Innovative Development of Cross-cultural Communication of Folk Art and Resource Personalized Recommendation Algorithm in the Context of Intangible Cultural Heritage

Shouliang Lai[1,a], Binrong Huang[1,b], Min Sun[1,c,*]

[1]College of Packaging Design and Art, Hunan University of Technology, Zhuzhou, Hunan, China
[a]laishouliang@hut.edu.com, [b]10437@hut.edu.com, [c]14016@hut.edu.com
*Corresponding author

Abstract: With the rapid development of Internet technology, many people have acquired a lot of knowledge through online learning. However, the huge amount of information on the Internet makes it difficult for learners to find the learning resources they need in a timely and efficient manner. Therefore, in teaching technology, personalized recommendation technology has been paid more and more attention by people. The rapid development of today's society and the country's high emphasis on folk art have created rich conditions for the contemporary inheritance of folk art in the context of intangible cultural heritage, and opened up new development ideas. Starting from new ideas, new cultural environment, new media, new technologies and new achievements, this paper points out that folk art in the context of intangible cultural heritage should break the traditional concept and reform the way of inheritance; the power of network, market and government is fully utilized; new technologies are applied rationally, the superb skills of the ancestors are inherited, exchanges and cooperation are continued to be strengthened, advanced experience at abroad is used for reference, and new development models are created. At present, in the process of inheritance, folk art is in a passive state, that is, the demise and variation of cultural subjects. Therefore, both sides would like to see the goal of economic stability, social harmony and cultural prosperity through the exchange of ideas of "harmony but difference", to explore cultural innovations between cultures of various countries, to cultivate the ability of dialogue and consultation, and to achieve economic stability, social harmony and cultural prosperity. The survey shows that the sharing of traditional folk art is only up to 78% due to the limitation of dissemination or geographical restrictions, and the dissemination ability is relatively low, while the shareability of modern art is as high as 90% in recent years. At the same time, traditional folk art is rarely innovated and cannot meet the needs of social development. The emergence of modern art has provided support for the inheritance of folk art, and now the innovation ability has reached 80%. Incorporating folk art into modern art while retaining its characteristics and making it popular will be a more suitable inheritance path.

Keywords: Intangible Cultural Heritage Context, Folk Art, Cross-cultural Communication, Personalized Recommendation Algorithms

1. Introduction

In the era of Internet big data, folk art is faced with a large amount of intangible cultural knowledge, and the most important technology that can solve the problem at present is search engine and recommendation. Compared with search engines, users are more inclined to adopt a personalized recommendation system, because it can actively analyze users through various information. In this way, users' artistic preferences and characteristics of cultural projects can be discovered, and then personalized information can be tailored for users. And according to the user's needs and project information, the proposed content and service mode are continuously adjusted to achieve the "customer first" personalized service. Intangible cultural heritage is the precious wealth of China, and every citizen has the responsibility and obligation to inherit and protect it. In this context, the research on folk art design is carried out on the premise of promoting the knowledge of intangible cultural heritage. Under the conditions of commodity economy, the alienation of protection achievements has become an important issue in the protection of "intangible cultural heritage". Under the protection background of

"intangible cultural heritage", attaching importance to the localization of art design and the interaction between localization and folk art not only provides a new perspective for the protection of "intangible cultural heritage", but also is a beneficial attempt for the parallel development of economy and culture, and provides a beneficial way for the realization of "cultural consciousness". This paper summarizes the current common personalized recommendation technologies and algorithms, and proposes a recommendation algorithm based on folk art, in order to provide a reference for the research on personalized cross-cultural development recommendation.

In China, folk art is the most important form of intangible cultural heritage. It originates from various ways of thinking of ancient people, and also from some trivial events in daily life, and has been inherited and developed through various festivals and customs. In the context of the protection of intangible cultural heritage, incorporating the beneficial elements of folk art into the design can not only bring visual pleasure to people, but also cultivate people's artistic sentiment.

Therefore, in the context of intangible cultural heritage, how to innovatively develop the cross-cultural communication of folk art and the personalized recommendation of art design resources will make a correct judgment on the development path of traditional folk art and contemporary art design. And on this basis, the benign interaction between the two will be realized, and a healthy overall cultural ecology will eventually be formed. Folk culture and art have a profound history and cultural tradition. It can not only promote the development of popular culture, but also promote the sustainable development of social economy, and lay a solid material foundation for the prosperity of the market economy and the diversification of culture. Therefore, the protection and inheritance of folk culture is conducive to the protection and enrichment of local culture; it is helpful to improve the cultural identity and cohesion of the nation; it is of great significance to the innovation and development of Chinese contemporary culture; it is of great significance to improve China's cultural soft power, improve cultural competitiveness, and promote the inheritance and development of folk art.

2. Related Work

Folk culture is an important part of Chinese national traditional culture, and it is the accumulation and accumulation of thousands of years of history, and its connotation is extremely rich. The rich historical process makes the cultural heritage of Chinese folk art very profound. Chinese folk art has distinct regional characteristics, it is synchronized with its unique aesthetic and historical development, and it is in this process that folk art of this period can give full play to the beauty of Chinese folk art. In addition, ethnic folk art has also had a profound impact on contemporary packaging design. In traditional culture, including big data technology and the essence of folk art, a new design concept has been created for consumers and different product values have been created. Tang F's research found that more and more packaging designers have begun to realize the role of folk art in packaging design [1]. Art culture is a traditional Chinese culture, such as paper-cutting, which is one of the oldest and most characteristic folk arts in China. It has a long history and is a treasure of Chinese folk art and world art. Wang P deeply felt that the handed down art culture is the long-standing traditional thinking and ancient culture of the Chinese people. The inheritance and distribution of Chinese folk art is very extensive, and its techniques and styles are varied. It has formed a relatively fixed art form and a self-improving modeling system. The application of paper-cut in modern computer design makes modern computer design have inherent traditional cultural characteristics [2]. Belomoeva O G analyzed the current problems faced by Chinese folk art in the information society, discussed the characteristics of folk art as a folk art culture, and its role in folk art, urban folk customs, amateur performances, etc. Starting from the characteristics of the information society, many influencing factors of the artistic process were revealed [3]. With the development of globalization, the research on intercultural communication becomes more and more important. In different cultural exchanges, each specific situation has some specific characteristics that deserve careful study. Beginning in the second half of the twentieth century, Qin X explored the characteristics of cross-cultural communication in Russian and Chinese art. Through the analysis of widely recognized communication methods, it was possible to draw a special way of communication between Russia and China. The study found that this characteristic was closely related to the process of intercultural communication, not only in the communication between the two peoples, but also in the process of artistic and cultural activities. Art appreciation and cross-cultural communication were information transmission at different levels [4]. The purpose of Huang S's research was to empirically analyze the implicit innovation theory of Chinese language teachers in China and compare it with previous literature. The study found that there was a mixed model in the implicit theories of different cultural groups, and combined with personal interviews, the implicit theories of cross-cultural groups were deeply analyzed from the aspects of

creativity and individuality. And it was concluded that the school evaluation method and the definition of student performance had an impact on the teacher's implicit innovation theory [5]. After the 1950s, whether it is "heritage" or "cultural heritage", its connotation and extension have been greatly changed and expanded. This process underscored the respect and promotion of cultural pluralism by the international community and had a direct impact on the continued development of UNESCO in the field of culture. In such a large environment, the protection of cultural heritage in traditional Silk Road countries and regions had a role beyond the cultural connotation. Chao G reviewed the various cultural heritage proposed by UNESCO with regard to conventions and protection, and analyzed the "Intangible Cultural Heritage" (ICH) project. This showed that the use of cultural diversity to promote the common heritage of mankind was not only related to culture, but also closely linked to sustainable development [6]. European cultural traditions were a strategic resource, and through the awareness of traditional cultural heritage, it was pointed out that the importance of cultural heritage has become increasingly prominent under the COVID-19 epidemic, while also emphasizing its importance as a form of expression. Moussienko N's theories and methods were based on the research of European scholars, especially Ukrainian scholars on cultural heritage, as well as European literature on this issue. In this context, the analysis of the competition for European cultural heritage was very important: The European Heritage Awards could be a way of disseminating and presenting the process of modern development, thus having an impact on the development of Europe [7]. Melnychuk H discussed the activities of the Kosif Khuchur Museum of Folk Art and Life, especially in terms of culture and education. The Regional Museum Centre was considered a major channel for collecting and learning about handicrafts. Through the analysis of physical materials, it could be seen that this museum was in the forefront in preserving the traditional arts and crafts of the Huchu area. The staff of the museum had some ideas, their purpose was to make the history and cultural heritage of the Huchu area widely disseminated. Museum staff were the organizers of various exhibitions, exhibitions, master classes and exhibitions of folk crafts. In the interaction with folk artists and games, young people participated in the practice of traditional handicraft skills, and many leisure modes or relaxation modes were carried out for the purpose of inheriting the national culture [8].

3. Innovative Development of Cross-cultural Communication of Folk Art and Personalized Recommendation of Resources

3.1 Development of Folk Art in the Context of Intangible Cultural Heritage

At present, folk art is the main goal of protecting intangible cultural heritage, and its existence and development are closely related to the current social and cultural environment. As a part of intangible cultural heritage, the important cultural value of folk art itself cannot be ignored. Chinese folk art expresses the original cosmic concept and aesthetic concept of national culture, and reflects the emotional temperament, psychological quality and national spirit of the Chinese nation [9]. The advent of industrial civilization has greatly compressed the living space of traditional folk art. Although the social changes caused by industrial civilization are different from the "change of dynasties" in the past, this is a revolution in the mode of production and world outlook. However, as long as it is gradual and conforms to cultural laws, it will naturally become a new and positive culture [10]. But the problem is that this should have been a benign transition, but it has been impacted by the times. Its sudden changes have made traditional folk art lose the buffer space for transition to modernity. In this sudden change, national art is not immune. This has caused the current social problems, and neither contemporary culture nor folk culture can avoid it.

When folk art is faced with such a dilemma and a crisis of endangerment, the emergence of "intangible cultural heritage" protection has very practical significance. By subsidizing the living of folk artists, they can create with confidence, thus basically solving the problem of protection of traditional folk art [11]. As long as the state can continuously provide a stable survival guarantee for the legal heirs, the problem of inheritance of traditional skills will be solved easily, so that folk art can continue to spread. This kind of living preservation of traditional folk culture undoubtedly makes up for the cracks in national culture caused by the sudden arrival of industrial civilization to the greatest extent. Therefore, the protection of "intangible cultural heritage" also shows its importance. The problem of cultural protection has been basically solved, and the next step is to develop it. The development of folk art is mainly related to the protection and economic issues at the development level. In today's economic development and increasingly rich material conditions, it is very important to stick to a corner of the traditional artistic style and retain and inherit its original spirit; however, it is also of great significance to conform to the trend of the times, integrate the style of the times into the

folk art creation with the perspective of development, and keep it updated [12]. During the development of human civilization, new materials and new art forms will emerge, but they are all the same. This kind of "patriarchal law" is the core of China's culture, and folk art can only develop healthily if it is based on the conscious inheritance of the "cultural genes of the Chinese nation". Table 1 summarizes the development of the previous folk art.

Table 1: Summary of the development status of folk art

development period	cultural environment	living space	Innovation needs	Expansion capacity
before industrial civilization	poor	47%	50%	hardly
industrial civilization	generally	79%	80%	generally
nowadays	better	90%	95%	better

3.2 Problems Faced by the Dissemination and Development of Folk Art Culture

(1) The impact of culture at abroad

Under the tide of globalization, many traditional cultures of the Chinese nation have been hit unprecedentedly, and the individuality and diversity of cultures have been seriously challenged. Hollywood movies, Korean movies, and Japanese animations have all poured into China, and the influx of cultures at abroad has had a huge impact on the traditional national culture [13]. This not only changes people's way of life, but also affects people's cultural concept. For example, festivals, today's young people prefer to celebrate Christmas, Carnival, Valentine's Day, April Fool's Day and so on. However, the concept of Chinese New Year, Lantern Festival, Qingming Festival, Mid-Autumn Festival, Double Ninth Festival and other festivals, and the respect and alienation of traditional Chinese festivals reflect the crisis of weak Chinese cultural awareness.

(2) Influence of the modernization process

Today, with the continuous changes of human production and lifestyle, folk art is disappearing at an unprecedented speed. A large number of folk arts and cultural heritages in China mainly come from the farming era. Due to the backwardness of productivity, the backwardness of science and technology, the closed living environment and the lack of people's outdoor activities, the survival and inheritance of many cultural heritages are faced with many problems [14]. Such cases can be seen everywhere, and hundreds of years of historical memory have been completely shattered by urbanization.

(3) The dilemma of traditional inheritance methods

As far as the folk art culture itself is concerned, it is characterized by being passed down from generation to generation. This inheritance chain is constantly broken with the changes of society. In the past, many families were poor, so they went to sing for their children and learn techniques. In the future, they could develop skills and survive better in society. Therefore, in today's folk handicrafts, as the older generation has gone, fewer and fewer young people of this generation have traditional handicrafts. If the art can make money, then maybe study it again. If the art doesn't make money, there may be another way out. In particular, some young people born in the 1990s and 2000s would rather go out to work than do these traditional jobs. Some folk art inheritances are facing the crisis of "people dying and art dying". In this context, it is necessary to consciously maintain national culture and folk culture, rescue and inherit those folk cultural heritages that are disappearing and will disappear [15]. How to inherit folk art culture and make it better integrated into the production, life, family and society is an urgent problem that needs to be considered and solved. Figure 1 shows the relationship between inheritance and development problems.
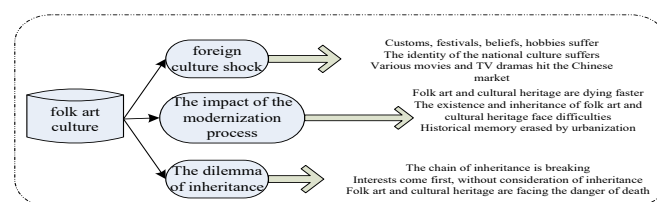

Figure 1: Relationship between inheritance and development issues

3.3 Innovative Development Strategies for Cross-cultural Communication of Folk Art

In the context of today's economic integration, a closed approach in order to protect folk culture is not feasible. While solving the cultural security problem of folk art, it is also necessary to prevent the monopoly of folk art, thereby burying the dissatisfaction and even resistance of the other party. To seek a strategy for cross-cultural communication, the reciprocity of cross-cultural communication should be sought on the premise of safeguarding national interests and protecting national cultural subjects from being violated to eliminate the contradiction of binary opposition.

(1) Under the protection of the state, the interests of the state are always the most important. From the perspective of cross-cultural exchange of "reciprocity", "harmony" is the best way to safeguard national interests. In political and cultural strategies, adhering to national interests is the political basis for the survival of folk art and the basic starting point for cross-border exchanges of folk art [16]. Cross-cultural communication is an important issue related to national interests. Faced with the cultural security issues of the West, whether in China or in the third world, the invasion of Western civilization has made local intellectuals feel great pressure. In addition to the defense against Western culture, Western countries such as France and Germany have also begun to pay attention to and respond to the infiltration of American culture among Western countries. The response of weak states, that is, "weak states", they adopted measures of "reverse osmosis" and "anti-control" to prevent their values, behavior patterns and social systems from being disturbed, reshaped and assimilated [17]. China and its Southeast Asian neighbors jointly formed a "Confucian cultural circle". From another point of view, Southeast Asia has not only exchanged and learned about the culture, but also is full of worries and fears about "cultural powers", which has led to the tension of geopolitical conflicts. Through the investigation of folk cross-cultural and multi-party verification, it is found that the international spread of cross-cultural folk art is more important than political propaganda.

(2) By thinking about interculturality and exploring the idea of interculturality, social differentiation can be overcome and cultural innovation between countries and nations can be promoted. "Interculturality" is an extension of the "intersubjectivity" of communication theory. From an intercultural perspective, reciprocal exchanges and cooperation can be strengthened, social differentiation can be reduced, and cultural and political crises caused by national borders can be further alleviated. The future produced by this interculturality is not to create a specific cultural hegemony, but to make it more diverse on the basis of maintaining the original cultural subject [18]. In fact, due to the existence of ethnic boundaries, the ethnic groups in the folk culture are isolated, which leads to the differentiation of the ethnic society. The term "cultural innovation" has a very broad meaning. In a broad sense, it refers to any new form that is different from the original culture as "cultural innovation"[19]. In a narrow sense, the most common approach is to combine culture and industry. Cultural creativity refers to a new form of production, exchange and consumption of cultural production, exchange and consumption.

(3) As far as the practical application of cross-cultural folk art is concerned, it is even more necessary to establish a harmonious relationship with neighboring countries. China does not want to cause cultural conflict or exercise cultural hegemony, but it focuses on intercultural dialogue and consultation. A guide can be found in Confucian culture. The concept of harmony in "harmony but difference" neither shuns differences nor rejects opposition, but must open up and actively accept it. In different countries, any kind of folk art has its own characteristics, and there are various power relations between the dominant culture and the marginal culture, the main ethnic group and the minority ethnic group [20]. As far as the practice of cross-cultural folk art is concerned, the most direct and effective way to achieve the concept of "harmony but difference" is to enable folk artists to have a broader vision of "dialogue and negotiation" across borders. Emphasis on the ability of dialogue and consultation is because it is easy to fall into the trap of nationalism. In political reality, only thinking about integrating into the culture of neighboring countries ignores the position of establishing dialogue and consultation from the perspective of others. The cultivation of the idea of "harmony but difference" in the educational system, especially for ethnic folk art with a geopolitical background, can lead them to consciously seek cross-cultural dialogue and consultation.

3.4 Differences and Integration of Folk Art and Modern Art

There is a fundamental difference between folk art and contemporary art. It is produced by the general public in their daily labor, while modern art creation is produced with the development of modern industrial civilization. This is their goal. Traditional folk art generally pays attention to

aesthetics and mood, often requires the combination of material and spiritual, and tends to meet the spiritual needs of human beings, showing the inherent pursuit of primitive instinct and emotional thinking [21]. Contemporary art design is more oriented by commercial value and interests. Folk art has high spiritual and aesthetic value. Its creation is basically a continuation of the original art. Its creative mentality is based on the coexistence of practicality and aesthetics, so the aesthetics are more prominent. The overall design of modern art is regarded as a systematic project and a positive cultural and aesthetic form. It covers many aspects. From the perspective of today's political, economic and cultural forms, contemporary art design not only expresses a material form, but also involves cultural values and aesthetic tastes. At the same time, modern art design also serves the society and economy, and its prosperity directly affects the development of modern art design.

Folk art is essentially a continuation and extension of primitive art, and its occurrence and development are inseparable from people's life and labor. When the aesthetic consciousness formed by people is put into folk art design, folk art and modern art are intermingled [22]. Folk art is the main source of national culture and artistic design today. As far as art is concerned, folk art is both a stream and a source; from the perspective of art psychology, folk art is the basis of national psychology and aesthetics. In real life, due to the rapid development of computer and network technology and the extensive use of information technology, the development of art and culture runs counter to the essence of human beings. As a result, modern art culture lacks humanistic value, and often does not follow the principle of "people-oriented". However, no matter from the perspective of time or from the perspective of space, folk art is closely linked with human life and has a high humanistic connotation [23]. Today's art culture is more about the combination of national characteristics and world trends, traditional culture and modern thinking, material basis and spiritual pursuit. Folk art stimulates the infinite creativity of contemporary art, which can effectively inspire contemporary art design and be carried out from multiple angles. Folk art contains rich traditional maternal culture, is the source of contemporary art design creation, and can well expand the creative field of contemporary art design.

3.5 Personalized Recommendation Algorithm Based on Cross-cultural Communication

Recommendation based on the cross-cultural communication of folk art is also called information filtering recommendation based on this content. The method does not require the user to evaluate the recommender, but extracts the content characteristics of the recommender, extracts the user's favorite information, and finally provides the user with target information that matches the user's preference. In the content-based recommendation algorithm, $f(u, c)$ is the utility function of the recommended object c to the user u, and the object content feature $(Content(c))$ usually uses the recommendation system model to describe the characteristics of the target content. Figure 2 shows the flow chart of the personalized recommendation system [24].
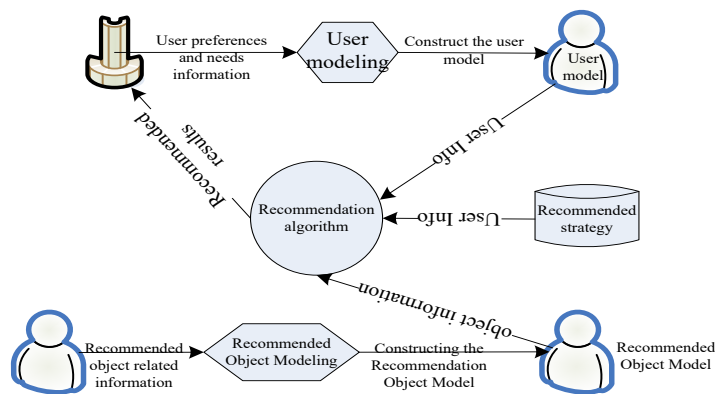

Figure 2: Flow chart of personalized recommendation system

The intelligent learning method is used to obtain the user's data model $(Content\ Based\ Profile(u))$, and the utility function $f(u, c)$ in the content-based recommendation algorithm is specified as:

$$f(u, c) = score[Content\ Based\ Profile(u), Content(c)] \tag{1}$$

It is assumed that the calculation of Score can be calculated by the cosine similarity of the two, as follows:

$$f(u, c) = \cos(W_u, W_c) \qquad (2)$$

At the same time:

$$f(u, c) = \frac{\sum_{i=1}^{k} w_{i,u} w_{i,c}}{\left(\sqrt{\sum_{i=1}^{k} w_{i,u}^2} \sqrt{\sum_{i=1}^{k} w_{i,c}^2}\right)} \qquad (3)$$

Finally, according to the final factory data, the targets are sorted and the first item is the recommended target. Although the recommendation of this method is better, it lacks freshness.

User-based collaborative recommendation method: Firstly, users with the same historical score are evaluated. In User-based mode, different similarity functions can be used, such as the Pearson correlation coefficient:

$$sim(u, v) = \frac{\sum_{i \in I_u \cap I_v} (\tau_{ui} - \bar{\tau}_u)(\tau_{vi} - \bar{\tau}_v)}{\sqrt{\sum_{i \in I_u \cap I_v} (\tau_{ui} - \bar{\tau}_u)^2} \sqrt{\sum_{i \in I_u \cap I_v} (\tau_{vi} - \bar{\tau}_v)^2}} \qquad (4)$$

Among them, τ_{ui} is the real score of user u on item i, $\bar{\tau}_u$ and $\bar{\tau}_v$ are the average score of user u and user v, respectively, and the set of items rated by user and user respectively, and the score of each user is represented by a vector θ_{nm}. Among them, n and m are the number of users and the number of items, respectively. Since different users have different scoring standards for items, the User-based model first normalizes the scores. At the same time, consideration of the fluctuation of scores can be introduced, such as the Z. scores normalization method, which balances the differences between users by introducing the user score deviation value σ:

$$\hat{\tau}_{ui} = \overline{\tau_u} + \sigma_u \frac{\sum_{v \in N_i(u)} sim(u,v)(\tau_{vi} - \bar{\tau}_v)/\sigma_v}{\sum_{v \in N_i(u)} |sim(u,v)|} \qquad (5)$$

Among them, $\hat{\tau}_{ui}$ is the predicted score of user u for item i, $N_i(u)$ is the set of neighbor users similar to the user, σ_u and σ_v represent the deviation value of the score of the target user u and the neighbor user v, respectively. In general, this method is a simple and effective method in current prediction calculation.

It is assumed that user and item attributes constitute feature set $X = \{x_1, x_2, x_3, \dots, x_n\}$ and recommend items are divided into two categories: item set c_1 recommended to users and item set c_2 not recommended to users. $p(x_i|c_1)$ and $p(x_i|c_2)$ represent the probability that the item x_i appears in the set of items recommended and not recommended to users, respectively, and the category with the highest probability is selected as the category to which the item belongs. X represents the feature set, and C represents the category set. It is stipulated as follows:

$$c = \arg_{i \in c} \max p(c_i) \prod_{x \in X} p(x|c_i) \qquad (6)$$

According to its calculation principle, it can be divided into a bipartite graph or a tripartite graph, that is, a joint recommendation based on material diffusion, thermal conductivity and resource distribution. The basic model of bipartite graph and tripartite graph is shown in Figure 3.
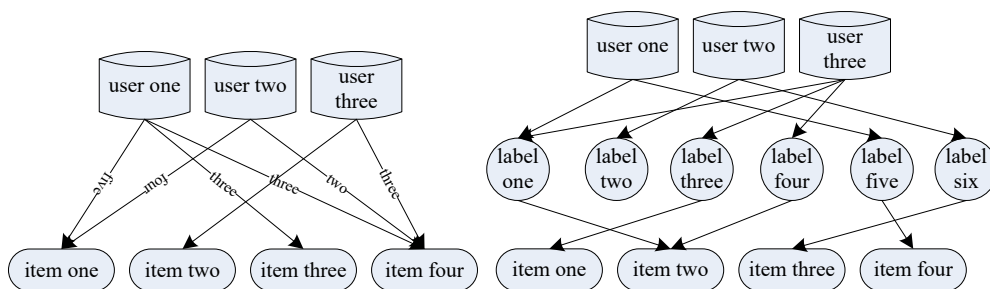

Figure 3: Basic model of bipartite and tripartite graphs

In bipartite graph collaborative recommendation, user similarity is:

$$s_{uv} = \frac{1}{k(u)} \sum_{i \in I} \frac{\tau_{ui} \tau_{vi}}{k(i)} \qquad (7)$$

Among them, k(u) represents the degree of user u, k(i) represents the degree of item i, $\tau_{ui}=1$ means that user u has rated item i, otherwise $\tau_{ui}=0$, and the tripartite graph increases the calculation of user to label. The regulations are as follows:

$$s_{uv} = \frac{1}{k(u)}[\alpha \sum_{i \in I} \frac{\tau_{ui}\tau_{vi}}{k(i)} + (1-\alpha) \sum_{t \in T} \frac{\tau_{ut}\tau_{vt}}{k(t)}] \tag{8}$$

Among them, k(t) represents the degree of label t, $\alpha \in (0,1]$ is a random parameter, when $\alpha = 0$ or $\alpha = 1$, the algorithm will degenerate to the bipartite graph algorithm.

Prediction accuracy refers to a method of predicting the user's interests and preferences in the recommendation algorithm. It mainly quantifies the deviation between the evaluation results generated by the recommendation system and the actual evaluation results in a quantitative way. The most commonly used estimation method is the mean absolute error (MAE), which is calculated as follows:

$$MAE = \frac{\sum_{u,i \in T}|\tau_{ui} - \hat{\tau}_{ui}|}{|n|} \tag{9}$$

Among them, n is the total number of ratings, τ_{ui} is the actual rating of item i by user u, and $\hat{\tau}_{ui}$ is the predicted rating of item i by user u. The MAE value is inversely proportional to the recommended prediction accuracy.

Compared with MAE, the root mean square error (RMSE) increases the penalty for inaccurate user item ratings, so the requirements are more stringent. The calculation formula is as follows:

$$RMSE = \sqrt{\frac{\sum_{u,i \in T}(\tau_{ui} - \hat{\tau}_{ui})^2}{n}} \tag{10}$$

In the recommendation system, evaluation can be carried out from two levels, the individual and the whole. The diversity of the individual evaluation system is mainly reflected in the diversity of the recommendation system's evaluation of a single user; the overall level refers to recommending different content to all users in the recommender system.

4. Comparison of Folk Art and Modern Art

Folk art has rich creative materials and can provide more creative space for contemporary art creation. At the same time, it has the characteristics of simplicity, innocence, close to human activities, and integration with nature, and is an important reference for contemporary art. It is necessary to correctly understand the charm of folk art, find the combination of it and contemporary art, combine the elements of modern art with its advantages, and apply its advantages to modern art to make the artistic effect better. The two are very different in terms of cross-cultural communication, innovative inspiration, development potential, closeness to reality, sharing, and artistic living space. Although there are differences between traditional folk art and contemporary art design, there is a significant internal connection between the two, and can achieve an essential integration to better inherit folk art. The sharedness comparison is shown in Figure 4.
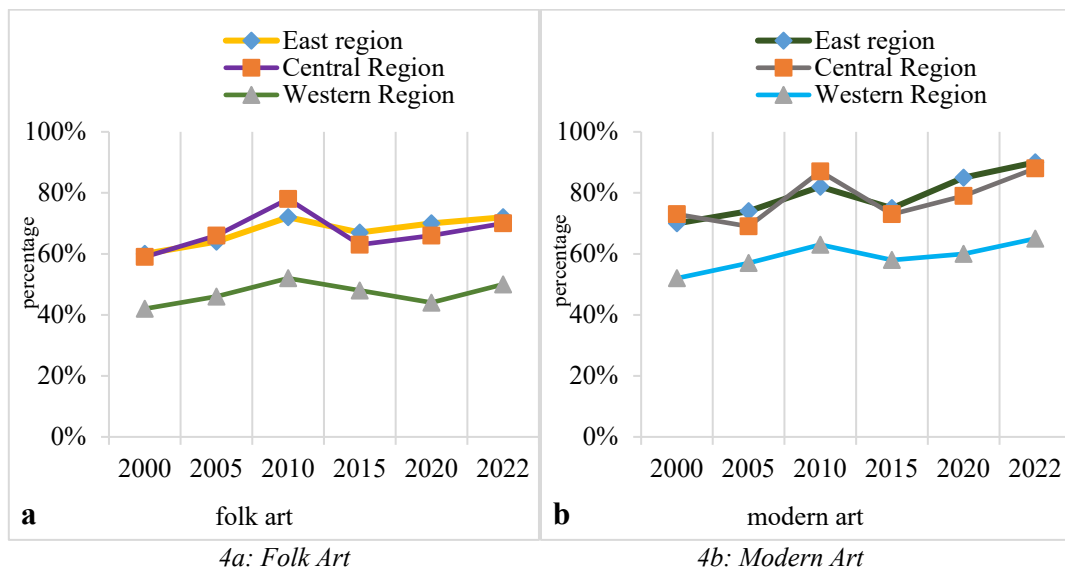

4a: Folk Art   4b: Modern Art

Figure 4: Shareability comparison

From the comparison of the shared survey data of traditional folk art and modern art in Figure 4, it can be seen that traditional folk art is limited by its dissemination or geographical limitations. Up to

now, it can be seen from Figure 4a that its shareability is only up to 78%, while the shareability of modern art has been relatively high for two decades. It can be seen from Figure 4b that it is as high as 90%, and there is still an increasing trend. Therefore, only by substituting traditional folk art into modern art can it be better preserved and inherited. Figure 5 shows the comparison of cross-cultural communication capabilities.
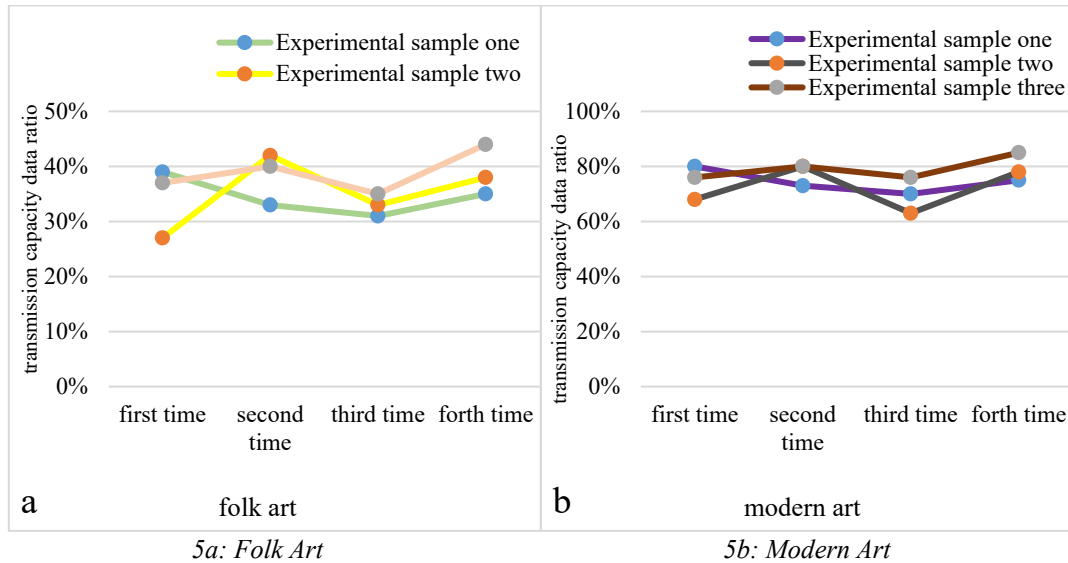

5a: Folk Art   *5b: Modern Art*

Figure 5: Comparison of cross-cultural communication capabilities

Traditional culture is closely related to human life, and its complete protection and inheritance has become an important goal of cultural integration today. As can be seen from Figure 5a, it is extremely difficult to achieve cross-cultural communication based on folk art itself. The survey found that the highest communication ability is only 44%. Only by integrating folk art into it with the help of the unique dissemination ability of modern art, can folk art be better spread to all parts of the world without distortion. From Figure 5b, it can be seen intuitively that the dissemination capacity of modern art has reached 85%, and the real realization of barrier-free cross-cultural communication is just around the corner. The innovative comparison is shown in Figure 6.
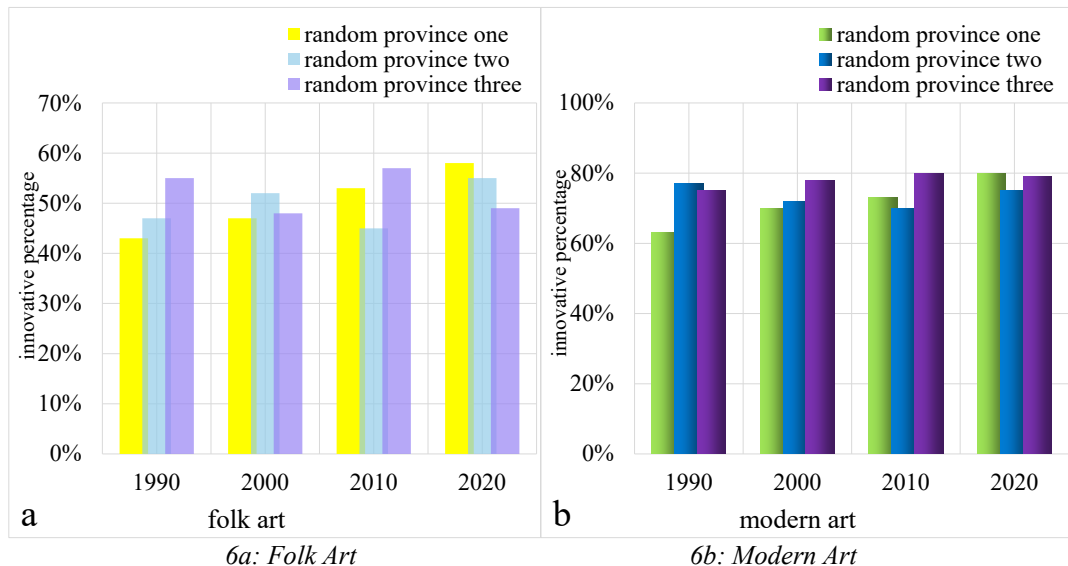

6a: Folk Art   *6b: Modern Art*

Figure 6: Innovation comparison

With the advancement of science and technology, the protection of national culture and the development of modern industries are inseparable to some extent. Through the data analysis in Figure 6a, it is found that traditional folk art cannot be said to have creativity. In recent decades, it has been relatively stable, and it can be found that its innovativeness even shows a downward trend, and it must not meet the needs of social development. The emergence of modern art provides support for the

inheritance of folk art. It can be seen from Figure 6b that the innovation ability has reached 80% today. It uses the relevant factors of folk art to innovate, and in disguise, the folk art will never be lost. Figure 7 shows the comparison of artistic living space.
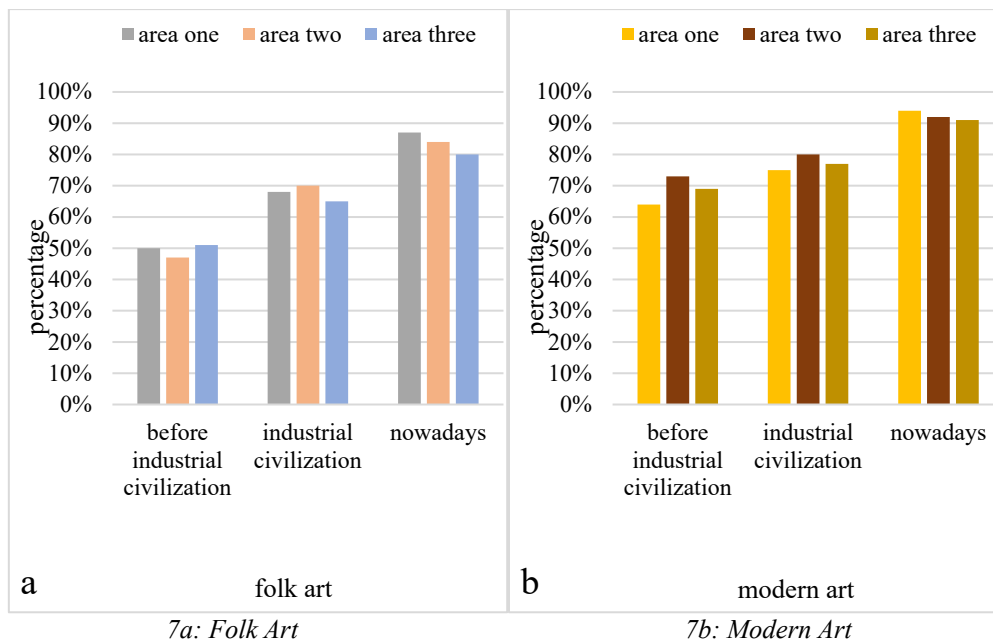

7a: Folk Art   7b: Modern Art

Figure 7: Comparison of artistic living space

Due to the advent of industrial civilization, the living space of traditional folk art has been severely squeezed. From the data in Figure 7a, it can be seen that the living space is up to 87% so far, the evolution process is extremely slow, and it is difficult to adapt to the rapid development of society. From the perspective of Figure 7b, modern art is very inclusive of both the early stage of industrial civilization and today's society, and the living space of folk art today is difficult to be equal to the space it had in the past. Therefore, it will be a more suitable way to inherit folk art to innovate and integrate it into modern art.

5. Conclusions

With the advancement of science and technology, the protection of "intangible cultural heritage" must have a close relationship with industry while social and economic development. Regardless of whether a productive method or an industrialized method is adopted, the integrity of the core technology and core values (original cultural connotation) of the intangible cultural heritage project must be guaranteed, instead of making it only superficial inheritance at the expense of the authenticity, integrity and inner cultural connotation of its technology. At present, many intangible cultural heritages in China are gradually disappearing, and it is urgent to protect and inherit them. As an intangible cultural heritage, folk art is an important hub for contemporary people to understand the traditional culture of the nation. Combining folk art with art design can not only increase the uniqueness of art design, but also promote the spread of folk art, and protect and inherit intangible cultural heritage to a certain extent. At the same time, the innovative development of cross-cultural communication will also be smoother.

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