

Research on the Innovative Inheritance of Dong Ethnic Group Baby Carriers Codes Integrated with AIGC Technology

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Abstract: Background: Since China started its reform and opening-up, the widespread integration of international fashion symbols has led to the gradual erosion of traditional cultural motifs in apparel design, resulting to a notable uniformity in style. It is therefore imperative to explore pathways for revitalizing traditional symbols within modern design frameworks. **Purpose:** This study investigates the application of Artificial Intelligence Generated Content (AIGC) technology in transforming traditional costume symbols. The goal is to create modern visual representations while preserving cultural significance, thereby providing reference for cultural heritage in contemporary design. **Methods:** Rooted in semiotic theory, this research systematically analyzes the cultural connotations of Dong ethnic group's baby carrier patterns to establish a theoretical framework for design reconstruction. Using platforms including Midjourney, we implement modern reinterpretations of the traditional spider motif through text-to-image generation and image fusion techniques. **Results:** The findings demonstrate that AIGC-assisted design significantly enhances pattern generation efficiency and enables diverse modern aesthetic expressions of the spider motif, expanding its applications in fashion and cultural creative products. However, delivering its cultural meaning effectively still needs human intervention for refinement. **Conclusion:** This study concludes that while AIGC technology effectively facilitates the visual modernization and application diversification of traditional symbols, it primarily functions as a technical tool rather than a cultural interpreter. The accurate transmission of cultural heritage remains dependent on human expertise. Future research should focus on developing specialized cultural databases and localized generative models to achieve more precise and meaningful cultural representation through human-AI collaboration.

Keywords: AIGC technology; Dong ethnic baby carrier patterns; Traditional costume symbols; Innovative cultural transformation; Intelligent design

1. Introduction

China's fashion system developed relatively late. Since the reform and opening-up, the texts, languages, and symbols of the international fashion system have been directly implanted into the domestic fashion industry, resulting in significant alterations to the traditional clothing system. Many original cultural symbols have gradually decreased or even disappeared. Simultaneously, under the dual influence of the international fashion system and industrial-standardized production methods, fashion design in China has exhibited increasing homogenization (Xiao, 2010). In daily life, patterns using English letters are frequently seen on garments, while traditional Chinese symbols are rarely applied. The reintegration of traditional Chinese cultural symbols into daily life is not merely an aesthetic issue but a pressing challenge of cultural preservation. Although existing research and practice have achieved some progress—such as the widespread application and dissemination of cloud patterns (xiangyun), dragon-phoenix motifs, and

other symbolic elements — these efforts remain inadequate in presenting a comprehensive picture of Chinese national culture.

The key challenge lies in how to achieve the contemporary transformation of traditional patterns while preserving cultural authenticity and promoting innovative inheritance. With the rapid development of digitalization and technology, Artificial Intelligence Generated Content (AIGC) has become a driving force for social advancement. It is widely applied in fields such as healthcare, education, and transportation, and has also demonstrated tremendous potential while also presenting new challenges in art and design. AIGC technologies not only expand the boundaries of creativity but also deepen the collaborative innovation between designers and design tools. The deep integration of AIGC with traditional Chinese culture and its applications in artistic and design practices offer new perspectives and methodologies for exploring the relationships between technology and culture, as well as between innovation and tradition (Chen et al., 2023).

1.1 Research Background

The origin of the Dong ethnic group's baby carriers is closely related to their modes of production, natural environment, and belief systems. Its symbolic system reflects the unique historical and socio-cultural context of the Dong people. As the Dong do not have their own written language, their history and emotional expressions are primarily transmitted through costume patterns. In this way, textile ornamentation becomes a medium for cultural expression, and the patterns on the baby carriers of the Dong ethnic group serve as a means of recording their ethnic history and emotional heritage. The baby carriers used by ethnic minorities are not only functional tools for infant care but also carriers of historical narratives, spiritual beliefs (such as the worship of the sun and spirals symbolizing reverence for ancestors), and concepts of fertility and reproduction (e.g., the legend of the Butterfly Mother). These patterns contain implicit memories of ethnic migration and perform apotropaic functions (Ma & Ma, 2003). In Western modern semiotic theory, Roland Barthes' theory of fashion codes offers a new perspective for studying clothing culture. Barthes extended semiotic analysis to the field of dress, using fashion symbols to prompt a re-examination of everyday objects beyond common understanding. From this viewpoint, the Dong ethnic group's baby carrier is not only a utilitarian object but also a narrative form, with its symbolic elements accumulated over time to become cultural representations. For Dong women, wearing a baby carrier fulfills both practical needs and ceremonial purposes, expressing specific social identities and cultural affiliations.

Semiotics offers a theoretical framework for examining the Dong ethnic group's embroidery aesthetics. As visual symbols of the Dong ethnic group culture, its patterns can be promoted through the development of cultural and creative products and digital branding systems. This approach can contribute to the dynamic preservation of intangible cultural heritage and enhance cultural confidence (Lu, 2021). According to Ferdinand de Saussure's semiotic theory, a symbol consists of the "signifier" (form) and the "signified" (meaning). The surface features of patterns on baby carriers serve as signifiers, presenting their visual form and aesthetic value — for example, the composition of floral, geometric, and animal patterns. On a deeper level, they function as signified, carrying rich cultural meanings. Common motifs such as the spider, fish, and cloud-thunder patterns all hold symbolic significance: the spider motif originates from the worship of the supreme deity "Sa Tiemba," and spotting a spider is considered an auspicious sign representing blessings for offspring safety; the fish symbolizes prosperity and abundance and is viewed as a sacred and purifying image; motifs like cloud-thunder, bridges, and wells represent divine manifestations and protective forces against evil. Wearing garments adorned with these symbols is believed to bring peace and protection. These symbols communicate deep cultural connotations through surface visual forms, embedding the Dong ethnic group people's understandings of nature, life,

and spirituality into the baby carriers, forming a unique and complete cultural symbol system.

1.2 Research Purpose

This study uses the symbolic patterns of the Dong ethnic group's baby carriers as an entry point to explore the application pathways of AIGC technology in the modernization of traditional motifs. As a significant cultural symbol of the Dong ethnic group, the baby carriers not only embody profound cultural meanings but also express strong aesthetic and artistic values through their distinctive patterns and colors. Dong clothing was included in the National List of Representative Elements of Intangible Cultural Heritage in 2014. The motifs used often express blessings, good wishes, and peace, demonstrating strong semiotic features. By integrating semiotic analysis with practical design experimentation, this study aims to explore innovative pathways of inheritance for traditional costume symbols using the Dong ethnic group's baby carriers as a focal case. Specifically, it aims to explore how AIGC technology can facilitate the modernization of these symbols while retaining their historical and cultural connotations, thereby achieving both cultural preservation and innovative development. The research aspires to offer insights and references for the contemporary development of Chinese ethnic costume culture.

2. Literature Review

2.1 A Study of the Patterns on Dong Ethnic Baby Carriers

As an integral part of the traditional clothing culture of the Dong ethnic group, the baby carrier not only embodies aesthetic interests but also conveys rich historical culture, religious beliefs, and practical wisdom. The twelve common motifs found in the Dong ethnic group's baby carrier garments can be categorized into five primary types: (1) nature worship, (2) flora and fauna, (3) geometric patterns, (4) ideographic and textual forms, and (5) imagery-based designs. Under the lens of AIGC technology, these categories offer significant potential for pattern regeneration and cultural transmission (Table 1) (Jin et al., 2025).

1) Nature Symbolism: Sun and Floral Motifs

Among the motifs of the Dong ethnic group's baby carrier, nature-inspired patterns hold significant cultural meaning and aesthetic value. The sun and floral motifs are especially representative. The sun motif originates from the Dong people's nature-based solar worship, symbolizing light, life, and divine power (Feng, 2025). It is often found on baby carrier garments worn during female coming-of-age ceremonies and weddings, signifying blessings, fertility, and protection. The motif typically features radiating structures, accompanied by spirals or vortex shapes, forming strong visual focal points. Floral motifs are usually based on the sunflower, which symbolizes harvest and prosperity. With its radially symmetrical petals, it continues the visual semantics of the sun motif while integrating softness and vitality (Zuo & Zheng, 2025). These motifs are commonly used on baby carriers by unmarried women, representing the beauty of nature and youthful energy. Both types provide clear symbolic structures and cultural contexts for AIGC visual modeling, exhibiting strong potential for image style transfer and visual reconstruction (Xue et al., 2025).

2) Botanical Patterns: Vine, Floral-Grass, and Eight-Petal Motifs

Botanical motifs hold prominent cultural and aesthetic significance in the Dong ethnic group's baby carrier costumes, featuring three primary types: vine patterns, floral-grass patterns, and eight-petal floral motifs (Ding, 2025). Vine motifs are inspired by the naturally coiling plant forms commonly seen in Dong daily life. They symbolize

continuity of life and the reproduction of the community. Characterized by uninterrupted curvilinear lines, they are often used along garment edges or central axes to enhance rhythmic aesthetics and embody respect for natural order. Floral-grass patterns are more dynamic and free-form, using intricate and swirling lines to express the chaotic and untamed beauty of vegetation. These patterns reflect the Dong's ecological philosophy of harmonizing with nature (Song et al., 2024a). The eight-petal floral pattern uses symmetrical design to simplify botanical motifs. Layered petals forming a unified structure symbolize completeness and the cycle of life. Commonly found in festive or ritual attire, they exhibit strong geometric aesthetics and are particularly suitable for AIGC graphic recognition and algorithmic reconstruction, with high potential for digital reinterpretation (Wang & Wu, 2024).

3) *Animal Symbolism: Hen and Fish Totems*

Animal-symbolic motifs hold a significant place in the iconography of the Dong ethnic group's baby carriers, particularly in patterns featuring hen and fish. These motifs reflect cultural reverence for maternal care and agricultural abundance. The hen motif often depicts a mother hen with chicks, symbolizing fertility, family continuity, and ethnic lineage. It is frequently used in weddings and infant ceremonies, reinforcing familial bonds and maternal virtues (Zhou & Li, 2024). The fish motif is closely associated with the Dong's unique rice-fish symbiosis agricultural system, symbolizing prosperity, smoothness, and the idea of "abundance every year." Often combined with lotus flowers, water waves, and other elements, it forms highly decorative visual symbols conveying hopes for a bountiful harvest. These motifs illustrate the Dong people's concept of harmonious coexistence with nature, providing vital symbolic data and visual structures for AIGC-based graphic regeneration along the "nature-image-symbol" continuum (Li et al., 2024).

4) *Ideographic and Geometric Motifs: "Eight-Character" and Circular Compositions*

Geometric-symbolic motifs such as the "Eight-Character" symbol and circular combinations are rich in cultural connotation and visual appeal (Song et al., 2024b). The "Eight-Character" (shaped like the infinity symbol " ∞ ") represents the endless cycle of life. It often serves as a transitional pattern connecting other motifs and carries meanings of eternal auspiciousness. With its strong geometric and mathematical properties, it is well-suited for AIGC image encoding and style transfer. The circular motif embodies the Dong cosmological view of "heaven as round and earth as square" and cycles of rebirth. Constructed through layered configurations of large parent circles and embedded smaller shapes, it creates a solemn and ceremonial visual structure. Such motifs can be integrated with contemporary design concepts within AIGC frameworks, leading to dynamic baby carrier patterns rich in spatial depth and cultural dimension, thereby realizing deep co-creation between tradition and technology (Chen et al., 2024).

5) *Imagery-Based Motifs: Object Depictions and Mirror Flower Patterns*







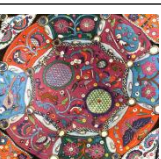
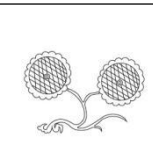

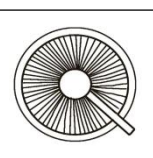

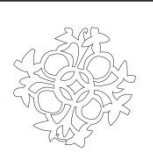

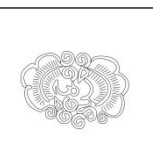

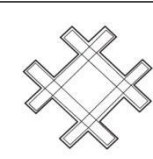
Imagery-based motifs originate from everyday artifacts of the Dong ethnic group, such as drum faces and weaving tools. These object depictions represent a concrete embodiment of Dong craftsmanship and wisdom. Characterized by stylized representations of real-world objects, they maintain realism while creating a sense of mystery. Commonly used in men's baby carriers or adult ceremonial attire, they signify identity and ritual importance. The Mirror Flower Pattern features a symmetrical, four-directional radiating structure, resembling "a flower in the mirror." Typically employed in women's garments, it combines elements such as flowers, butterflies, and birds to construct graceful, harmonious visuals. This motif symbolizes moral virtue, beauty, and ideal femininity. Both types exhibit distinct symbolic constructions and are well-suited for AIGC-based graphic recognition and generation. Their cultural semantics









can be excavated and applied to modern, female-oriented cultural and creative products (Cong, 2024).

6) Short Characteristic Loop Patterns

Short loop patterns are typically used as corner decorations or interval elements between motifs. Composed of multiple short line segments arranged in specific combinations, they possess a strong sense of rhythm. Within the Dong ethnic group costume design, such patterns serve both as connectors and transitional elements, reflecting the “rhythmic order” embedded in traditional motif logic. These patterns are particularly well-suited for batch generation via AIGC and can function as auxiliary design modules in virtual garments and AI-driven cultural and creative products (Quan et al., 2024).

Table 1: Main patterns of Dong ethnic group baby carriers

Nationality	Class	Pattern	Image	Brief strokes	Description
Dong	Plants	Sun Pattern			The Sun Pattern is the most primitive totem worship in China, where the sun emits twelve rays of light clockwise around it, presenting a strong sense of movement and symbolizing light, life, and eternity.
		Peony pattern			As a symbol of national auspicious patterns, it integrates people’s beautiful aspirations and good wishes for life, implying that the prosperity and flourishing of the Chinese nation have a long history.
		Chaos flower pattern			The chaos described in mythology is a round egg, like a ball. The skillful hands of the Dong people give it the image of a flower, making it more in line with the symbol of motherhood - the idea that flowers nurture life.
		Sun Moon Flower pattern			Surrounding the eight figures of the Eight Trigrams, five of them are embroidered with trees forming two circular flowers or fruits, resembling a pair of bright eyes.
		Banyan tree pattern			The symbolism of banyan tree suspenders mainly includes protecting the health, safety, and happy growth of infants and young children. The banyan tree symbolizes vitality and reproduction in Dong culture.
	Animal	Spider pattern			Spiders, formerly known as Xizi or Ximu, have always been regarded as mascots in Chinese folklore. Embroidering spiders on the back fan not only blesses newborns with intelligence and wisdom but also signifies longevity, wealth, peace, and good fortune.
		Dragon pattern			It is a symbol of the auspicious god, symbolizing the protective god of agricultural production and the auspicious god who blesses the nation.
	Geometry text	Deformed double# (well) pattern			The deformed double # (well) pattern is a decorative pattern on Dong ethnic clothing, symbolizing the prosperity of the population and the continuous flow of water like a spring. It originated from the Dong people’s worship of water, especially their dependence on well water.

Object imagery	Cloud pattern			This embroidered shoulder strap cover is themed around the combination of cloud patterns and eight trigrams, showcasing a mysterious and philosophical beauty
	Chaos cloud & water pattern			Cloud patterns symbolize the pursuit of progress, auspiciousness, and good fortune, embodying the cultural concepts and aesthetic spirit of the Chinese nation. Water patterns symbolize favorable weather conditions and the use of softness to overcome hardness.
	Moon pattern			Four stars surround the moon flower. If the Dong women are indeed embroidering the four stars of the young woman, this piece can be viewed as them embroidering baby carriers under the moonlight.
Other characteristic categories	Eight dishes and one soup pattern			Composed of eight small circles wrapped around a large circle. The large circular design in the center is embroidered with a chaotic floral pattern using colored silk thread, while the eight small circular designs are embroidered with patterns of flowers, fish, butterflies, etc.

2.2 AIGC Technology

With the rapid development of AIGC technology, the traditional modes of image design production are undergoing a fundamental transformation. AIGC empowers traditional costume design by promoting its transformation into ready-to-wear, diversified, and mass-consumable forms, thereby balancing the demands of cultural heritage with commercial viability, while significantly enhancing design efficiency and creativity (Yu & Zhang, 2024). In the digital preservation and creative design of ethnic costume culture, AIGC can not only greatly enhance the efficiency of motif reconstruction but also provide new pathways for the expression of cultural symbols and the generation of creative patterns. This study analyzes the image generation mechanism of AIGC and its application within the Dong ethnic group’s costume symbolism, with reference to the diagram illustrating the working principles of AI image generation (Figure 1) (Wang & Zhou, 2025).

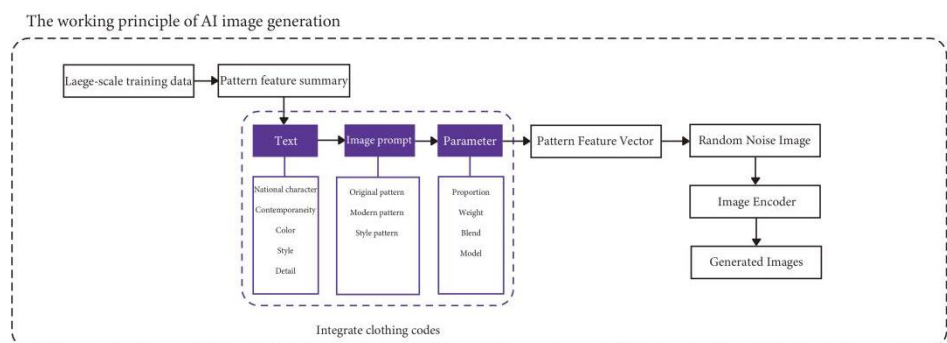


Figure 1: AI output principle of integrating clothing codes

1) Interpretation of the Overall Process Framework

As shown in Figure 1, the logic of AIGC image generation follows a complete chain consisting of “data learning – feature understanding – content input – feature transformation – output generation.” This process can be divided into three core stages:

(1) Frontend Input Phase: The model extracts and summarizes visual features of patterns from large-scale training datasets (Foka & Griffin, 2024).

(2) Mid-process Interactive Fusion Phase: The designer's intent is embedded through the combined input of textual prompts, image prompts, and parameter settings.

(3) Backend Output Phase: The system constructs the pattern's feature vector and employs an image decoder to generate the target image.

This mechanism enables a highly integrated process of "data-driven input + semantic guidance + stylistic fusion," allowing AIGC to not only generate images but also express creative visual patterns.

2) Functional Analysis of Key Modules

As the first step in the diagram corresponding to the process of "large-scale training data → pattern feature summarization", Pattern Feature Encoding (Feature Encoder) involves the model learning features related to style, composition, color, and texture from a wide range of images, including traditional motifs, modern patterns, and artistic styles. This stage serves as the model's "visual cognition" phase, akin to the accumulation of visual experience in humans.

Designers then input prompts via the Text Input (Text Prompt) module, incorporating keywords that reflect ethnic identity, modernity, color schemes, and stylistic orientation (e.g., "Dong ethnic group", "women's wedding garment", "eight-petal floral pattern", "indigo blue"); the model converts this text into vectorized signals, forming a mapping with visual features, and this semantic-driven mechanism endows AIGC with a high degree of controllability and adaptability in ethnic symbol innovation.

Meanwhile, Image Input (Image Prompt) functions as visual templates—these can be original ethnic motifs or modern graphic compositions that serve as style anchors, providing the model with foundational compositional cues. For instance, when reconstructing the Dong ethnic group baby carrier patterns, one can input traditional motifs such as the sun or fish pattern, enabling the model to recombine them based on underlying texture logic.

The Parameter Control module, on the other hand, allows users to set ratios, weights, and model mixing parameters to fine-tune the degree of stylistic fusion. For example, by configuring the traditional motif to account for 60% and modern fashion elements for 40%, the resulting image will exhibit a balanced expression of "traditional cultural foundation + contemporary aesthetic form," achieving true "contextual re-innovation" of symbolic content.

3) Analysis of the Image Generation Logic

Following the combined input of text prompts, image prompts, and parameters, the AIGC system integrates the data to construct a comprehensive pattern feature vector (Feature Embedding) — a multidimensional and abstract digital representation that encompasses the content, structural form, and stylistic features of the pattern to be generated. In the subsequent generation process, AIGC typically employs a diffusion model, starting from random noise and gradually guiding the image from a blurred state to clarity; this results in patterns rich in detail, spatial structure, and dimensional depth. Here, the "random noise image" represents the initial state of generation, while the "image decoder" is responsible for converting the abstract feature vector into a finalized, visualized image — i.e., the final design output (Wu & Li, 2024).

3. Theoretical Framework and Methodology

3.1 Theoretical Framework

Focusing on the spider motif found in Dong baby carriers' costume patterns, this study first traces its origin, historical development, and semiotic features. Based on the semiotic concepts of "signifier" and "signified," this analyzes both the surface decorative

aspects and the deeper cultural meanings of the baby carriers' motifs. The study then examines the risks of symbolic rupture and the difficulties of cultural transmission under the pressures of modernization. On this basis, it explores how generative AIGC technologies can be used to revitalize and creatively reinterpret these symbols. Finally, the study proposes a practical pathway that balances cultural preservation and contemporary application .

3.2 Research Methodology

This study adopts a combination of literature analysis, semiotic theoretical interpretation, and field investigation. Drawing on the semiotic perspectives of Roland Barthes (Barthes, 2000), Ferdinand de Saussure (Saussure, 2007), and Charles Sanders Peirce (Peirce, 2014), the research conducts a multidimensional analysis of the symbolic system of the Dong ethnic group's baby carriers. Simultaneously, design experiments are carried out using generative tools such as Midjourney to explore methods for transforming traditional patterns within a digital environment. Ultimately, the study aims to summarize and propose a feasible framework for the modern transmission of traditional cultural symbols.

4. Results

4.1 Application Analysis of AIGC Technology in the Cultural Transmission of Dong Ethnic Group Baby Carriers Costume Symbols

1) *Advantages of AIGC Technology in the Inheritance of Dong Ethnic Group Baby Carriers Symbols*

The application of AIGC technology in designing Dong ethnic baby carrier costume motifs exhibits considerable merits. Leveraging text-driven pattern reconfiguration, designers can utilize culturally embedded keywords—such as “Dong ethnic group”, “baby carrier”, “auspicious symbolism”, “indigo blue” and “sun motif”—to direct the generation of novel designs that adhere to traditional visual lexicons. Regarding stylistic synthesis, AIGC empowers the seamless integration of conventional motifs with contemporary aesthetic paradigms, encompassing minimalist or line-drawing styles, thereby achieving a harmonious visual convergence of heritage and modernity.

AIGC furthermore boasts heightened operational efficiency in both generation and selection capacities, enabling the rapid production of a multitude of creative variations suitable for iterative refinement, significantly augmenting design productivity. Powered by sophisticated architectures including Generative Adversarial Networks (GANs), diffusion models, and Transformer-based frameworks, AIGC systems benefit from training on extensive datasets, endowing them with the capability to intelligently comprehend and replicate pattern styles, color palettes, and underlying cultural semantics. This technological prowess fosters substantial automation and scalability throughout the design workflow. Augmented by prompt engineering, AIGC facilitates precise “semantic-to-image” translation, effectively mitigating persistent challenges inherent in traditional design methodologies, such as protracted production cycles and suboptimal efficiency. In the realm of visual expression, AIGC enables proportional modifications, morphological reinterpretation, and chromatic optimization, thus catalyzing a fluid transition from distinctive ethnic aesthetics towards contemporary visual idioms. This transformation significantly broadens the applicability of time-honored patterns across diverse contexts, spanning festive attire, cultural and creative merchandise, and the growing field of virtual fashion (Rao & Xiong, 2023).

Moreover, and perhaps more profoundly, AIGC holds the potential to establish a comprehensive digital “graphic knowledge repository”. Such a repository would systematically archive pattern structures, compositional principles, and semantic annotations, thereby underpinning both the preservation and innovative

reinterpretation of the Dong ethnic group costume iconography. This technology-driven design paradigm facilitates the dual perpetuation of both the formal attributes (“form”) and semantic significance (“meaning”) of intangible cultural heritage. Consequently, the Dong ethnic group culture can achieve wider dissemination and enhanced global resonance within digital ecosystems. Ultimately, it reveals an innovative pathway for the vibrant transmission and contemporaneous development of Chinese traditional culture (Peng & Yu, 2025).

2) Challenges and Proposed Solutions

Despite the remarkable efficiency and creative potential of AIGC in facilitating the digital transmission of traditional culture—particularly in the generative reconceptualization of semiotically rich imagery such as Dong ethnic group baby carrier motifs—its practical implementation faces significant challenges. These predominantly encompass the precise expression of cultural meaning, the profound restoration of image semantics, and the harmonious integration with traditional craftsmanship. The Dong ethnic group’s costume symbols extend beyond mere decorative elements; they constitute embodied repositories of ethnic history, cosmological frameworks, and philosophical beliefs. Each motif conveys specific iconographic meanings and ritualistic functions—exemplified by the sun pattern, which represents vitality and protective guardianship, and the fish motif, which signifies fertility through the ecological partnership of rice-fish systems.

Overreliance on poorly curated training data or ambiguous semantic categories by AIGC may yield designs that appear similar in form but differ in meaning, leading to symbolic misappropriation, cultural disconnect, or the reduction of meaningful iconography into decontextualized decoration. Such epistemological dissonance ultimately leads to stylistic inconsistencies and functional misalignment. To mitigate these challenges, it is necessary to establish a comprehensive, well-structured, and semantically rich “ethnic symbol ontology”. This knowledge framework should include historical context, cultural interpretive frameworks, ceremonial applications, and craft-based methodologies intrinsically linked to each motif. Concurrently, collaboration among cultural semioticians, indigenous designers, and AI specialists is crucial. These stakeholders must work together at every stage—from annotative curation and semantic modeling to output validation—shifting the focus from basic “image recognition” to cognitively nuanced “cultural reconstitution” (Xia et al., 2025).

A further critical challenge lies in the artisanal adaptability of AIGC-generated outputs. Traditional Dong ethnic group baby carriers feature intricate techniques, including embroidery, reverse appliqué, and indigo batik. In contrast, AI-generated patterns typically appear as flat 2D visuals lacking adaptations to substrate constraints, stitch topologies, or thread color variations. Bridging this ontological gap requires the incorporation of AIGC into augmented design systems. A dedicated “pattern-to-process” translation framework should be developed to translate AI-generated motifs into practical artisanal steps. For instance, an AIGC-created eight-petal floral motif could be algorithmically broken down into embroidery sequencing, thread color specifications, and programmable instructions for weaving or batik, thereby optimizing manufacturing efficiency while preserving traditional accuracy. This “image-to-craft” operational model not only preserves the continuity of tacit craftsmanship but also empowers AIGC-generated patterns to attain material realizability, enabling their use across diverse applications: couture fashion, cultural merchandise, digital clothing systems, and virtual environments. Fully unlocking AIGC’s potential for preserving and revitalizing ethnic costumes depends on the close integration of AIGC algorithmics, cultural insight, and hands-on artisanal expertise, thereby establishing a holistic, self-sustaining ecosystem covering semantic encoding, iconographic synthesis, and craft implementation. This combined approach offers a promising path toward a novel

protection method for intangible cultural heritage, based on the trilateral integration of technology, cultural knowledge, and material practice (Dong et al., 2025).

4.2 Practical Exploration of the Innovative Transformation of Dong Ethnic Group Baby Carriers Symbols Using Midjourney

Midjourney is a widely used generative AI design tool known for its efficiency, interactivity, and creative capability. It enables designers to digitize and modernize traditional cultural symbols. As a leading platform in generative image technology, Midjourney uses algorithms and data to transform the image creation process. It shifts from traditional physical media (e.g., brushes, canvas) into “data-driven virtual production” guided by text instructions, establishing a new approach called “verbal visualization” (Zhang & Yang, 2024). Using text prompts, designers can quickly generate clothing patterns, garment styles, virtual models, and display environments, thereby significantly improving design efficiency and diversity. This enables “boundary-free integration” in the realms of design and illustration (Yu & Zhu, 2024). This chapter takes the spider motif from the Dong ethnic group’s baby carrier as a starting point. It explores how this motif can be innovatively modernized by using the imagination, blending, and description modes available in Midjourney. By adjusting parameters and optimizing design configurations, this study investigates how these modes can facilitate the transformation of spider motifs into contemporary visual expressions. The goal is to clarify the applicability and best practices of different generative modes and provide a reference framework for future research and practical applications of the Dong ethnic group’s baby carriers symbols.

1) Research Subject: Cultural Background and Artistic Characteristics of the Dong ethnic Spider Motif

As a prominent symbolic element in the baby carrier patterns of the Dong ethnic group, the spider motif holds profound cultural significance, representing a unique sense of ethnic identity. In the Dong ethnic group culture, the spider is not only respected as a guardian spirit of children but also symbolizes peace, good fortune, longevity, prosperity, and the continuity of life. This belief reflects the Dong people’s reverence for and worship of the natural world and its creatures (He, 2010). Traditional spider motifs are commonly used in garments and decorative items, often created through hand-drawn or embroidered designs. Their designs typically emphasize horizontal symmetry, flowing lines, and detailed patterns, showcasing the Dong people’s artistic creativity and aesthetic sensibility. These patterns are deeply rooted in local culture and ethnicity, embodying the historical memory and cultural heritage of the Dong society. As such, they serve as one of the most important visual and symbolic representations of the Dong cultural identity.



Figure 2: Spider pattern on the back fan of the Dong ethnic group (Rainbow of Love: Art Exhibition of Back Fan Clothing of Southwest Ethnic Minority Donated by Ma Zhengrong and Ma Li)

2) Practical Methods and Technical Workflow

This study adopts three core modes of the Midjourney software—*imagine*, *blend*, and *describe*—to modernize the Dong ethnic spider motif. All experimental outputs were generated using square aspect ratios to facilitate consistent comparison of pattern variations. The specific methods and steps are as follows:

As one of Midjourney’s core functions, the *Imagine* mode enables image generation based on text prompts, and this study employed it to explore the methods and outcomes of generating modernized designs of the Dong ethnic spider motif by incorporating its visual characteristics, cultural connotations, and traditional color schemes. The experiment began with crafting precise textual prompts, where keywords such as “an embroidered pattern”, “elements of spider” and “modern style” were carefully selected to ensure the generated designs preserve the traditional cultural essence while integrating contemporary design sensibilities. Subsequently, parameters were adjusted to optimize the pattern output — specifically, by modifying the “*iw*” parameter (image–text weighting ratio), we examined how varying the balance between textual input and reference imagery influences the generation results (see Table 2).

Table 2: List of main parameters of Midjourney

Parameter	Name	Description
--aspect	Aspect ratio	Adjust the scale of the image
--chaos	Chaos	Adjust the diversity of the results. --Chaos value ranges from 0 to 100. The default chaos value is 0.
--no	Negative prompt	--"no plants" instructs to remove plants from the image.
--quality	Quality	--Q< 25, 5, 1, or 2>represents how much time to be spent on rendering. The default value is 1. The higher the value, the longer the rendering time, and the lower the value, the shorter the rendering time.
--seed	Random seed	Random numbers are randomly generated for each image. Using the same seed number and prompt will produce similar images.
--stop	Stop	Use the -- stop parameter to complete the task midway through the process. Stopping homework at an earlier percentage will result in more ambiguous and less detailed results.
--tile	Tile	Generate images that can be used as repeated collages to create seamless patterns commonly used on fabrics, wallpapers, and textures.
--version	Model version	--V<1, 2, 3, 4, or 5>Use different versions of the Midjourney model.
--style	Style switching	--Style<4a, 4b, or 4c>V4 model style switching-- Style<expressive, or cut>Niji model style switching.
--stylize	Stylization	The image generated with a low stylization value matches the prompt more closely, but with lower artistic quality. Higher stylization value brings high artistic quality, but less connection to prompts.
--iw	Weight	Change the weight parameter “ <i>iw</i> ” to adjust the importance of the image and text parts of the prompt. A higher “ <i>iw</i> ” value means that image cues will have a greater impact on the generated image.

For the *Blend* mode, which generates hybrid visual outputs by uploading multiple images, it is well-suited for the fusion and re-creation of design styles; this study thus took traditional Dong ethnic spider motifs as the core input and mixed them with contemporary design images to examine how varying the number of input images affects the generated results. In its practice process, the traditional spider motif was consistently placed as the first input image to increase its visual weight, and subsequently, the number of blended images was gradually increased to observe the stylistic shifts in the output.

Finally, The *Describe* mode, which analyzes uploaded images and generates text descriptions related to their visual content, is suitable for feature extraction and idea generation in design processes. Its practice process involved uploading an embroidered swatch of the traditional spider motif to the system, which automatically produced descriptive text; the output text was then manually refined — adding detail and removing irrelevant or inaccurate content — before being re-entered into the *Imagine* mode for further image generation.

5. Conclusion

This study examines the potential application and practical pathways of AIGC technology in the transmission and innovation of Chinese traditional cultural symbols,

using the Dong ethnic spider motif from baby carriers' attire as a case study. Through semiotic analysis, the cultural meanings and symbolic significance of the motif were examined in depth, laying a theoretical foundation for its digital reinterpretation. Building on this, tools such as Midjourney were employed to reconstruct the spider motif in a modern context, producing designs that retain cultural depth while achieving visual innovation.

5.1 Analysis of Practice Results with the Imagine Mode

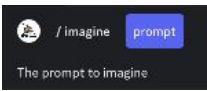






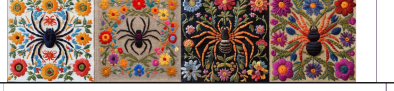

In the image-plus-text approach, where both reference images and descriptive prompts were used, we found that lower "iw" values yielded outputs that retained more of the geometric features and detailed characteristics of the traditional spider motif, closely aligning with the original aesthetic of the Dong ethnic group. In contrast, higher "iw" values produced more modernized designs, but at the expense of diluting the motif's core traditional elements.

When the "niji" model option was enabled during parameter tuning, the generated patterns exhibited stylized features resembling manga art.

In pure text-based generation, where no reference images were used, the resulting patterns leaned heavily toward modern stylistic interpretations. Although visually novel, these results often lacked identifiable traits of the traditional spider motif, reducing the recognizability of the cultural symbol.

Therefore, combining images and textual descriptions proves more effective in balancing traditional cultural essence with modern design elements. Strategic parameter adjustments allow for precise control over the ratio of traditional to modern components in the output (Table 3).

Table 3: The generation practice of imagine pattern

Mode	Image	Text	Generate results
		An embroidered pattern containing elements of a spider, modern style, the spider element is in the middle, surrounded by the flower element. —ar 1:1 —iw.5	
		An embroidered pattern containing elements of a spider, modern style, the spider element is in the middle, surrounded by the flower element. —ar 1:1 —iw2	
		An embroidered pattern containing elements of a spider, modern style, the spider element is in the middle, surrounded by the flower element. —ar 1:1 —niji	
	/	An embroidered pattern containing elements of a spider, modern style, the spider element is in the middle, surrounded by the flower element. —ar 1:1	
	/	An embroidered pattern containing elements of spider, modern style, the spider element is in the middle, surrounded by the flower element. The embroidery is detailed and vibrant against the pure white backdrop, showcasing intricate designs in bright shades of red, pink, blue, green, yellow, and purple. —ar 1:1	

5.2 Analysis of Practice Results with the Blend Mode

The Blend mode effectively integrates traditional cultural elements with modern design aesthetics, although the output significantly depends on the weight distribution of the input images.

In the two-image blend mode, where only two input images were used, the resulting designs leaned toward traditional styles. The geometric characteristics and cultural symbols of the spider motif were well preserved.




















In the three-image blend mode, the outputs began to adopt a more modern aesthetic. While the visual characteristics of the traditional motif were somewhat diminished, their cultural identity remained recognizable.

In the four-image blend mode, the original visual features were further diluted, and the generated outputs appeared more modern, with the expression of traditional elements becoming more ambiguous.

When increased to five-image blending, the generated patterns leaned toward minimalism, better aligning with the demands of modern minimalist design. However, the cultural expressiveness of traditional symbols was significantly reduced.

This mode offers a unique advantage in merging traditional and modern elements, notably by adjusting the weight and quantity of the input image. The study concludes that the two-image blend best preserves traditional aesthetics, while the five-image blend is more suitable for minimalist modern design contexts (Table 4).




Table 4: Blend mode generation practices




Mode	Figure1	Figure2	Figure3	Figure4	Figure5	Shape	Generate results
			/	/	/	①Square: The ratio is 1:1, which is the default ratio ②Portrait: The proportion is 2:3, suitable for generation Vertical image ③Landscape: The ratio is 3:2, suitable for generating landscape images	
				/	/		
					/		
							

5.3 Analysis of Practice Results with the Describe Mode

The Describe mode was found to lack precision in extracting features from traditional motifs. The designer’s manual refinement of the text was necessary to improve semantic accuracy. After textual optimization, the generated outputs more accurately reflected the core symbolic features of the traditional spider motif (Table 5).

Table 5: Description of the generation practices of the pattern

Mode	Image	Generate description	Comprehensive description	Result
		Embroidered round hat, in pink and blue colors with a white background, featuring colorful patterns of traditional Uyghur culture embroidered on the front. The image is in ultra-high definition resolution, with a top-down view and a white background. The embroidery is detailed and vibrant against the pure white backdrop, showcasing intricate designs in bright	An embroidered pattern containing elements of a spider, in a modern style. The spider element is in the middle, surrounded by the flower element. It features pink and blue colors on a white background. The image is in	

	<p>shades of red, pink, blue, green, yellow, and purple. This artwork embodies cultural richness and artistic expression, adding an extra layer to its design.</p>	<p>an ultra-high-definition resolution, with a top-down view and a white background. The embroidery is</p>	
	<p>A traditional round cotton cap with colorful embroidery, adorned with pink and blue patterns against a white background. The intricate designs capture the essence of an ancient love song style, reminiscent of G Arteque, a designer from the Kalash Valley. This vibrant piece is perfect for adding an artistic touch to your outfit or as an artful display on any surface. High resolution, high quality, high detail, top view.</p>	<p>detailed and vibrant against the pure white backdrop, showcasing intricate designs in bright shades of red, pink, blue, green, yellow, and purple.</p>	
	<p>Overhead photo of an embroidered pink and white circular design with colorful embroidery on it, isolated on a transparent background. This pattern is often associated with traditional warriors' headwear called zivers or fithas in smaller sizes. It features symmetrical designs, showcasing vibrant colors like red, pink, blue, green, yellow, black, purple, and gray, which add depth to its appearance.</p>		
	<p>Embroidered round cap with pink and blue patterns on a white background, surrounded by colorful decorative elements. Traditional style, vibrant colors, and cultural fusion of nomadic cultures. Soft lighting, top-down angle, high resolution. High-quality photography. Digital camera photography. White isolated background.</p>		

Based on the practice results of the three modes (Imagine, Blend, Describe), an optimal workflow for traditional motif transformation can be summarized: The study outlines an optimal workflow for traditional motif transformation: first, use the Describe mode to extract visual features of the traditional motif; then, apply the Blend mode to combine traditional and modern elements; finally, utilize the Imagine mode to enhance the design, generating high-quality modernized patterns.

5.4 Overall Conclusions and Future Directions

The findings suggest that AIGC technologies offer significant advantages in the digital preservation of cultural symbols, enabling efficient and diversified expressions of traditional elements and expanding their application in modern design scenarios. Moreover, AIGC facilitates not only improved design efficiency but also creates new opportunities for the cross-cultural dissemination and dynamic transmission of cultural symbols.

However, the study also highlights limitations—particularly AIGC’s current inability to fully capture and express nuanced cultural meanings without human intervention, highlighting important areas for future technological refinement. Moving forward, it is essential to develop a more comprehensive database of traditional cultural

symbols, accompanied by the creation of indigenous AIGC software tailored to Chinese design. Enhancing parameter diversity and optimizing algorithms will better align designers with generative tools, ultimately enhancing their capabilities. By deeply integrating technology with cultural understanding, this approach can significantly contribute to the preservation and development of the Dong ethnic group's baby carrier traditions, while also serving as a model for the innovative expression of broader Chinese cultural symbols in a modern context.

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