

Research Article

Application of Artificial Intelligence Technology in Cross-Cultural Communication of Intangible Cultural Heritage

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Intercultural communication not only promotes the emergence and development of multiculturalism but also promotes cultural exchanges on a global scale. China has rich resources and a long history. Because of its unique national characteristics, it is even more famous and unique in the world today. However, with the transformation of society, cross-cultural dissemination and blending are inevitable. Intangible cultural heritage is an important cultural form, and its international dissemination is increasingly attracting people's attention. The spontaneous inheritance mode of intangible cultural heritage, which is mainly based on oral and heart teaching, has been unable to adapt to the development of society and has gradually moved away from people's sight. How to better protect and inherit intangible cultural heritage is an important topic in the field of current cultural exchanges. However, due to the particularity of intangible culture, especially its abstract nature, it is difficult to show it to the public, which makes it difficult to protect and promote intangible cultural heritage. The application of the advantages of artificial intelligence technology to the dissemination of intangible cultural heritage is to solve these problems, which can not only make it innovative in protection but also promote its sustainable development to a certain extent. This paper discusses the application of artificial intelligence technology in the protection and dissemination of intangible cultural heritage from multiple perspectives and points out that the advantage of artificial intelligence is that although it cannot be creatively inherited, it can be reproduced in a historical moment, so as to meet people's needs for intangible cultural heritage. It can also be found in the questionnaire for the visitors that 66% of the visitors prefer to learn about the intangible cultural heritage through experience and feel that the personal experience is more intuitive and interesting. Artificial intelligence technology has great advantages in disseminating intangible cultural heritage.

1. Introduction

Currently, intangible cultural heritage is an international topic that has attracted the attention of domestic and overseas people. With its global endangerment, the intangible cultural heritage is in a difficult place for its survival. Especially now that many tourist attractions are over-exploited and commercialized and some intangible cultural heritage items have already existed in name only, it is urgent to call on the public to pay more attention to intangible cultural heritage. In the protection of intangible cultural assets, dissemination and promotion are the primary tasks of preserving intangible culture assets, while realizing preservation is the eventual starting point and destiny. The conservation and transfer of intangible and cultural heritage not only is in the form of

words, figures, and recordings but also can be disseminated in an increasingly versatile way. It makes up for the feelings given to later generations by a single text and photo record. It dynamically reproduces the historical features at that time, makes the viewer feel more immersive, and can more vividly spread the intangible cultural heritage. It also makes the audience more willing to accept this form of communication and achieves the effect of entertaining. It combines cultural communication and entertainment very appropriately. In the collision of global cultures, it is undoubtedly of great significance to further enhance the country's cultural soft power.

Intangible culture is the weakest part of living culture. The cultural differences between different countries and ethnic groups are the inevitability of cross-cultural

communication, and it is also the result that cross-cultural communication is difficult to penetrate into the hearts of the people. Based on the “use and satisfaction theory,” Yun established an evaluation model for the dissemination and identification of intangible cultural heritage popular science publications. Based on surveys of experts and general audiences, the weighted scores for the model are obtained. The results are presented below. In the assessment module of dissemination and evaluation of popular science and culture related publications of subtangible cultural property, various levels of access and validation factors impact the identified recipients. Among these factors, the audience's ability to understand the channel, whether it can be clearly presented, and the skills and knowledge to integrate into the relevant context have a significant impact on the dissemination of intangible cultural heritage publications. It can not only help the audience to acquire knowledge but also make the audience interested and combine the new media with itself [1]. Manera conducted a cross-cultural exchange analysis of the clinical structure of the Urok practice of the Bago tribe in Kalinga province, Philippines. Urok refers to the custom of offering financial relief to each tribal group member during times of marriage, residency, and death, developing a community identity worthy of acceptable and honorable representation from the outside of the tribe. The intercultural exchange was used to conduct a critical analysis of the cultural fabric of the Urok custom of the Bago tribe. It investigates how members of Aboriginal communities have used their first-hand experiences to model Urok customs, particularly their implications for alleviating the economic hardships of community members. Important findings include the following topics. (a) Urok is the value of true mutual love and coexistence in the sociocultural sense. (b) Urok is seen not only as a material aid but also as a portrait of a harmonious relationship. (c) Urok is a form of moral compassion, an act of restraint. In general, the cross-cultural communication of the Bago tribe is revealed in the practice of Urok, whose cultural structure creates an image of unity and mutual aid in the Bago. Undoubtedly, Urok becomes an important part of community life because it is rooted in the value of “panakikadwa” (partnership), resulting in reciprocity and camaraderie [2]. Khaydarova studied the peculiarities of forming linguistic and literacy abilities of students in the teaching process of English and worked on the problem of forming the linguistic to cultural abilities when acquiring English. The elements and a structure of verbal and cultural proficiency are formed on the basis of auditory texts, and the major types of skills, knowledge, and skills falling within their framework are presented, as well as some approach and receptive techniques to form their structure. The relevance of the purposes of foreign education is associated with the students' formation of these kinds of knowledge, skills, and abilities, the mastering of which allows them to become familiar with the national values of the country they are attending and to practically use the foreign language on the basis of intercultural intelligibility and knowledge. The sum of these kinds of knowledge, skills, and capacities makes up the sociability of a student. The notion of interpersonal competence is the result of an attempt to

draw a line somewhere between one's intellectual skills and basic interpersonal ability. Based on the communicative law, it is necessary to develop students' ability to communicate in a foreign language or, in the other words, to acquire communicative competence in the process of teaching foreign languages. Communicative competence is the ability to use all types of language activities: reading, listening, speaking (monologue and dialogue), and writing [3]. As an important part of modern society, intercultural dialogue should help one's self-identification in cultural space. SerEGINA proved the necessity of multiculturalism—learning a secondary tongue in the Russian higher learning experience system. By analyzing and making comparisons of trials of learning a second language, the research results defined effective teaching methodology and modalities. In the process, the research foreshadowed a number of effective forms of teaching and pointed out the ways to achieve them. In other words, the results of the study are likely to help determine effective strategies for teaching foreign languages at the local and global level but are not very practical [4].

AI translation provides users with the means to turn any text—from phrases to books—into recognizable expressions. Yanisky-Ravid and Shlomit discussed the thriving possibilities of AI online translation as an accessibility tool in the era of 3A (advanced, autonomous, and AI systems), whose users are data providers and feedback providers. Therefore, they contribute to the programming and improvement process of these translation tools. The real worry resulting from admitting this new area, conversely, stems from the mischievous use of AI, frequently hidden. Such hidden facets include embedded all kinds of biases such as ethnicity, gender, race, color, religions, or ethnic origin, which are always included in a discussion of the problematic systemic flaws of AI systems [5]. Human-machine communication has become a new relational context in education and should be the focus of teaching research in the coming years. As AI and robots provide personalized instruction, the role of teachers may shift to those of supervisors, designing and selecting machine-guided instruction, monitoring student progress, and providing support. Chad et al. believed that it is important to bring the emotion of teaching researchers to these issues involving machine agents, both inside and outside the traditional classroom walls [6]. Artificial intelligence (AI) has gained momentum and importance in society over the past few years, and Luttrell et al. provided an opportunity for greater dialogue between the greater social and digital media community of inquiry and those invested in using focused and productively focused ways to answer critical questions associated with these areas. Five critical considerations are raised in educational efforts to sustain the future of the communication classroom, particularly on this topic, that will move the discourse forward. These considerations are designed to engage the scholars in intellectually engaging dialogue and to provide a tentative foundation for the direction of dissemination education. They are not implied to be an elaborate list, but rather to initiate discussions in teaching and research that tackle the impact of new and emerging technologies on the field and what can be built into media and dissemination curricula to prepare

educators and students [7]. These studies provide a detailed analysis of the cross-cultural transmission of intangible cultural heritage. It is undeniable that these studies have greatly promoted the development of the corresponding fields. One can learn a lot from methodology and data analysis. However, there are relatively few studies combining artificial intelligence technologies, and it is not thorough enough, and it is necessary to fully apply these technologies to the research in this field.

Intangible cultural heritage contains the essence of a large number of national traditional culture. This article conducted a survey of a group of arts and crafts museums. For local tourists, 50% of them learned about relevant intangible cultural heritage through friends and came to visit. The acquisition of foreign tourists is relatively scattered, mainly through newspapers (23%), Internet information (38%), and other media and friends (20%) to visit. For local audiences who have emotional resonance and a sense of identity in their own history and culture, 43% of the visitors' main purpose of visiting is to increase their knowledge, and most of them will visit the museum for 1 to 3 hours. 66% of the visitors hope to understand the intangible cultural heritage culture through experience and feel that the personal experience is more intuitive, and 65% of the visitors are highly satisfied with the display and exhibits.

2. Deconstruction of the Application of Artificial Intelligence Technology in the Cross-Cultural Communication of Intangible Cultural Heritage

Intangible cultural heritage means conventional aspects of culture that exist in an immaterial form, are strongly linked to people's daily lives, and are handed down from a generation to another. Intangible cultural heritage is produced and spread among the people. It is the product of social development to a certain stage, the crystallization of collective or individual social practice, and an important part of traditional culture. To a certain extent, it reflects the national sentiment and aesthetic taste of a place. Intangible cultural heritage includes oral tradition, traditional performed arts, folklore events and festivals, traditional folk knowledge and practices, traditional craft techniques, and cultural spaces associated with these expressions of traditional culture [8, 9]. Most of the intangible cultural heritage relies on physical objects that reflect their spirit, values, and meaning through a material medium or vehicle. With the increasing trend of international integration, intangible cultural heritage has gradually become an international topic. Figure 1 shows the scope of intangible cultural heritage [10].

China is the world's third largest cultural heritage country. It officially joined the protection of intangible cultural heritage in 2004. At present, three batches of national intangible cultural heritage lists (including two batches of expanded lists) have been publicly released, including a total of 10 categories of items (as shown in Table 1) [11].

As shown in Figure 2, the intangible cultural heritage culture is regarded as a cultural information space. The cultural information space can be divided into three layers, namely, the inner layer, the middle layer, and the outer layer. The inner layer reflects people's spiritual and ideological needs and is generally an intangible non-material culture, which is embodied in the core cultural concepts, values, storytelling, and cultural characteristics [12, 13]. The inner layer of the core expands outward to the outer material culture carrier, which is a cultural element that is easier to be extracted. For example, Dongyang woodcarving is a traditional art in Dongyang City, Zhejiang Province, and one of the national intangible cultural heritages. It can be analyzed in terms of specific theme, color, texture, shape, texture, component composition, etc. Between the inside and the outside is the immaterial core cultural memetic information that is encoded, transmitted, and decoded. In the dissemination of intangible culture, this process of encoding, transmitting, and decoding will be repeated repeatedly. This process is smooth, which is the successful replication of memes. If the deviation or delivery fails due to various reasons, the meme will mutate or disappear [14]. It must be pointed out that non-material cultural factors and their related factors cannot all become non-material cultural memes, and non-material cultural factors must possess the above-mentioned three characteristics of inheritance, variation, and selection to be considered as their memes [15].

Since intangible cultural heritage is a living culture rooted in national soil and a developing living culture, it has the characteristics of dependence and activity, so it cannot be separated from the subjective initiative of human beings, and the main body of inheritance has its core role [16]. The main body of intangible cultural heritage inheritance has its own unique craftsmanship and techniques. For example, local folk paper-cuts, clay sculptures, wood carvings, brocades, Thangkas, and other works have their own unique expression techniques. They are all passed down to the present day through the skilled craftsmanship and creativity of the inheritors [17].

In the cross-cultural dissemination of intangible cultural heritage, different cultural backgrounds and their own time factors make the dissemination of intangible cultural heritage into a dilemma [18]. Intangible cultural heritage has a strong cultural atmosphere of ritual and music, and its cultural structure has many spiritual connotations, and there are many factors that affect the effect of cross-cultural communication, such as outlook on life, legal norms, values, and ways of thinking. Each era has its own cultural form and characteristics, and there is a natural "generation gap" between the cultural form as "heritage" and the characteristics of the era of informatization and modernization [19]. For example, some people believe that, as a product of farming civilization, shadow play can no longer meet the aesthetic needs and values of modern people, and it is difficult to escape the historical fate of extinction. The success of intercultural communication is related not only to the scope of communication but also to whether the intercultural system is easily recognized by people in other countries.

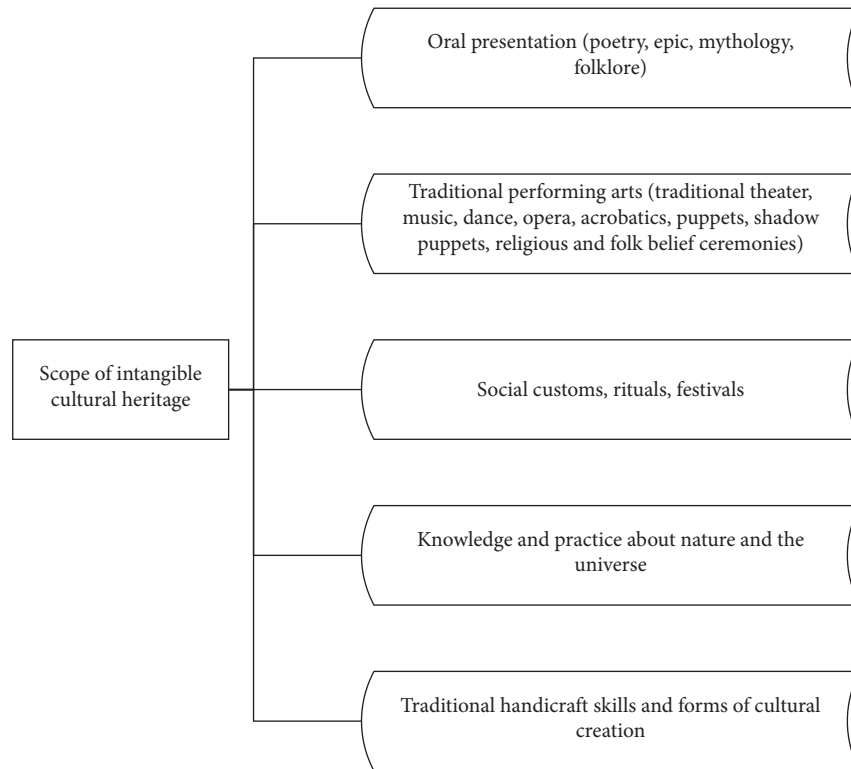


FIGURE 1: Scope of intangible cultural heritage.

TABLE 1: Statistics on the list of intangible cultural heritage.

Category	Number of items	Category	Number of items
Folk literature	145	Folk music	188
Traditional drama	219	Music and arts	139
Folk art	144	Traditional medicine	33
Traditional handcraft	264	Folklore	183
Traditional sports and acrobatics	82	Folk dance	140

Figure 3 shows a ladder model of cultural communication effect.

Artificial intelligence technology refers to the intelligent behavior of artificial objects, including perception, reasoning, learning, communication, and behavior in complex situations [20]. It is a variety of technical means such as computer, image, simulation, language, multimedia, network, data, virtual reality, and so on and provides an effective auxiliary means for human beings [21]. With the development of artificial intelligence technology, the interaction between people and intelligent machines is getting closer and closer. In some ways, people have been able to perform human-computer interaction in real time, providing better services for people's daily life and production. Using artificial intelligence technology to protect intangible cultural heritage and using artificial intelligence technology to spread intangible cultural heritage, its advantages in the process of dissemination are as follows [22]:

- (1) Objective and true: digitally record the text, figures, and sounds of intangible cultural heritage, so as to

restore the historical style of the time to the greatest extent and fully display its artistic characteristics and expression techniques. These intangible cultural heritages can also be permanently preserved [23].

- (2) Various forms: when the audience understands the knowledge of intangible cultural heritage, they are no longer limited to the understanding of words but can selectively expand to various communication methods such as images, sounds, videos, and so on. It deepens people's understanding and recognition of intangible cultural heritage.
- (3) Convenient storage: the unique storage information function of new media can systematically organize and preserve a large number of long-standing and fragmented intangible cultural heritage and save massive and rich intangible cultural heritage at a very low cost. Especially the arrival of the 4G era will also bring more convenience to the dissemination of intangible cultural heritage.

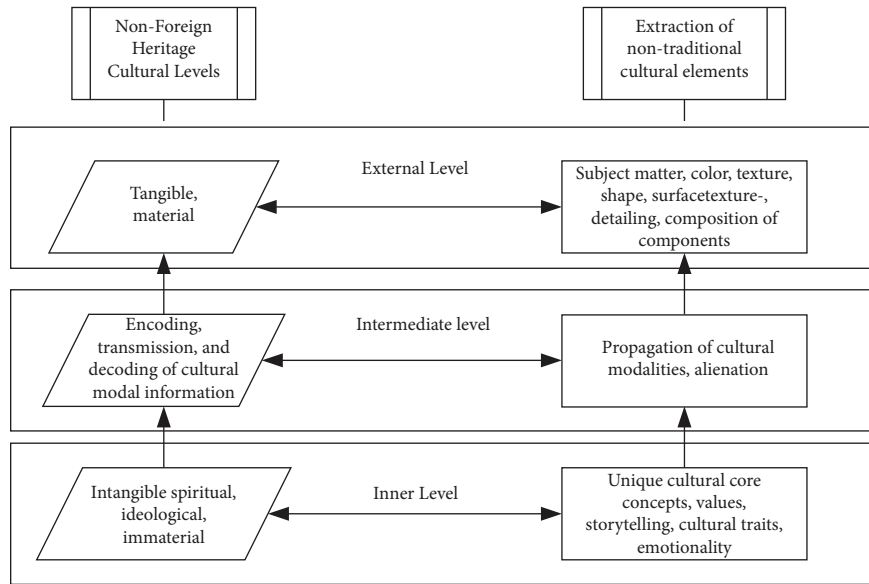


FIGURE 2: Intangible cultural heritage information space.

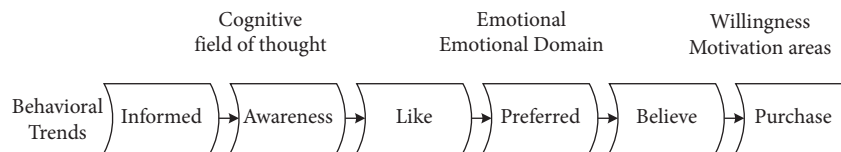


FIGURE 3: Propagation effect ladder model.

- (4) Interactive function: the interaction of new media such as the Internet and mobile phones has deepened the public’s understanding and understanding of intangible cultural heritage culture, especially smart phones, which facilitates online and offline support and interaction, thus broadening the audience of intangible cultural heritage. It is convenient for the audience to deepen their understanding of intangible cultural heritage and expand the influence of intangible cultural heritage.
- (5) Entertainment: with the change of society, the audience cannot accept dogmatic indoctrination but is willing to accept novel, unique, and entertaining forms to accept new things. Intangible cultural heritage spreads intangible cultural heritage through humorous and vivid animation images, vividly displays the content of intangible cultural heritage, and enriches the form of dissemination of intangible cultural heritage. It can gradually change the people’s outdated views on intangible cultural heritage, stimulate the audience’s interest, increase their attention, and make them more easily and happily accept and understand intangible cultural heritage knowledge.

Human-computer interaction is the information exchange between humans and computers. It includes the

two-way information exchange between humans and computers. It is a key technology in the field of artificial intelligence. Using artificial intelligence software, it gets rid of the limitations of traditional keyboard, mouse, and other input methods and can use body language, such as voice, gestures, and so on [24, 25]. In a virtual environment, people can make corresponding actions according to your own commands, giving people an immersive illusion. Most of its technology is implemented by sensors. The digital dissemination of intangible cultural heritage can be displayed through various platforms, thereby shortening the distance between intangible cultural heritage and the public.

Virtual reality (VR) is a device-implemented technology that has more features in actual use, including immersion, multisensory, conceptual, and interactive. The basic realization of virtual reality technology is computer simulation of virtual environment to give people a sense of environmental immersion. By using virtual reality technology to carry on the inheritance and dissemination of intangible cultural heritage culture, users can have a feeling of “operability,” breaking through the limitations of traditional static display of intangible cultural heritage, and realizing multilevel and multidirectional virtual scene reproduction to achieve inheritance and dissemination of culture. Figure 4 highlights the use of virtual reality technology to pass on and spread intangible culture.

Panoramic video is one of the most important components of virtual reality. Due to the ultra-high-definition resolution and multiangle information required for panoramic images to immerse users in it, the amount of information in panoramic videos may be dozens of times higher than ordinary videos. Taking 4KRGB (red-green-blue) 360° panoramic video as an example, its full viewing angle resolution needs to reach 7680×3840 pixels, which is 32 times that of ordinary 720P video, and the processing and transmission delay will be greatly increased. This puts forward high demands on the processing and transmission capabilities of the system. The network requirements for virtual reality video are shown in Table 2.

In the video transmission system, the judgment of video quality will be affected by many factors, such as video acquisition, encoding, transmission, decoding, rendering, playback process, and so on, which can be measured by objective data monitoring or subjective experience testing. Objective methods will evaluate the quality of videos by building a mathematical model of the human visual system. In image and video processing, peak signal to noise ratio (PSNR) is the most commonly used objective quality assessment metric. PSNR is compared pixel by pixel between the reference image and the distorted image, and finally a peak SNR map is generated. This process does not need to consider what the image content actually represents. For the decoded image pixel component/d, the mean square error (MSE) of the original image pixel component I is calculated as

$$MSE = \frac{\sum_{i=0}^{P-1} \sum_{j=0}^{Q-1} (I(i, j) - I_d(i, j))^2}{M \times N}. \quad (1)$$

Among them, each frame has $M \times N$ pixels, and $I(i, j)$ and $I_d(i, j)$ are the luminance pixels at position (i, j) in the image. PSNR is the logarithmic ratio between the maximum value of the received signal and the maximum value of the background noise (MSE), so the PSNR value is calculated as follows:

$$PSNR = 10 \times \log \frac{(2^B - 1)^2}{MSE}. \quad (2)$$

Among them, B is the bit depth of the image sample. If each sample uses 8 bits to represent pixels, then

$$PSNR = 10 \times \log \frac{255^2}{MSE}. \quad (3)$$

Doing the PSNR calculation for each frame in the above form can be 50% slower than encoding the same video.

Calculate the weighted mean square error and WMSE of each pixel, as shown in the following formula.

$$WMSE = \frac{1}{\sum_{i=0}^{P-1} \sum_{j=0}^{Q-1} w(i, j)} \sum_{i=0}^{P-1} \sum_{j=0}^{Q-1} \Delta^2 w(i, j). \quad (4)$$

Among them, $M \times N$ represents the resolution of the 2D planar virtual reality image after projection.

$$\Delta = y(i, j) - \hat{y}(i, j), \quad (5)$$

where $y(i, j)$ and $\hat{y}(i, j)$ represent the value of the original image and the reconstructed image at pixel (i, j) , respectively, and Δ^2 represents the variance of the absolute values of the two.

$$w(i, j) = \cos \frac{(i + 0.5 - P/2)\pi}{P} \times \cos \frac{(j + 0.5 - Q/2)\pi}{Q}. \quad (6)$$

The user-perceived video quality $q(R_c)$ can be expressed as

$$q(R_c) = 10 \log \left(\frac{(2^I)^2}{WMSE} \right). \quad (7)$$

Among them, I represents the bit depth of the initial video (image color depth), that is, the number of bits used to define each pixel, and commonly used values are 8, 10, 12, etc.. The larger the value of this parameter is, the larger the pixel value range of the image is and the richer the color that the image can present.

By using a Gaussian function to fit the viewing angle and the MOS (mean option score) curve obtained by subjective ratings of the quality of six different videos viewed by 50 first-time participants, the quantitative relationship expression between viewer QoE and viewing angle and blocking scheme can be obtained:

$$R = 60 - N + (N - 1) \times e^{-0.5 \times (h - 2/6N)^2}. \quad (8)$$

Among them, R represents the QoE value, h represents the viewing angle, and N represents the corresponding parameter of the selected blocking scheme.

Kalman filtering is a method of using the state formula of a linear system to perform a recursive operation on the previous prediction and observation data to obtain a posterior system state value. The algorithm consists of two steps, one is to estimate the current system state according to the last estimated value, and the other is to adjust the existing predicted value according to the Kalman gain coefficient to obtain a more accurate prediction.

The state variable to be estimated is defined as $x \in R^n$, which can be expressed as a stochastic difference formula in a linear system:

$$x_c = A_{c-1} x_{c-1} + B u_{c-1} + w_{c-1}. \quad (9)$$

Define the observed variable $z \in R^m$, and the measurement formula is

$$z_c = H x_c + v_c. \quad (10)$$

Among them, w_c and v_c represent process excitation noise and observation noise, so the essence of Kalman filtering is to reduce the influence of noise signals of w_c and v_c in the calculation process and obtain the optimal estimated value of x_c .

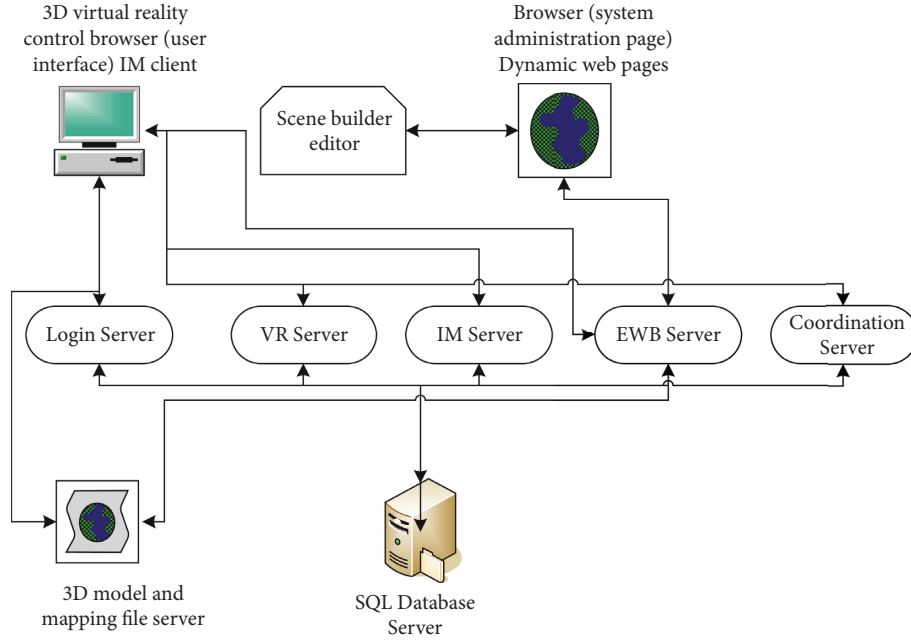


FIGURE 4: System structure figure.

TABLE 2: Network transmission requirements for virtual reality video.

Different VR levels	Para-VR (no immersion)	Entry-level VR (partial immersion)	Optimized VR (deep immersion)	Ultimate VR (full immersion)
Bandwidth requirements	25Mbit/s	100Mbit/s	420Mbit/s	2.4Gbit/s
RTT requirements	40 ms	30 ms	20 ms	10 ms
Packet loss ratio requirements	$1.4E-4$	$1.5E-5$	$2.0E-6$	$5.5E-8$

Definition $\hat{x}_{\bar{c}} \in R^n$ (-represents prior, ^ represents estimation) is the prior state estimate of the c -th step when the state before the c -th step is known, and definition $\hat{x}_{\bar{c}} \in R^n$ is the posterior state estimate of the c -th step when the measured variable z_c is known. This defines the prior estimation error and the posterior estimation error:

$$\begin{aligned} e_{\bar{c}} &= x_c - \hat{x}_{\bar{c}}, \\ e_c &= x_c - \hat{x}_c. \end{aligned} \quad (11)$$

The covariance of the prior estimation error is

$$P_{\bar{c}} = E[e_{\bar{c}}e_{\bar{c}}^T]. \quad (12)$$

The covariance of the posterior estimation error is

$$P_c = E[e_c e_c^T]. \quad (13)$$

In order to find the optimal value of x , the posterior variance must be minimized, and then the Kalman filter is used to weight the existing estimates and observations to obtain the posterior estimate (K is the Kalman gain).

$$\hat{x}_c = \hat{x}_{\bar{c}} + K(z_c - H\hat{x}_{\bar{c}}). \quad (14)$$

3. Experiments on the Application of Artificial Intelligence Technology in the Cross-Cultural Communication of Intangible Cultural Heritage

The digital interactive experience-type intangible cultural heritage culture is a multifunctional smart museum that emerged after the revival of modern culture. Under the action of AR full-sensing experience technology, virtual figures are introduced into the real world, so that people can feel the charm of traditional culture from all angles. Through the impact of 3D visual effects, the auditory impact of multichannel audio and video, the tactile impact of the scene, the impact of smell, and the impact of taste, people can experience the intangible cultural heritage in an all-round way. Coupled with the AR full-sensing model, various scenarios can be switched according to the user's preferences and requirements to meet the needs of users. In order to strengthen the protection of intangible cultural heritage and promote the development of intangible cultural heritage in the tourism industry, we must adhere to the principles of prioritizing protection, rational

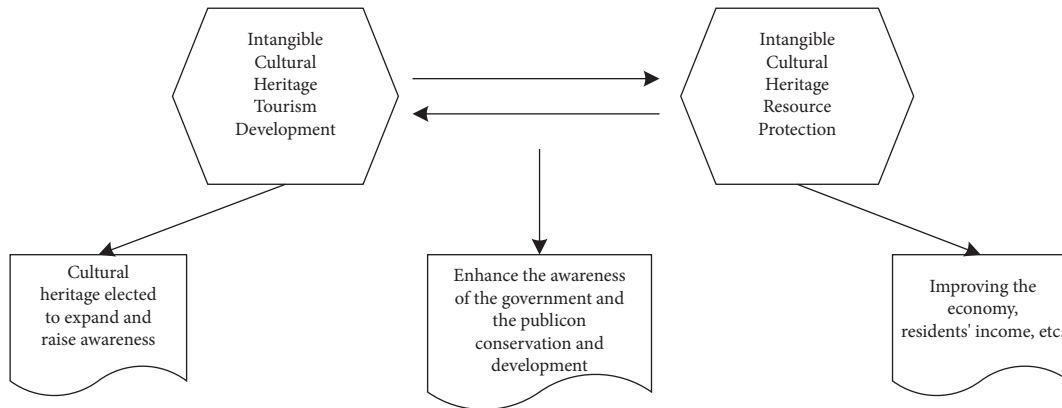


FIGURE 5: Interaction and impact of intangible cultural heritage protection and museum development.

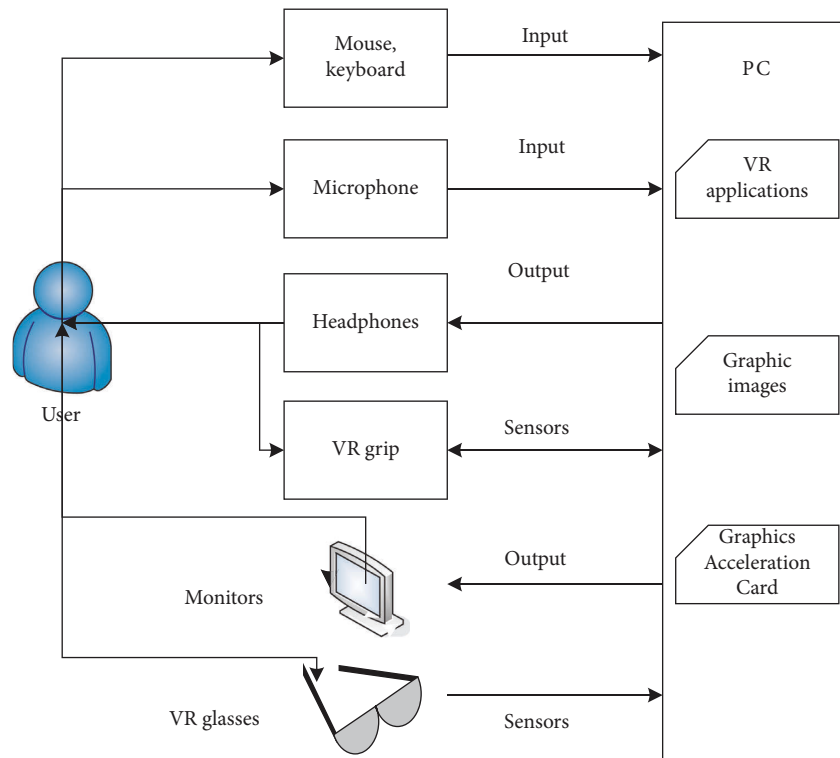


FIGURE 6: Architecture of a virtual reality system.

utilization, inheritance and development, protection first, and development second. In order to achieve a double harvest of intangible cultural heritage protection and tourism development, in the entire process of intangible cultural heritage tourism development, people should also focus on the organic combination of development and protection. On the premise of doing a good job in protection, scientific development can be carried out to achieve sustainable development of intangible cultural heritage and enrich cultural background, as shown in Figure 5.

Developers can use computers or workstations to achieve simulation effects, use computer input and output devices to control visual and physical sensations, and allow users to

enter a virtual 3D simulation environment. At the same time, it can also change with the movement of the user, bringing an immersive feeling to the user, as shown in Figure 6.

Intangible cultural heritage is highly valued in today's cultural communication. This paper conducts a survey on a group of arts and crafts museums and also conducts a questionnaire survey on the public. In the survey, a total of 200 visitors of different ages are randomly selected for questionnaire survey. As shown in Table 3, from the statistics of the questionnaire results, the arts and crafts museum group has a relatively wide audience, among which the youth and middle-aged and young people account for more than half.

TABLE 3: Basic information of the respondents.

Age group of visitors	Number of people	Proportion (%)
<18	20	10
18–25	24	12
25–35	40	20
35–65	76	38
>65	20	10

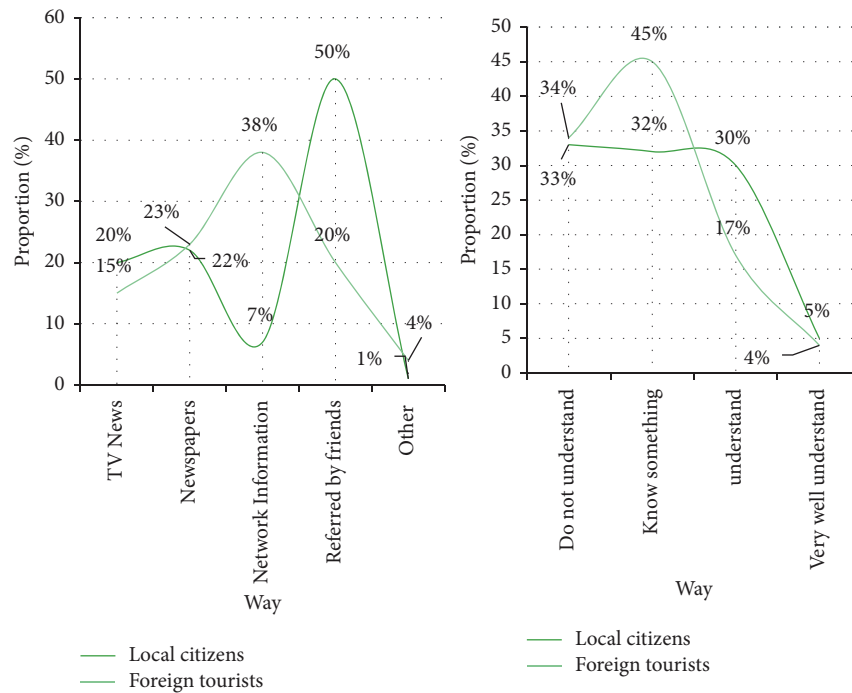


FIGURE 7: Visitors' access to information.

4. Data Deconstruction in the Cross-Cultural Communication of Intangible Cultural Heritage

In order to understand the effects of various dissemination channels of intangible cultural heritage, statistics were made on the ways of information acquisition by visitors, as shown in Figure 7.

It can be seen from Figure 7 that for local tourists, they mainly come to visit relevant intangible cultural heritage through the introduction of friends, accounting for 50%. The acquisition of foreign tourists is relatively scattered, mainly through newspapers (23%), Internet information (38%), and other media and friends (20%) to visit. It can be seen that the proportion of visitors who know very well is very small, no more than 5%.

Intangible cultural heritage is limited by the natural environment. China has a vast territory, a large population, and different living habits, forming the diversity of Chinese culture. Figure 8 shows the statistical result of the visitor's visit purpose and stay time.

As can be seen from Figure 8, for local audiences who have emotional resonance and a sense of identity in their own history and culture, the main purpose of their visit is to increase their knowledge, accounting for 43%, and most of them will visit the museum for 1 to 3 hours.

According to the progress of technology, information technology, figure processing, and VR technology have gradually revealed their unique charm. Digital restoration and reproduction provide advanced and better means of preservation for the transmission and spreading of inter-material cultural heritage. The statistics resulted in Figure 9 in order to examine the public's position on the succession of science and technology and the diffusion of subtangible cultural assets.

It can be seen from Figure 9 that 66% of the visitors prefer to learn about intangible cultural heritage culture through experience and feel that the personal experience is more intuitive and interesting. This provides a broad market prospect for the improvement of virtual intangible cultural heritage experience. The audience generally believes that the on-site display of traditional handicrafts is the biggest

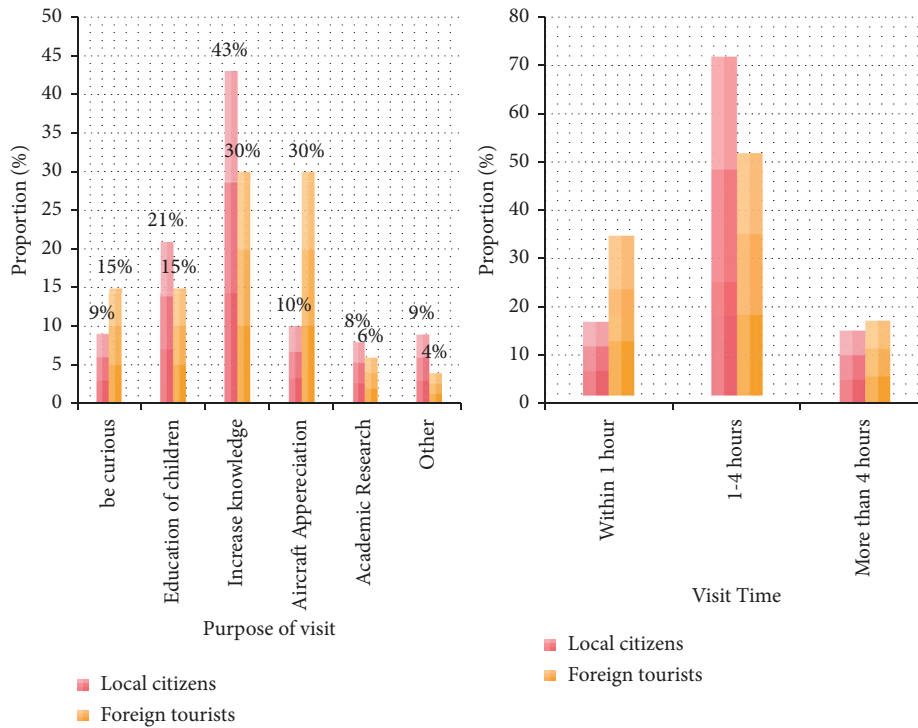


FIGURE 8: Visitor's purpose and stay time.

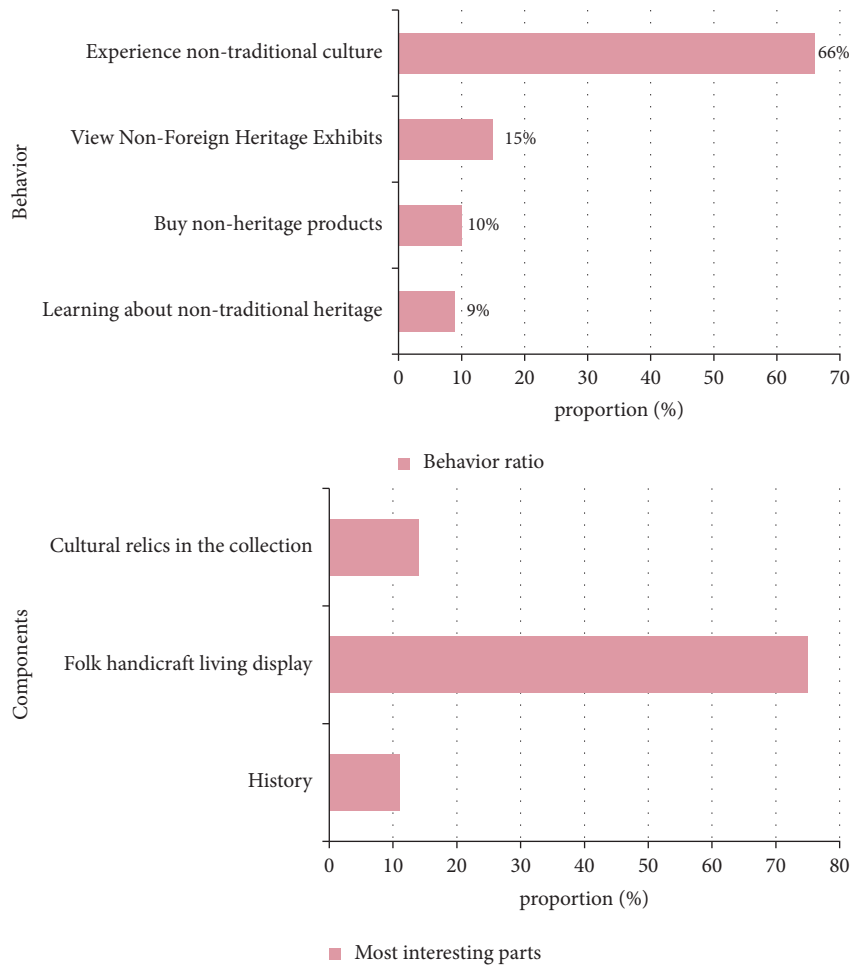


FIGURE 9: Proportion of participation in intangible cultural heritage.

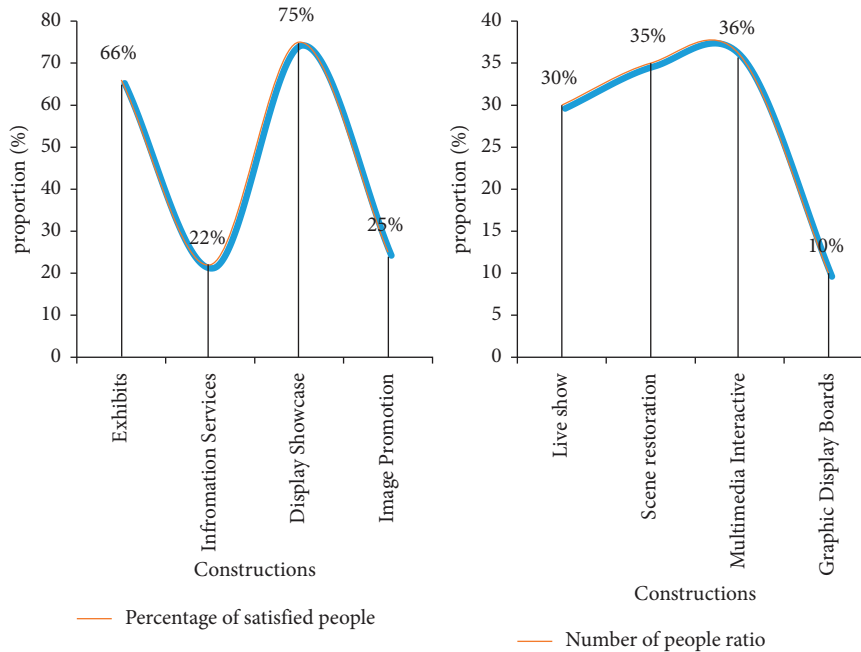


FIGURE 10: What visitors are satisfied with and what they think needs improvement.

attraction of the museum, and they hope to strengthen the on-site display content and scene creation during the display process. At the same time, they also affirmed the important role of the handicraft life exhibition hall in the protection and inheritance of intangible cultural heritage. Figure 10 shows the parts that visitors are satisfied with and the parts that need to be improved.

From Figure 10, it can be seen that the audience’s satisfaction with the display and exhibits is high, reaching more than 65%. 36% of the visitors believe that multimedia interaction needs to be strengthened, and 35% of the people think that the scene restoration needs to be strengthened.

5. Conclusions

With the development of the times, the Internet has become the most efficient and convenient way for cross-cultural communication. The globalization of economy and culture is also a good opportunity for intangible cultural heritage to realize cross-cultural dissemination. This paper studies the application of artificial intelligence technology to the cross-cultural dissemination of intangible cultural heritage in order to better protect and promote intangible cultural heritage culture. The cross-cultural dissemination of artificial intelligence technology in non-material culture is not only a means of attracting consumers but also a high-tech technology that is truly, comprehensively, and deeply applied to venues. With the application of artificial intelligence technology, the protection and utilization of Chinese folk intangible cultural heritage is being carried out in an orderly manner, and the revival and prosperity of national traditional culture is imminent. Intangible cultural heritage is a living fossil of human civilization. People all over the world use various means and methods to record, disseminate, and

preserve ancient intangible cultural heritage. Intangible cultural heritage is the crystallization of Chinese wisdom and civilization and an important cultural resource for the development of human society. On the basis of inheriting the national culture, through the power of the government, the media, and the people, the Chinese cultural concept, way of thinking, way of life, art form, etc. are transmitted to the outside world, thereby reducing misreading, rejection, anxiety, and conflict between cultures and realizing understanding, adaptation, identification, and integration between cultures.

Data Availability

The datasets generated and/or analyzed during the current study are not publicly available due to sensitivity and data use agreement.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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