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## **TYPOLOGICAL ANALYSIS AND CLASSIFICATION OF ETHNIC PATTERNS IN DIGITAL FASHION DESIGN CONTEXTS**

*In the context of digital transformation in fashion design, the interpretation and application of ethnic patterns face increasing demands for systematic classification and semantic adaptability. This study aims to construct a typological system for ethnic patterns that bridges traditional cultural meaning with digital design practices. This study proposes a new typological classification system for ethnic patterns in digital fashion contexts. The system integrates three dimensions: visual structure, symbolic meaning, and media adaptability. It addresses limitations in existing classification models that focus only on region or form, and builds a model applicable to digital generation and cross – cultural communication. A combination of visual analysis, pattern deconstruction, symbolic interpretation, and digital adaptability assessment was employed to build a four – category, eight – subcategory classification model. The categories include geometric – constructive, natural – representational, abstract – transformative, and symbolic – referential types, each refined according to structural characteristics and cultural connotations. Sample analysis demonstrated that different types of motifs have different uses: Geometric patterns are ideal for AI training and repeatable design, while Natural and Abstract motifs are better for fashion storytelling and dynamic visuals. Symbolic motifs are effective in building cultural identity and branding. Based on more than 60 ethnic pattern samples, the study validates the typology through comparative case analysis and demonstrates its operability in AI – based pattern generation, modular design workflows, and cultural storytelling. Compared to existing classification systems, the proposed framework incorporates a media – adaptive and symbolically rich approach, enhancing its relevance in digital fashion design and visual communication. The research provides a foundational method for pattern recognition, database construction, and cross – cultural dissemination of ethnic motifs in digital environments. In addition, the model bridges gaps in media communication and platform adaptability. It can support cultural heritage visualization, AI – generated pattern databases, and intelligent design applications. Future research may explore algorithmic implementation of the system and its role in AR, virtual fashion, and digital heritage platforms.*

**Key words:** *fashion design, digital fashion, pattern semantics, cultural encoding, symbolic structure, digital motif generation, media adaptability, ethnic visual heritage.*

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## ТИПОЛОГІЧНИЙ АНАЛІЗ ТА КЛАСИФІКАЦІЯ ЕТНІЧНИХ ОРНАМЕНТІВ У КОНТЕКСТАХ ЦИФРОВОГО ДИЗАЙНУ КОСТЮМА

У контексті цифрової трансформації в дизайні одягу, інтерпретація та застосування етнічних візерунків стикаються зі зростаючими вимогами до систематичної класифікації та семантичної адаптивності. Це дослідження має на меті побудувати типологічну систему для етнічних візерунків, яка поєднує традиційне культурне значення з практиками цифрового дизайну. Система інтегрує три виміри: візуальну структуру, символічне значення та адаптивність медіа. Вона враховує обмеження існуючих моделей класифікації, які зосереджені лише на регіоні чи формі, та створює модель, застосовну до цифрової генерації та міжкультурної комунікації. Для побудови моделі класифікації з чотирма категоріями та вісьмома підкатегоріями було використано комбінацію візуального аналізу, деконструкції візерунків, символічної інтерпретації та оцінки цифрової адаптивності. Категорії включають геометрично-конструктивні, природно-репрезентативні, абстрактно-трансформативні та символічно-референційні типи, кожен з яких уточнюється відповідно до структурних характеристик та культурних конотацій. Аналіз вибірки показав, що різні типи мотивів мають різне використання: геометричні візерунки ідеально підходять для навчання штучного інтелекту та повторюваного дизайну, тоді як природні та абстрактні мотиви краще підходять для розповіді модних історій та динамічних візуальних елементів. Символічні мотиви ефективні для побудови культурної ідентичності та брендингу. На основі понад 60 зразків етнічних візерунків дослідження перевіряє типологію за допомогою порівняльного аналізу випадків та демонструє її працездатність у генерації візерунків на основі штучного інтелекту, модульних робочих процесах дизайну та культурному сторітеллінгу. Порівняно з існуючими системами класифікації, запропонована структура включає медіаадаптивний та символічно насичений підхід, що підвищує її актуальність у цифровому дизайні одягу та візуальній комунікації. Дослідження пропонує фундаментальний метод для розпізнавання візерунків, побудови баз даних та міжкультурного поширення етнічних мотивів у цифровому середовищі. Крім того, модель усуває прогалини в медіакомунікації та адаптивності платформи. Вона може підтримувати візуалізацію культурної спадщини, бази даних візерунків, згенеровані штучним інтелектом, та програми інтелектуального дизайну. Майбутні дослідження можуть дослідити алгоритмічну реалізацію системи та її роль у доповненій реальності (AR), віртуальній моді та платформах цифрової спадщини.

**Ключові слова:** дизайн одягу, цифрова мода, семантика візерунків, культурне кодування, символічна структура, генерація цифрових мотивів, адаптивність медіа, етнічна візуальна спадщина.

**Introduction.** In recent years, there has been growing global awareness of the need to protect intangible cultural heritage. Ethnic patterns have become a key visual symbol of cultural identity and historical memory. These patterns have attracted attention from many fields such as design, computing, and semiotics. In the past five years, many studies have focused on the structure, meaning, and communication of ethnic patterns. For example, Shomirzayev (Shomirzayev, 2020) and Rudenko & Ivanova (Rudenko & Ivanova, 2023) studied folk art and found that these patterns reflect local culture and offer ways to recognize its uniqueness; described ethnic patterns as important

tools for expressing group identity, especially in minority language cultures.

With the fast development of digital design and artificial intelligence, more researchers are working on data collection, modeling, and automatic recognition of ethnic patterns. Liu et al. (Liu, 2023), Huang (Huang, 2024), and Chen (Chen, 2022) introduced methods for style feature extraction, semantic tagging, and pattern generation using GANs. These works offer technical solutions for re-creating ethnic patterns in digital form. However, most of these studies focus on visual techniques. They do not provide enough analysis from a typological or classification

point of view. Also, many current systems still rely on regional or stylistic groupings. They lack unified structural standards and clear classification models (Zhou, 2024; Tang, 2024). First, the study reviews recent research (within the past five years) on ethnic pattern structure, visual language, cultural meaning, and digital transformation. Based on this review, the study extracts useful classification dimensions and builds a structural logic for the system. It refers to work by Das and Sudha (Das & Sudha, 2020), Zhou (Zhou, 2024), and Wu (Wu, 2023). These scholars discussed pattern composition and meaning in traditional art. The study summarizes three key dimensions for analysis: composition structure, symbolic meaning, and media adaptability.

This paper reviews 17 recent studies and builds a typology system for ethnic patterns. It is based on three main dimensions: structure, symbolic meaning, and media adaptability.

**The aim of the article.** The aim of research is to explore how different pattern types work in digital design and how they can be used in new ways. This paper tries to fill the gap in structural and semantic analysis and offers a framework for using cultural patterns in fashion design. The main innovation is the creation of a full typological system. It builds a bridge between traditional ethnic designs and AI – based visual design.

**Research analysis.** In recent years, the typological study of ethnic patterns has moved beyond formal aesthetics. Researchers are now exploring cultural meanings and digital transformation. Through fieldwork and visual analysis, she showed that patterns are not only decorative but also act as “visual texts” for ethnic memory. Shomirzayev (Shomirzayev, 2020) analyzed traditional embroidery in Central Asia, including Uzbekistan and Tajikistan. He identified five basic types of patterns: plant, animal, object, geometric, and Islamic script. His work revealed both the shared and different features of pattern aesthetics and religious culture.

In China, Kong et al. (Kong, 2024) studied the patterns on traditional clothing across five dialect groups of the Li ethnic group. They created a model connecting pattern location, type, and cultural meaning. They stressed the importance of how patterns are placed and their narrative function. Nesen (Nesen, 2024) looked at how Ukrainian folk art patterns are classified. She proposed that the classification should include not only style but also materials, tools, and regional context. This led to a three – dimensional model: material–pattern–function. Patel (Patel, 2022) explored the link between Indian architectural decoration and pattern design. He showed how symbols

from buildings are transformed into textile designs. His study highlights the relationship between symbol source, cultural continuity, and visual expression.

A recent trend in pattern studies is the focus on digital translation and visualization systems. Liu et al. (Liu, 2023) used fuzzy clustering and convolutional neural networks to analyze style features in traditional patterns. They showed that geometric structures and semantic tags can be used in AI training datasets. This work set the base for pattern generation using AI. Huang (Huang, 2024) added symbolic tags into a pattern recognition system. These tags improved the system’s ability to recognize and sort pattern styles. Zhang (Zhang, 2024) used a visual symbol network to model ethnic patterns in three levels: graphic unit, combination structure, and visual meaning. This helps build AI design platforms.

In the field of cross – media transmission and symbolic reconstruction, Lee (Lee, 2023) studied Korean patterns in metaverse fashion. She found that cultural recognizability and interaction are key to redesigning patterns in digital spaces. Kim (Kim, 2023) introduced the idea of «pattern behavior». He believes that patterns are not only static shapes but also flexible and interactive cultural units in virtual environments.

**Results and Discussion.** This study uses a multi – phase and cross – method approach. The goal is to build a typological classification framework that is both theoretically sound and practically useful for ethnic patterns. The research follows three main paths:

– **Case Image Collection and Feature Extraction.** Following the classification strategies used by Kong et al. (Kong, 2024) for Li ethnic clothing and the clustering method from Tang (Tang, 2024), this study collects over 60 typical ethnic pattern samples. These patterns come from the Miao, Tibetan, Li, and Naxi groups. The images are processed using Photoshop and Adobe Illustrator for vectorization. Then, the study applies a visual structure decomposition method. It identifies basic design units, such as geometric shapes, symmetry lines, and symbol combinations.

– **Pattern Modeling and Validation.** Inspired by Liu et al. (Liu, 2023) and Huang (Huang, 2024), the collected patterns are grouped based on visual form (geometric, representational, or mixed), symbolic meaning (abstract, totemic, or emblematic), and media usage (clothing or digital platforms). This leads to a classification system with four main types and eight subtypes. To test its validity, four comparison cases are used. These follow the semantic classification standards suggested by Gao (Gao, 2023) etc.

– In summary, this study uses both qualitative and quantitative methods. It combines symbol decoding

and image recognition to ensure the system is practical for digital design and rich in cultural meaning.

– **Construction of a Typological System for Ethnic Patterns.** To build a typological system suitable for digital fashion design, this study analyzed over 60 representative ethnic patterns. These patterns were collected from Chinese ethnic groups including Tibetan, Miao, Naxi, and Mongolian communities. The study applied image feature extraction, structural analysis, and semantic coding. It focused on four main dimensions: composition logic, visual form, symbolic meaning, and adaptability in digital design. Based on this, a classification framework was developed with four major types and eight subtypes.

Each main category is divided into two subcategories based on composition structure and symbolic complexity. For example, Category A (Geometric Constructive) is divided into A1 «Regular Repetition» and A2 «Combined Overlap». Category C (Abstract Transformative) includes C1 «Symbolic Assembly» and C2 «Structural Distortion». In Category D, D1 refers to «Totemic Symbolism», which reflects cultural memory, while D2 refers to «Religious Script Type», which focuses on sacred text or faith – related symbols.

This classification system maintains visual and aesthetic logic while also considering digital adaptability and semantic encoding ability. It offers useful tools for tasks such as tagging training sets, building image databases, and generating digital fashion patterns.

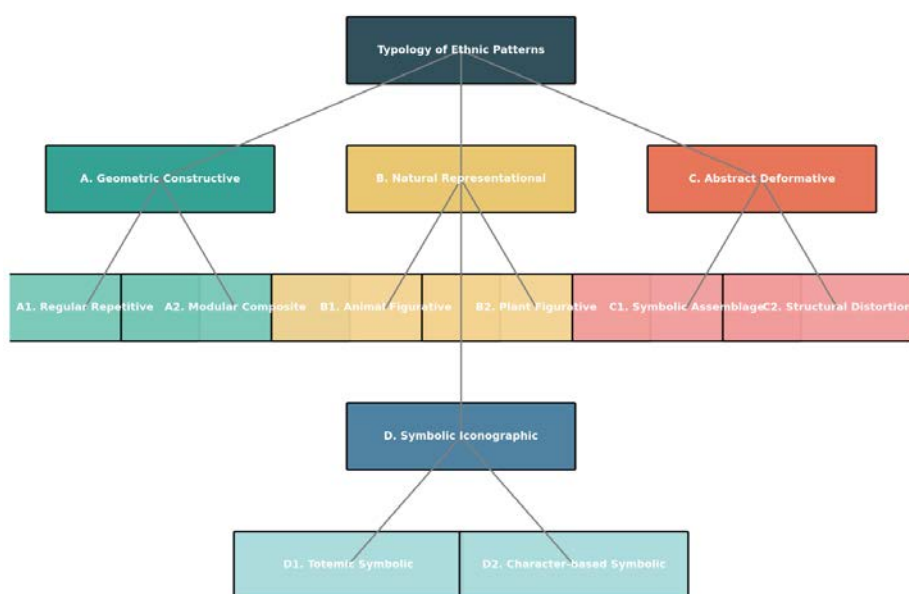
**Case Analysis and Typological Validation.** To test the practical value and clarity of the classification

system, this study selected four representative ethnic pattern samples. Each sample was analyzed in terms of structural features, visual meaning, and digital adaptability. The chosen samples represent different types – geometric, natural, abstract, and symbolic. All have strong traditional cultural identity and distinct visual features.

**Sample 1: Geometric Pattern on Bouyei Traditional Costume.** This pattern shows central symmetry and repeated structure. Its edges are clear and its layout is highly regular, matching the features of type A1 «Regular Repetition». On AI – assisted design platforms, it performs well with stable layer separation and vector edge recognition. It is suitable for modular pattern design, architectural decoration, and ceremonial clothing.

**Sample 2: Natural Embroidery Motif from the Naxi People.** The pattern uses seaweed flowers and snow – capped mountains as its main elements. The composition is asymmetric and the shapes are realistic, expressing a connection between nature and mythology. It fits type B2 «Representational Realism». This pattern works well in storytelling – based fashion design or cultural creative products. It has strong narrative power and cultural impact.

**Sample 3: Abstract Flame Motif from Dunhuang Murals.** This pattern shows strong rotation, overlap, and curved deformation. It has high visual energy and color gradient effects, falling under type C2 «Structural Distortion». In digital re – design, it can be used to create motion graphics, such as dynamic backgrounds in fashion shows or layered visuals in XR interactive experiences.



**Fig. 1. Typological Tree of Ethnic Pattern Classification**

Source: compiled by the authors.



**Sample 4: Totemic Symbol Pattern from Miao Brocade.** This pattern features strong totemic structure, symmetry, and dense symbolic visuals. It clearly shows cultural encoding and belongs to type D1 «Totemic Symbolism». It is suitable for cultural badges, tourism – related products, and exhibition design. It helps reinforce ethnic identity and promote cultural symbols.

These sample analyses show that patterns can be accurately categorized using the proposed system. The system also highlights their different visual behaviours and digital applications. This proves the classification's scientific value in structural recognition and semantic expression.

**Comparison with Previous Studies.** This study's classification system for ethnic patterns focuses not only on form and structure but also on media adaptability and potential for creative re – design in digital environments. It shows both theoretical innovation and practical value.

First, traditional studies often categorize patterns based on region or artistic style. For example, Rudenko & Ivanova (Rudenko & Ivanova, 2023) treat patterns as fixed within cultural areas, focusing on folk art traditions. In contrast, this study examines patterns in the context of digital visualization and AI – based re – creation. By establishing a «Geometric–Regular

Repetition» type and linking it to pattern generation tags, this research solves the limitations of traditional systems for AI modeling (Chen, 2022; Zhang, 2024).

Previous classification studies mostly focused on visual forms or regional styles. For example, Wang (Wang, 2025) classified Dunhuang geometric patterns into the «ordered symmetry» group. However, her study did not analyze the adaptability of these patterns in digital generative systems. In contrast, this paper defines a subclass «A1–Regular Repetition Type» and aligns it with AI design workflows, which supports pattern generation in modular design and architectural ornamentation.

From a cultural semiotics perspective, Qiu et al. (Qiu, 2023) emphasized the aesthetic of cultural fusion and visual narrative of ethnic motifs. However, their work lacked hierarchical analysis of symbolic meanings. Our study introduces a major category «Symbolic Type», subdivided into «Totemic Symbol» and «Character Symbol» groups. This approach reflects the diverse religious beliefs and cultural identities of different ethnic groups.

This classification system is also complementary to Liu et al. (Liu, 2023), who developed a fuzzy recognition model for ethnic pattern clustering. Their system supports automated classification using convolutional neural networks. In contrast, our study pro-

Table 1

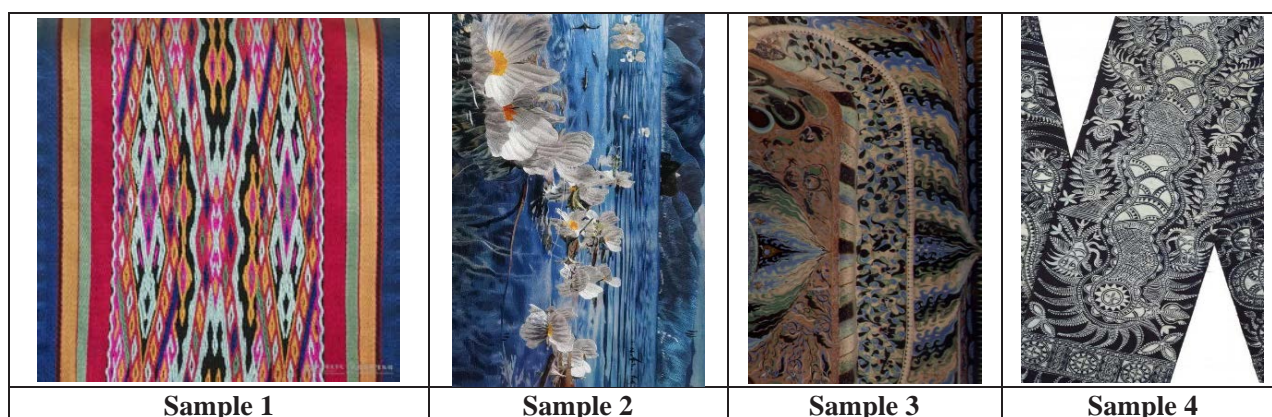
Ethnic Pattern Typology: Subcategories and Characteristics

Subtype Code	Subtype Name	Structural Features	Symbolic Meaning	Digital Application	Representative Pattern
A1	Regular Repetition Type	Standard geometric repetition, grid layout	Cosmic order, sense of rhythm	AI pattern training, layer segmentation	Miao brocade check pattern
A2	Modular Combination Type	Modular stitching, layered composition	Harmony and unity	Architectural facades, hybrid pattern generation	Mongolian lacquerware layout
B1	Botanical Theme Type	Plant and floral motifs, natural growth structure	Ecological reverence	Printed fabrics, interactive wall surfaces	Dai lotus motif
B2	Figurative Animal Type	Animal images like deer, eagle, fish	Life worship, totemic beliefs	Suitable for narrative fashion design	Naxi embroidery
C1	Symbolic Assembly Type	Symbolic unit modules forming abstract semantics	Emotional symbolism	Modular design and graphic recombination	Yi symbolic codes
C2	Structural Distortion Type	Element distortion and recomposition, strong visual tension	Soul manifestation	Dynamic visual transformation, immersive design	Dunhuang flame motif
D1	Totemic Symbol Type	Iconic structure with cultural symbolism	Ethnic identity	Logo systems, commemorative badges	Miao butterfly mother
D2	Religious Script Type	Includes scriptures, characters, and sacred symbols	Ancestral heritage	Info – totems, cultural storytelling systems	Tibetan Eight Treasures symbol

Source: compiled by the authors.

Table 2

## Comparative Analysis of Sample Case Images



*Note: Sample 1 – Bouyei Traditional Costume, Sample 2 – Natural Embroidery Motif from the Naxi People, Sample 3 – Abstract Flame Motif from Dunhuang Murals, Sample 4 – Totemic Symbol Pattern from Miao Brocade*

*Source: Sample 3 – Digital Dunhuang; Sample 1 and 4 – Museum of Ethnic Costumes, Beijing Institute of Fashion Technology; <https://p3.itc.cn/images01/20230415/79d64f33b52e40fa94188b53eace7681.jpeg>*

vides a manually interpretable label system with clear semantic logic. Together, these models can support AI training set labeling and pattern recognition in visual cultural databases. Further, Padricelli & Punziano (Padricelli & Punziano, 2023) called for a multi – dimensional typological model that integrates composition, semantics, and media behavior. This idea supports our "media – adaptive" framework, which classifies patterns based on visual form, symbolic meaning, and their performance across digital platforms. Senkāne & Laganovska (Senkāne & Laganovska, 2023) proposed a visual semiotic triangle that describes the dynamic relationship between form, content, and context in ethnic design. This model aligns closely with our approach in differentiating symbolic types and abstract deformations. Shiyang & Kolosnichenko (Shiyang & Kolosnichenko, 2024) analyzed Miao embroidery using structural semiotics. Their research revealed how visual symbols map onto religious memories, which supports our division between «Totemic Symbols» and «Character Symbols». Qian et al. (Qian, 2019) studied Kyrgyz Yormac textile patterns and built a library of visual elements such as horn, eagle, and geometric motifs. Their analysis of symmetry and frequency helped refine our classification logic, especially in identifying repeatable and culturally meaningful structures. Moniruzzaman et al. (Moniruzzaman, 2021) emphasized pattern migration and visual modeling in intercultural contexts. Our typological model responds to this by establishing a triadic structure of «Type – Meaning – Application», which supports cross – cultural adaptation. Liu & Lu (Liu & Lu, 2024) proposed a deep learning – based evaluation model of visual similarity in brocade patterns. Their work validates

the computational potential of typological categories, and improves the compatibility of our system in intelligent retrieval platforms.

**Conclusions.** This study proposes a new typological classification system for ethnic patterns in digital fashion contexts. The system integrates three dimensions: visual structure, symbolic meaning, and media adaptability. It addresses limitations in existing classification models that focus only on region or form, and builds a model applicable to digital generation and cross – cultural communication.

We identified four major types – Geometric Construction, Natural Realism, Abstract Deformation, and Symbolic Patterns – and refined them into eight subtypes. This structure corresponds to the cultural logic, the narrative depth discussed by Das & Sudha (2020), and the computational techniques from Liu et al. (2023) and Huang (2024).

Sample analysis demonstrated that different types of motifs have different uses: Geometric patterns are ideal for AI training and repeatable design, while Natural and Abstract motifs are better for fashion storytelling and dynamic visuals. Symbolic motifs are effective in building cultural identity and branding. Liu & Lu (Liu & Lu, 2024) argued that visual computability is key to smart design. Our model offers a visually interpretable and semantically clear structure that meets this need.

In addition, the model bridges gaps in media communication and platform adaptability. It can support cultural heritage visualization, AI – generated pattern databases, and intelligent design applications.

Chen et al. (Chen, 2024) highlighted the role of ethnic motifs as carriers of collective memory, not just decoration. Our model reflects this by focusing on symbol layers and contextual meaning. Chen (Chen,

2025) noted that entering digital platforms requires both structural logic and cultural storytelling. Our model responds with a structured typology that supports digital regeneration and global sharing.

Future research may explore algorithmic implementation of the system and its role in AR, virtual fashion, and digital heritage platforms.

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## BIBLIOGRAPHY

1. Chen, J. Cultural heritage and artistic innovation of decorative patterns: A case study of contemporary fiber art. *Mediterranean Archaeology and Archaeometry*, 2025. №25 (3), P. 256–266.
2. Chen, L., Mohamad Daud, W. S. A., & Md Arif, M. F. B. Examining Chinese Hainan Miao ethnic patterns: Embracing nature's influence through ecological themes, shapes, and colors in design. *ArtsEduca*, 2024. Vol. 41 (October), P. 122–136.
3. Chen, Y. Generative Adversarial Networks for the Innovation of Miao Ethnic Motifs. *Computers & Graphics*, 2022. Vol. 107, P. 134–143. <https://doi.org/10.1016/j.cag.2022.04.008>
4. Das, P., & Sudha, P. Typology of folk painting motifs in India: A comparative study. *South Asian Journal of Arts and Aesthetics*, 2020. Vol. 2 (1), P. 34–48.
5. Gao Xia, Yezhova O. Chinese traditional patterns and totem culture in modern clothing design. *Art and Design*. 2023. №2 (22). P. 20–30. <https://doi.org/10.30857/2617-0272.2023.2.2>
6. Huang, M. Semiotic – based annotation and classification of ethnic motifs in fashion design. *International Journal of Fashion Design, Technology and Education*, 2024. № 17 (1), P. 23–31.
7. Kim, J. The behavioral pattern of cultural motifs in digital fashion systems. *Fashion and Textiles*, 2023. № 10, 28.
8. Kong, X., Liao, Q., & Yang, C. Comprehensive analysis of Li ethnic clothing based on five major dialects and its application in modern fashion design. *Fibres & Textiles in Eastern Europe*, 2024. № 32 (2), P. 17–32.
9. Lee, S. Traditional Korean motifs in the metaverse: Opportunities for digital heritage. *Digital Applications in Archaeology and Cultural Heritage*, 2023. Vol. 30, e00265.
10. Liu, H., Zhang, J., & Chen, Y. Ethnic motif recognition and classification based on fuzzy clustering and convolutional neural networks. *Pattern Recognition Letters*, 2023. Vol. 170, P. 56–64. <https://doi.org/10.1016/j.patrec.2023.03.002>
11. Liu, S., & Lu, H. Evaluating the visual similarity of Southwest China's ethnic minority brocade based on deep learning. *Computer – Aided Design and Applications*, 2024. № 21 (S7), P. 107–122.
12. Moniruzzaman, M., Nizam, M. E. H., Hasan, M. T., Karim, M. A., Shammi, M. A., & Raisa, L. N. Comparative analysis of China (Han) & Bangladesh cultural authentication and transformation context on “Motif Design”. *Journal of Textile Engineering & Fashion Technology*, 2021. № 7 (1), P. 1–10. <https://doi.org/10.15406/jteft.2021.07.00261>
13. Nesen, I. Ukrainian works of folk art through the prism of scientific attribution. *Notes on Art Criticism*, 2024. № 24 (1), P. 14–22. <https://doi.org/10.63009/noac/1.2024.14>
14. Padricelli, G. M., & Punziano, G. Ethnography and the digital scenario: A typological scheme of differences and evolutionary trajectories. *Frontiers in Sociology*, 2023. № 8, Article 1037359. <https://doi.org/10.3389/fsoc.2023.1037359>
15. Patel, N. The impact of architecture embellishment on traditional motifs: A study. *International Journal for Research in Applied Science & Engineering Technology*, 2022. Vol. 10 (12), P. 1766–1773. <https://doi.org/10.22214/ijraset.2022.48300>
16. Qian, J., Xiao, A., Xin, X., & He, M. Pattern Primitive Library Construction and Feature Analysis of Kirgiz Textile Pattern. *Humanities and Social Sciences*, 2019/ № 7 (6), P. 185–190. <https://doi.org/10.11648/j.hss.20190706.11>
17. Rudenko, Y., & Ivanova, L. Attribution of local Ukrainian ornament and its importance in national heritage. *Journal of Cultural Heritage Studies*, 2023. № 12 (3), P. 91–101.
18. Senkāne, O., & Laganovska, K. Visual Semiotics in the Study of Art Phenomena: Symbol and Symptom. *Society. Integration. Education*, May 26, 2023, Vol. II, 366–377. <https://doi.org/10.17770/sie2023vol2.7148>
19. Shiyang, W., & Kolosnichenko, O. V. Study of Miao Embroidery: Semiotics of Patterns and Artistic Value. *Art and Design*, 2024. № 3 (27), P. 98–109. <https://doi.org/10.30857/2617-0272.2024.3.8>
20. Shomirzayev, M. Kh. Ethnic characteristics of national traditional crafts. *European Journal of Research and Reflection in Educational Sciences*, 2020. № 8 (12), P. 216–225.
21. Tang, L. Ethnic pattern evolution and style migration: A clustering approach. *Journal of Design Morphology*, 2024. № 16 (2), P. 102–113.
22. Wu, J. Structural analysis of ethnic visual symbols: A typological perspective. *Visual Communication Studies*, 2023. № 21 (1), P. 79–91.
23. Zhang, Y. Visual Symbol Networks and Multi – layer Pattern Modeling for AI – generated Ethnic Motifs. *Design Studies*, 2024. Vol. 88, 102172.
24. Zhou, H. Evolution of ethnic patterns in Chinese folk art: A cultural memory perspective. *Journal of Art History and Theory*, 2024. № 29 (2), P. 11–22.



## REFERENCES

1. Chen, J. (2025). Cultural heritage and artistic innovation of decorative patterns: A case study of contemporary fiber art. *Mediterranean Archaeology and Archaeometry*, 25 (3), 256–266.
2. Chen, L., Mohamad Daud, W. S. A., & Md Arif, M. F. B. (2024). Examining Chinese Hainan Miao ethnic patterns: Embracing nature's influence through ecological themes, shapes, and colors in design. *ArtsEduca*, 41 (October), 122–136.
3. Chen, Y. (2022). Generative Adversarial Networks for the Innovation of Miao Ethnic Motifs. *Computers & Graphics*, 107, 134–143. <https://doi.org/10.1016/j.cag.2022.04.008>
4. Das, P., & Sudha, P. (2020). Typology of folk painting motifs in India: A comparative study. *South Asian Journal of Arts and Aesthetics*, 2 (1), 34–48.
5. Gao Xia, Yezhova O. (2023). Chinese traditional patterns and totem culture in modern clothing design. *Art and Design*. 2 (22). 20–30. <https://doi.org/10.30857/2617-0272.2023.2.2>
6. Huang, M. (2024). Semiotic – based annotation and classification of ethnic motifs in fashion design. *International Journal of Fashion Design, Technology and Education*, 17 (1), 23–31.
7. Kim, J. (2023). The behavioral pattern of cultural motifs in digital fashion systems. *Fashion and Textiles*, 10, 28.
8. Kong, X., Liao, Q., & Yang, C. (2024). Comprehensive analysis of Li ethnic clothing based on five major dialects and its application in modern fashion design. *Fibres & Textiles in Eastern Europe*, 32 (2), 17–32.
9. Lee, S. (2023). Traditional Korean motifs in the metaverse: Opportunities for digital heritage. *Digital Applications in Archaeology and Cultural Heritage*, 30, e00265.
10. Liu, H., Zhang, J., & Chen, Y. (2023). Ethnic motif recognition and classification based on fuzzy clustering and convolutional neural networks. *Pattern Recognition Letters*, 170, 56–64. <https://doi.org/10.1016/j.patrec.2023.03.002>
11. Liu, S., & Lu, H. (2024). Evaluating the visual similarity of Southwest China's ethnic minority brocade based on deep learning. *Computer – Aided Design and Applications*, 21 (S7), 107–122.
12. Moniruzzaman, M., Nizam, M. E. H., Hasan, M. T., Karim, M. A., Shammi, M. A., & Raisa, L. N. (2021). Comparative analysis of China (Han) & Bangladesh cultural authentication and transformation context on “Motif Design”. *Journal of Textile Engineering & Fashion Technology*, 7 (1), 1–10. <https://doi.org/10.15406/jteft.2021.07.00261>
13. Nesen, I. (2024). Ukrainian works of folk art through the prism of scientific attribution. *Notes on Art Criticism*, 24 (1), 14–22. <https://doi.org/10.63009/noac/1.2024.14>
14. Padricelli, G. M., & Punziano, G. (2023). Ethnography and the digital scenario: A typological scheme of differences and evolutionary trajectories. *Frontiers in Sociology*, 8, Article 1037359. <https://doi.org/10.3389/fsoc.2023.1037359>
15. Patel, N. (2022). The impact of architecture embellishment on traditional motifs: A study. *International Journal for Research in Applied Science & Engineering Technology*, 10 (12), 1766–1773. <https://doi.org/10.22214/ijraset.2022.48300>
16. Qian, J., Xiao, A., Xin, X., & He, M. (2019). Pattern Primitive Library Construction and Feature Analysis of Kirgiz Textile Pattern. *Humanities and Social Sciences*, 7 (6), 185–190. <https://doi.org/10.11648/j.hss.20190706.11>
17. Rudenko, Y., & Ivanova, L. (2023). Attribution of local Ukrainian ornament and its importance in national heritage. *Journal of Cultural Heritage Studies*, 12 (3), 91–101.
18. Senkāne, O., & Laganovska, K. (2023). Visual Semiotics in the Study of Art Phenomena: Symbol and Symptom. *Society. Integration. Education*, May 26, 2023, Vol. II, 366–377. <https://doi.org/10.17770/sie2023vol2.7148>
19. Shiyang, W., & Kolosnichenko, O. V. (2024). Study of Miao Embroidery: Semiotics of Patterns and Artistic Value. *Art and Design*, 3 (27), 98–109. <https://doi.org/10.30857/2617-0272.2024.3.8>
20. Shomirzayev, M. Kh. (2020). Ethnic characteristics of national traditional crafts. *European Journal of Research and Reflection in Educational Sciences*, 8 (12), 216–225.
21. Tang, L. (2024). Ethnic pattern evolution and style migration: A clustering approach. *Journal of Design Morphology*, 16 (2), 102–113.
22. Wu, J. (2023). Structural analysis of ethnic visual symbols: A typological perspective. *Visual Communication Studies*, 21 (1), 79–91.
23. Zhang, Y. (2024). Visual Symbol Networks and Multi – layer Pattern Modeling for AI – generated Ethnic Motifs. *Design Studies*, 88, 102172.
24. Zhou, H. (2024). Evolution of ethnic patterns in Chinese folk art: A cultural memory perspective. *Journal of Art History and Theory*, 29 (2), 11–22.

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