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AIGC Empowered Metaverse: A Design Study on the Dissemination Pathways of Intangible Cultural Heritage in Jiarong Tibetan Embroidery

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Abstract:
Objective: the intangible cultural heritage of weaving and embroidery is facing the dilemma of single communication form and low audience coverage. In today's digital age, the rise of metaverse and AIGC technology provides the possibility of transformation. Methods: using AIGC technology to design a feasible communication path for the intangible cultural heritage of weaving and embroidery. Firstly, it analyzes the core pain points and user needs of the dissemination of Jiarong Tibetan weaving and embroidery intangible cultural heritage. Secondly, build a three-tier communication model of "data layer - service layer - application layer", and clarify the functional positioning with AIGC technology as the core. On this basis, the whole process of effect generation and user collaborative design based on AIGC technology is designed and elaborated. Finally, the logic of mapping meta universe to wearable devices and virtual space is proposed, and the complete technical path is given in the form of flow chart. Results: this path mode makes the audience group of Jiarong Tibetan weaving and embroidery intangible cultural heritage change from passive "audience" to active "creator". It innovates a whole set of process system from user demand input to AIGC intelligent generation, to virtual display of meta universe scene, and finally to social communication. At the same time, the research shows that AIGC technology can effectively solve the problems of high cost and low efficiency in the production of meta universe scenes, making it possible for the personalized communication mode of intangible cultural heritage. Conclusion: the communication process system constructed in this paper provides practical path support for the digital inheritance of Jiarong Tibetan weaving and embroidery intangible cultural heritage. Its core value is to significantly enhance users' sense of participation and immersion in the dissemination of intangible cultural heritage by giving advanced science and technology to intangible cultural heritage traditional culture without weakening its cultural heritage and cultural connotation.

Keywords:
metaverse; artificial intelligence generated content (AIGC); Jiarong Tibetan embroidery; dissemination pathway; human-machine collaboration

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Jiarong Tibetan embroidery is a traditional craft of the Tibetan people in the Jiarong region of the Aba Tibetan and Qiang Autonomous Prefecture, Sichuan Province, and is also a national-level intangible cultural heritage with distinctive Tibetan characteristics[1]. It embodies the traditional culture and aesthetic consciousness formed by the Tibetan people over a long historical development process. Its patterns, colours, materials, and other aspects are highly distinctive in terms of ethnic regionality, earning it the reputation of being a "distinctive gem" among Tibetan costumes[2].

Meanwhile, generative artificial intelligence (AIGC) technology is developing rapidly. Tools such as the diffusion model, like Stable Diffusion, which can automatically generate high-quality images based on textual descriptions or simple sketches, have now been widely applied in fields such as design, art, and advertising. This technology also provides new possibilities for expanding the ways of preserving intangible cultural heritage. After the emergence of AIGC technology, ordinary users do not need to possess professional painting or embroidery skills. They can use its functions to generate distinctive textile patterns and a series of renderings of surrounding product effects.

1.Analysis of Cultural Elements of Jiarong Tibetan Embroidery

1.1 Analysis of Regional Characteristics of Jiarong Tibetan Embroidery

Jiarong Tibetan originated from the ancient Diqiang ethnic group, and then gradually merged with other ethnic groups to form a unique culture[3]. Jiarong area has been a corridor for cultural migration and exchange between North and South since ancient times. Its unique geographical location and historical factors form the inclusiveness of the local culture, which makes Jiarong Tibetan embroidery also show the characteristics of multiple integration and keeping pace with the times. In particular, the immigration of Han and Qiang people in the Qing Dynasty objectively promoted the maturity of Jiarong Tibetan embroidery technology. Both its patterns and stitches showed the characteristics of multi-ethnic integration of Tibet, Qiang and Han [4].

Later, it incorporated the techniques of Qiang embroidery, forming a comprehensive needlework system. The most distinctive techniques include seven types: weaving and embroidery with picks, cluster embroidery, rolling needle embroidery, connecting needle embroidery, sewing and overlapping stitches, edge-locking embroidery, and adding lines for flowers (also known as cross-stitch, which is to embroider a "×" shape on the fabric and arrange and combine it in vertical, horizontal or diagonal directions to form a pattern) [5].

There are certain differences in the embroidery patterns of the clothing. The patterns are full of natural beauty and have strong decorative properties [6]. Their embroidery pattern designs are simple and plain, mostly taking common elements from daily life as their sources. The local people pay more attention to the decorative and artistic nature of the clothing, so the design of the patterns tends to be complex and exquisite. Geometric shapes such as squares and triangles are often used to enrich the visual effect. As for Jinchuan County, its embroidery patterns clearly incorporate elements from Danba County. This is mainly due to the proximity of the two places, and cultural exchanges naturally bring about the borrowing and integration of patterns [7].

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The embroidery and weaving of the Tibetan people in the Jiarong region are also influenced by local economic development, lifestyle, geographical environment, and natural climate, resulting in certain variations in their costume patterns. Jiarong Tibetan embroidery patterns mostly depict natural scenery, including mountains, rivers, flowers, and birds. These patterns are full of natural beauty and possess strong decorative qualities[6]. In the Qiaoqi Tibetan Township of Yaan, local residents make their living primarily from agriculture, so they prefer durable and stain-resistant clothing. Their pattern designs are simple and plain, often drawing from common elements in everyday life. In Maerkang City of Aba Prefecture, where residents' income levels are generally higher than in other Jiarong Tibetan areas, people place greater emphasis on the decorative and artistic aspects of clothing. Consequently, the patterns tend to be more intricate and delicate, often using geometric shapes such as squares and triangles to enrich visual effects. Residents of Jiaju Tibetan Village in Danba County, on the other hand, favor colourful floral and scroll-grass patterns, which are closely tied to the profusion of flowers and greenery that covers the surrounding mountains and fields. As for Jinchuan County, its costume patterns clearly incorporate elements from Danba County, largely due to their geographical proximity, which has naturally facilitated cultural exchanges and the mutual borrowing and integration of motifs [7].

1.2 Analysis of the Cultural Value of Jiarong Tibetan Embroidery

The weaving and embroidery patterns of the Jiarong Tibetan people are an artistic expression form that integrates folk customs, life concepts and religious worship. Due to the restriction of natural conditions and the choice of life style, Jiarong area kept a certain distance from the mainstream culture of Tibet and Han, and therefore its embroidery art showed a distinct national character. Jiarong people prefer to draw inspiration from the animals and plants familiar in daily life, and turn them into decorative patterns of embroidery, and vividly outline the dynamics and charm of the depicted things in a delicate and vivid way [8].

In the long-term development of Jiarong Tibetan embroidery pattern, it has gradually formed the artistic characteristics of paying attention to stylization, rhythm regularity, symmetry and balance. These features are mainly reflected in the composition form, subject selection, and inheritance methods, demonstrating the harmonious integration of various elements. Jiarong Tibetan embroidery patterns are usually composed of multiple or groups of elements. When organizing these patterns, the author will comprehensively consider the position, size, area, color and other elements between the patterns, so as to form a scattered and rhythmic contrast relationship between the patterns, so as to highlight the theme to be expressed. In Jiarong Tibetan weaving and embroidery patterns, rhythm and rhyme are reflected in the regular and rhythmic repeated arrangement of patterns according to a certain proportion, position and moving distance, so as to sort out and summarize the complex objects and form a neat, unified and harmonious aesthetic feeling. Symmetry and balance are reflected in adjusting the relationship between the local and the overall, allowing each element to coexist harmoniously, presenting a stable visual effect, which meets people's yearning for a stable and peaceful psychological need, and also brings a solemn artistic beauty to the viewers. In the weaving and embroidery of the Jiarong Tibetan people, absolute symmetry is often achieved by adjusting independent patterns through fixed axes or center points in ways such as left and right, up and down, and rotation, thereby generating new patterns that are either absolutely symmetrical or nearly symmetrical.

The cultural value of Jiarong Tibetan weaving and embroidery is not only reflected in its unique form, but

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also in its emotional resonance. Jiarong Tibetan weaving and embroidery, with its delicate lines, rich colors and unique composition, shows the unique aesthetic pursuit and local customs of local residents, conveys their deep understanding and perception of nature, society and life, and also embodies the values and spiritual pursuit of Jiarong Tibetan culture.

1.3 The Value and Significance of AIGC Empowered Dissemination of Jiarong Tibetan Embroidery

In the digital and intelligent era, using AIGC tools for design work can not only further expand the creative thinking and innovative vision of designers, but also provide a more convenient and efficient way for the development and innovation of subsequent design workflows.

One of the advantages is that it can effectively lower the design threshold. The design of traditional weaving and embroidery patterns requires daily training and learning, making it difficult for the general public to participate. However, AIGC tools allow users to input their requirements in brief language or sketches, and the system will automatically convert and generate patterns and related products in accordance with the style of the Jiarong Tibetan nationality, enabling non-professionals to deeply participate in the design process. Another advantage is that it can enhance the interactivity of dissemination. In the past, traditional weaving and embroidery were usually displayed through static exhibitions and other means, which were difficult to arouse the interest of the younger generation. The interactive system empowered by AIGC tools can transform the traditional pattern design into the process of "input-generation-modification-sharing". Users can naturally contact and understand the Jiarong Tibetan embroidery culture in the operation process, and enhance the user's sense of participation. Thirdly, it can promote the inheritance and continuation of intangible cultural heritage. The digital products generated using AIGC tools can be conveniently applied to modern life scenarios and appear on the phone wallpapers, social media avatars, T-shirt prints, and cultural and creative products of the majority of users. In this way, Jiarong Tibetan embroidery is transformed from a collection in the museum to an element in People's Daily life, and the living inheritance of intangible cultural heritage is realized.

2. Feasibility Analysis of AIGC Empowered Jiarong Tibetan Embroidery

2.1 AI Drives Technological Change

AIGC (Artificial intelligence generated content) technology, also known as generative artificial intelligence, is an important branch of “artificial intelligence” and a significant application of AI in creative fields. It is an AI technology based on generative adversarial networks (GANs) and large pre-trained models. The development of AIGC dates back to the 1950s. In 1957, the first computer-generated musical piece, composed by Lejaren Hiller and Leonard Isaacson, marked the embryonic stage of AIGC [9]. After more than half a century of evolution, thanks to data accumulation, enhanced computing power, and the widespread adoption of deep learning algorithms, AIGC has penetrated numerous industries and plays an indispensable role in various scenarios [10].

In recent years, in the field of design, more and more scholars have been using AIGC tools to carry out design creation and transformation. Among them, it is not only confined to the traditional field of product

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design, but also increasingly moving towards exploring the path of innovative development and creative transformation of China's traditional intangible cultural heritage. Li Jianliang et al. [11] established a design framework for generating patterns with colored patterns from the Song Dynasty through Stable Diffusion, from the calculation and processing of the original patterns to the generation of the final product. They used AIGC technology to achieve the modernized and digitalized re-creation of the traditional patterned colored flowers of the Song Dynasty. Li Jia et al. [12] used AIGC technology to achieve innovation in the pattern form and connotation of Shu embroidery, further combining AIGC technology with traditional intangible cultural heritage of China, strongly promoting the inheritance and progress of ethnic culture, and also opening up a new direction for the combination of modern design and traditional culture. Based on AIGC technology, Liang Xueying et al. [13] proposed a new whole-process design system with digital intelligence technology as the core, aiming at the pain points such as rigid cultural translation, serious homogenization, low design efficiency and disconnection of sustainable practice in the intangible cultural heritage of overseas Chinese Hometown in the Lingsouth, which effectively opened up the creative transformation channel of the intangible cultural heritage of Overseas Chinese hometown. Yu Peng et al. [14] established an AIGC workflow for the development of Miao ethnic clothing, through deep learning of traditional Miao ethnic clothing by artificial intelligence technology, injecting fresh blood into the modernization development and innovation of intangible cultural heritage. Although AIGC technology has produced in-depth research on Chinese traditional intangible cultural heritage culture, it also has some limitations, such as too little content involved in the transmission of Jiarong Tibetan embroidery. This paper aims to use AIGC technology to empower the metaverse, realize the vision of inheriting and innovating Jiarong Tibetan culture, and also provide new ideas and methods for the protection and dissemination of other minority cultural resources.

2.2 The Need for Regional Cultural Development and Revitalization of Intangible Cultural Heritage

The advantage of AIGC technology in empowering the development of intangible cultural heritage lies in the fact that artificial intelligence technology has the ability to understand and innovate culture. Compared to traditional design which relies on the personal experience of designers, AIGC technology can present various design solutions for different needs through massive data training. As long as the prompt is precise, it can break through conventional thinking and achieve creative integration of different cultural elements [15]. This approach enables designers to select and explore design solutions more efficiently. Wei Xiaoguang et al. [16] studied the intrinsic connection between AIGC technology and the inheritance of Chinese culture and found that AIGC can effectively enhance the productivity, dissemination power, and appeal of traditional Chinese culture.Jiarong Tibetan embroidery, as an important carrier of Jiarong Tibetan culture, integrates AIGC technology, which represents new quality productivity, into the design and transformation process of Jiarong Tibetan embroidery, which can effectively provide an implementable specific path for the living inheritance of Jiarong Tibetan intangible cultural heritage culture.

Jiarong Tibetan inhabited area is geographically remote, and the external public has limited access to its culture. AIGC technology can break through the limitations of geographical factors, so that users in various places can participate in the recreation and sharing of weaving and embroidery patterns through the Internet, so as to expand the scope of the dissemination of Jiarong Tibetan culture. Secondly, in order to inherit and

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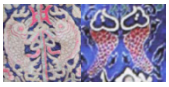
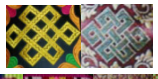
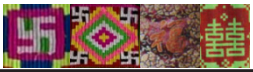
develop intangible cultural heritage culture represented by Jiarong Tibetan weaving and embroidery in the era of digital intelligence, it is necessary to rely on emerging technologies represented by AIGC tools. Most traditional intangible cultural heritage communication projects are still based on the mode of teaching and learning, requiring users to invest more time and energy. However, using AIGC technology can simplify the creation process into two steps: user requirements description and design scheme generation, which greatly reduces the threshold of public participation. At the same time, the visual elements of Jiarong Tibetan weaving and embroidery have the characteristics of uniqueness and scarcity. Based on the regional culture, the integration of emerging scientific and technological tools can meet the contemporary youth's pursuit of personalization and emotion, make the products more attractive to consumers and enhance competitiveness.

3. Innovative Dissemination Pathways of AIGC Driven Jiarong Tibetan Embroidery in the Metaverse

3.1 Construction of an AIGC Based Digital Sample Library for Embroidery

The quality of the AIGC technology generation scheme depends on the quality of its training data and labels. Therefore, a necessary step is to build a representative and highly complete digital sample database of Jiarong Tibetan embroidery patterns. After collecting and sorting the papers related to Jiarong Tibetan weaving and embroidery patterns and culture on CNKI, this study can roughly divide Jiarong Tibetan weaving and embroidery patterns into animal patterns, plant patterns, figure and animal patterns, and auspicious symbol patterns. See Table 1 for details:

Table.1 Classification table of Jiarong Tibetan embroidery patterns

Pattern themes	Name of the pattern	Pictures of the pattern
animal patterns	Butterfly pattern	
	Fish pattern	
plant patterns	Azalea pattern, Plum blossom pattern, Peach blossom pattern	 
	Lotus pattern, Four-leaf clover pattern	
	Fangsheng pattern, Hui pattern	 
auspicious symbol patterns	Jialuo pattern, Fangge pattern	
	Panchang pattern	
	Yongzhong pattern, fu, xi	

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As shown in table 1, the plant patterns in Jiarong Tibetan embroidery all derive from the main living materials on which the Jiarong ancestors relied for survival. Therefore, they permeate all aspects of the Jiarong people's daily life—clothing, food, housing, and transportation—and have become an important component of the pattern themes in their embroidery. Among the animal patterns, the most common are butterfly motifs, which come from nature and are closely intertwined with the Jiarong people's production and daily life. Butterfly patterns are widely applied and can be found on garments, aprons, belts, and headscarves. The motifs of figures and mythical beasts mainly originated from the Jiarong ancestors' longing and worship for powerful forces during their long and arduous life journey, which led to the emergence and development of mythical beast themes[8]. As for auspicious symbol patterns, the fusion and influence between the local Jiarong Tibetan culture and the foreign Central Plains culture can be clearly observed, such as in the character-based patterns like Fu (blessing) and Xi (happiness).To establish a relevant digital pattern database, each image needs to be annotated with label information, including the pattern category, specific pattern name, colour symbols and style composition, cultural meaning, and other key information. The database will be used not only for AIGC training on Jiarong Tibetan embroidery patterns but also to generate links that can be opened to researchers and the public as cultural display resources.

3.2 Intelligent Generation and Style Transfer of Embroidery Symbols

Based on the establishment of digital sample database, the stable diffusion tool is selected as the platform for the generation and style migration of embroidery. First, input the image and corresponding text data in the sample library into the prompt word column, and then adjust the parameters, such as iteration times, model sampling method, prompt word guidance coefficient (CFG scale), and use the LO RA model for fine-tuning, so that it is more inclined to output patterns and products that meet the target style when generating images. In addition to text generation, the stable diffusion platform also supports the mode of inputting sketches to generate renderings. Users can upload simple hand drawn drawings, and the sketch retains its outline structure. The control net module of SD tool can replace the internal texture, color and decorative details of the sketch with Jiarong Tibetan weaving and embroidery style. This function can significantly reduce the drawing difficulty of users, and also broaden the activation and inheritance path of traditional intangible cultural heritage culture. While generating the target rendering, the content generated by AI should be avoided from deviating from or blaspheming traditional culture. Users need to input database patterns and keywords as required. The detailed process is shown in Figure 1:

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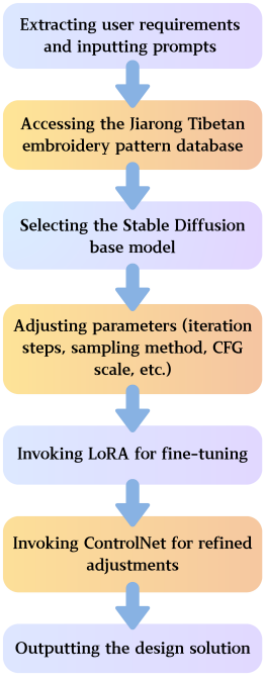


Fig.1 Intelligent generation flowchart based on the Stable Diffusion platform

3.3 Human-Machine Collaborative Digital Immersive Experience

The digital experience of human-computer cooperation is the core link of this research path. Its main function is that in the process of pattern generation and modification, artificial intelligence represented by AIGC technology undertakes the tasks of calculation and execution, while human users are responsible for aesthetics and direction selection. Both give full play to their respective advantages and jointly complete a Jiarong Tibetan embroidery work with cultural connotation.

In order to achieve efficient human-computer cooperation, this study designed a set of interactive processes that fully consider the user's operating habits. After entering the system, users can enter their design intent in two ways. One is text description, which allows users to select the pattern category, main color, theme and so on from the system preset database, and also allows users to freely enter short text. The second is sketch input, where the user draws a rough outline on the touch screen or uploads an existing hand drawn drawing. The system will simply preprocess the sketch, such as de-noising and closing the edge, encode the content entered by the user, call the fine tuned AIGC large model, and finally generate five different effect display diagrams. The necessary design connotation explanation is attached at the bottom of each effect drawing, which can help users accumulate cultural knowledge while selecting schemes. The system also supports the iteration and modification of user schemes. The modified instructions can be divided into local or overall iterative modifications, and the scheme can be regenerated after the system parses the instructions. During this period, users can propose modifications for many times until they are satisfied.

It should be emphasized that the human-computer collaborative digital immersive experience is not simply the pursuit of entertainment effect. In the whole interaction process, the system has always embedded the elements of culture and education. For example, the explanation of the cultural connotation of the patterns and

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the cultural constraint prompts in the modification instructions enable users to gradually deepen their understanding of the cultural connotation of Jiarong Tibetan weaving and embroidery while immersing themselves in creation and social interaction. Therefore, this path mainly focuses on the goal of "edutainment": users continue to participate in the immersive experience and naturally complete the cultural continuity and emotional resonance in the process of participation.

3.4 Construction of Visual Scenes in the Metaverse

The metaverse is a future industry enabled by the integrated application of new-generation information technologies such as AI, blockchain, and virtual reality. It can not only lead the development of the next-generation internet and accelerate the high-end, intelligent, and green upgrading of manufacturing while supporting the construction of a modern industrial system, but also, through new combinations of digital technologies, drive disruptive changes in the structure of the digital economy industry[17]. Specifically within this paper, the meta universe primarily refers to an innovative virtual space of scenarios driven by the convergence of technologies including XR, AI, blockchain, and the Internet of Things; it satisfies users' needs for immersive cultural and spiritual consumption as well as realistic experiences through narrative-driven expression, interactive participation, and multi-sensory engagement[18]. This study aggregates the renderings generated by users into the metaverse environment, thereby expanding the dimensions of the digital experience. The construction of metaverse scenes in this study is carried out mainly through three aspects: virtual try-on experiences, virtual space experiences, and virtual interactive behaviours.

The construction based on the meta universe scene is mainly realized through the empowerment of AIGC technology. The effect pictures completed by users on platforms such as stable diffusion can be mapped to the wearable devices of the meta universe scene, such as virtual clothing, virtual headdress, virtual bag, etc. In the constructed meta universe virtual place, users can wear these products with Jiarong Tibetan embroidery patterns in real time, walk and socialize in the meta universe space. This display of personal experience is more infectious and influential than the traditional two-dimensional pictures. The part about virtual space experience is to open a special "Jiarong Tibetan weaving and embroidery exhibition hall" in the meta universe scene. The user generated renderings will be displayed on the exhibition wall. Users entering the exhibition hall can click to view the design connotation, creation process and author information of the renderings. At the same time, the exhibition hall also supports multiple online editors, and users can comment and exchange with each other. This social display can effectively enhance the frequency of interaction between users, and also better promote and disseminate Jiarong Tibetan embroidery culture.

Among them, the design of virtual interactive behavior is mainly carried out from three aspects: users' browsing and observation, creation and upload, and social interaction. In the constructed meta universe scene, users can walk freely and slide through the keyboard direction keys or fingers. When close to the exhibits, the system will automatically pop up the information panel, including the pattern name, cultural meaning, generator and other information. At the same time, the user can freely rotate the viewing angle to observe the details of the display diagram from different angles. In the interactive experience area of the meta universe scene, users can directly call the AIGC generation tool to complete the scheme design. After the user confirms, it will be uploaded to the system, and the scheme will automatically appear in the display bar of the user creation area. This process realizes the seamless connection from "generation" to "display". In the same meta universe

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scenario, many users can be allowed to join, and users can see other users in the exhibition hall. When you are close to others, you can send a preset expression or open a text chat box to communicate. Users can also leave a message at the bottom of the work, and the message will be suspended near the work in the form of bubbles. Although these social functions are basic, they are sufficient to support mild community interaction and effectively enhance users' sense of participation. The specific implementation method is shown in Figure 2 as follows:

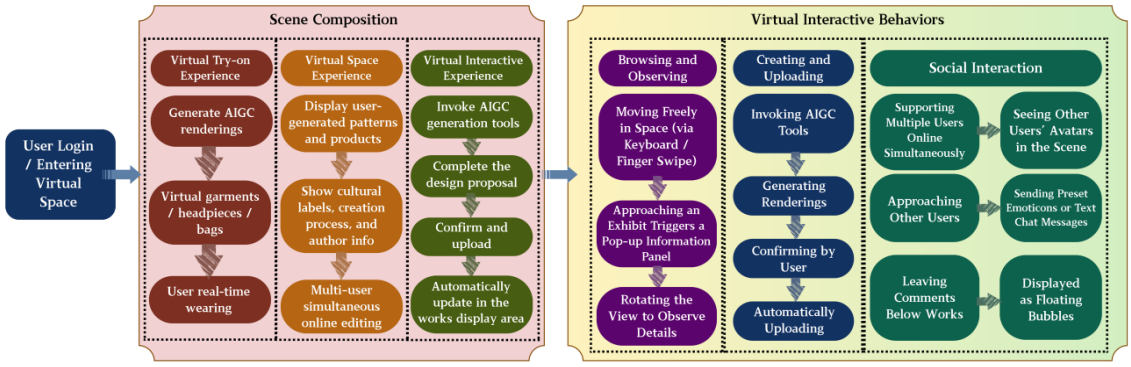


Fig.2 Metaverse construction flowchart

3.5 Presentation of the Overall Design Pathway Process

This pathway follows the logic of "data preparation — intelligent generation — collaborative creation — scene integration — social dissemination", comprising five core stages.

The study comprises five stages: (1) data preparation—collect and categorize Jiarong embroidery images (animal, plant, auspicious), annotate with cultural labels (name, color, composition, meaning) to build a digital library for AIGC training; (2) AIGC generation—using Stable Diffusion + LoRA, users input text or sketches, system outputs five renderings and supports iterative modifications; (3) human—AI collaboration—AI renders, users judge and modify, system records preferences; (4) metaverse mapping—confirmed renderings are placed into three scenarios: virtual wear (garments, headpieces, bags), exhibition hall (display with cultural info), and interactive area (re-creation via AIGC, multi-user social); (5) sharing and feedback—works receive likes and comments, share to social, system logs behaviors to update library and model, forming a closed loop. The complete flowchart is shown in Figure 3 below.

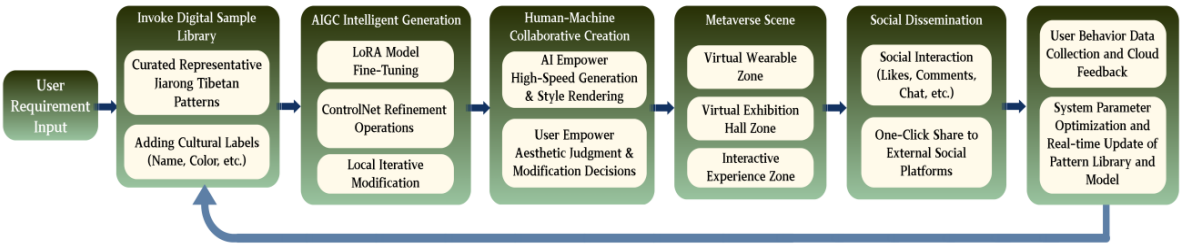


Fig.3 Full-path design flowchart

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4. Conclusion

This study focuses on the communication dilemma of Jiarong Tibetan weaving and embroidery intangible cultural heritage, and proposes an innovative communication path of enabling the meta universe with AIGC technology. The path includes four modules: the construction of digital sample library, intelligent pattern generation and style migration, man-machine collaborative creation process, online display and achievement transformation, forming the whole process system from user demand input to achievement sharing and dissemination. Through extensive research, it can be seen that AIGC technology can effectively broaden the path of intangible cultural heritage culture transmission, and inject new productivity into the traditional Jiarong Tibetan embroidery without weakening the cultural connotation. However, this path is still in the design stage, and its actual effect needs to be verified by subsequent development and user experience. Subsequent research will focus on the development of prototype system based on AIGC technology and the optimization of meta universe scene, and explore the innovative cooperation mode with Jiarong Tibetan.

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Reference

[1] China Intangible Cultural Heritage Network·China Intangible Cultural Heritage Digital Museum. Tibetan Weaving and
Embroidery Craft [EB/OL]. Available at: https://www.ihchina.cn/project_details/14240.html.
[2] Wang Mianzhi, Duo Erji. Jiarong Tibetan Costume [M]. Beijing: China Tibetology Publishing House, 2015: 1-294.
[3] Li Yuqin. A Study on Tibetan Costume Culture [M]. Beijing: The Ethnic Publishing House, 2010: 107-109.
[4] Zhu Wenshuang, Deng Mengwei. Application Research of Jiarong Tibetan Embroidery Patterns in Women's Cosmetic Bag Design [J]. Leather Science and Engineering, 2025, 35(1): 107-113.
[5] Hu Jiawei. On the Artistic Form of Jiarong Tibetan Embroidery Craft and Its Causes [J]. Journal of Sichuan Minzu College, 2023, 32(2): 97-105.
[6] Song Yanfang, Fu Yingying. Regenerative Design and Application of Jiarong Tibetan Embroidery Patterns Based on Shape Grammar [J]. Hunan Packaging, 2025, 40(2): 40-43.
[7] Su Hang, Liao Qingyi, Liu Haiyan. Application of Jiarong Tibetan Costume Patterns in Cultural and Creative Product Design [J]. Beauty and Times (Part I), 2024, (10): 139-143.
[8] Jiao Tianqi. A Study on Jiarong Tibetan Embroidery and Weaving Patterns [D]. Sichuan Normal University, 2024: 22-37.
[9] Tang Na, Li Tong. Application Research of Visual Communication Design Empowered by AIGC [J]. Screen Printing, 2024, (19): 94-97.

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[10] Jiang Sha, Zhao Mingfeng, Zhang Gaoyi. Brief Analysis on Application Progress of Generative Artificial Intelligence (AIGC) [J]. Mobile Communications, 2023, 47(12): 71-78.
[11] Chen Yanbo, Wang Yuran, Li Jianliang. Innovative Design of Traditional Patterns from the Perspective of AIGC: A Case Study of Song Dynasty "Shengsehua" [J]. Industrial Engineering Design, 2024, 6(4): 63-71.
[12] Li Jia, Zhang Jing. AIGC Innovative Design and Digital Promotion of Shu Embroidery from the Perspective of Aesthetic Education [J]. Packaging Engineering, 2024, 45(4): 485-490.
[13] Liang Xueying, Ou Maoyang. Research on the Pathway of AIGC-Empowered IP Cultural and Creative Packaging Design for Intangible Cultural Heritage in Lingnan Overseas Chinese Hometown [J]. Green Packaging, 2026, (5): 17-21.
[14] Yu Peng, Zhang Yi. From Feature Identification to Image Generation: Miao Costume Design Based on AIGC Paradigm [J]. Silk, 2024, 61(3): 1-10.
[15] Li Mingyuan. Translation of Regional Cultural Symbols under AIGC Technology and Its Application in Packaging Design [J]. China Packaging, 2026, 46(4): 31-36.
[16] Wei Xiaoguang, Han Lixin. Generative Artificial Intelligence and the Inheritance of Chinese Cultural Wisdom: A Discussion Based on ChatGPT [J]. China Radio & TV Academic Journal, 2023, (9): 13-16.
[17] Gu Xingchi, Liu Yun. Research on Characteristics and Evolution of Collaborative Innovation Network in China's Metaverse Industry [J]. World Sci-Tech R&D, 2025, 47(S2): 71-82.
[18] Qi Ji, Chen Si. Spatiotemporal Characteristics and Future Trends of Virtual Cultural Tourism in the Era of Digital Economy [J]. Journal of Shenzhen University (Humanities & Social Sciences), 2022, 39(4): 47-55.

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