# Digital technology and the revival of Chinese excellent traditional culture

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**Abstract.** Chinese excellent traditional culture is the spiritual bloodline and unique spiritual identity inherited by the Chinese nation, with the continuous development of information technology, digital technology is becoming more and more mature, the development of digital dissemination of culture and art has now gathered a variety of energy, digital technology has become one of the important areas in the development of Chinese excellent traditional culture and art. The creation of digital technology and the development of traditional culture and art are bound to produce some collision, so how to find a balance between the two, and the two mutual achievement, is a problem worth exploring. In this paper, we will discuss the symbiotic relationship between digital technology and the revival of Chinese outstanding traditional culture from several perspectives, including the regeneration of Chinese outstanding traditional art, the protection of intangible cultural heritage, and the display of digitized collections in Chinese cultural venues, as well as by combining important cases.

## 1 Introduction

Chinese excellent traditional culture is the spiritual blood and unique spiritual symbol of the Chinese nation, and plays an important role in cultural people. The rapid development of digital technology has brought about the diversification of Internet information media, the ubiquity of communication channels, the personalization of audience needs, and the digital innovation of culture. With the continuous development of information technology, digital technology has become one of the important fields in the development of culture and art. The emergence of digital technology enables the audience to directly participate in the works and realize the interaction and co-creation between the audience and the works. There will inevitably be some collisions between the emergence of digital technology and the development of traditional culture and art, so it is necessary to find a balance between the two, and how to make the two achieve each other is a problem worth exploring.

Digital technology and culture and art are not isolated fields, but should influence and combine with each other. The emergence of digital technology has brought more forms of expression to the display of traditional culture and art. Meanwhile, digital technology should also be inspired by aesthetics and become an important part of displaying Chinese culture and art. Some traditional Chinese art forms have gradually introduced digital elements, such as digital performances, digital movies, etc. Traditional Chinese culture has also been given a new expression under the blessing of digital technology, realizing the integration of traditional culture and emerging technologies.

The emergence of digital technology provides new ideas for our aesthetics and perception. Nowadays, with the development of digital technology, the forms of traditional cultural communication are no longer simple. No matter what kind of communication media, complex

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expression has become necessary. Various digital technologies can form a variety of communication languages through art design, making telling Chinese stories vivid and interesting and accessible. Digital technology is becoming more and more mature, and now it has gathered diverse energies for the digital transmission of culture and art.

## 2 Digital technology and the reproduction of Chinese excellent traditional art

Image integration is inseparable from the reproduction of images, that is, through copying, engraving, printing and other means to reproduce fine painting and calligraphy, such as the Tang Dynasty "Lanting Xu" copy, modern Commercial Press, Ke Luo version of "Chinese famous Painting: Strehlneek collection photocopy, Tianlai Pavilion old collection Song people's picture album, etc., modern Rongbaozhai woodblock watermarking copy of The Night Revels of Han Xizai, Lady Guo Go's Outing in Spring , Riverside Scene at Qingming Festival, etc. From the early manual copy to the later rise of printing industry, through block printing, lithography, collotype, and now digital printing, many calligraphy and painting classics are reproduced and circulated in the form of copies. Since the founding of New China, China has published "The Complete Works of Chinese Fine Arts", "The Complete Works of Chinese Painting" and other large-scale collection of ancient calligraphy and painting fine books. Among them, in the 1980s, the Identification Group of ancient Chinese calligraphy and painting composed of Xie Zhiliu, Qigong, Xu Bangda, etc., lasted eight years to conduct the most authoritative identification and grade of calligraphy and painting works in public and private collection institutions nationwide, and selected 20,000 works from more than 60,000 works to edit and publish 24 volumes of Ancient Chinese Calligraphy and Painting Catalogs. It contains 20,117 works of calligraphy and painting from the Western Jin Dynasty to the Ming and Qing Dynasties, with more than 35,700 pictures. It is the most authoritative, systematic, accurate and large-scale integrated atlas of ancient calligraphy and painting, which is of great significance for the study of ancient Chinese art history and cultural history, and has become an essential reference book for the study of art history. However, it cannot but be pointed out that due to the limitations of The Times, the large-scale integration of this painting and calligraphy inevitably has obvious defects: First, the works included are only printed into a black and white small picture, which is graphical, and can not truly show the original appearance of the painting and calligraphy, which can be used as a data index, but it is difficult to meet the needs of detailed and in-depth viewing and research. Second, it only collects the works of important domestic collection institutions, and there is no overseas public and private collection of Chinese calligraphy and painting. It can be said that the poor printing and incomplete collection have been the obvious defects of the compilation and publication of ancient Chinese paintings before. This defect was finally made up by the "Chinese Painting Department of the past Dynasties" organized and implemented by Zhejiang University and Zhejiang Provincial Cultural Relics Bureau.[1]

The "Chinese Painting Department" is a major commissioned project of Zhejiang Cultural Research Project, National Publishing Fund project and National Social Science Fund, and has been included in the General Office of the Communist Party of China Central Committee and The General Office of the State Council on the Implementation of the Chinese Excellent Traditional Culture Inheritance and Development Project and the Outline of the National Cultural Development and Reform Plan for the 13th Five-Year Plan Period. In the past 17 years, the "Chinese Painting Department" has adhered to the image standards closest to the original works, and has adopted the most advanced digital technology to collect digital images covering the vast majority of Chinese painting masterpieces around the world. The project reproduces the more than 2,000 years of development of ancient Chinese painting, provides a new way to explore the in-depth understanding, protection, research and display of Chinese art and culture, and promotes the digital return of ancient Chinese painting through the digital restoration of hand-down famous paintings. The "Big Department" project team and more than 260 cultural and museum institutions around the world, bringing together hundreds of experts in the fields of art, science and technology,

archaeology and other fields, using digital high-tech means to explore a new path to display excellent traditional Chinese art and traditional culture, in order to digitize ancient paintings handed down from generation to generation. The project team successfully discriminated and extracted the original denudation dark and unrecognizable to the naked eye, the inscriptions and imprints, and realized the "non-damage" restoration of cultural relics.[2]The" Big System "project includes 12,405 pieces (sets) of Chinese paintings from 263 cultural and museum institutions at home and abroad. Compiled and published the Complete Works of "Pre-Qin, Han and Tang Paintings", "the Complete Works of Song Paintings", "the Complete works of Yuan Paintings", "the Complete works of Ming Paintings", and "the Complete Works of Qing Paintings", totaling more than 240 volumes in 66 volumes. This project, with the responsibility of cultural inheritance, high-tech printing means and the spirit of excellence, reproduces the ancient painting classics such as "Dwelling in the Fuchun Mountains", "A Thousand Li of Rivers and Mountains" and "Court Ladies Wearing Flowered Headdresses". Advanced equipment, high-tech technology, a high sense of responsibility, so that the "Chinese painting of the past dynasties" show the "authenticity" close to the original style, has become a classic copy of the color version of ancient paintings.

At the same time, the project team, together with Chongqing Dazu Rock Carvings Research Institute and Sichuan Anyue Grottoes Research Institute, realized the digital modeling of Dazu rock carving 245 grottoes and Anyue stone carving as a whole, 1:1 three-dimensional reproduction and multimedia virtual interaction through the comprehensive use of VR, AR, 3D printing and other high-tech means. In addition, through cloud computing, motion capture and other modern technologies, it realizes the interaction between people and paintings, the interaction between ancient and modern, and the re-creation of the works by the viewers, which greatly strengthens the audience's sense of participation and realizes the multi-dimensional transformation and integration of the sensory experience of ancient Chinese painting, which can not be achieved by other traditional arts. With a large number of rare images and documents, the grand achievements of ancient Chinese painting are presented in a panoramic manner. Advanced equipment, high-quality materials, high-tech technology, a high sense of responsibility and a serious and meticulous work attitude, so that the "Chinese painting of the past" shows the "authenticity" close to the original style, and has become a classic copy of ancient paintings.[3] Through digital technology, cultural relics can be brought to life, and the cultural and aesthetic essence of Chinese paintings in the past dynasties can be widely disseminated.

At present, digital technology has increasingly played a role in telling Chinese stories and Chinese culture, better promoting and displaying excellent traditional Chinese art and culture, and making new contributions to the continuous Chinese context, which is of great significance for the prosperity of Chinese fine arts and the enhancement of national cultural soft power.

## 3 Digital technology and the protection of China's intangible cultural heritage

Intangible cultural heritage is the most dynamic and important part of cultural diversity, the crystallization of human civilization and the most valuable common wealth, carrying the wisdom of mankind and the civilization and glory of human history. Intangible cultural heritage is an important part of the fine traditional Chinese culture, a vivid witness of the continuous inheritance of the Chinese civilization, and an important basis for connecting national emotions and maintaining national unity. China attaches great importance to the protection of intangible cultural heritage, and the protection, inheritance and utilization of intangible cultural heritage are of great significance to the continuation of the historical context and the strengthening of cultural confidence in building a strong socialist culture. In 2005, The State Council, in its Opinions on Strengthening the Protection of China's Intangible Cultural Heritage, pointed out that the intangible cultural heritage should be recorded in a real, systematic and comprehensive way through various means such as text, audio, video and digital multimedia, and the establishment of archives and databases. The Intangible Cultural Heritage Law of the People's Republic of China, which came into effect on June 1, 2011, also emphasizes that "cultural authorities should

have a comprehensive understanding of the situation related to intangible cultural heritage and establish intangible cultural heritage archives and related databases." This is the first time that the country has clearly defined the necessity of digital protection of intangible cultural heritage at the legal level. In the Opinions on Further Strengthening the Protection of Intangible Cultural Heritage issued by the General Office of the CPC Central Committee and The General Office of the State Council in 2021, it is also clearly pointed out that it is necessary to improve the protection and inheritance system of intangible cultural heritage, strengthen the digitization of archives, use modern scientific and technological means, improve the level of professional records, and properly preserve relevant physical objects and materials.

With the development of modern computer cloud computing technology, computer graphics technology, multimedia technology, sensor technology, human-computer interaction technology, network technology, three-dimensional display technology and other technologies, the protection and inheritance of intangible cultural heritage has begun to use digital information acquisition technology, multimedia virtual scene modeling technology, virtual scene coordination and display technology. On the basis of analyzing and studying the laws of living inheritance of intangible cultural heritage, multi-dimensional data information is formed by capturing and recording sounds, expressions and movements in the inheritance process of intangible cultural heritage, and then using digital graphics, images, rendering, animation and other technical means as well as three-dimensional scanning, construction, restoration and simulation of text to reproduce the original appearance of cultural heritage. The application of these virtual reality and visual display technologies in the protection of intangible cultural heritage can express and perceive information in the most intuitive way, and manipulate information processing technology with a touchable (touch screen) interface, so as to provide vivid, intuitive and efficient information services for the inheritance of intangible cultural heritage, and effectively promote the protection and dissemination of intangible cultural heritage.

The digital display and dissemination of intangible cultural heritage can make use of three-dimensional scenes, modeling virtual scenes, coordinated display technologies, and online production, use and dissemination of intangible cultural heritage. With the help of multimedia integrated digital photography and other technologies, digital museums of intangible cultural heritage can be established to integrate intangible cultural heritage information formed by various media and disseminate it through the Internet. It breaks the limitation of time and space, and makes it a new way of display and communication suitable for mass communication, so that a large number of intangible cultural heritage resources can be shared and utilized to the greatest extent. Modern VR technology provides more advanced means and methods for the inheritance of intangible cultural heritage, such as the use of 3D digital animation technology to restore, reproduce and interpret intangible cultural heritage phenomena, scenes, events or processes, and realize the visualization of intangible cultural heritage through pictures, three-dimensional animation and other forms to achieve the restoration and reproduction of the original. Realistic character generation, scene construction, action binding, human-computer interaction, knowledge modeling and other technologies are applied to quickly generate scenes and behaviors in the intangible cultural heritage, and realize virtual representation, knowledge visualization and interactive operation of the intangible cultural heritage, so that as many people as possible can understand these intangible cultural heritage through viewing. Including the original appearance of intangible cultural heritage in danger of disappearing.

Digital protection technology is an important means to protect intangible cultural heritage. At present, a large number of intangible cultural heritage in China lack digital means of high-fidelity collection and record, lack of information management means of standard system, and the construction of digital resource database is also in a blank state. Digital protection technology should be used. Provide comprehensive protection services for China's intangible cultural heritage and build a platform for its display and dissemination. Digital collection and storage technology provides a guarantee for the complete protection of China's intangible cultural heritage. Digital technology provides a broad space for the inheritance,

development and utilization of intangible cultural heritage. Digital technology can not only record various information of intangible cultural heritage, but also make use of such information for digital production and digital dissemination, so as to give full play to the cultural and economic value of intangible cultural heritage. Using digital technology to realize the industrialization of the redevelopment and utilization of intangible cultural heritage is conducive to extending the industrial chain and producing new products, which has important economic value for the development of today's cultural industry.

## 4 Digital technology and cultural communication in Chinese cultural venues

The instinctive layer can bring direct sensory stimulation to the audience, which is reflected in the perceptual needs such as gaze and sound. As early as the 1990s, the American Non-Visual Arts Association (ABS) began to study how to let visually impaired people experience museums and visual culture through perceptual tools, such as touch pictures, touch, hearing, language and sound. With the rapid development of perceptual research in the past 20 years, more and more perceptual strategy studies have shown that multi-perceptual learning is not only applicable to children, but also plays a significant role in youth and adults, which gives museum researchers great inspiration.[4]Therefore, how to enhance perception, promote interaction and realize experience in museums is an important direction for museums to explore.

With the rapid process of digitalization, traditional culture is no longer transmitted in a single way. The public can be influenced by traditional culture in various ways, and digital technology can form a complex and diverse communication language through art design, making the original boring content vivid and accessible. By enhancing the sense of fun and participation, we can better realize the dissemination of traditional culture. In recent years, with the continuous improvement of human living standards and spiritual pursuit, viewers are no longer satisfied with the interaction of information acquisition, and more and more pursue experience. The core value of interactive experience of virtual space switching is that science and technology serve human intelligence and imagination, and the use experience of science and technology should be constructed according to the user's perception, cognition and motor ability.[5]Therefore, more and more museums and art galleries are undergoing great changes, transforming the traditional storage of cultural relics into a space with social functions. A large number of interactive designs based on VR technology have emerged, enriching the display form of collections and the way of visitors' experience. The museum exhibition under the influence of the interactive design concept aims to promote cultural communication and build the interactive relationship between the exhibition and the audience, and uses various media technologies to design situations around the exhibition theme to encourage the audience to participate in the exhibition physically and mentally, and turns the visiting process of the audience into a two-way interactive communication mode of exploration, discovery and reflection in the experience. It includes two aspects: the influence of the exhibition on the audience's psychology and behavior, and the influence of the audience on the cultural transmission of the exhibition.[6]In 2017, the Palace Museum launched the "Palace Museum VR Experience Museum" project, which aims to promote the traditional culture of the Palace Museum and provide modern entertainment venues. Compared with traditional VR technology, the highlight of this project is that it is equipped with a "head-mounted" 360-degree VR wearing device, 3D dynamic seat, and lighting atmosphere control system, which jointly stimulate the audience's sense of motion, vision, hearing and other senses. The project "Zhu Di Builds the Forbidden City" uses the HTC Vive head-mounted system, and after the viewer puts on the VR device, he can not only follow the emperor Zhu Di along the way, but also listen to Chinese stories such as stars, rites, and intangibles.

At present, more and more cultural venues in China are using digital technology. Located in Liangzhu, Hangzhou, the Hangzhou branch of the China National Edition Museum has attracted the attention of the public since its opening. In addition to the rich Jiangnan cultural collections, the modern Wisdom Museum is a major highlight. For the modern National Library of

Editions, it is not only necessary to protect the physical collections, but also to scientifically manage the "digital doppelgons" of the collections. When collections are stored, digital collection and digital processing should be carried out according to data standards, so as to realize the information aggregation of version data in different forms such as graphics, audio and video, and finally form digital exhibits in the digital exhibition hall. The construction of the Smart Museum fully reflects the characteristics of Zhejiang, the integration of art, culture and technology, the comprehensive application of naked eye 3D screen, laser projection, lighting and sound effects to achieve multi-system linkage, 129 square meters of indoor naked eye 3D screen, to achieve nearly 100 million pixels of ultra-high-definition picture output. China Mobile also supports the digital exhibition hall from the aspects of data storage and cloud platform, and launches new intelligent services such as on-site AR reality navigation and cloud roaming. The venue uses cultural big data to link different forms of version resource data such as text, text and audio to form a gene bank of Chinese cultural seeds. In addition, in order to make the management intelligent, the Hangzhou National Edition Museum can open up the physical operation of the physical dimension and the digital management of the information dimension, and use the concept of digital twins to complete the mapping of the museum from the physical world to the digital world, realize visual management, combine the Internet of things and other related technologies, and establish the information physical world. Realize convenient and efficient scenario-based intelligent management and multi-dimensional data association analysis.

In the link of exhibition - communication - reception (audience), the way of presentation and viewing is a particularly important intermediary. As a means of display, digital technology can greatly enhance the participation and interaction of the exhibition. Rich media means are applied in the display of modern cultural venues, impacting people's senses, thus affecting the audience's psychological response, and stimulating the audience's imagination and curiosity. Various interactive experience media facilities are set up in the cultural venues, and the audience can perceive and experience through watching, listening, touching and other ways, and understand their own recognition, processing and rules of external information through interactive experience. In the future, cultural venues will be a diversified space of education and entertainment, so we should better explore the application of digital technology such as interactive design in the exhibition design of cultural venues.

## 5 Problems to be solved in the co-development of digital technology and Chinese excellent traditional culture

It is not simple for digital technology to integrate well with art, and digital technology must become an organic part of the expression form and expression content of culture and art. While digital innovation will have a huge impact on how culture and art are presented, it is not the key factor, nor is it the only factor. From the perspective of the potential and advantages of digital technology, the development space of digital art is extremely broad, and the impact on human social life is incalculable. In the face of this art form which is still developing, it is necessary for us to put forward an idealized form description from a cultural standpoint, in order to suggest a "Chinese idea of digital art" for our cultural strategy pursuit, that is, to enpower digital art with Chinese cultural logic, Chinese aesthetics and Chinese people's talents, and to define its form and value with Chinese style. Prepare from the conceptual source to add a "Chinese" confidence and courage to the journey we have actually begun.[7]Therefore, we should attach great importance to the new form supported by digital technology.

In the process of promoting the revival of Chinese excellent traditional culture, digital technology should avoid the lack of understanding of the cultural connotation and skills behind Chinese excellent traditional culture and art, and must be rich in a certain depth of cultural heritage and aesthetic values. It is necessary to understand the cultural connotation through appropriate media, and it is also necessary to obtain information and learn the connotation and value behind it through multiple channels. In terms of technological innovation and aesthetic exploration, continuous exploration and innovation are needed to promote the in-depth development of the practice and theory of

digital art. Digital technology has a wide range of prospects and will certainly have a place in the future of culture and art, but it can only be a single element in the diversity. In the final analysis, the use of digital technology still needs a deep cultural heritage, which is the most important mission given by culture and art.

## 6 Conclusion

The splendid and long-standing Chinese culture, nurtured over 5,000 years of civilization, embodies the deepest spiritual pursuit of the Chinese nation, represents the unique spiritual symbol of the Chinese nation, provides rich nourishment for the continuous growth and growth of the Chinese nation, is the cultural fertile soil rooted in socialism with Chinese characteristics, and is a prominent advantage of contemporary China's development. It plays an important role in the continuation and development of Chinese civilization and the advancement of human civilization. With the profound economic and social changes in China, the increasing opening up to the outside world, and the rapid development of Internet technology and new media, there is an urgent need to enhance cultural confidence and inherit the Chinese context.

The integration and symbiosis of digital technology and China's excellent traditional culture, rooted in the organic unity of digital life and artistic life, promotes the enrichment and development of culture at the concept and behavior levels, and builds a new model with innovation in content and form. At the same time, such integration and symbiosis cannot be separated from the social, political, economic and cultural environment. The integration and creation of digital technology and Chinese excellent traditional culture is a new practice. In order to promote the Chinese aesthetic spirit and promote the sustainable generation of aesthetic culture, it is urgent to have new development in aesthetic concept, aesthetic intermediary, aesthetic scene, aesthetic experience, aesthetic system and other aspects. The path of integration and symbiosis between Chinese excellent traditional culture and digital technology will also change, and we should continue to actively explore it anyway.

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