International Journal for Housing Science and Its Applications
Publish August 10, 2025. Volume 46, Issue 4 Pages 2263-2274

https://doi.org/10.70517/ijhsa464193

The Cultural Value Reinvention of Intangible Cultural Heritage Embroidery in Tourism Products Driven by the Integration of the Cultural and Tourism Industries

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Abstract Under the trend of deep integration of culture and tourism industry, tourism products have become a new type of carrier to reproduce the value of non-heritage culture. On the digitization of the inheritance and innovation of non-heritage Manchu embroidery, this paper proposes a total of two effective paths to collect and publish the digitized information of Manchu embroidery culture and establish a database. And the graph structure method is chosen as the mathematical modeling method for the information of Manchu embroidery culture. Unsupervised pre-training is carried out based on the topological features of the graph dataset to build a pre-training model that can capture the features of contextual information. On the basis of this model, fine-tuning based on the graph pre-training model is proposed to build a model framework for feature migration. At the same time, a platform framework containing the functions of the three modules of resource collection, resource retrieval, and user participation is designed, which is combined with a database to form a database platform for the non-heritage Manchu embroidery cultural heritage. The designed database platform method has an average performance of 0.904 in terms of accuracy rate in information extraction performance, which can provide powerful data and information support for the construction of non-heritage full-embroidery knowledge map as well as the design of tourism products.

Index Terms non-heritage manchu, cultural heritage database, graph pre-training, graph structure

I. Introduction

Manchu embroidery, commonly referred to as “Man embroidery,” is a type of embroidery practiced by China's ethnic minorities. It originated from “nail thread embroidery” and developed rapidly during the Qing Dynasty as Manchu culture assimilated embroidery techniques from other schools. However, with the decline of the Qing Dynasty and the rise of industrialization, Man embroidery gradually fell into decline [1], [2]. Man embroidery is an important component of China's traditional ethnic culture and is classified as a hand-embroidered craft product [3]. Manchu embroidery works combine the charm of Western oil paintings with the characteristics of the Chinese nation, enabling Manchu embroidery to continue to shine in modern society [4], [5]. However, in today's era of rapid development in internet information technology and the flourishing of mechanized industries, Manchu embroidery faces challenges such as insufficient innovative development capabilities and conservative industrial models, and its traditional inheritance methods have been strongly impacted by modernization [6]-[8]. To prevent this intangible cultural heritage from fading from public view and to enhance its economic value, thereby revitalizing it with new vitality, it is essential to continuously innovate its modern development pathways and establish new industrial models [9]-[11].

Under the backdrop of cultural and tourism integration, intangible cultural heritage is increasingly becoming an important driving force for the innovative development of the cultural creativity industry and tourism industry [12]. As people's living standards improve, consumers are increasingly valuing the cultural connotations and innovation of tourism products, which provides a broad space for the design and development of intangible cultural heritage creative products [13]-[15]. Manchu embroidery has been passed down to the present day with its long history and exquisite craftsmanship, forming a complete system. It features complex and diverse craftsmanship, rich and varied decorative techniques, and vibrant artistic expressions, developing its own unique style over the long course of its evolution [16]-[19]. However, with economic development, some shortcomings have gradually emerged, such as rigid artistic forms and severe formalization, making it increasingly difficult to meet the aesthetic demands of contemporary cultural and creative consumers [20], [21]. This necessitates that in the inheritance of intangible cultural heritage, Manchu embroidery cultural and creative products must not only emphasize traditional

craftsmanship but also actively combine with innovative artistic forms, researching and exploring the latest artistic expressions that reflect cultural value [22]-[24].

The cultural industry and tourism industry have a natural complementary relationship. Some scholars have conducted relatively comprehensive research on the design and market systems of intangible cultural heritage cultural and creative products in the dissemination of intangible cultural heritage. On one hand, incorporating modern design concepts and elements into the design of intangible cultural heritage cultural and creative products is a key pathway to enhancing product appeal and market competitiveness. Literature [25] explores design methods for tourism cultural and creative products based on regional historical and cultural elements, integrating regional tourism resources with cultural and creative design, which significantly promotes the development of the cultural and creative industry and the tourism industry. Literature [26] points out that the integration of the cultural and tourism industries provides rich resources and inspiration for cultural and creative product design. Under the influence of digitalization and globalization, the communication and emotions conveyed by cultural products are further expanded. Literature [27] indicates that product design based on digital technology is an important future method for transmitting culture. By utilizing digital technology to produce or design the cultural symbols contained in cultural and creative products, the cultural value of the cultural elements in the products can be further enhanced. Literature [28] established a multi-attribute DFuzzy decision-making model to evaluate the unique characteristics, cultural value, and sales value of cultural and creative products, providing objective and quantitative decision-making support for the design of cultural and creative products to meet market demands. Literature [29] explored the direction and strategies for cultural and creative tourism product design supported by artificial intelligence technology, significantly enhancing brand value by fully exploring the cultural connotations within product cultural elements and design elements.

On the other hand, some scholars emphasize that while maintaining the core values of intangible cultural heritage, one should dare to innovate the functions and usage scenarios of cultural products. Literature [30] introduces a new product exhibition format that integrates the cultural industry and tourism industry, which provides users with an immersive experience based on virtual reality technology, greatly expanding the intrinsic value of cultural products. Literature [31] proposes a cultural industry transformation strategy for tourism destinations that integrates technological innovation, using augmented reality and other technologies to build communication channels to better disseminate the cultural attributes of cultural products. Literature [32] studies design methods for tourism cultural products adapted to textiles in tourism destinations, leveraging the cultural background of tourism destinations to empower product manufacturing, thereby creatively enhancing the price and value of tourism activities. This not only increases users' awareness of cultural and creative products but also enhances their willingness to participate in tourism activities.

As the integration of the cultural and tourism sectors accelerates and market demands continue to evolve, further research is needed to develop cultural and creative product design strategies tailored to the dissemination of intangible cultural heritage embroidery culture, building on the aforementioned studies.

This paper first details the digitization collection and publication process of Manchu embroidery cultural content information as well as the idea of database establishment in the inheritance of non-heritage Manchu embroidery. Then, for the entity modeling in the digitization process, we explore the pre-training method based on the topological features of the graph dataset and propose the graph pre-training model. At the same time, we design a model framework for feature migration and construct a graph representation enhancement model based on topological structure information. Combined with the behavioral hierarchy of existing cultural heritage database platforms, the non-heritage Manchu embroidery cultural heritage database platform is constructed. Subsequently, four different database establishment methods are selected to compare the information extraction performance of this paper's method. Synthesize the non-heritage Manchu embroidery cultural heritage database platform, build the non-heritage Manchu embroidery cultural knowledge map, and output the non-heritage Manchu embroidery tourism products. Finally, a questionnaire is used to assess the effectiveness of the tourism products in cultural protection and inheritance by means of reliability and validity analysis and structural equation modeling analysis method.

II. Database Platform for Cultural Heritage of Non-Heritage Manchu Embroidery

II. A. Digitization of the inheritance and innovation of non-heritage Manchu embroidery

II. A. 1) Digital information capture and publishing

Through the use of a variety of methods, including text, images, sound, and electronic media, a large amount of history, heritage, technology, documentation, and a variety of primary sources have been collected. These were comprehensively analyzed, organized, and preserved so that these valuable historical heritages could be better managed in the future. These valuable Manchu embroidery materials were made vivid and visualized to the

general public, so that the essence of Manchu embroidery history and culture, science and technology, artistic achievements and other values were studied more systematically and presented more intuitively.

Digitized information spreads widely, rapidly, in various forms and without geographical and spatial limitations, which conforms to the learning rhythm and acceptance mode of modern people. With the prevalence of digital terminals and digital sharing programs, digital information on Manchu embroidery can be transmitted to the audience through these channels anytime and anywhere. As a key e-publication planning project, “Chinese Manchu Embroidery” is divided into four themes, namely, historical origin, excellent skills and artistic treasures, and covers the connotation and extension of Manchu embroidery in a more complete way through photographs and video materials, so that more people can understand and love this art form with a long history of inheritance.

II. A. 2) Establishment of the database

Database system information technology is the fastest growing and widest application field of electronic computer science and technology, which can not only store and manage a large number of information resources, but also effectively preserve and disseminate the intangible cultural heritage, therefore, to realize the effective preservation and dissemination of the intangible cultural heritage, database system information technology should be utilized. The establishment of database will become the core content of developing and utilizing the data and information resources of Manchu embroidery, and it is one of the bases to make the original information resources of Manchu embroidery effectively preserved, helping to better inherit and carry forward Manchu embroidery. The establishment of Manchu embroidery information database refers to the management and classification of video, audio, electronic files, images and other fragmented information collected in the early stage, which comprehensively covers the history, culture, art, craftsmanship, documentary records and other information contents of Manchu embroidery. Under the database framework of Manchu embroidery, the functions of information collection, storage, management, distribution, modification and retrieval are necessary to provide data support for the application of the digitization platform of Manchu embroidery through the output and other basic function boards. Through this scientific and standardized data-oriented platform, which is used in conjunction with the digitizing terminal, it is easy for the public to access, check and study. In order to help the development of full-embroidery weaving and full-embroidery cultural and creative products, it is especially important to establish a perfect database. Through systematic analysis of the data, the basic concepts of Manchu embroidery can be quickly grasped, especially for a clearer and more accurate understanding of the artistic achievements, providing a rich source of inspiration and solid theoretical support for design creation.

II. B.Enhanced model for graph representation based on topological information

II. B. 1) Pre-training on graph topology information

Graph datasets are all composed of nodes and edges, but the meanings represented by the nodes and edges of graph datasets in different domains are also different, and the connection between graph networks in different domains is often weak. There is a need to explore the common features in different citation networks and set the objective of optimization by the common features. Degree features describe the number of connections between neighboring nodes and the central node, and Graphlets subgraph features describe the local substructure of the central node by counting non-isomorphic subgraphs. Degree and Graphlets subgraph statistics are pre-computed for all nodes in the graph network before sampling out paths as sample data for training using a randomized wandering algorithm. The unsupervised pre-training process for cross-graph topology information is shown in Fig. 1.

II. B. 2) Fine-tuning of graph-based pre-training models

The framework of the fine-tuned model based on the graph pre-trained model is shown in Fig. 2. After obtaining the pre-trained model with generalized features through unsupervised pre-training, the model framework shown in Fig. 2 is used for fine-tuning. On the graph datasets Citeseer, Cora, and Pubmed, the degree and Graphlets subgraph counts of all nodes are computed. Then fully connected layers are added to utilize their labeling information. Supervised fine-tuning is performed by mapping the features that have been computed and extracted by the pre-trained model to the node labels. For a node sequence $S=(v_1,v_2,\ldots,v_n)$ of fixed length n, the generic feature information of subsequence $(v_{i-K_w},\ldots,v_{i-1})$ is used to predict the label of node v_i as in equation (1):

$$P\left(v_i \left| v_{i-K_w},\ldots,v_{i-1}\right.\right)=P\left(y_i \left| F_{i-K_w},\ldots,F_{i-1}\right.\right)=soft\max\left(F_nW\right) \tag{1}$$

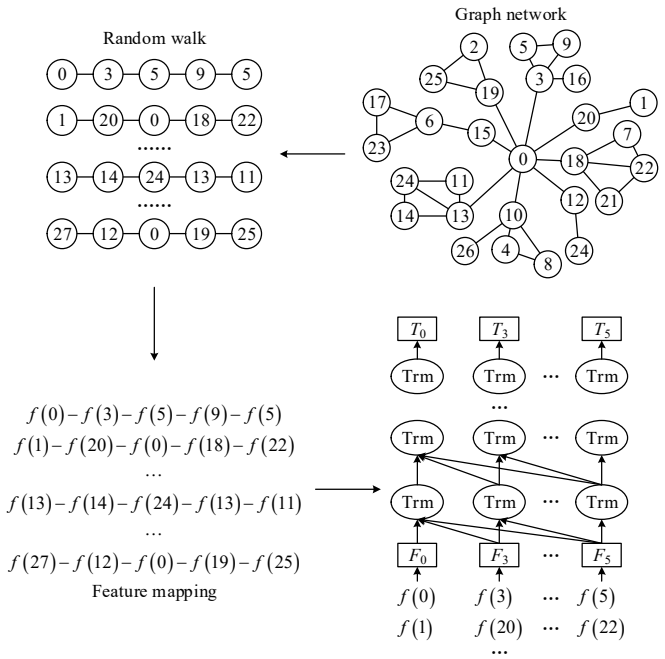

Figure 1: Unsupervised pre-training process of cross-graph topological information

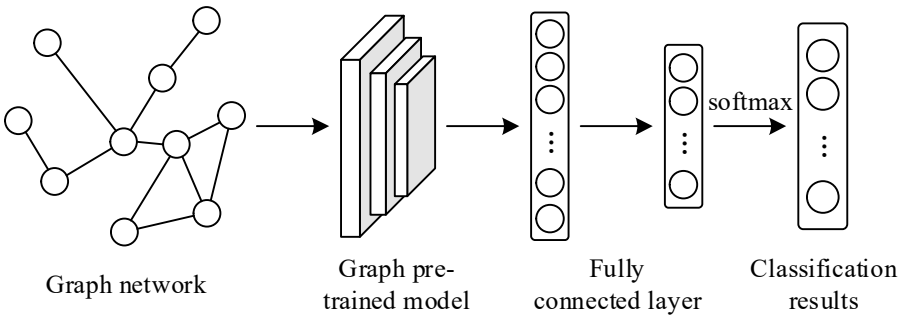

Figure 2: Fine-tuning model framework based on graph pre-trained models

Suppose the output of the pre-trained deep teacher model is q, which is used as a target to train the shallow student model so that the output p of the student model is close to q as in equation (2):

$$L_{KD} = (1-\alpha) H(y, p) + \alpha T^2 H(q, p) \tag{2}$$

Where: H is the cross-entropy loss function. α is the set distillation ratio.

If the temperature parameter is set to 1, Eq. (2) can be simplified to the objective function as Eq. (3):

$$L_{KD} = H\left((1-\alpha) y + \alpha q, p\right) \tag{3}$$

The knowledge in the teacher model is distilled into the student model by linearly combining the feature label information in the shallow student model with the output of the deep teacher model.

II. C.Framework of the Cultural Heritage Database Platform

This chapter thoroughly researches and analyzes the cultural heritage database platforms at home and abroad, and discusses in detail the specific functions of the intangible culture database platform and its design process based on the target users and the purpose of use. Combining the results of the above comparative study, the behavioral hierarchy of existing cultural heritage database platforms is obtained as shown in Figure 3.

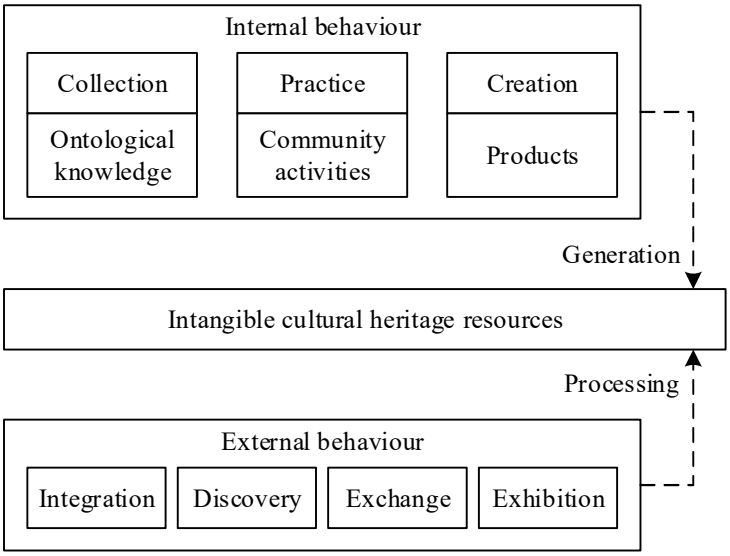

Figure 3: The behavioral hierarchy of the cultural heritage database platform

(1) Internal actions refer to actions involving the revitalization of the intangible cultural heritage's own knowledge and practice of conservation, which can generate intangible cultural heritage resources, and external actions refer to actions implemented after the formation of intangible cultural heritage resources.

(2) According to the enumerated resource contents of each database platform, a categorized collection can be obtained based on three criteria: form, source, and elements of intangible heritage, and there are five collection methods from cultural heritage digital resources to database platforms.

(3) The commonly used search function of cultural heritage database platform and its advantages and disadvantages are fully explored, and the ways, presentations and optimization of database platform resource search can be considered from the aspects of database volume, content complexity, usage, etc., and the appropriate way of resource acquisition can be selected, and the forms of digital humanities value-added applications, dynamic interactions, visualization and thematic sets provide more possibilities for the organization and presentation of resources in the database platform.

(4) In view of the dynamic nature of intangible cultural heritage, the interaction between objects and the environment, and emotional factors and other qualities, it is necessary to design user participation functions and judge whether to open APIs and applications.

(5) In general, the basic, core and innovative services provided by the cultural heritage database platform connect the whole process of cultural heritage digital information life cycle, and their service frameworks are divided as follows:

(A) Resource collection objects: (A1) digital culture, (A2) heritage metadata.

(B) Resource collection methods: (B1) physical digital resource upload, (B2) collection of metadata, (B3) submission of metadata, (B4) harvesting of metadata, (B5) harvesting of integrated metadata.

(C)Search paths: (C1)One-stop search, (C2)Categorized search, (C3)Advanced search, (C4)Restricted search, (C5)Phrase search, (C6)Federated search, (C7)Full-text search, (C8)Correlation search, (C9)Tagged search, (C10)Hot-word search, and (C11)Correlation search.

(D)Retrieval Result Presentation: ((D1) List, (D2) List, (D3) Statistical Data, (D4) Visual Chart, (D5) Gallery/Grid, (D6) Slideshow, (D7) Map.

(E) Retrieval result optimization forms: (E1) Filter, (E2) Filter catalog, (E3) Secondary search, (E4) Categorized list, (E5) Word cloud, (E6) Related search.

(F)Forms of retrieval results access: (F1) online reading, (F2) multimedia online browsing, (F3) links to external resources, (F4) file downloads, (F5) document delivery services, (F6) offline locations, (F7) purchases, (F8) citations.

(G)Resource organization: (G1) Resource organization visual presentation, (G2) Knowledge set, (G3) Topic set.

(H)User Participation Functions: (H1) Basic Form, (H2) Forum, (H3) Add to List, (H4) Add Tags, (H5) Add Comments, (H6) Add Images, (H7) Correct Digital Text, (H8) Add Legacy, (H9) Add Actions, (H10) Upload csv File.

Based on the main behavioral bias of the platform, these functional services of the 16 database platform cases in this paper are distributed to seven cultural heritage database platform behaviors: (I1) ontological knowledge acquisition, (I2) conservation practice, (I3) creation, (I4) integration, (I5) discovery, (I6) communication, and (I7) exhibition, and the behaviorally-guided functional service hierarchy of cultural heritage database platforms is obtained as shown in Table 1. It serves as a reference for choosing the construction path of similar cultural heritage database platforms in the future.

Table 1: The functional service level of behavior guidance for the database platform

		I1	I2	I3	I4	I5	I6	I7
A	A1	4	2	4	2	1	3	2
	A2	2	1	3	9	7	2	2
B	B1	4	2	4	2	1	2	1
	B2	1	1	1	1	1	1	
	B3				1	1		
	B4	1		2	6	4	1	2
	B5				1	1		
C	C1	3	2	3	9	7	3	3
	C2	1		1	6	4		1
	C3	1		2	4	2		1
	C4			1	3	2	1	1
	C5				3	3		
	C6				1	1		
	C7				1	1		
	C8				1	1		
	C9				1	1		
	C10				1	1		
D	D1	4	2	4	7	5	3	3
	D2				2	1		1
	D3			1	2			1
	D4				1			1
	D5				3	3		
	D6				1	1		
	D7				1	1		
E	E1			1	2	2		
	E2	1			6	5	1	2
	E3				1	1		
	E4				2	2		
	E5	1		1				
	E6	1			2	2		1
F	F1	4	2	4	6	4	3	3
	F2	3		2	2	2		
	F3				3	3		
	F4	2		2	4	3		1
	F5				2	2		
	F6				1	1		
	F7				2	2		
	F8				2	2		
G	G1				1			1
	G2			1	1			
	G3				3	3	1	1
H	H1	3		3	3	3		
	H2				1	1		
	H3				1	1		
	H4				1	1		

	H5				1	1		
	H6				1	1		
	H7				1	1		
	H8		1				1	
	H9		1					
	H10			1	1			

III. Application and evaluation of the database platform

This chapter confirms the validity of the constructed database by examining the information extraction performance of the database building method mentioned above. Subsequently, with the data support of the non-heritage Manchu embroidery cultural heritage database, a part of the non-heritage Manchu embroidery knowledge map is constructed and displayed. Using the information of Manchu embroidery patterns provided by the database platform and the knowledge map as a reference, the tourism products of Manchu embroidery refrigerator stickers are designed. And through a questionnaire survey, we evaluate the promotion effect of this tourism product on the protection and inheritance of non-heritage Manchu embroidery culture.

III. A. Assessment of database creation methods

This section evaluates the database construction method designed in this paper for extracting information from intangible cultural heritage embroidery patterns. The following methods are selected for comparison: (M1) BERT-CNN-BiLSTM-CRF, (M2) RNN-CRF, (M3) BERT-RNN-CRF, and (M4) BERT-LSTM-CRF. The performance of these methods in extracting information from classic intangible cultural heritage embroidery patterns is compared. The experiments were implemented using the PyTorch framework, with a Tesla T4 GPU used for model training. The number of data labels used for training and testing is shown in Table 2, with the following types: (T1) intangible cultural heritage project name, (T2) intangible cultural heritage type, (T3) provincial-level administrative region, (T4) prefectural-level administrative region, (T5) inclusion time, (T6) inclusion batch, (T7) inclusion level, and (T8) useless information.

Table 2: Amount of data labels for training and testing

Tags	Type	Train	Test	Total
NAME	T1	15815	5675	21490
TYPE	T2	9264	3360	12624
POV	T3	10005	4090	14095
LOC	T4	8938	3103	12041
TIME	T5	11864	4066	15930
BATCH	T6	7212	2866	10078
LEVEL	T7	12587	4565	17152
0	T8	52798	8642	61440

A comparison of the performance of different methods in extracting information from classic intangible cultural heritage embroidery patterns is shown in Table 3, where AME represents the name of the intangible cultural heritage project, TYPE denotes the pattern type, POV denotes the provincial-level administrative region where the pattern is commonly used, LOC denotes the prefectural-level city administrative region where the pattern is commonly used, TIME denotes the year the intangible cultural heritage project was included, BATCH denotes the batch number of the intangible cultural heritage project's inclusion, LEVEL denotes the inclusion level of the intangible cultural heritage project, and Avg denotes the average value of the extraction performance for the aforementioned types of information.

Table 3: The performance of pattern information extraction by different methods

Model	Index	TYPE	POV	LOC	TIME	BATCH	LEVEL	Avg
M1	Precision	0.556	0.609	0.496	0.898	0.404	0.769	0.622
	Recall	0.512	0.796	0.765	0.904	0.455	0.732	0.694
	F1	0.533	0.690	0.601	0.901	0.427	0.750	0.650
M2	Precision	0.783	0.891	0.592	0.898	0.564	0.906	0.772
	Recall	0.892	0.824	0.733	0.904	0.874	0.911	0.856

	F1	0.834	0.856	0.655	0.901	0.685	0.909	0.807
M3	Precision	0.867	0.916	0.743	0.925	0.840	0.908	0.867
	Recall	0.858	0.880	0.959	0.878	0.785	0.909	0.878
	F1	0.863	0.898	0.837	0.901	0.812	0.909	0.870
M4	Precision	0.853	0.910	0.789	0.916	0.748	0.998	0.869
	Recall	0.894	0.885	0.875	0.888	0.888	0.970	0.900
	F1	0.873	0.898	0.830	0.902	0.812	0.984	0.883
Textual	Precision	0.901	0.896	0.950	0.913	0.852	0.911	0.904
	Recall	0.941	0.896	0.942	0.964	0.925	0.917	0.931
	F1	0.921	0.896	0.946	0.942	0.887	0.914	0.918

Observe Table 3. (M1) The BERT-CNN-BiLSTM-CRF method performs less than ideal in information extraction, and the overall performance is mostly concentrated between 0.400 and 0.800. The information extraction performances of the three methods, (M2)RNN-CRF, (M3)BERT-RNN-CRF, and (M4)BERT-LSTM-CRF, are also relatively average, with the highest average recall rate being only 0.900. The database establishment method designed in this paper shows an average accuracy rate of 0.904, an average recall rate of 0.931, an average F1 value of 0.918 in the information extraction of intangible cultural heritage Manchu embroidery patterns, and all the indicators of each information reach 0.850 or above.

III. B. Construction of Knowledge Graph

Taking traditional Manchu embroidery as the research object, based on the database establishment method designed in this paper to mine its related information (including origin, history and culture, theme, pattern, needlework, art form, weaving method, etc.), the knowledge map is drawn in Figure 4.

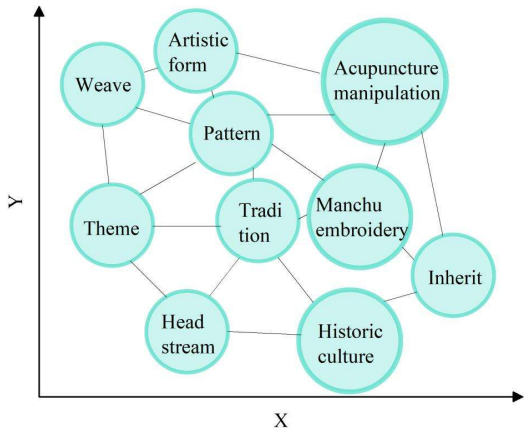

Figure 4: The knowledge graph of traditional Manchu embroidery

III. C. Effectiveness of tourism products in terms of conservation and inheritance

Based on the designed cultural heritage database and knowledge map of non-heritage Manchu embroidery, design a refrigerator sticker tourism product with Manchu embroidery as the reference image. At the same time, a questionnaire on tourists' intention to protect and inheritance behavior is designed around the product, which contains five dimensions: functional value, educational value, contextual value, perceived value, and protection and inheritance behavior, with three questions under each dimension. In the museum of non-heritage Manchu embroidery, Manchu embroidery refrigerator stickers as a souvenir with the questionnaire sent to tourists, a total of 200 questionnaires issued, 187 valid questionnaires were returned, the questionnaire validity rate of 93.50%.

III. C. 1) Reliability and validity analysis

The reliability, that is, the degree to which this questionnaire is reliable, is intended to test the consistency of the results under the same method. At the same time, this final result is used as a criterion for judging the feasibility of this method of testing, and in order to assess the reliability of internal consistency, it is necessary to assess it with the help of Cronbach's Alpha coefficient. The reliability results show whether the respondents are answering the same questions in the same scale. The reliability analysis was carried out from six perspectives, namely, overall

reliability, (FV) functional value, (EV) educational value, (SV) situational value, (PV) perceptual value, and (AV) preservation and inheritance behavior, as shown in Table 4.

Table 4: Reliability analysis

Dimensionality	Cronbach's Alpha	Number of item
Overall reliability	0.951	15
Functional value	0.881	3
Educational value	0.909	3
Situational value	0.923	3
Perceived value	0.936	3
Acts of protection and inheritance	0.927	3

As can be seen, the reliability coefficient Cronbach's alpha, that is, the consistency of the questionnaire results, the results of this questionnaire show that the overall coefficient value is 0.951, the coefficients of the functional value, the educational value, the situational value, the perceptual value, the protection and inheritance behaviors are 0.881, 0.909, 0.923, 0.936, 0.927 respectively, which are all greater than 0.8, and the statistics are that A reliability of 0.7 or more shows good credibility, so the internal consistency of this questionnaire is high and credibility is high.

Pooled validity, also referred to as convergent validity, means that the test indicators measuring the same potential traits (constructs) will fall on the same common factors, this study mainly used factor loading coefficients, combined reliability, and the average amount of variance extracted (AVE) of the three indicators to test the convergent validity of the variables, and the results of the analysis of the pooled validity using the AMOS software to calculate the pooled validity are shown in Table 5. Setting the evaluation dimensions as latent variables, and the topics contained in them are The evaluation dimensions are set as potential variables, and the topics they contain correspond to the observed variables, which are numbered: functional value (FV1-FV3), educational value (EV1-EV3), contextual value (SV1-SV3), perceived value (PV1-PV3), and preservation and inheritance behaviors (AV1-AV3).

Table 5: Set validity analysis

Latent variable	Observational variable	Loading coefficient	Composite reliability	Average
Functional value	FV1	0.785	0.897	0.834
	FV2	0.849		
	FV3	0.867		
Educational value	EV1	0.795	0.911	0.823
	EV2	0.81		
	EV3	0.864		
Situational value	SV1	0.852	0.924	0.834
	SV2	0.826		
	SV3	0.823		
Perceived value	PV1	0.839	0.936	0.841
	PV2	0.837		
	PV3	0.848		
Acts of protection and inheritance	AV1	0.895	0.934	0.903
	AV2	0.926		
	AV3	0.889		

It is generally believed that when the factor loadings are greater than 0.50, the average extracted variance (AVE) is greater than 0.50, and the combined reliability is greater than 0.7, it means that the aggregation validity of the variables is better, and it can be found from the above table that the loading coefficients of the variables, the AVE, and the combined reliability are all in the critical range, and by synthesizing the results of the above indexes, it can be concluded that the data from the various constructs of the questionnaire of the current research have a very good aggregation validity.

III. C. 2) Structural equation modeling analysis

Structural equation modeling was used to analyze the correlation between Manchu embroidery tourism products and the willingness to protect and pass on behaviors, and the AMOS fitting results obtained are shown in Table 6.

Table 6: The AMOS model after fitting the results

	Estimate	S.E.	C.R.	P
$AV \leftarrow FV$	0.219	0.08	16.684	***
$AV \leftarrow EV$	0.587	0.077	22.8	***
$AV \leftarrow SV$	0.326	0.035	21.119	***
$AV \leftarrow PV$	0.959	0.076	20.763	***
$FV1 \leftarrow FV$	0.862	0.052	19.913	***
$FV2 \leftarrow FV$	0.927	0.019	16.667	***
$FV3 \leftarrow FV$	0.897	0.017	20.084	***
$EV1 \leftarrow EV$	0.853	0.042	15.2	***
$EV2 \leftarrow EV$	0.792	0.084	18.266	***
$EV3 \leftarrow EV$	0.863	0.062	20.773	***
$SV1 \leftarrow SV$	0.808	0.014	19.332	***
$SV2 \leftarrow SV$	0.791	0.025	15.362	***
$SV3 \leftarrow SV$	0.85	0.084	20.346	***
$PV1 \leftarrow PV$	0.832	0.07	19.524	***
$PV2 \leftarrow PV$	0.852	0.089	16.064	***
$PV3 \leftarrow PV$	0.822	0.046	15.562	***

(FV) Functional value, (EV) Educational value, (SV) Situational value, (PV) Perceived value all have a significant and positive impact on (AV) protection and inheritance behaviors, with coefficients of 0.219, 0.587, 0.326, and 0.959, respectively, with the greatest degree of influence of perceived educational value on NGT inheritance and protection behaviors being 0.959.

The results of the fit between the dimensions are shown in Table 7, which shows that (FV) Functional Value has an effect on (EV) Educational Value, (SV) Contextual Value, and (PV) Perceived Value, and their fit values are 0.31, 0.291, and 0.288, respectively, and all are significant at 99%. (EV) Educational value has an effect on (SV) Contextual value, (PV) Perceived value and its fitted values are 0.291, 0.294 and significant at 99%. (SV) Contextual Value has an effect on (PV) Perceived Value with a fit value of 0.287 and significant at 99%.

Table 7: The fitting results between dimensions

	Estimate	S.E.	C.R.	P
$FV \leftarrow EV$	0.31	0.037	9.685	***
$FV \leftarrow SV$	0.291	0.035	9.733	***
$FV \leftarrow PV$	0.288	0.036	9.33	***
$EV \leftarrow SV$	0.291	0.034	9.875	***
$EV \leftarrow PV$	0.294	0.035	9.615	***
$SV \leftarrow PV$	0.287	0.034	9.832	***

IV. Conclusion

In the collection and datatization of non-heritage Manchu embroidery cultural information, this paper proposes a more comprehensive database establishment method. A graph representation enhancement model based on topological structure information is also established to portray the connection between the collection of non-heritage Manchu embroidery entities and the entities. With the technical support of the graph representation enhancement model, the proposed database establishment method shows an average precision rate of 0.904, an average recall rate of 0.931, and an average F1 value of 0.918 for each information extraction of Manchu embroidery, and constructs the cultural heritage data platform of non-heritage Manchu embroidery with the main functional modules of resource collection, resource retrieval, and user participation. The platform is not only an important source of data and information for the knowledge map of Manchu embroidery, but also the tourism products designed with support have significant positive impacts on tourists' conservation and inheritance

behaviors in four dimensions: functional value, educational value, situational value, and perceived value (0.219, 0.587, 0.326, and 0.959).

Funding

The title of the Scientific Research Project of the Education Department of Jilin Province: Research on the Development Strategies of Manchu Embroidery, an Intangible Cultural Heritage, under the Background of the Integration of Culture and Tourism Industries (Project approval Number: JJKH20251681SK).

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