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Computer-Aided Design AND APPLICATIONS

Innovative Design and Dissemination Strategy for Hebei's Intangible Cultural Heritage

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Abstract. In the wave of "mass entrepreneurship and innovation," the protection and innovative development of intangible cultural heritage have become important forces in promoting cultural prosperity. This article focuses on the traditional dragon dance art and its musical elements in Hebei Province and explores in depth the integration and application of computer-aided design (CAD) technology in the innovative design of intangible cultural heritage, as well as the innovative deployment of big data in music culture dissemination strategies. Through CAD technology, we have achieved precise extraction, 3D modelling, and detail optimization of traditional patterns and colours in dragon dance art, and cleverly combined these elements with modern minimalist aesthetics and music elements to create creative products that retain the traditional charm and are rich in modernity. The research results indicate that the organic combination of CAD technology and big data strategy can not only enrich the expression forms of dragon dance art and enhance its aesthetic value but also effectively promote the protection, inheritance, and modernization development of intangible cultural heritage.

Keywords: Mass Entrepreneurship and Innovation; Intangible Cultural Heritage; Big Data; Communication Strategy; Music Elements; Communication of Music Culture
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1 INTRODUCTION

With the changing times, traditional dragon dance art and its musical elements are facing unprecedented challenges. On the one hand, the aging problem of inheritors is becoming increasingly prominent, and the younger generation's interest in traditional culture is gradually weakening. On the other hand, under the impact of diversified modern entertainment methods, the market demand for dragon dance art tends to shrink, and the unique charm of its musical elements is also difficult to demonstrate and spread fully. Therefore, exploring new paths for inheritance and development and

revitalizing the art of dragon dance and its musical elements in modern society has become an urgent problem to be solved [1]. In this context, this article selects traditional dragon dance art and its musical elements in Hebei Province as the research object, aiming to provide new ideas and methods for the protection and inheritance of intangible cultural heritage through innovative applications of computer-aided design (CAD) technology and big data analysis. CAD technology provides strong support for the digital protection and innovative design of intangible cultural heritage with its powerful design capabilities and precision. Through CAD technology, we can achieve precise extraction, 3D modelling, and detail optimization of traditional patterns and colours in dragon dance art, injecting modern design elements into traditional art and making it more in line with modern aesthetic needs. At the same time, combining music elements with CAD technology and visualizing the rhythm and melody of music not only enriches the forms of dragon dance performances but also enhances the audience's immersion and experience [2].

In the journey of promoting the protection and inheritance of intangible cultural heritage, we pay special attention to the role of designers in innovation, encouraging them to flexibly apply computer-aided design (CAD) technology for creative integration based on a deep understanding and respect for traditional essence [3]. This process is not limited to innovation in the visual arts, but extends to music, an indispensable component of intangible cultural heritage. Designers integrate modern design concepts with traditional patterns, colours, and musical elements in dragon dance art to create creative products that retain the ancient charm and shine with the times, achieving a harmonious dialogue and coexistence between tradition and modernity. In order to further enrich the cultural experience of users, we have introduced mixed reality (MR) technology. This technology enables users to immerse themselves in virtual scenes of intangible cultural heritage and engage in direct and in-depth interactions with dragon dance art and its musical elements [4]. In the virtual world built by MR, users can not only watch every detail of the dragon dance performance up close but also listen to the melodious melody and passionate drum beats, feeling the perfect integration of music and dance, greatly enhancing their immersion and participation in learning. At the same time, we fully utilize the power of big data to develop precise strategies for the dissemination of intangible cultural heritage. By collecting and analyzing massive user data, we can accurately depict the interest maps, preference tendencies, and demand changes of different audience groups, providing solid data support for the formulation of communication plans. On this basis, we have designed a series of personalized and differentiated communication plans aimed at accurately conveying the unique charm of dragon dance art and its musical elements to a wider audience and inspiring the whole society's attention and love for intangible cultural heritage [5].

By using CAD technology, we can not only accurately restore the complex structure and intricate patterns of traditional cultural clothing, but also create creative designs based on tradition. For example, combining 3D printing technology to create unique decorative accessories, or using environmentally friendly materials to replace traditional materials, not only preserves the artistic characteristics of traditional cultural clothing but also conforms to the sustainable development concept of modern society. Based on the CAD platform, a series of traditional cultural clothing products with unified and distinctive styles can be designed to meet the needs of different occasions and consumers. With the help of big data analysis, we can accurately target our audience and achieve a comprehensive digital display and interactive experience of traditional cultural clothing through online platforms such as virtual museums and digital exhibitions. Through the release of short videos, pictures and texts, live broadcasts and other content related to traditional cultural costumes, we will attract the attention and participation of young audiences and broaden the communication channels and audience base [6]. CAD technology can also assist in exploring the application of new materials and modernizing traditional processes. Through parametric modelling, designers can flexibly adjust the lines, colours, and pattern layout of clothing, retaining traditional charm while incorporating modern aesthetic elements and achieving a harmonious coexistence of tradition and modernity [7]. Users can not only appreciate the exquisite dress details but also experience the charm of Qin Opera art through virtual reality (VR) and augmented reality (AR) technology. At the same time, combined with branding operation strategies, we aim to create influential traditional cultural clothing brands, and enhance cultural added value and market competitiveness. Social media marketing and cultural

communication: use social media platforms such as Weibo, WeChat, and TikTok to analyze users' interests and preferences in combination with big data and develop accurate cultural communication strategies [8]. In this context, the introduction of CAD technology provides new possibilities for the innovative design of ICH. With its powerful design function and efficient production process, CAD technology can help designers quickly capture ICH elements and carry out creative reconstruction so as to design creative products with both traditional cultural heritage and modern aesthetic interest [9]. Intangible cultural heritage, as an important cultural symbol, showcases the cultural ideas and skills of our Chinese nation for thousands of years.

Centred on Hebei ICH's innovative CAD design and big data dissemination within the "MEI" framework, this research seeks to generate fresh perspectives for safeguarding and perpetuating Hebei's ICH through rigorous investigation and practical application.

Structurally, the article begins by presenting the research context and its importance. It then elaborates on the innovative design workflow for Hebei ICH using CAD technology. Subsequently, an analysis and comparison of the proposed algorithm's strengths in feature detection and point cloud surface reconstruction are conducted. The article concludes by summarizing the research findings and outlining future research avenues, striving to introduce novel approaches for the protection and continuation of Hebei's ICH.

2 LITERATURE REVIEW

The application of big data technology makes it possible to widely disseminate and deeply explore information on the protection of architectural heritage. In the wave of mass entrepreneurship and innovation, CAD technology is not limited to industrial product design, but creatively applied to the protection and inheritance of intangible cultural heritage. Meanwhile, CAD technology can also assist designers in innovating designs based on traditional elements. In addition, big data can also help establish digital archives of architectural heritage, achieve permanent preservation and convenient sharing of heritage information, and provide rich resources for academic research, public education, and tourism development. Luther et al. [10] can accurately grasp the current situation and needs for heritage protection and develop more scientific and reasonable protection strategies by collecting and analyzing multi-source information such as architectural heritage monitoring data, tourist behaviour data, and social media feedback. Faced with unforeseeable risks such as natural disasters, digital technology provides an effective protection network for architectural heritage. Deep learning algorithms can learn the patterns and characteristics of disaster occurrence from massive data, achieving accurate prediction and early warning of multiple disasters. Digital twin technology can construct virtual images of architectural heritage, monitor its status changes in real time, and provide data support for preventive protection. Ming et al. [11] used CAD software to accurately simulate and restore the structure, patterns, and spatial layout of traditional architectural heritage, providing a scientific basis for restoration work. Develop architectural products that preserve cultural essence while meeting modern aesthetic and functional requirements, promoting the revitalization and utilization of cultural heritage. On this basis, combined with an intelligent monitoring system based on human-computer interaction, automatic detection and timely response of structural damage to architectural heritage can be achieved, effectively reducing disaster losses.

In the context of mass entrepreneurship and innovation, the protection and inheritance of digital cultural heritage are gradually integrating into the wave of technological innovation. It not only greatly improves the accuracy and efficiency of identifying historical architectural elements, but also accelerates the process of Historical Building Information Modeling (HBIM), opening up new avenues for the digital protection of intangible cultural heritage. The DL framework proposed by Nieto et al. [12] integrates dynamic graph convolutional neural networks (DGCNN) and innovatively introduces multidimensional features such as normals and colours to achieve efficient and accurate segmentation of 3D point cloud data. These buildings not only span different historical periods but also showcase different architectural styles. This dataset covers various indoor and outdoor scenes, including churches, chapels, corridors, porticos, and pergolas, all of which are building types with rich

historical heritage. More importantly, relying on the ArCH (Architectural Heritage) dataset as a newly collected DCH dataset, its diversity and breadth provide a solid foundation for training and testing deep learning models. Pierdicca et al. [13] combined deep learning techniques to enable CAD software to automatically or semi-automatically generate high-quality 3D models of historical buildings, greatly reducing design costs and shortening design cycles.

With the rise of mass entrepreneurship and innovation, the protection and dissemination of intangible cultural heritage are no longer limited to traditional frameworks but deeply integrated with modern technological means such as CAD innovative design and big data dissemination strategies, ushering in a new era of cultural heritage revitalization and utilization. Sanchez et al. [14] combine their expertise with digital technology through interdisciplinary collaboration to jointly explore new values and forms of cultural heritage. In the process of studying the collections of temples and their museums, we are increasingly aware of the importance of establishing deep partnerships with cultural heritage institutions. Meanwhile, through the application of big data dissemination strategies, the results of these projects can be widely disseminated, allowing more people to understand and participate. This collaboration not only promotes in-depth academic research but also builds a bridge for the digital protection and innovative dissemination of cultural heritage. Specifically, it is possible to strengthen the close integration of course content with cultural heritage protection practices, introduce more real cases and project practices, and allow students to experience the charm and value of cultural heritage through participation. It is particularly noteworthy that we have accumulated experience managing two student projects for the RUSI organization. Schuster and Grainger [15] further reflected on and optimized curriculum design, creating more attractive courses that stimulate students' creativity and sense of responsibility. These two projects not only enhance students' practical abilities but, more importantly, encourage them to integrate CAD innovative design thinking into the protection of cultural heritage records, designing digital products that have both historical authenticity and modern aesthetics.

The existing research is still insufficient in the combination of ICH's CAD innovative design and big data dissemination and lacks a systematic theoretical framework and practical cases. The purpose of this study is to provide solutions for the protection and inheritance of ICH in Hebei Province by constructing the innovative CAD design system of ICH and combining it with the big data communication strategy.

3 OVERVIEW OF HEBEI INTANGIBLE CULTURAL HERITAGE (ICH)

The intangible cultural heritage of music in Hebei not only has extremely high historical value but also serves as an important carrier of social culture and national spirit. They have witnessed the development process of Hebei and even the Chinese nation, reflecting the social landscape and people's emotions in different periods. At the same time, these musical heritages are also important symbols of Hebei's cultural identity, playing an irreplaceable role in enhancing national identity and cultural confidence. At the social level, they promote cultural exchange and dissemination, enrich the spiritual and cultural life of the people, and provide strong cultural support for building a harmonious society. This section will give an overview of ICH resources in Hebei from three aspects: the general situation, historical value, and social significance, as well as the present situation of protection and inheritance.

(1) Overview of ICH resources in Hebei.

There are many kinds of ICH resources in Hebei, including traditional handicrafts, folk literature, folk activities, traditional medicine, and other fields. Among them, traditional handicrafts are the most prominent. These handicrafts have won wide acclaim from people at home and abroad for their unique artistic style and exquisite production skills. In addition, Hebei is rich in folk literature resources. These oral literature works enrich people's spiritual lives and inherit the historical memory and cultural genes of the Hebei people. In terms of folk activities, traditional festivals in Hebei, such as the Spring Festival Temple Fair, the Dragon Boat Festival, and the Mid-Autumn Festival, as well as folk performing arts such as lifting the pavilion, carrying sticks, and running donkeys, all show the

love and inheritance of Hebei people to traditional culture. Hebei's folk literature resources are also rich and diverse, including many excellent works closely related to music. These oral literary works, such as folk songs and opera lyrics, enrich people's spiritual world with their vivid language, beautiful melodies, and profound connotations, inheriting the historical memory and cultural genes of the people of Hebei. In the process of singing these works, music has become a bridge connecting the past and present, allowing people to feel the inheritance and changes of culture in the melody.

(2) The historical value of ICH in Hebei.

The integration of music brings new vitality to the inheritance and development of intangible cultural heritage. It not only stimulates the vigorous growth of the tourism industry, but also attracts domestic and foreign tourists to explore the ancient stories and beautiful legends contained in music; At the same time, it has also promoted the prosperity of cultural/creative industries, providing artists with rich creative materials and sources of inspiration, and promoting the diversification and innovation of cultural products. In this context, the local economy has been effectively revitalized, and the cultural industry chain continues to extend, forming a virtuous cycle.

(3) Current situation of protection and inheritance of ICH in Hebei.

As a shining pearl in the treasure trove of national culture, Hebei's intangible cultural heritage plays an irreplaceable role in enhancing national cohesion and identity. The resonance of music transcends the boundaries of geography and language, allowing every Chinese child to find a sense of belonging and pride in familiar melodies. Through the exhibition and dissemination of intangible cultural heritage, especially those activities that incorporate musical elements. We can not only showcase the unique charm and cultural heritage of Hebei and even China to the world, but also enhance mutual understanding and respect through communication, and improve the country's cultural soft power and international influence. In recent years, Hebei Province has made remarkable achievements in the protection and inheritance of ICH. However, with the acceleration of globalization and modernization, ICH in Hebei is also facing some challenges. On the one hand, the number of inheritors of traditional skills is limited, and they are older, and the younger generation's interest and participation in ICH are not high, which leads to the risk of some ICH skills being lost. On the other hand, the market demand for ICH is limited, and it is difficult to get enough attention in the modern market, which affects the inheritance and development of ICH.

In order to meet these challenges, Hebei Province actively explores new paths for the protection and inheritance of ICH. On the one hand, by strengthening the publicity and education of ICH, the public's participation in ICH is improved; On the other hand, through innovative forms of ICH, such as the use of digital technology, network technology and other modern scientific and technological means, ICH is closer to modern life.

4 INNOVATIVE CAD DESIGN STRATEGY OF ICH IN HEBEI PROVINCE

4.1 CAD 3D Modeling and Optimization

In the context of the interweaving of music and cultural heritage, CAD's 3D modelling technology has demonstrated extraordinary charm. It can not only accurately capture and reproduce the intricate structures and delicate decorative details in traditional handicrafts, but also give new life and emotions to these handicrafts under the guidance of musical elements. Through the magical hand of CAD, ancient instruments such as guzheng and erhu, with their complex resonance box structures, intricate string layouts, and even every carved or embedded pattern, can be accurately digitized and presented in three dimensions. And music, as the soul of these handicrafts, its melody, rhythm, and harmony can also be cleverly transformed into colour gradients, pattern textures, or dynamic light and shadow effects through the image processing functions of CAD.

Figure 1 deeply reveals the construction process of the Gaussian pyramid and Gaussian difference pyramid in ICH image feature extraction. This process is the basis of high robustness feature point detection, which requires a detailed comparative analysis of each pixel, not only limited to the current scale space but also extended to 26 neighbouring pixel points in the adjacent scale

space. Through this cross-scale space extreme point determination mechanism, it is ensured that the representative feature points can be stably extracted from the image in the changeable scale environment, which provides a reliable basis for the subsequent image processing and analysis.

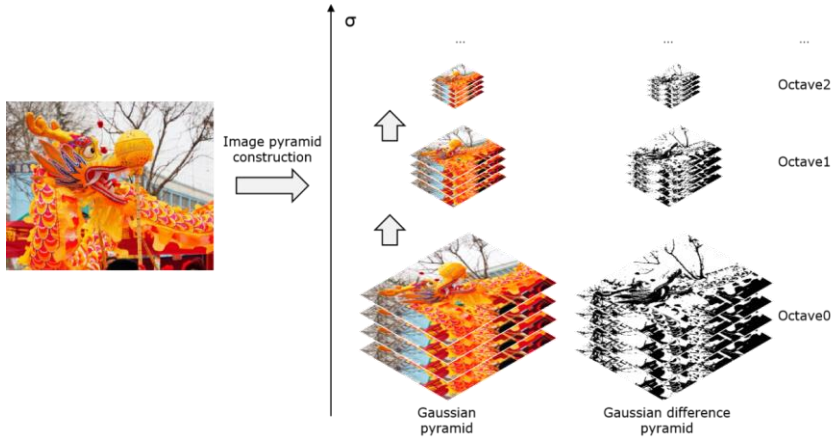


Figure 1: Gaussian pyramid and Gaussian difference pyramid.

During image processing, 2D column vectors are employed to delineate the gradient of function $f\ x,y$:

$$\nabla f = \begin{bmatrix} G_x \\ G_y \end{bmatrix} = \begin{bmatrix} \frac{\partial f}{\partial x} \\ \frac{\partial f}{\partial y} \end{bmatrix} \tag{1}$$

After wavelet decomposition, let E_1 represent the low-frequency energy of image A_1, and E_2 represent the low-frequency energy of image A_2. Consequently, for the synthesized image, its low-frequency part:

$$A = \frac{E_1 A_1}{E_1 + E_2} + \frac{E_2 A_2}{E_1 + E_2} \tag{2}$$

Wavelet decomposition's high-frequency part captures edge details of the original image. For this part, the maximum value fusion rule is employed, selecting the pixel with the greatest absolute value at each position to optimize high-frequency component retention.

The activation function influences network optimization by altering the data distribution of input layers. Sigmoid and tanh functions, with their bilateral saturation, induce gradient vanishing as network depth increases, enhancing the network's noise robustness. Specifically, the activation value for the network layer l_n is determined as follows:

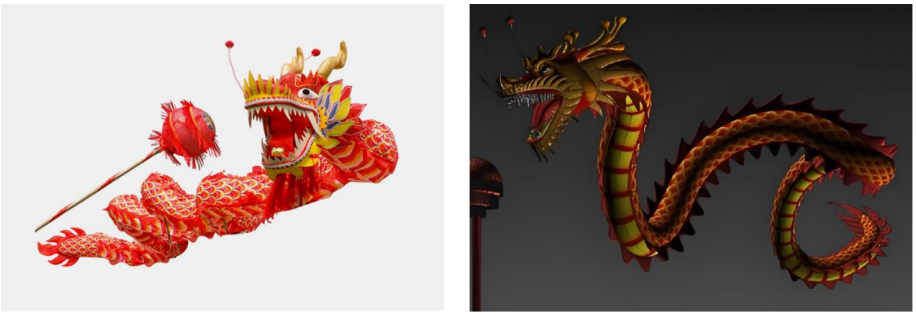
$$Z_n = f\ W_n^T x_n + b_n \tag{3}$$

Here x_n denotes the network layer input, f signifies the ReLU activation function while W_n, b_n encompasses both the weight and offset parameters.

On the basis of data collection and processing, the accurate modelling of ICH is carried out by using the 3D modelling function of CAD. This includes the overall framework, details, and colour matching of ICH. Through the accurate modelling of CAD, the original style of ICH can be restored. On the basis of 3D modelling, the key elements in ICH are extracted by using the image processing

function of CAD. These elements can be integrated with modern design elements to form an innovative design with traditional cultural characteristics without losing the sense of modernity.

Figure 2 shows an example of applying this feature extraction technique to the 3D reconstruction of ICH images. Based on 25 carefully selected real images, a 3D model with high realism and detail preservation was successfully constructed.



(a) Realistic image of dragon dance (b) 3D reconstruction model based on multiple images

Figure 2: Real image and reconstruction model.

In the actual 3D reconstruction process, the complexity of the scene, such as occlusion and regular repetitive structure, brings challenges to feature point matching. Relying only on the traditional nearest neighbour algorithm of feature points, it is often difficult to avoid the generation of mismatched point pairs. These noise points will seriously interfere with the accurate estimation of camera parameters, and then affect the accuracy of 3D reconstruction.

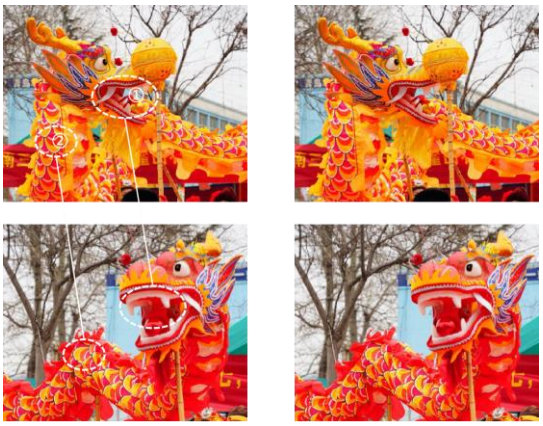


Figure 3: Feature point matching results of two methods.

Figure 3a and Figure 3b show the matching results of feature points under two different methods. Figure 3a shows the nearest neighbour matching of the original feature points of the target object in different spatial positions and postures of the camera, and there are many mismatches due to the complexity of the scene. Figure 3b shows that the matching of feature points is significantly improved after combining the nearest neighbour matching algorithm of feature points with the noise removal model proposed in this study. Through the application of this model, the noise in matching point pairs is effectively filtered, the accuracy and reliability of matching are improved, and more accurate data support is provided for the 3D reconstruction of ICH images.

Using the rapid iteration function of CAD technology, the design scheme is constantly modified and optimized. Through the visualization function of CAD, we can directly see the improvement effect of the design scheme and provide the basis for decision-making. After the design scheme is determined, the design prototype is quickly made by combining CAD technology with 3D printing and other manufacturing technologies. Through actual production and testing, the feasibility and practicability of the design scheme are verified.

4.2 Experimental Results

This article explores in depth the pattern aesthetics and colour emotions contained in traditional dragon dance art in Hebei Province. This process cleverly integrates the inspiration of musical elements, transforming the dynamic rhythm of dragon dance performance into the visual narrative in static images. In the image acquisition process, we not only use high-resolution cameras to capture the static beauty of dragon dance works but also try to capture the vitality that leaps with the rhythm of drum beats through the lens. In the preprocessing stage, in addition to conventional image denoising and contrast enhancement, we also attempted to simulate the atmosphere of live audience cheers and music interweaving during dragon dance, adding an intangible "sound" dynamic colour to the image through digital means.

When extracting features, we not only focus on the edges, contours, and key feature points of the patterns but also try to analyze how these patterns correspond to the rhythm of the music in dragon dance performances. For example, some specific patterns may correspond to passionate drum beats, while others are softly accompanied by melodious flute sounds. In the colour analysis stage, we delve into the cultural significance behind the colours of dragon dance works and their correlation with musical emotions. Through colour space conversion and colour histogram statistics, we not only capture the harmony and contrast of colours themselves but also attempt to interpret how these colours work together with music to weave vivid cultural landscapes.

In the design innovation, traditional dragon dance elements fuse with modern minimalism, resulting in products that embody both cultural heritage and contemporary aesthetics. Figure 4 exhibits design examples that preserve the allure of traditional dragon dance art while embracing modern design's simplicity.

Figure 4: 3D dragon dance design example.

To assess the feature detection capabilities of the proposed algorithm, a comparison with the Retinex algorithm was conducted. Results indicate the notable superiority of the proposed algorithm in detecting ICH features. As illustrated in Figure 5, the Retinex algorithm exhibits false positives and

negatives in feature identification, whereas the proposed algorithm demonstrates enhanced precision in pinpointing key feature points, as evidenced in Figure 6.

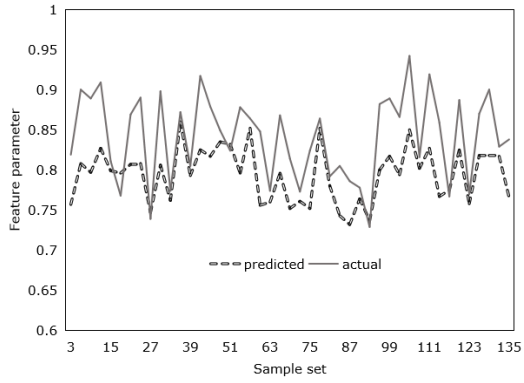


Figure 5: Feature detection results of the Retinex algorithm.

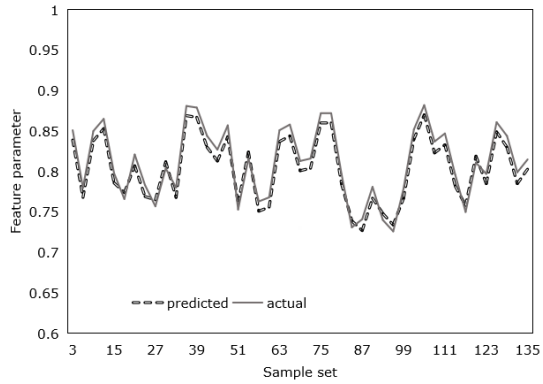


Figure 6: Feature detection results of this algorithm.

In the aspect of point cloud surface reconstruction, the standard point cloud model Buddha model is selected as the experimental object, and the different effects of cubic mean filtering in the traditional Poisson algorithm and improved Gaussian filtering with σ=1.0 in point cloud surface reconstruction are compared. The experimental results are shown in Figure 7. Figure 7a shows the results of the traditional Poisson algorithm, and it can be seen that there is significant noise in region ⊖, while the details in region ⊜ are relatively blurry. In contrast, the improved Poisson algorithm based on Gaussian filtering in Figure 7b significantly improves the smoothing effect of region ⊖ on noise while ensuring that the details in region ⊜ are not lost.

5 HEBEI'S DISSEMINATION STRATEGY BASED ON BIG DATA

5.1 Communication Strategy Based on User Portrait

Big data communication strategy is a strategy based on massive data collection, processing and analysis, which aims to maximize the information communication effect by accurately positioning the audience and optimizing the communication content and channels.

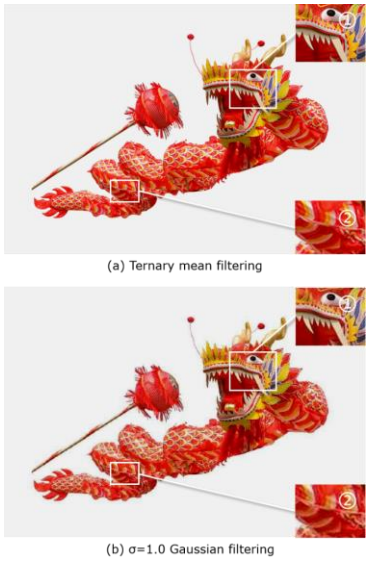


Figure 7: Different smoothing filtering effects.

It uses the advantages of big data technology to solve the problems of information asymmetry and inefficiency in traditional communication methods. Based on the collected data, communicators can use big data analysis technology to build user portraits. User portrait is a comprehensive description of user characteristics, including information about users' interests, needs, behaviour habits and so on. By constructing user portraits, communicators can deeply understand the characteristics and needs of the target audience and provide a foundation for accurate communication.

A user's cultural aesthetic preference is shaped by both short- and long-term interests, thus their preference document can be articulated as follows:

$$D = M, N \tag{4}$$

With M representing short-term interest and N representing long-term interest, due to the diverse range of interests, M and N are formulated as:

$$M = S_1, S_2, \ldots, S_n \tag{5}$$

$$N = L_1, L_2, \ldots, L_n \tag{6}$$

The user's interest preference is articulated as follows:

$$U = S_1, S_2, \ldots, S_n, L_1, L_2, \ldots, L_n \tag{7}$$

For every S_i and L_j, category attributes E_i and E_j, along with weight attributes F_i F_j, are incorporated, allowing S_i and L_j to be represented as:

$$S_i = \langle S_i, F_i, E_i \rangle, i = 1, 2, \ldots, m \tag{8}$$

$$L_i = \langle L_j, F_j, E_j \rangle, i = 1, 2, \ldots, n \tag{9}$$

Big data analysis can also help communicators optimize the selection and combination of communication channels. By analyzing key indicators such as user activity and conversion rates across different channels, communicators can evaluate the effectiveness of each channel and adjust channel strategies accordingly. For example, young user groups can choose to advertise on social media platforms; While professional user groups can choose to publish content on industry websites.

Once the nearest neighbor set U for target user u is determined, the following formula can be applied to forecast the score of target user u for ICH item i, noted as:

$$P_{u,i} = \overline{R_u} + \frac{\sum_{u_k \in U} sim\ u, u_k \times R_{u_{k,i}} - \overline{R_{u_k}}}{\sum_{u_k \in U} \left| sim\ u, u_k \right|} \tag{10}$$

The aforementioned formula $R_{u_{k,i}}$ signifies the non-zero score assigned by user u_k to project i. $\overline{R_{u_k}}$ Denotes the mean score of the overlapping projects scored by the user u_k. Meanwhile, $\overline{R_u}$ represents the average score given by the user u across all projects.

5.2 Experimental Results and Analysis

The experiment assesses the accuracy and recall of the introduced algorithm against the traditional decision tree approach. As depicted in Figures 8 and 9, the proposed algorithm outperforms its counterpart. Specifically, it boosts accuracy by 19.88% and recall by 22.45%. These improvements stem from optimizations in feature selection, model training, and classification decisions, enhancing both the algorithm's fitting ability and generalization performance.

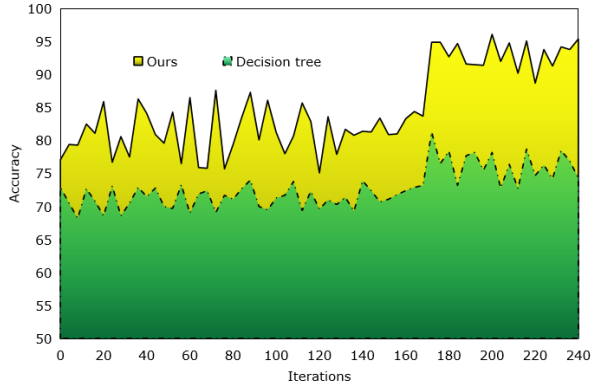


Figure 8: Accuracy of different algorithms.

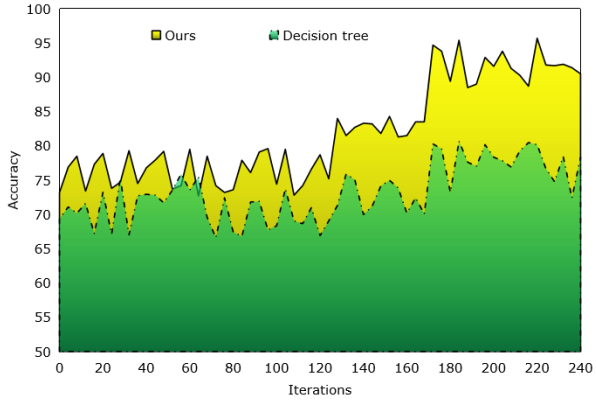


Figure 9: Recall rate of different algorithms.

The proposed algorithm demonstrates considerable advantages in accuracy, a crucial metric assessing an algorithm's capacity to classify samples correctly. Experimental comparisons reveal optimizations in feature selection, model training, and classification decision-making. Moreover, it excels in recall, which evaluates an algorithm's ability to identify positive samples. A high recall rate signifies precise capture of key information, enhancing decision-making accuracy and reliability. Refining the algorithm's flow and parameter settings significantly improves positive sample recognition and recall rate.

6 CONCLUSIONS

As a treasure of the Chinese nation, intangible cultural heritage contains rich historical and cultural connotations. With the deployment of intangible cultural heritage by the state, the development of emerging technologies such as the Internet, and the innovation of intangible cultural heritage inheritance methods, many development platforms and practitioners began to realize that intangible cultural heritage methods can no longer be imposed, but should interact with the audience to achieve mutual sharing and influence, and strive to improve the audience's sense of participation. Music, as an important element in the inheritance of intangible cultural heritage, combined with modern means such as narratology, digital technology, and big data, has jointly opened up new paths for the inheritance and dissemination of intangible cultural heritage. It not only enriches the content and form of inheritance but also stimulates the audience's interest and love for traditional culture, making intangible cultural heritage shine more brilliantly on the stage of the new era. The construction of digital scenes can solve the problems encountered in the inheritance and development of intangible cultural heritage, and establish effective communication. The concept of narrative can provide a broader space for thinking and new perspectives for the diversified presentation of intangible cultural heritage inheritance. The application of big data in communication strategies has been proven to be advantageous. The comparative analysis of various algorithms in feature detection, point cloud reconstruction, accuracy, and recall confirms the superiority of the proposed algorithm in ICH propagation. Big data technology has improved communication strategies' accuracy and efficiency, thereby expanding ICH's coverage and audience.

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