotional resonance.

4.2. Digital protection and inheritance

By utilizing blockchain technology, representative works from the Yanjing Eight Treasures, such as Jing embroidery and cloisonn é, can be transformed into digital collectibles. The "Yanjing Eight Wonders of Beijing Embroidery Digital Collection" jointly launched by Lingkun Digital Collection, Dongcheng District Bureau of Culture and Tourism, Tencent, and JD.com is a successful attempt. This digital collection is unique, tamper proof, and non-replicable, and can also be sold through e-commerce platforms, effectively protecting intangible cultural heritage intellectual property rights. The Judicial Bureau of Gusu District has innovatively launched the "Sucheng Cunzheng" APP blockchain platform, which combines blockchain technology with national notary power to provide full chain protection for intangible cultural heritage intellectual achievements from conception to sales, and fixed evidence of infringement. This platform has shifted the focus from post protection to pre prevention, covering the entire lifecycle. It is the first to use blockchain technology to support the development of intangible cultural heritage. Additionally, through VR and AR technology, virtual exhibition spaces can be created to allow visitors to experience the exquisite craftsmanship and unique charm of Yanjing's eight wonders online, enhancing interactivity and immersion. An online education platform can also be built to enable more people to understand and inherit this intangible cultural heritage through video tutorials, interactive Q&A, and other forms.[6]

4.3. Optimization and inheritance of machine learning technology

The inheritance of intangible cultural heritage art relies heavily on oral transmission and manual skills, which have certain drawbacks. Machine learning technology can accurately capture the core elements of intangible cultural heritage works, providing technical support for analysis, identification, and inheritance, and improving the accuracy and completeness of skill inheritance. Taking Hanzhong rattan weaving as an example, machine learning algorithms can finely analyze the weaving process, which covers more than ten delicate steps from vine peeling, picking, cleaning, drying, dyeing, weaving to painting, etc., improving the accuracy of the craftsmanship, opening up

new paths for skill inheritance and artist training, and effectively promoting the revitalization and inheritance of Hanzhong rattan weaving as an intangible cultural heritage.

4.4. Virtual repair and reproduction

AIGC technology enables the digital presentation of traditional intangible cultural heritage crafts and their production processes, such as the exquisite craftsmanship of Xiushan lanterns, which can be vividly captured and simulated through this technology, allowing the audience to experience its charm firsthand. At the same time, AIGC's virtual restoration and reproduction capabilities provide support for the protection and inheritance of intangible cultural heritage resources, accelerate the pace of digitization, and effectively ensure the continuity and cultural inheritance of intangible cultural heritage. For example, some Dazu Rock Carvings have suffered serious damage due to the circulation of years and historical changes, and the details of the carvings are blurred. However, the damaged parts have been virtually repaired by AIGC technology, which retains the historical style and cultural value of the stone carvings and greatly improves the value of viewing and research.

5. Conclusions

The rapid development of artificial intelligence technology has opened up new paths for the inheritance and protection of intangible cultural heritage. By establishing digital archives, enhancing dynamic interaction, achieving diversified dissemination, and product development, AI not only effectively solves many challenges faced in the inheritance of intangible cultural heritage, but also injects new vitality and opportunities into it. In the future, with the continuous advancement of technology and the continuous expansion of application scenarios, we have reason to believe that AI will play a more important role in the inheritance and protection of intangible cultural heritage, and help Chinese excellent traditional culture shine brighter in the new era.

Acknowledgments

The authors are grateful to the support from Master of Accounting Professional Degree Master's Program Construction Project (Project No. 2109024003). This article is a phased research achievement of Exploration of Advanced Cultural Cognition and Practice Courses for Cultivating Innovative Practice Ability of Graduate Students in Media Management under the Background of New Liberal Arts (Project No. 21090324015).

References

[1] Fan Xichun. Better shoulder new cultural missions at a new historical starting point. Red Flag Manuscript, 2024, (09): 38-42+1

[2] Gao Xiaohong, Li Hongjiang. Injecting dissemination momentum into the construction of modern civilization of the Chinese nation. Chinese Editor, 2023, (10): 4-8

[3] Zhou Yucheng, Chen Lu. Research on Science and Technology Promoting the Inheritance and Development of Intangible Cultural Heritage -- Taking Xiaogan Carved Paper Cuttings as an example [J]. Journal of Changjiang University (Social Sciences Edition), 2020, 43 (04): 33-37

[4] Zhou Jinxia. Inheritance and Innovation of Intangible Cultural Heritage: Research on Integrating Traditional Techniques into Modern Design [J]. Shanghai Packaging, 2024, (04): 77-79

[5] Wu Menglong, Wang Xiaolu. Exploration of the Value and Path of Digital Technology Empowering the Protection and Inheritance of Intangible Cultural Heritage [J]. Journal of Suihua University, 2024, 44 (06): 96-98

[6] Dong Yang. Digital twin technology helps research on the protection and inheritance of Central Plains intangible cultural heritage The Yellow River Loess. Yellow people, 2023, (18): 64-65