

FROM TRADITION TO MODERNITY: DIGITAL EXPRESSIONS IN THE PRESERVATION AND INHERITANCE OF NEW YEAR PAINTINGS

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Abstract: The China New Year Paintings are folk painting that evolved from farming culture. It once fell into a cultural depression and nearly died out. With the joint efforts of the government, artists and researchers, the art of it has been preserved and inheritance. In order to verify whether the digitization of New Year Paintings can solve the low social awareness and confusing cultural dissemination problems, this paper reviews the literature of scholars, introduces the co-occurrence matrix and comparative learning framework, using Co-occurrence Matrix Analysis and Statistical Product and Service Solutions (SPSS) for similarity analysis, compares the attempts made by artists through digitization and identify the digital representation and outcomes of the New Year Paintings by examining the frequency and similarity of keyword occurrences. This paper compares and discusses the attempts made by artists through digitalization by reviewing the literature of scholars, introducing the co-occurrence matrix and comparative learning framework, and conducting similarity analysis. The results of this study show that New Year Paintings can be reasonably disseminated and accepted, thereby generating more diverse interpretations and applications. This study has sorted out the digital expressions of New Year paintings, broadened the research horizon, and provided ideas for subsequent conservation research.

Keywords: Conservation, Culture, Digitization,
Heritage, New Year Paintings

1. INTRODUCTION

New Year Paintings, which originated from the “Door God Paintings” of the Han Dynasty in China, are an important part of traditional Chinese culture, carrying the wisdom and aesthetic interests of the Chinese people with their unique art forms and rich cultural connotations. In Chinese agrarian society, New Year Paintings, usually featuring auspicious and festive motifs, are a cultural carrier for transmitting blessings and prayers, and are widely used for the decoration of traditional festivals such as the Spring Festival, where every household posts New Year Paintings to pray for an auspicious New Year. Its art form matured during the Song Dynasty and reached its peak during the Ming and Qing Dynasties, forming five of the most famous production areas of New Year Paintings, such as Yangliuqing in Tianjin City, Yangjiabu in Shandong Province, Taohuawu in Suzhou City, Mianzhu in Sichuan Province, and Zhuxianzhen in Henan Province. However, with the decline of farming culture and the acceleration of urbanization, the art of New Year Paintings once fell into a trough. The single form of the product and the performance of the content cannot keep up with the development of the times are important factors that restrict the development of New Year Paintings in modern times.



Figure 1. Traditional New Year Paintings

(Source: Yang liuqing in Tianjin City)



Figure 2. Digital New Year Paintings

(Source: Zhuxianzhen in Henan Province , <https://zhongkui.com>)

Firstly, the problem of low social acceptance is particularly prominent. The fast pace of modern society and diversified forms of entertainment have caused traditional New Year Paintings to be gradually neglected by the younger generation. As a traditional art form, New Year Paintings are often considered to be out of touch with modern life, making it difficult to arouse the interest of the public, especially young people. Although some schools and pavilions are carrying out educational and promotional activities on New Year Paintings, the overall effect is still limited.

Secondly, cultural communication chaos is also an important issue that needs to be addressed in the process of passing down New Year Paintings. With the popularity of the Internet and social media, the way in which New Year Paintings are disseminated has changed dramatically. However, due to the lack of uniform standards and norms, some low-quality and commercialized New Year Paintings have flooded the market, resulting in the overall level of the art of New Year Paintings being uneven. In addition, some of the New Year Paintings have suffered from content distortion and cultural breaks in the process of dissemination, further weakening the cultural value and artistic charm of New Year Paintings.

In this context, the application of digital technology provides new possibilities for the protection and inheritance of New Year Paintings. For example, babies in New Year Paintings have been turned into anime characters for promotional videos and TikTok mini videos. Zhuxianzhen New Year Paintings chose to combine the woodcut New Year Paintings of Zhong Kui (Ghost King) and Shi Zun (Buddha) with NFT to create digital art works. Yangliuqing New Year Paintings used Extended Reality (XR) and 5G

networks to create a “Magic Wall” that can be interacted with by users. Through digital means, artists and researchers can preserve, disseminate and reproduce the art of New Year Paintings more conveniently. Digitization not only enhances the visual effect of New Year Paintings but also raises the public's awareness of and interest in New Year Paintings through virtual displays and interactive experiences. However, how to maintain the traditional characteristics of New Year Paintings in the process of digitization and effectively deal with the problems of low social acceptance and chaotic cultural dissemination is still an urgent issue to be resolved.

2. LITERATURE REVIEW

2.1 DIGITAL APPLICATIONS OF TRADITIONAL CHINA NEW YEAR PAINTINGS

This section discusses the digital representation of traditional New Year Paintings, and Kun Wang (2011) points out in his thesis that the Digital Survival of Chinese Woodblock Printed New Year Paintings project has established a complete archive of New Year Paintings that includes textual, photographic, and audio data, with the video data mainly in digital formats such as DV, HDV, or AVCHD. Heng Qian (2012) analyzed the relationship between the aesthetics of China New Year Paintings and digitalization in commercial animation advertisements and argued that the character modelling of New Year Paintings, which is characterized by planar generalization, is in line with the simplified treatment of animation modelling design, and that the qualities of simple and honest folk art are the pursuit of animation advertisement design. Hongmei Yang (2013) through a study of New Year Paintings on display in museums, proposed the adoption of dynamic display, openness, and the use of a variety of different materials and techniques. that dynamic display, open protection and digital dissemination should be adopted to maximize the protection of New Year Paintings and the social functions of museums. However, the digitization proposed by scholars ensures that the authenticity of the paintings is not lost. Therefore, it has a positive effect on the conservation of the year paintings. Han He (2013) suggests that for the old methods that cannot mobilize the attention and interest of the audience, Zhangzhou New Year Paintings can be brought closer to the distance between the New Year Paintings and the audience by establishing a database through the virtual reality technology and the Internet and displaying it dynamically. Bin Zhu (2014) argues that for the digital preservation of the Tantou New Year Paintings, it should be started from the digital storage, digital creation and display, and the maintenance of digital information property rights, to protect them while inheriting them, and to avoid the problem of chaotic cultural dissemination. Fanghao Song, Yan Liu, and Kehui Mao (2014) explored the application design relationship between Yangjiabu New Year Paintings and APPs, and argued that through the development of APPs, the

New Year Paintings can be used to stimulate the audience's interest in a more visually rich and interactive ways to stimulate the audience's interest and enhance the awareness of the inheritance and protection of the New Year Paintings. However, scholars have proposed very effective application methods to enhance the vitality of New Year paintings. Therefore, it is a favorable attempt for the development and preservation of New Year Paintings. Ruimin Zhang (2015) by studying The Italian Digital Library Portal and Cultural Tourist Network, Gallica and TATE, analyzed and found that the governments of Italy, France and the UK that all provide support for the digital protection and construction of cultural heritage, which provides a reference and reference for the protection of China New Year Paintings, affirming the importance of digital technology for New Year Paintings. Hongliang Li (2016) provides a strategy for the digital dissemination of New Year Paintings and argues that there is a need to disseminate the historical, cultural and value system of the New Year Paintings, on the platforms, and at the same time, to conduct audits and data analysis of the promotional scripts, with a fixed-point push. Dan Chen, Lu Ren (2017) elaborated on the current situation of Zhuxianzhen New Year paintings that are not easy to store, analyzed the necessity of using digital technology for protection and inheritance, and proposed that platform display, mobile dissemination and outdoor electronic media display should be carried out together. However, the digital platform display of New Year Paintings is favorable to the protection and inheritance of New Year Paintings. Therefore, the digital New Year Paintings are easy to be understood and supported by the audience.

2.2 DIGITAL APPLICATIONS OF MODERNITY CHINA NEW YEAR PAINTINGS

In this section, the digital expression of modern New Year Paintings will be discussed. Yu Xiao (2017) proposed that the digital teaching platform of Longhui Tantou New Year Paintings has the functions of resource and teaching management, learning community, and the integrated teaching mode adopted can activate the interaction between teachers and students, which promotes the cultivation of New Year Paintings inheritors. Xuemeng Huang (2018) explored the role of digital tools in the protection of Liangping New Year Paintings, and It is believed that the trend of community inheritance is being formed, and the appeal of modern New Year Paintings is to comply with the digital trend, which is also in line with the development law of Liangping New Year Paintings, while digital tools can also protect the inherited body of New Year Paintings and carry out auxiliary modelling and restoration of New Year Paintings. Juan Huangfu (2018) investigated the status of digital conservation of New Year Paintings in the Central Plains and believed that a single means of communication is not enough to attract the subjective initiative of the audience and suggested that virtual reality displays of New Year paintings and interactive experiences of printing techniques be carried out in museums, and an online platform

be established. However, modern New Year Paintings have a wider range of applications for digitalization. Therefore, digitalization is a mainstream trend for the future development of modern New Year Paintings. Yiding Lu (2019) analyzed the status quo that the New Year Paintings of Zhuxianzhen have been digitally protected, but there are still difficulties in inheritance, and concluded that the digital inheritance mode is also applicable, and more and better inheritors of New Year Paintings can be cultivated in this way. Xuan Qin, Jin Zhou (2020) studied from the perspective of Zhuxianzhen New Year Painting art, economy and inheritance, they think that digitalization is more in line with the modern aesthetic demand, the establishment of platform is conducive to the rapid dissemination of New Year Painting works, and the uploaded works can be well preserved, and put forward the idea of New Year Painting creative industry of clustering development. Ziyi Li (2021) mentions that Taohuawu New Year Painting unitary dissemination channel has led to the loss of economy, slow updating of themes and inheritance difficulties. loss, slow updating of themes and difficulties in inheritance. With the convenience of the mobile terminal, an APP was designed for Taohuawu New Year Paintings to establish a mobile publicity and communication platform. However, the digital preservation of modern New Year Paintings is still difficult to inherit. Therefore, it becomes more important to expand the digital inheritance of New Year Paintings. Xinwen Tian (2022), through the study of Laohekou New Year Paintings, found that it faces the problems of the lack of inheritors, the lack of preservation of New Year Paintings, the impact of the advanced technology, and the single inheritance method. With the support of augmented reality technology, an Android display platform is built with 3D models, animation and audio. Jinbo Xu, Yijie Zhu (2023) cited the method of cultural translation in their study, analyzed the significance of cultural symbols of Zhuxianzhen New Year Paintings at the material, behavioral and philosophical levels, and used it as a basis for exploring the functionality of the digital medium, preserving the cultural roots of New Year Paintings and innovating interaction methods. Yixuan Zhou, Lianyu Huang (2024) explore the digital status of Dongchangfu New Year Paintings and find that the current display form exists the phenomenon of props pattern, experience means singularity and information display dispersion. An experience design strategy is proposed from three aspects of multi-sensory, multi-scene and new carrier to integrate emotional and experiential into the digital design of New Year paintings. In any case, the digital application of modern New Year Paintings has evolved from mere conservation and inheritance to focus on the emotional and experiential aspects of the audience. It is therefore necessary to continue to use digital forms to express modern New Year Paintings.

3. METHODOLOGY

3.1 CO-OCCURRENCE ANALYSIS OF THEME KEYWORDS

This study analyses digital applications in traditional and modern New Year Paintings through a literature review, detailing and describing the role that digital technology plays in the preservation and transmission of New Year Paintings. Literature cases are analyzed and evaluated to sort out the changes made in the process of digitization of traditional New Year Paintings. Using “Co-occurrence Matrix Analysis”, which is used to record the frequency of simultaneous occurrences of keywords in the literature, to analyze the co-occurrence relationship between the primary theme T_i and the secondary theme keywords T_j , to show the number of occurrences of the theme keywords, and to identify the theme keywords that occur at high frequency by identifying the traditional to modern, the What are the main forms of digital representations of New Year Paintings.

$$M_{ij} = \sum_{k=1}^n \delta(T_i, D_k) \cdot \delta(T_j, D_k)$$

This M_{ij} represents the primary theme T_i and the secondary theme T_j , and is the data in row i and column j of M . It is the number of k where T_i and T_j are equal at the same time in all the D_k , which shows the frequency of co-occurrences of the theme terms among the literature. The number of documents is denoted by $\delta(T, D)$ denotes the function value of 1 when the topic T_i or T_j occurs in the document D , and the function value of 0 when $T_i = D_k$, $\delta(T_i, D_k)$ and $\delta(T_j, D_k)$ are used to check whether T_i and T_j are equal to D_k , which shows together or not. The frequency of occurrence of the subject keywords is then counted and the most co-occurring subject terms are labelled.

3.2 SIMILARITY ANALYSIS OF SUBJECT KEYWORDS

In order to facilitate the differentiation and statistics of the similarity and difference between the theme keywords, and at the same time to learn the representation of the theme keyword features, the use of SPSS will introduce the “Comparative Learning Framework” to be used to differentiate between the similarity or difference of the data, to analyze the similarity relationship between the main theme and the secondary theme keywords, and to optimize the New Year Paintings based on the keyword characteristics of the shape of digital representation and find out the most suitable digital representation for New Year Paintings representation.

$$z_i = f(x_i; \theta)$$

A feature extraction model is used to determine the set of feature vectors for two sets of subject keywords to train the model to increase the understanding of New Year Paintings and digital artistic representations. z_i represents the feature vectors extracted in f , which displays the output value of z on the i th sample. x_i is the content of the i sample of literature, and θ is the model parameter. $f(x_i; \theta)$ is used to output x_i as z_i , which displays the predictive model representing the similarity. After that, the similarity calculation is performed to find out the subject terms with high similarity.

4. DATA FINDINGS AND ANALYSIS

Table 1: Primary Theme and Secondary Theme

Primary Themes (T_i)	Secondary themes (T_j)
Digital Conservation	APP
Tantou Woodblock Prints	Digital Conservation
Digital Teaching Platform	Tantou Woodblock Prints
Taohuayu Woodblock Prints	Digital Technology
Digital Age	Branding
Intangible Cultural Heritage Protection	Digital Animation
New Year Painting Art	Teaching Reform
Digital Design	New Year Paintings Art
Zhuxianzhen Woodblock Prints	Key Protection
Liupanshan Woodblock Prints	Anyang Region
Protection and Inheritance	Cultural and Creative Products
Experience Design	Image Resources
Wuqiang Woodblock Prints	Carving Skills
Yangjiabu Woodblock Prints	User Experience
Experience Economy	Traditional Folk Art
Mianzhu New Year Paintings	Yangjiabu Woodblock Prints
Digital Representation	Folk Art
Digital Construction	Database
Intangible Cultural Heritage	Contextual Concept
Digital Dissemination	Virtual Reality
Digital Interpretation	Oral History
Zhuxianzhen New Year Paintings	Digital Construction
Tantou New Year Painting	Intangible Cultural Heritage
Cross-cultural	Digital Museum
Tantou New Year Paintings	Taohuawu New Year Paintings
New Media	Liangping New Year Painting
Woodblock Prints	Digital Age
Pingyang Woodblock Prints	Dissemination Methods
	Art Branding

	Cultural Industrialization
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Through the search of China National Knowledge Infrastructure (CNKI) for the keyword “Digital New Year Painting”, the timeline from 2011 to the present, 32 academic journals, 16 dissertations, 1 conference paper and 1 newspaper were found. Expanding the keywords “New Year Painting” and “Digital”, are developed to produce a table of Table 1 (Primary Themes and Secondary Themes), in which the Primary Themes was to expand on the location and influence of digital representation on New Year Painting, and the Secondary Themes was to expand on the digital application of New Year Painting.

A literature search and co-occurrence matrix analysis of the expanded keywords revealed that the digital representation and application of New Year Paintings mainly focuses on the digital conservation of New Year Paintings, cultural and creative products, mobile APP design, and digital construction.

Table 2: Types of Woodblocks Prints and Digital Technology

Woodblocks Prints	Digital Technology
Tantou Woodblock Prints	Digital Teaching Platform
Wuqiang Woodblock Prints	Experience Design
Zhuxianzhen Woodblock Prints	Digital Representation
Yangjiabu Woodblock Prints	Digital Construction
Pingyang Woodblock Prints	Digital Dissemination
Taohuawu Woodblock Prints	Digital Interpretation
Liupanshan Woodblock Prints	New Media
	App
	Digital Age
	Digital Animation
	Virtual Reality
	Digital Museum

Table 2 “Woodblock Prints” includes woodblock prints from six cities, “Tantou, Taohuawu”, “Wuqiang”, “Zhuxianzhen”, “Yangjiabu”, “Pingyang” and “Liupanshan”, with a total frequency of 48 in Table 3. “Digital Technology” includes 12 keywords: “Digital Teaching Platform”, “Experience Design”, “Digital Representation”, “Digital Construction”, “Digital Dissemination”, “Digital Interpretation”, “New Media”, “App”,

“Digital Age”, “Digital Animation”, “Virtual Reality”, “Digital Museum”, with a total frequency of 45 in Table 3.

Table 3 shows the five most frequent themes in the literature, “Digital Conservation”, “Intangible Cultural Heritage Protection”, “New Year Painting Art”, “Woodblock Prints” and “Digital Technology”. In the list of themes, “Digital Conservation” and “Intangible Cultural Heritage Protection” are the most frequent combinations, which shows that there is a strong link between the two. This shows that there is a close connection between the two, and that it is feasible to use digital means for the protection of intangible cultural heritage. By comparing the keywords “Digital Conservation”, “New Year Painting Art”, “Digital Teaching Platform” and “Digital Age”, the digital representation of New Year Paintings is not only limited to itself, but also involves the social, pedagogical and stakeholder aspects.

Table 3: Co-occurrence Matrix Data

Themes	Frequency
Digital Conservation	78
Intangible Cultural Heritage Protection	65
New Year Painting Art	52
Woodblock Prints	48
Digital Technology	45

The most frequent combination of “Woodblock Prints” is “Tantou Woodblock Prints” and “Yangjiabu Woodblock Prints”, which is a good example of the digital representativeness of different locations for artists and scholars. This shows that for artists and scholars, New Year Paintings in different locations have the power of digital expression and shows that the digital expression of New Year Paintings is not affected by their location and cannot be digitally transformed. The high frequency of “Digital Teaching Platform”, “Digital Technology”, “New Media” and “User Experience” indicates that in terms of digital expression, apart from the protection of New Year Paintings, we should also explore New Year Paintings from the perspectives of digital technology, media communication and user experience. The study also illustrates that in addition to the preservation of traditional art, digital technology, media communication and user experience should also be explored.

Table 4 by using the similarity study method of comparative learning, we define those greater than 0.7 as highly similar, those between 0.5-0.7 as moderately similar, and those less than 0.5 as lowly similar. We can identify a very high similarity between the

highly similar keyword “Digital Conservation” and “Intangible Cultural Heritage Protection” (similarity = 0.876), which indicates that digital conservation is an important part of New Year Paintings in the process of Intangible Cultural Heritage Protection (NCH) protection. There is also a high similarity between “Digital Technology” and “Digital Conservation” (similarity = 0.743), which indicates that the updating of digital technology plays an important role in the conservation of New Year Paintings in digital conservation. “Digital Technology” and “Intangible Cultural Heritage Protection” are highly similar (similarity = 0.712), indicating that digital technology can be widely used in the conservation of NCH.

Table 4: Similarity Matrix Data

Theme	Digital Conservation	Intangible Cultural Heritage Protection	New Year Painting Art	Woodblock Prints	Digital Technology
Digital Conservation	1.000	0.876	0.659	0.452	0.743
Intangible Cultural Heritage Protection	0.876	1.000	0.634	0.495	0.712
New Year Painting Art	0.659	0.634	1.000	0.512	0.678
Woodblock Prints	0.452	0.495	0.512	1.000	0.584
Digital Technology	0.743	0.712	0.678	0.584	1.000

The moderate similarity between the keywords “New Year Painting Art” and “Digital Conservation” is moderately (similarity = 0.659), which indicates that ensuring the artistry of New Year Paintings is the basis of digital conservation. “New Year Painting Art” is also like “Digital Technology” (similarity = 0.678), suggesting that the artistry of New Year Paintings may be affected by digital technology in digital expression. “New Year Painting Art” and “Intangible Cultural Heritage Protection” have medium similarity (similarity=0.634), which shows that New Year Paintings, as one of the Non-Heritage Sites, is in urgent need of finding a way to protect and pass on its art. “Woodblock Prints” and “New Year Painting Art” are both forms of Chinese New Year Paintings (similarity=0.512), indicating that both woodblock printing and painting are part of New Year Paintings and bring different artistic styles.

The lower similarity between the keywords “Woodblock Prints” and “Digital Conservation” is low (similarity = 0.452), which may indicate that the combination of different locations of the New Year Paintings may not be consistent due to the

location of the New Year Paintings in the research process of digital conservation. The low similarity between “Woodblock Prints” and “Intangible Cultural Heritage Protection” (similarity=0.495) suggests that in the process of inheriting and protecting New Year Paintings, the attention paid to woodblock prints may still be lacked.

5. DISCUSSION AND CONCLUSION

Through searching and analyzing the literature related to digital New Year Paintings, we can see that there have been some attempts and progresses in the digital representation of traditional and modern New Year Paintings, and some results have been achieved. At present, digital museums or databases have been established for different locations of Chinese New Year Paintings, and the artistry, techniques and culture of traditional New Year Paintings have been effectively preserved, and some attempts have been made on the artistic practice of digital application of traditional New Year Paintings, so that the research on the means of storage and display is no longer the primary goal of the digital representation of New Year Paintings.

According to the results of the co-occurrence matrix, it shows that there are fewer studies on the ability of AI to increase the digital representation of New Year Paintings, artistic expression and communication effects. At the same time, there is not enough attention to the user experience in the digital application of China New Year Paintings, which makes one think that some practices have deviated from the concept of human-centered art and become digital practices only for the sake of digital transformation. The results of the similarity calculations show that there is a correlation between the themes related to digital art that are relevant to the inheritance and preservation of the New Year Paintings, which suggests that the New Year Paintings can be digitized in a way that allows for more varied interpretations.

Despite the subtle relationship we have drawn between digital art applications and New Year Paintings, the data from this research is limited by the amount of literature available, and there is a small sample size. It is suggested that subsequent studies can use the current study as a basis to explore more forms of expression between New Year Paintings and digital art, and to provide more directions for the inheritance and preservation of New Year Paintings in terms of digital art practice.

Through the co-occurrence matrix and similarity study of the existing results, it is clarified that in the inheritance and protection of the New Year Paintings, between the New Year Paintings and the digital art, although the progress of the digital transformation of the New Year Paintings and the degree of integration are different in different locations due to the relationship of the social, educational, technological, and

media factors, the New Year Paintings can be digitized, and the subsequent research can have more different applications, and the current low social acceptance and chaotic dissemination can be solved with the continuous exploration and innovation. With continuous exploration and innovation, the current low social acceptance and communication chaos can be solved.

The analysis of the similarity results shows that digital conservation is an important part of the protection and inheritance of New Year Paintings, and if New Year Paintings want to be inherited and developed for a longer period, it is necessary to break the current dissemination limitations, increase the user experience, and broaden the digital technology. Artificial intelligence can also be introduced to help researchers develop trends and patterns in digital New Year Painting art to promote the inheritance and development of New Year Painting art.

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