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INNOVATIVE DESIGN OF CLOTHING AND FOOTWEAR USING EMBROIDERY PATTERNS OF THE CHINESE MIAO ETHNIC GROUP

In the article analyzes the elements, skeletons, and colors of Miao embroidery clothing products, decomposes the design elements of Miao embroidery clothing products and modern clothing products, summarizes the innovative design process, and proposes innovative design element matching schemes. The aim is to provide with design ideas for intangible cultural heritage clothing products,

to design garments that meet consumer demands and conform to modern aesthetics.

The following methods were used in the study of literature research and field investigation. It consults domestic and foreign literature on Guizhou Miao embroidery, Guizhou intangible cultural heritage, and Kansei engineering, and explores the history, techniques, patterns, and meanings of Guizhou Miao embroidery, and analyzes the shortcomings of existing research and the innovation points of this research. It visits Guizhou Miao villages and museums in person, collects digital samples of Miao embroidery clothing products, consults and interviews Miao embroidery inheritors, and obtains first-hand information.

The study presented is based on the Chinese intangible cultural heritage as the inheritance foundation, and explores the modernization development of Miao embroidery, and participates in the protection and promotion of Guizhou Miao embroidery. Starting from its cultural connotation and aesthetic characteristics, it extracts the matching elements suitable for clothing design, improves the design efficiency of clothing products, designs a series of clothing products, and realizes the visualization of design concepts.

This paper innovates the design of Miao embroidery clothing products from a Kansei perspective, and provides new design ideas for Guizhou Miao embroidery clothing products. Through questionnaire surveys, it obtains Kansei needs and preferences, determines the design improvement direction and methods of Miao embroidery clothing products, formulates feasible design strategies and innovative design models, improves consumers' acceptance of intangible cultural heritage embroidery clothing products, and thus achieves the purpose of inheriting and marketing Guizhou Miao embroidery patterns, which is feasible.

Key words: *innovative design, fashion and footwear design, design technology, intangible cultural heritage, Miao embroidery; patterns, product decoration.*

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ІННОВАЦІЙНИЙ ДИЗАЙН ОДЯГУ І ВЗУТТЯ З ВИКОРИСТАННЯМ ОРНАМЕНТІВ ВИШИВКИ КИТАЙСЬКОЇ ЕТНІЧНОЇ ГРУПИ МЯО

У статті проаналізовано елементи, композиційні типи та кольори одягу з вишивкою Мяо, охарактеризовано елементи дизайну одягу з вишивкою Мяо та сучасного одягу, узагальнено інноваційний дизайн-процес та запропоновано інноваційні схеми поєднання елементів дизайну. Мета полягає у представленні ідеї для дизайну одягу з використанням нематеріальної культурної спадщини, а також у розробці одягу, який відповідає вимогам споживачів і сучасній естетиці.

У дослідженні використано методи аналізу літератури та польових досліджень. Розглянуто вітчизняну та зарубіжну літературу про вишивку Мяо, нематеріальну культурну спадщину Гуйчжоу та інженерію Кансей, а також досліджено історію, техніку, візерунки та значення вишивки Мяо, визначено недоліки існуючих досліджень та інноваційні моменти цього дослідження. Авторка особисто відвідує села та музеї вишивки Мяо, збирає цифрові зразки вишитого одягу, консультується та бере інтерв'ю у спадкоємців вишивки Мяо, а також отримує інформацію з перших рук.

Представлене дослідження базується на китайській нематеріальній культурній спадщині, на модернізаційному розвитку вишивки Мяо, а також сприяє захисту та просуванню вишивки Гуйчжоу Мяо. Виходячи з її культурної конотації та естетичних характеристик, вона виокремлює відповідні елементи, придатні для дизайну одягу, підвищує ефективність дизайну виробів одягу, надає можливості розробки серії виробів одягу та взуття та реалізує візуалізацію дизайнерських концепцій.

Робота впроваджує інновації в дизайн вишитого одягу з елементами Мяо, а також пропонує нові ідеї дизайну для вишитого одягу Мяо. За результатами анкетних опитувань можна зазначити, що вишивка відповідає потребам та вподобанням споживачів, визначає напрямки та методи вдосконалення дизайну вишитого одягу, надає можливість формувати стратегії дизайну та інноваційні моделі дизайну, покращує сприйняття споживачами вишитого одягу з елементами нематеріальної культурної спадщини, і таким чином досягає мети успадкування та маркетингу візерунків вишивки Мяо.

Ключові слова: *інноваційний дизайн, дизайн одягу та взуття, дизайн-технології, нематеріальна культурна спадщина, вишивка Мяо; візерунки, оздоблення виробів.*

Problem Statement. China's intangible cultural heritage has sparked a craze in the world, especially in the design field. Designers have started to infuse intangible cultural heritage into modern products, bringing opportunities to Miao embroidery. However, Miao embroidery also faces some challenges, such as the impact of modern industry, the aesthetic lag of traditional Miao embroidery, etc. Therefore, it is necessary to explore the modern design path of Miao embroidery clothing products, and promote the development and inheritance of Miao embroidery. This paper analyzes the elements, skeletons, and colors of Miao embroidery clothing products, decomposes the design elements of Miao embroidery clothing products and modern clothing products, summarizes the innovative design process, and proposes innovative design element matching

schemes. The aim is to provide other designers with design ideas for intangible cultural heritage clothing products, and help them design clothing products that meet consumer needs and conform to modern aesthetics.

With the gradual attention and promotion of the «intangible cultural heritage» declaration related work by our country, Miao embroidery has ushered in its own «growth point» and «opportunity point». Since Guizhou Province issued the «Guizhou Province Ethnic Culture Protection Regulations» in 2012, Guizhou Province has designed a specific protection mode for the intangible cultural heritage of Guizhou Province from both «horizontal and vertical» aspects. Among the many ethnic cultural projects, Miao embroidery, as one of the unique forms of expression in the historical culture of the Miao people, was

included in the first batch of national intangible cultural heritage list in China as early as 2006. The protection and inheritance of Miao embroidery also needs to achieve the transformation from «blood transfusion» to «blood production», which not only relies on the support of the government, but also needs to explore the design mode with individual characteristics suitable for the background of the times.

Analysis of research. The domestic heat of Miao embroidery creative design is constantly rising. According to the results of data collection from CNKI, the current situation of innovative design mode of intangible cultural heritage handicraft is analyzed, such as Wei Zifan's «Regeneration Application of Lunlao Ethnic Embroidery Pattern in Packaging Design Based on Shape Grammar» (Wei Z., Li J., Chen S., 2022), and Liu Jing's «Regeneration Design Application Research of Qiang Embroidery Pattern Based on Shape Grammar», both of which use shape grammar to build innovative design mode, which can be roughly divided into three parts: collecting patterns, extracting core textures and pattern evolution, combining the design of ethnic minority patterns and computer automatic generation technology (Liu L., 2020). In Zhang Wanyu's article «Analysis and Innovative Design of Tang Dynasty Brocade Tuanke Pattern», she uses morphological grammar and split grammar to decompose and deduce the complex tuanke pattern, and finally builds the tuanke pattern inference model and carries out the innovative application of the pattern, applying the pattern scheme to modern silk products (Zhang W., Chen Y., Zhou C., 2021). In addition, in Wang Wei's article «Artistic Characteristics and Innovative Design of Liangshan Yi Nationality Traditional Costume Pattern», he uses the mind map proposed by British educator Tony Buzan to improve and establish the work knowledge map, combines the product attributes and expression demands, and endows the modern textile with cultural connotation and regeneration creativity from three aspects: «human care», «humanistic care» and «natural care» (Wang W., Wang Z., 2019). However, looking at the existing ethnic pattern improvement mode, most of them are directly redesigned with the help of shape grammar, which easily leads to homogenization and application of the phenomenon, lack of individuality for the pattern, so it is necessary to consider the characteristics of Guizhou Miao embroidery itself, to design an innovative design mode (Zheng M., 2015).

Purpose of the article. The aim of the study is to characterise the artistic and technological features of embroidery of the Miao ethnic group and to classify

the main patterns that can be applied in modern design.

Presentation of the main material.

1. *The artistic characteristics of Miao embroidery pattern.*

1.1. *Primitive classification.*

Decomposing the elements in the pattern, abbreviated as primitives, is to analyze the basic constituent units of Guizhou Miao embroidery patterns in combination with literature research (He J., 2015). According to the expression methods, they can be roughly divided into three types: abstract geometric primitives, concrete and semi-concrete primitives, and composite primitives. Abstract geometric primitives include single geometry, mixed geometry, and combined geometry. The basic abstract geometric primitives are water wave pattern, back pattern, well pattern, cloud pattern, cross pattern, diamond pattern, cone tooth pattern, and wan pattern. The birth of geometric primitives comes from two aspects. On the one hand, it originates from the Miao people's worship of nature and ancestors. These patterns evolve from the weather in nature, such as the water wave pattern representing rivers and the back pattern symbolizing clouds and thunder. On the other hand, geometric primitives have the characteristics of programmability and simplicity, which makes them more suitable for the decoration of the edges of basic Miao clothing products, and plays a role in enriching the embroidery surface.

Concrete and semi-concrete primitives, also known as quasi-figurative primitives, come from the realistic records of daily things by the Miao people in Guizhou. These primitives are mainly divided into three categories: plant, animal, and Chinese character inscriptions. Plant primitives mostly choose plants that are common or have auspicious meanings in the local area, such as peach blossoms and millet flowers, which are often selected and applied to clothing patterns because of their good meanings of having many children and blessings, and family prosperity. The animal primitives reflect the symbiotic relationship between the Miao people and other creatures, including domestic animals, such as cattle, horses, and sheep. It also includes totem auspicious animals, such as dragons, butterflies, and frogs.

Composite primitives are large primitives with a story-like quality that are composed of the above three types of primitives, and the themes involved are usually human daily life and ancient legends, with complete story plots and content. The composite primitives of the human daily life theme are usually related to some local agricultural activities or festival celebrations, such as «Jiubo Killing the Dragon»,

which depicts the image of the hero and the dragon: either the character holds a sharp blade, riding on the head or flying dragon (Zhong Y., Xu H. et al., 2016); or the character holds a club, standing in front of the dragon head. These patterns vividly show the intense battle scene, and introduce the origin of the Miao people from the perspective of mythology. According to the three main types of primitives divided into abstract geometry, concrete semi-concrete and composite primitives, find the representative patterns in the sample, and summarize them as shown in Table 1.

1.2. Features of the composition.

The skeleton is the core structure of the Miao embroidery pattern, divided into three types: single, symmetrical and continuous (Chai S., 2011). The single skeleton is divided into two types: central and free, which are often used for a complex and discontinuous pattern with the surroundings. This pattern has a high degree of integrity and independence, and does not require any other edge decoration. The central skeleton refers to the main pattern located in the center of the embroidery piece, showing a blank effect around, the visual effect is harmonious and unified, and has a very high stability,

they have a certain distance from the other patterns on the edge (Cao Y., Zhao L., 2014); the free skeleton refers to the random arrangement of each pattern on the embroidery piece, which looks free and casual, but does not lose the center of gravity, orderly in chaos, and not messy, forming a full and rich visual effect, as shown in Table 2.

Symmetrical patterns often present symmetrical geometric shapes such as squares, rectangles and triangles, which constitute the symmetrical skeleton of Miao embroidery, as shown in Table 2.

The continuous skeleton refers to the pattern that is arranged continuously and repetitively, with a rhythmic beauty that conforms to the law of motion, which can be subdivided into two-way continuous and four-way continuous. Two-way continuous, also called strip continuous, usually based on one or several basic elements, they regularly cycle infinitely in one or several directions on the strip plane.

1.3. Color matching mode.

Another uniqueness of Guizhou Miao embroidery is reflected in its color matching, which has the characteristics of cold and warm contrast, light and dark complementarity, imitating nature and symbolism (Liu Q., 2015). Light and dark complementarity is

Table 1

Miao Embroidery primitive type diagram





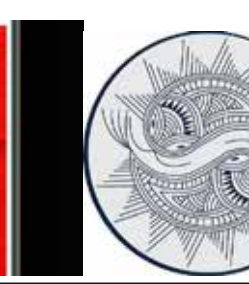

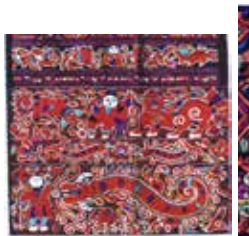
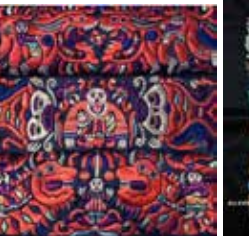



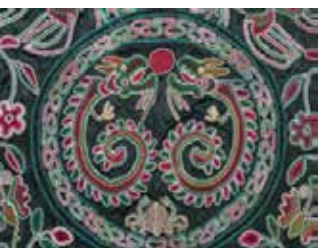

Primitive type	Primitive pattern		
Abstract geometric primitive			
Representational semi-representational primitive			
Combination primitive			

Table 2

Classification of types of compositional constructions

Composition type			
			
Separate form: Center type	Separate form: freestyle	Symmetric expression	Continuous type

another distinctive color feature of Miao embroidery, which often uses pure color high brightness as the main, medium brightness and low brightness as the auxiliary color principle, and often appears in the form of three primary colors and complementary colors. For example, when making embroidery with pure red as the base, the lines used will choose adjacent colors or low-purity contrast colors, thus blending different brightness colors, making the clothing look fresh and harmonious. The Miao people's perception and worship of nature, because the Miao embroiderers cannot understand the influence of external conditions such as light source, environment, etc. on the color of things, they will only intuitively observe the scenery and create based on their own color consciousness.

The embroidery created in this way has the same vitality and vitality as nature, reflecting the Miao people's preference for eye-catching and coordinated colors. In terms of the symbolism of Miao embroidery color matching, different color combinations give Miao embroidery different meanings. For different groups, scenes and seasons, embroiderers will choose different colors when making clothing. Take red as an example, as the most frequently used color by the Miao people, it is not only a symbol of auspiciousness, wealth, celebration and joy, but also represents vitality, youth and life, expressing the Miao people's enthusiastic personality and love for life, so it is mostly used for unmarried women and children's festival clothing. The blue-purple color that symbolizes heavy and mature beauty often appears in the clothing of married women and middle-aged and elderly groups, with a quiet and mature visual effect. The color of the Miao elders' clothing is mostly chosen to be more elegant and simple blue tones, giving a kind and friendly feeling.

2. Summary of innovative design process.

The process of innovative design of Miao embroidery patterns, refers to the protection and inheritance of traditional Miao embroidery patterns,

using modern design concepts and methods, to improve, refine, combine, deform and other creative processing of Miao embroidery patterns, to adapt to the needs of modern daily necessities design, showing the fashion charm and cultural value of Miao embroidery. The process of innovative design of Miao embroidery patterns, generally can be divided into the following steps:

Research and analysis: First, we need to conduct in-depth research and analysis on the history, techniques, colors, patterns, etc. of Miao embroidery, understand the cultural connotations and aesthetic characteristics of Miao embroidery, master the basic elements and rules of Miao embroidery, find out the strengths and weaknesses of Miao embroidery, and provide theoretical basis and material sources for innovative design.

Design conception: we need to determine the theme and style of the design according to the purpose, object, carrier, function, etc. of the design, combine the characteristics of Miao embroidery and the trend of modern aesthetics, propose the design creativity and plan, and form the preliminary conception and sketch of the design.

Design implementation: According to the design conception and sketch, select suitable Miao embroidery patterns or innovate the Miao embroidery patterns, use graphic design software or other tools, draw, fill, adjust, layout, etc. the Miao embroidery patterns, and complete the specific implementation and production of the design.

Design evaluation: we need to evaluate and feedback the design results, check whether the design effect meets the design goals and requirements, whether it reflects the characteristics and charm of Miao embroidery, whether it adapts to the needs of modern daily necessities design, whether it has innovation and artistry, and modify and improve the design according to the evaluation results.

3. Design scheme determination.

The innovative design scheme of Miao embroidery patterns in modern clothing products, starting from the design elements, exploring the design separately, and innovating the design of some basic design elements. The theme of this design scheme is called Bubble Fish, which is a creative pattern inspired by the Guizhou turbine pattern and the fish pattern, aiming to create a pattern design that can move freely in the water. The design inspiration comes from the shape change of the turbine pattern and the direction and shape change of the fish, which reflects the beauty and diversity of the underwater world. The purpose of this pattern is to bring more fun and imagination to people, by integrating the characteristics of the turbine pattern and the fish, showing the unique charm of Guizhou ethnic culture. This design aims to convey respect for the natural beauty and culture, while stimulating people's creativity and artistic inspiration.

The pattern design of Bubble Fish fully reflects the combination of creativity and imagination, as well as the respect and expression of Guizhou ethnic culture. This design not only shows the beautiful natural elements, but also implies the protection and cherish of nature and culture. The abstract geometric primitives are subjected to a series of simplification, deformation and combination operations, while retaining the original style of Miao

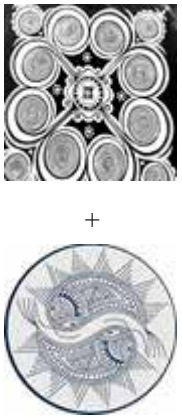
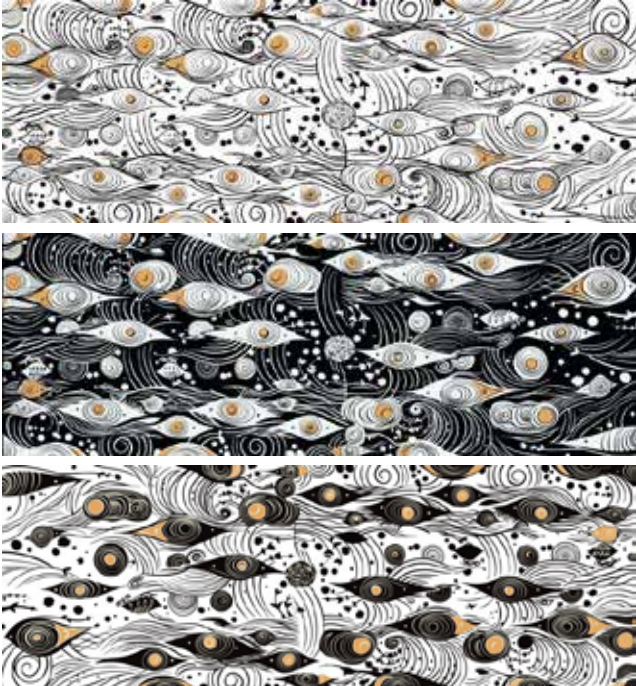

embroidery patterns, making them more modern in visual effects, thus continuing and inheriting the new situation of Guizhou Miao embroidery patterns. And for the relatively complex figurative and semi-figurative primitives, the main purpose is to preserve their integrity and recognizability, so only partial deformation or simplification is performed, making the pattern outline more complete and smooth. This design adopts a free-form skeleton, which means that the patterns are arranged randomly, looking free and casual, but not losing the center of gravity, orderly in chaos, mixed but not messy, forming a full and rich visual effect, as shown in Table 3.

The pattern and the color of the women's shoes are chosen from the complementary color scheme in the matching scheme, black and white, and then orange as the embellishment color, which does not break the overall visual effect of the clothing products, but also plays a role of contrast and increasing the color richness.

Conclusion. This paper seeks a way of integrating intangible cultural heritage elements with modern clothing products, and increasing consumers' identification. Based on the modern consumers' views on Miao embroidery clothing, it finds the integration path between them and modern clothing products, and achieves artistic integration at two levels: form and content. On the form level, it

Table 3

Innovative design

Seedling pattern prototype	design	Innovative clothing design
		

inherits the aesthetic characteristics and exquisite and complex Miao embroidery techniques of Guizhou Miao embroidery, and uses artistic exaggeration and partial depiction to give consumers a strong visual impact. On the content level, it enriches and enhances the intangible cultural heritage, and displays the Miao culture through unique shapes and traditional Miao embroidery techniques, highlighting the aesthetic appeal, increasing consumers' identification with the intangible cultural heritage clothing products, and promoting the development of regional ethnic tourism products in Guizhou.

This article argues that Miao embroidery is an important expression form of Miao culture, with high artistic value and innovation potential. It also analyzes

the artistic characteristics of Miao embroidery clothing products, mainly including the constituent elements, application principles and color expression, and finds that Miao embroidery clothing products are characterized by abstract geometry, balance and complementary color. Based on the previous analysis, the design direction of Miao embroidery clothing is determined, that is, to design Miao embroidery accessories suitable for daily wear, highlighting the abstract geometric and complementary color features of Miao embroidery, showing the mystery, fashion and neutrality of Miao embroidery. This design practice not only shows the artistic charm of Miao embroidery, but also provides new ideas and methods for the innovative design of Miao embroidery patterns.

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