

# Research on the Innovative Inheritance and Dynamic Development of Cultural Heritage Empowered by Digital and New Media Technologies in the Context of Interdisciplinary Art

Huaxin Ye<sup>1\*</sup>

<sup>1</sup> College of Artificial Intelligence, Xi'an Aeronautical Polytechnic Institute, Xian, China

**Abstract.** With the rapid development of digitalization and new media technology, the protection and inheritance of cultural heritage are facing unprecedented challenges and opportunities. The traditional way of inheriting cultural heritage can no longer fully meet the needs of modern society for cultural heritage protection, and the empowerment of digital technology provides a new path for innovative inheritance of cultural heritage. This article explores the application of digital and new media technologies in cultural heritage from an interdisciplinary artistic perspective and analyzes how they empower the innovative inheritance and dynamic development of cultural heritage. The article first introduces the definition and importance of cultural heritage, then elaborates on the basic concepts of digital and new media technologies and their applications in cultural heritage protection, and finally discusses the innovative practices of digital technology in cultural heritage inheritance through case analysis and proposes a dynamic development model for cultural heritage. Research has shown that digital technology can not only promote the preservation and dissemination of cultural heritage, but also give it new vitality, promoting the modern transformation and dynamic development of cultural heritage.

## 1 Introduction

With the acceleration of globalization, the protection and inheritance of cultural heritage have become increasingly prominent. Cultural heritage is the historical and cultural accumulation of a country and nation. It is not only a witness to past civilizations, but also provides a foundation for cultural identity and values for contemporary people. However, traditional cultural heritage protection and inheritance methods face many challenges in modern society, such as resource scarcity, outdated technological means, and insufficient awareness of protection. In response to these challenges, the rapid development of digital and new media technologies has brought new opportunities for the protection and inheritance of cultural heritage.

Digital technologies, especially virtual reality (VR), augmented reality (AR), 3D printing, digital modeling, and other technologies, provide new tools and methods for the protection of cultural heritage. New media technology makes the communication and dissemination of cultural heritage more diversified and interactive through Internet platforms, social media, interactive displays and other means. These technologies can not only help preserve cultural heritage, but also creatively showcase and disseminate culture, endowing cultural heritage with new vitality.

This paper will explore from the perspective of interdisciplinary art how digital and new media technologies empower the innovative inheritance and

dynamic development of cultural heritage, analyze the application and effects of these technologies in practice, and propose relevant theoretical and practical suggestions.

## 2 Definition and Importance of Cultural Heritage

Cultural heritage refers to the material and intangible heritage created by human beings in the process of historical development, which has historical, cultural, artistic, and scientific value. According to the definition of UNESCO, cultural heritage includes "intangible cultural heritage" and "tangible cultural heritage". Tangible cultural heritage refers to material heritage such as architecture, art, handicrafts, literature, archaeological sites, etc; Intangible cultural heritage includes traditional performing arts, festival activities, folk stories, language, and handicrafts [1].

Cultural heritage holds irreplaceable significance in contemporary society. Firstly, cultural heritage is the carrier of human civilization, carrying the wisdom, history, and cultural memory of humanity. Secondly, cultural heritage is an important symbol of national identity and cultural identity, which can inspire public cultural confidence and collective identity. Finally, cultural heritage is also an important resource for socio-economic development, especially in areas such as cultural tourism and creative industries, which have

\* Corresponding author: Xayjmjy@163.com

enormous potential for growth. Therefore, protecting and inheriting cultural heritage has profound historical, cultural, and economic value [2].

However, traditional cultural heritage protection methods mainly rely on physical protection measures such as restoration, preservation, and display, which often have problems such as limited resources, insufficient technology, and limited effectiveness. With the rise of digital technology and new media technology, the inheritance of cultural heritage has entered a new stage of development. Digital technology not only provides more efficient and precise means of protecting cultural heritage, but also opens up new avenues for its innovative inheritance.

### **3 The Application of Digital and New Media Technologies in Cultural Heritage**

#### **3.1 Application of Digital Technology**

Digital technology refers to a series of technical means that use computers and digital processing technology to collect, store, process, display, and disseminate data on cultural heritage. The application of digital technology can effectively solve the limitations of traditional cultural heritage protection methods and provide more refined, long-term, and secure protection solutions [3].

##### **3.1.1 3D Scanning and Modeling Technology**

3D scanning technology is one of the most commonly used techniques in the protection of digital cultural heritage. By using 3D laser scanners or optical scanning devices, high-precision 3D data collection of cultural heritage can be carried out to create complete digital models. This model can not only accurately present the appearance, structure, and details of cultural heritage, but also be used for later restoration and reconstruction. For example, in the protection of architectural heritage, 3D modeling technology can help restore sites damaged by natural disasters or human destruction, providing scientific basis for the restoration of cultural heritage.

##### **3.1.2 Virtual Reality and Augmented Reality Technology**

Virtual reality (VR) and augmented reality (AR) technologies provide innovative means for the display and interaction of cultural heritage. Virtual reality technology generates virtual environments through computers, allowing users to immerse themselves in cultural heritage in the virtual environment, while augmented reality technology enhances the audience's perception of cultural heritage by capturing the real world in real time and overlaying virtual information onto the real scene. Through VR and AR technology, audiences can not only watch static displays of cultural heritage, but also experience its historical background, cultural connotations, and the stories behind them. For example, many museums and cultural sites have already

used VR technology to create virtual tours, allowing visitors to have an immersive visiting experience through virtual reality devices [4].

##### **3.1.3 Digital Archives and Big Data Technology**

The digital archives of cultural heritage can be effectively managed and analyzed through big data technology. By establishing a digital database of cultural heritage, it is possible to preserve, query, and share a large amount of heritage information. In addition, big data technology can help researchers extract potential historical value and cultural connotations from a large amount of cultural heritage data, providing richer information for heritage research and display.

#### **3.2 Application of New Media Technology**

New media technology refers to a series of technical means for content dissemination and interaction through Internet, social media, mobile applications and other platforms [5]. The application of new media technology makes the dissemination and display of cultural heritage more flexible, interactive, and extensive.

##### **3.2.1 Online Display of Cultural Heritage**

With the popularity of social media and video platforms, the dissemination of cultural heritage has undergone revolutionary changes. Many cultural institutions and museums upload pictures, videos, documents, and other materials of cultural heritage to the internet through official websites and social media accounts, making them easily accessible to audiences worldwide. For example, the Louvre Museum in Europe has launched a virtual exhibition, where visitors can watch the works of art in the museum through the Internet and get expert explanations.

##### **3.2.2 Interactive Experience of Cultural Heritage**

New media technology has also enhanced the interactivity and fun of cultural heritage display through interactive exhibitions and gamified design. For example, many cultural heritage projects allow audiences to participate in the experience of cultural heritage through mobile applications and interactive screens, engaging in activities such as virtual archaeology and cultural exploration [6]. This interactive experience not only increases tourists' participation and interest, but also makes the learning process of cultural heritage more vivid and interesting.

##### **3.2.3 Global Dissemination of Cultural Heritage**

The popularity of social media has enabled cultural heritage to quickly spread globally through short videos, images, and text, greatly increasing the visibility and influence of cultural heritage. For example, through short video platforms, museums and cultural institutions can showcase their precious cultural relics and historical

sites to global audiences, attracting more tourists and followers.

## 4 Digital and New Media Technologies Empower the Innovative Inheritance and Dynamic Development of Cultural Heritage

### 4.1 Digital Technology Empowers Innovative Inheritance of Cultural Heritage

Digital technology not only provides innovative protection methods for cultural heritage, but also opens up new paths for its innovative inheritance. The inheritance of traditional cultural heritage often relies on physical display and oral transmission, which, although effective, also have limitations. Digital technology has broken these limitations and provided a broader space for the display and dissemination of cultural heritage [7].

Through 3D modeling, virtual reality, and augmented reality technologies, the display of cultural heritage is no longer limited to static physical spaces, but can be presented in a more dynamic and interactive manner. For example, viewers can "enter" ancient palaces through VR technology, personally experience historical scenes, and understand the stories behind the ruins. This innovative display method not only enhances the audience's immersion, but also promotes the dissemination and popularization of cultural heritage knowledge.

### 4.2 Digital Technology Promotes the Dynamic Development of Cultural Heritage

The dynamic development of cultural heritage refers to the fact that cultural heritage is not only passively preserved and displayed, but also maintains its vitality and relevance to the times through continuous innovation and transformation. Digital technology provides new impetus for the dynamic development of cultural heritage. Empowered by digital technology, cultural heritage can not only be better preserved and inherited in modern society, but also integrated into modern life, becoming an important component of contemporary cultural and economic development.

For example, by combining cultural heritage with modern art creation, digital technology can help artists transform traditional cultural elements into modern art works, promoting the recreation and innovative inheritance of cultural heritage. Meanwhile, digital technology can also enhance the social and economic value of cultural heritage in modern society by integrating with industries such as tourism, education, and commerce.

## 5 Case Studies

### 5.1 Case 1: Successful Practice of Digital Protection - the Mogao Grottoes of Dunhuang

The Mogao Grottoes of Dunhuang is one of the most important Buddhist cultural heritage in China. Its murals and sculptures are known as the world's art treasure house, bearing the precious memory of a thousand years of history and culture. However, due to adverse natural factors such as wind, sand, and drought, the cultural heritage of Mogao Grottoes is facing severe protection issues. At the same time, the increase in the number of tourists has also exacerbated the wear and tear of the site, especially the damage to the murals caused by substances such as humidity and carbon dioxide in the air. To address these issues, Dunhuang Academy has collaborated with multiple technology research institutions both domestically and internationally, utilizing digital technology for comprehensive protection [8].

Firstly, the Dunhuang Academy adopted three-dimensional laser scanning technology to conduct a comprehensive digital scan of the Mogao Grottoes. This technology can accurately record the spatial data of the site, generate high-precision 3D models, allowing researchers to clearly see the details of every mural and sculpture, and even trace back to the tiny cracks and fading phenomena of the mural. These three-dimensional data not only provide scientific basis for later restoration work, but also provide a virtual experimental platform for cultural relics protection personnel, avoiding further damage to the real site.

In addition to 3D laser scanning, the application of virtual reality (VR) technology has also become a highlight of the digital protection of the Mogao Grottoes of Dunhuang. Through VR technology, tourists can visit the Mogao Grottoes in a virtual environment, enjoying high-definition presentations of murals and sculptures, while avoiding actual interference with the site. This approach not only immerses tourists in the art world of Mogao Grottoes, but also solves the problem of irreversible damage caused by too many tourists to the site. In addition, the digital display of the Mogao Grottoes of Dunhuang also includes panoramic images and digital restoration process. The audience can understand the story behind the protection work and technology through interactive experience, and enhance the public participation and awareness of cultural heritage protection.

Through the application of this series of digital technologies, the Mogao Grottoes of Dunhuang have not only been effectively protected, but also further spread their cultural values through virtual displays, becoming a successful example in the field of digital cultural heritage protection.

### 5.2 Case 2: Innovative Application of New Media Communication - The Palace Museum of China

The Palace Museum of China, as one of the most important cultural heritages in the world, is renowned for its rich historical, artistic, and cultural values. In order to enable more people to understand and

appreciate the cultural relics of the Forbidden City, the Palace Museum has carried out a series of innovative dissemination and exhibition work with the support of new media technology. Through these new technologies, the Forbidden City can not only break through the limitations of space and time, but also provide a more intuitive and rich cultural experience to global audiences.

The Palace Museum made full use of the advantages of social media platform, especially on WeChat official account, microblog and short video platform, and launched a large number of cultural relics related content. For example, on the WeChat official account, the Forbidden City has released high-definition images of cultural relics, historical stories and cultural connotations behind them, allowing the audience to more intuitively understand the unique value of each cultural relic through the way of pictures and texts. In addition, the Palace Museum has also released a series of short films through short video platforms, introducing the daily work of the museum, the historical background of the exhibits, and the artistic stories behind them. These contents have not only been warmly welcomed by the public, but also attracted the attention of a large number of young audiences.

In addition to social media, the Palace Museum has further expanded the boundaries of its cultural dissemination through virtual museums and online exhibitions. Through the Internet platform, visitors can visit the major pavilions in the Forbidden City without leaving home to enjoy the high-definition display of many precious cultural relics. For example, through 360-degree panoramic images and virtual reality technology, the Forbidden City presents the real scenery of the exhibition hall and the details of the cultural relics to a global audience, allowing those who cannot be present in person to have an immersive exhibition experience through the internet. In addition, the online exhibition of the Forbidden City also invited internationally renowned scholars and cultural relic experts to give special lectures and live broadcasts, interacting with the audience and further enhancing their sense of participation and cultural identity.

Through these innovative technological applications, the Palace Museum has not only successfully achieved digital dissemination of cultural heritage, but also strengthened the global audience's recognition of traditional Chinese culture, enhancing the effectiveness of cultural relic protection and dissemination. This combination of traditional culture and modern technology provides useful reference for the protection and display of other cultural heritage.

## 6 Conclusions and Prospects

Digital and new media technologies provide new opportunities for the innovative inheritance and dynamic development of cultural heritage. Through digital protection, virtual display, interactive experience and other means, cultural heritage can not only be preserved and inherited more efficiently, but also integrated into modern life, enhancing its social value and cultural influence. In the future, with the continuous

development of technology, digital and new media technologies will play an increasingly important role in the protection and inheritance of cultural heritage.

However, the application of technology also faces some challenges, such as standardization issues of digital technology, copyright protection issues, and the integration of technology and traditional culture. Therefore, future research should strengthen the deep integration of technology and cultural heritage inheritance, explore more innovative application models, and achieve sustainable protection and development of cultural heritage.

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