

A Study on Traditional Chinese Geometric Patterns Based on Morris Semiotics: A Case Study of Turtle Back Patterns

¹zhaowen li
(zhaowenli62@gmail.com).

²Choi Albert Young
(aychoi@hanyang.ac.kr)

ABSTRACT :The study explores traditional Chinese geometric patterns, focusing on the turtle back pattern, through Morris's semiotics theory. It aims to analyze these patterns' syntactic, semantic, and pragmatic dimensions to understand their cultural significance and contemporary design relevance. By combining qualitative analysis of historical texts and artifacts with semiotic analysis, the research bridges ancient symbolism and modern design, highlighting the turtle back pattern's deep cultural roots and its innovative application in modern design contexts.

KEYWORDS:cultural symbols ,Morris semiotics, parametric design, traditional Chinese geometric patterns, turtle back patterns,

I. INTRODUCTION

1.1Background and Implications

This research initiates a thorough investigation into the complex domain of traditional Chinese geometric patterns, focusing specifically on the turtle back pattern, a design of profound cultural importance and historical richness. These patterns transcend simple ornamentation, embodying deep symbolic significance that reflects the philosophical, spiritual, and societal norms of ancient Chinese society. As a perennial visual language, they provide insight into the cultural identities and aesthetic preferences of historical communities, establishing a concrete connection to China's ancestral wisdom and artistic heritage.

1.2Objectives and Scope of the Study

The study's primary goal is to utilize Morris's semiotic theory to dissect and examine the syntactic, semantic, and pragmatic facets of traditional Chinese geometric patterns. This analysis aims to unravel the embedded meanings within these patterns and to explore their contemporary relevance and application in modern design. This investigation goes beyond mere aesthetic valuation, probing into the historical progression and semiotic importance of the turtle back pattern, thus offering an exhaustive comprehension of its lasting legacy and its innovative potential in current design paradigms.

1.3Research Methods

To achieve the stated objectives, the research employs a mixed-methods approach, combining qualitative analysis of historical documents and artifacts with a structured semiotic analysis. This methodology facilitates a detailed scrutiny of traditional Chinese geometric patterns. Through this lens, the study not only aids in the conservation of these traditional patterns but also promotes their creative reinterpretation, ensuring their pertinence in the current global design context.

1.4Literature Review

As an ancient decorative pattern, the turtle back pattern has a long history in traditional Chinese artworks such as silk and ceramics. Zhao Feng [1] mentioned in the General History of Chinese Silk that the turtle back pattern may have originally originated from a pattern of foreign culture, and in the process of integration with China's local culture, it gradually developed into a decorative pattern with Chinese characteristics. The typical characteristics of the turtle back pattern are based on hexagonal geometric figures, with various forms and can be combined into complex patterns, and the characteristics of this geometric structure have different manifestations and applications in different historical periods.

In "An overview of traditional Chinese patterns ", Kun, B[2]. emphasized that the turtle back pattern is not only a decorative pattern, but also contains rich cultural significance. In traditional Chinese culture, the turtle symbolizes longevity and auspiciousness, so the turtle back pattern is often endowed with a beautiful meaning of hope, health and longevity. This deep cultural heritage has made the turtle back pattern occupy an important place in the traditional decorative arts. Morris's semiotics offers a new perspective on the analysis and

understanding of the traditional pattern of the turtle back pattern. Through an in-depth analysis of the symbolic semantics and grammar of the turtle back pattern, we can reveal its symbolic meaning in traditional Chinese culture and its transmission and communication functions in social interactions. This approach not only helps to understand the cultural symbolism of the turtle back pattern, but also explores new expressions and innovative applications of it in modern design.

The definition and description of the turtle back pattern in the Dictionary of Chinese Cultural Relics highlights the characteristics of its geometric structure, and the geometric shape of the hexagonal shape makes the turtle back pattern have strong visual effect and decoration. Chunming, G[3] also mentioned in "A study of Chinese clothing and accessories" that the geometric form of the turtle's back pattern is one of the important reasons for its name and widespread application. In traditional decorative arts, the turtle back pattern is not only used for the ground pattern of fabrics, but also widely used in architecture, ceramics, metal utensils and other fields, showing its unique decorative charm.

With the updating of design concepts and the development of technology, the elements of turtle back pattern are increasingly used in the field of modern design, especially in clothing design. Through the modern deconstruction and reorganization of the traditional turtle back pattern, the designers have created design pieces that are both traditional and in line with modern aesthetics. Huang Aoxue's research in "Innovative Application and Research on Turtle Back Pattern in Modern Clothing Design in the Ming Dynasty" shows that combining turtle back pattern with modern design concepts can provide new inspiration and possibilities for modern clothing design.

Through the above literature review, we can see that the turtle back pattern, as an important traditional decorative pattern, occupies an important position in Chinese culture, and has a wide range of application prospects and innovation potential in modern design.

Ultimately, this paper seeks to uncover the intricate web of meanings behind traditional Chinese geometric patterns, emphasizing their role in cultural heritage and their adaptability to contemporary uses. By conducting an in-depth exploration of the turtle back pattern, the research celebrates the amalgamation of historical traditions and modern innovation, contributing to the ongoing dialogue on cultural continuity and evolution in the field of design.

II. AN OVERVIEW OF THE BASIC THEORIES OF SEMIOTICS

Semiotics is the scientific study of signs and symbols in communication, the definition and development of which has expanded over the years to various disciplines. This field explores how meaning can be constructed and conveyed through symbols and symbols as an essential element in understanding human interaction and cultural expression. The study of visual semiotics, a field pioneered by scholars such as Roland Barthes Roland Barthes [4].

The semiotic theories developed by American philosophers Charles Saunders Pierce and Charles William Morris provide a powerful framework for analyzing signs and their meanings in various forms of expression, including language, images, and other sign systems[5]. This theoretical framework applies to the rich traditional Chinese arts, which have undergone a long evolutionary process from their initial creation to their symbolic establishment in culture.

Morris's theory of semiotics, developed from the writings of Charles Saunders Pierce and further developed by Charles William Morris, divides the study of signs into three distinct branches: syntax, semantics, and pragmatics [6]. Syntax focuses on the formal structure of symbols and their relational properties. Semantics deals with the relationship between a sign and its referent or its meaning. Pragmatics studies the use of symbols in the actual communicative context, studying how the receiver constructs and interprets meaning in a given situation.

The relevance of Morris semiotics to the study of traditional culture is profound. It provides a powerful framework for analyzing the ways in which cultural symbols and patterns, such as traditional Chinese geometric patterns, convey deep cultural narratives and values. This theoretical approach allows for a nuanced understanding of how traditional symbols function in their cultural context, as well as insight into their continuity and evolution over time. By applying Morris's semiotics, scholars can dissect the multiple layers of meaning embedded in cultural artworks, revealing their significance in both historical and contemporary contexts, thereby bridging the gap between traditional cultural expressions and modern interpretations.

Semantics: Semiotics is the study of the relationship between a sign and its referent or concept. In the context of traditional Chinese cultural symbols, this involves exploring the specific things or concepts that these symbols represent.

Morphology: This aspect focuses on the relationship between signs, studying how they combine to form more complex meanings. In traditional Chinese culture, various symbols (colors, patterns, words) may be combined to create composite symbols with specific cultural significance.

Pragmatics: This branch studies the use and effect of symbols in real-world situations and explores how symbols are understood and used by individuals or social groups.

Integrating these semiotic dimensions provides a comprehensive approach to understanding the enduring significance of traditional Chinese symbols, such as the turtle's back pattern, in historical and contemporary cultural narratives. This semiotic analysis highlights the dynamic interplay between traditional art forms and their evolving meanings in a modern context.

III. ANALYSIS OF TURTLE PATTERN BASED ON MORRIS SEMIOTICS

3.1 Overview of the Turtle's Back Pattern By

observing the patterns on the turtle's shell, humans abstracted and symbolized the unique texture of its back to create a continuous geometric pattern based on hexagonal units, which in ancient China was named the turtle's back pattern, also known as the tortoiseshell pattern, because of its similarity to the turtle shell pattern[7]. This design is not only an innovation in the pattern, but also an abstract and artistic expression of the form of the natural world.

The structure of the turtle back pattern is mainly based on a hexagonal shape and is repeatedly constructed through the continuous arrangement of square patterns. The record of "Constructing the French Style" shows that during the Song Dynasty, the turtle back pattern was extremely common in a variety of decorative arts, and its main styles included geometric patterns such as Luodi Turtle Inscription, Jiaojiao Turtle Inscription, and Liuchu Turtle Inscription [8]. This pattern is heavily influenced by Islamic culture, which is known for its mathematical and aesthetic precision. Therefore, the introduction and widespread popularity of the turtle back pattern reflected the cultural trends and aesthetic tendencies of the time.

3.2 Semantic interpretation of turtle back pattern

Semiotics is the study of the relationship between a sign and its referent or concept. In the context of traditional Chinese cultural symbols, this involves exploring the specific things or concepts that these symbols represent.

In primitive societies living under the constraints of the natural environment, turtles were regarded as sacred creatures that could resist natural disasters and had strong survival ability, so they worshipped them as totems. This sacred status of the turtle provided a solid foundation for the widespread application and dissemination of its image in later cultures, especially in the clothing patterns of the Spring and Autumn Period and the Warring States Period. In the Spring and Autumn Period and the Warring States Period, with the development of society and the evolution of aesthetics, "food must be Liang meat, clothes must be embroidered", the development of decorative ornaments has reached the peak of prosperity, and the turtle back pattern and dragon pattern, phoenix pattern, tiger pattern and various plant patterns are the same, it has become one of the symbolic and beautiful ornaments, widely used in various fabrics and ornaments.

By the Han Dynasty, the image of the turtle was associated with the cult of power. During the Han Dynasty, the cast "Ding" was engraved with a turtle pattern, which was called "Turtle Ding", implying the long-term stability of the country, such as the longevity of the turtle [9]. At this time, the turtle became a symbol of the ruler's oath of sovereignty and ambition. When the emperor traveled, the honor guard would wave flags embroidered with tortoise patterns, and high-ranking officials were awarded "tortoise buttons" to represent power. Obviously, the image of the turtle is already closely linked to the symbol of power [10].As shown in Table 1.

Table 1Semiotic Analysis of Turtle Image in Han Dynasty

Symbol	Object	Interpretation
The image of a turtle		It means that the country has a long-term peace and stability, such as the longevity of a turtle. A symbol of the ruler's oath of sovereignty and ambition

During the Song Dynasty in China, the meaning of the turtle back pattern as a cultural symbol was newly developed and interpreted. As shown in Table 2. During the Song and Yuan dynasties, the turtle back pattern, as an important ornamental element, was widely used in the decoration of soldiers' armor, because it symbolized the solidity and durability of the turtle shell, and symbolically enhanced the soldiers' defensive awareness and psychological preparation to resist foreign enemies. For example, the image of the soldier

depicted in the novel "The Legend of the Righteous Martyrs of Huancuitang Yuefu" as shown in Fig.1, the hexagonal geometric pattern inlaid on his armor is a classic presentation of the turtle back pattern.

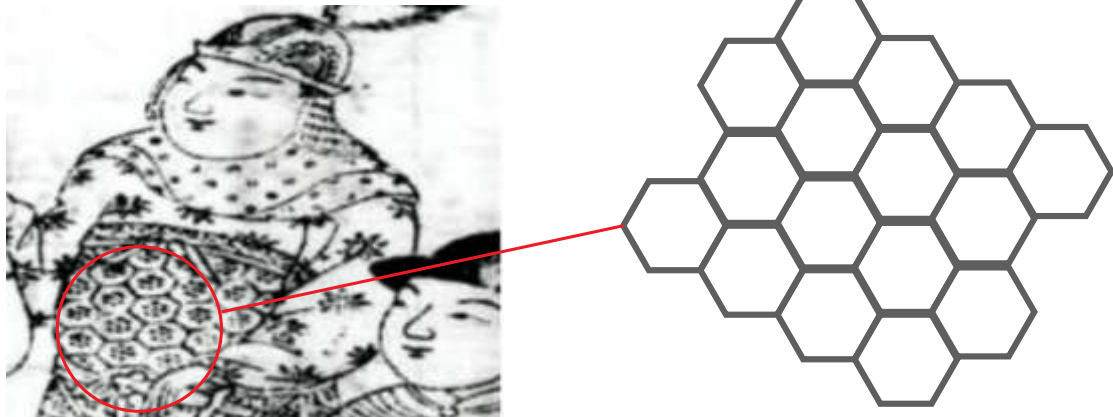



Figure 1 "The Legend of the Righteous Martyrs of Huancuitang Yuefu"

Table 2 Semiotic Analysis of Turtle Patterns in the Song and Yuan Dynasties

symbol	object	interpretation
	The image of a soldier in armor depicted in a novel from the Song and Yuan dynasties	It symbolizes the solidity and durability of the turtle shell, and symbolically enhances the soldiers' sense of defense and psychological preparation to resist foreign enemies

During the Ming and Qing dynasties, the development of turtle back pattern entered a new stage, and the design paid more attention to far-reaching and innovative meanings and became the mainstream decoration of auspicious meanings [11]. During this period, almost all pattern designs pursued the concept of "the picture has an apartment, and the residence is auspicious", and the turtle back pattern has become an indispensable element in the decoration design because of its multiple meanings such as tenacity, longevity, and exorcism. Inheriting and carrying forward the artistic creation and application of the previous generations, the designers of the Ming and Qing dynasties further combined the turtle back pattern with various traditional Chinese animal patterns and plant patterns [12], and integrated various decorative themes with the turtle back pattern as the framework, which not only enhanced the visual beauty, but also gave the works a richer cultural connotation and emotional expression. As shown in Table 3.

Table 3 Semiotic Analysis of Turtle Patterns in the Ming and Qing Dynasties

symbol	object	interpretation
		Perseverance, longevity, exorcism and other multiple meanings, auspicious meanings

As a traditional Chinese pattern, the turtle back pattern has different expressions and interpretations in different historical periods. As shown in Table 4.

Table 4 Analysis of social causes in different dynasties

dynasty	Symbolism	Social reasons
Han dynasty	It means that the country has a long-term peace and stability, such as the	The rulers of this period were strong against countries outside the Central

	longevity of a turtle.	Plains, and prosperous and stable at home
	A symbol of the ruler's oath of sovereignty and ambition	
Song Yuan	Symbolizing the sturdiness and durability of the turtle shell, It symbolically strengthens the soldiers' sense of defense and psychological readiness to resist foreign enemies	The Song Dynasty emphasized literature over military force, and the spiritual and cultural needs of the people were very high, and the people were in a corner of peace. But the ruling class has been resisting invasion from countries outside the Central Plains through peace talks and rations.
Ming and Qing dynasties	Perseverance, longevity, exorcism and other multiple meanings, auspicious meanings	During the Ming and Qing dynasties, wars broke out frequently in the Central Plains, and the people were more displaced, but the palace nobles still enjoyed luxury.

From ancient times to modern times, with the changes of society and the development of culture, people's aesthetic concepts and values are constantly changing, which requires designers to not only consider the traditional meaning of patterns when creating, but also combine modern aesthetic needs and social and cultural backgrounds, so that the design works not only carry the cultural heritage, but also meet the aesthetic and practical needs of modern people.

3.3 Morphology

This aspect focuses on the relationship between symbols, studying how they combine to form more complex meanings. In traditional Chinese culture, various symbols (colors, patterns, words) may be combined to create composite symbols with specific cultural significance.

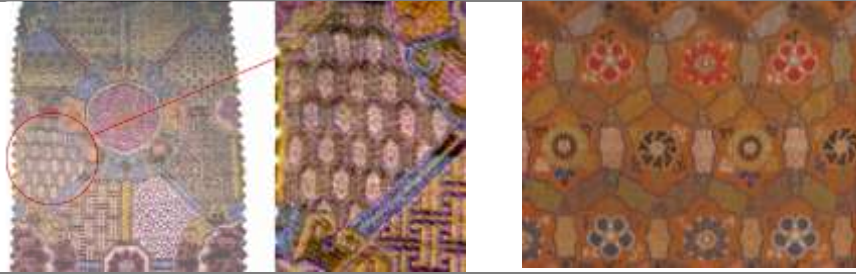
In the complexity hierarchy of the decoration system, it includes the basic elements, the unit pattern, the complete pattern, the skeleton relationship, and the overall pattern. There is some flexibility in the process of modular assembly, and some modules may be omitted when decoration space is limited [13]. Most of the carriers of Chinese patterns are textiles, which are divided into two categories: shading patterns and skeleton patterns. [14]

As shown in Table 5.

Table 5 Classification of Chinese Patterns

Geometric pattern form	Shading pattern	Skeletal pattern
description	The geometric pattern is no longer the main pattern alone but is transformed into a shading of the tapestry. This not only enriches the layering of the fabric, but also highlights the distinction between the subject and the background.	The geometric pattern serves as the skeleton of the pattern, and the interior is filled with design.

example



3.3.1 Continuous vs. Repetitive

In the traditional Chinese art of ornamentation, repeated and continuous patterns are extremely common, and they symbolize auspiciousness and infinite vitality. When the turtle back pattern is used as a shading, it usually appears together with other geometric patterns and plant patterns, which together express the meaning of longevity and auspiciousness. The following Table 6 shows the examples.

Table 6 Semiotic analysis of tortoise pattern as shading

Shading pattern (symbol)	Cultural Relics Case (Target)	Symbolism (Explanation)
		Together with other geometric patterns, it symbolizes auspiciousness and longevity
		Together with the flower and grass patterns, it symbolizes good luck

In the above two examples, the turtle back pattern is used as a shading, which can be understood as a background to express symbolic meaning. In the case, it can be seen that although the turtle back pattern is also used as a shading to express auspicious meaning, it is more used to support and create a sense of space.

3.3.2 The rhythm and sense of order of the turtle back pattern

In Chinese pattern design, the application of bipartite continuous and quadripartite continuous is particularly common, and this criss-cross arrangement gives the pattern rich in variation on the basis of unity.

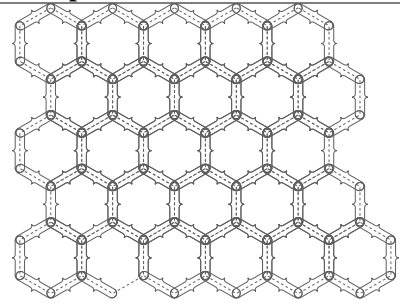
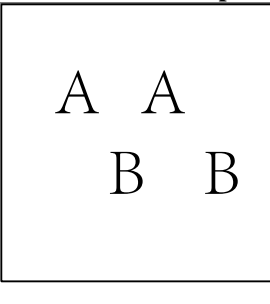

During the Song Dynasty, literati thought was extremely popular, and its core advocated order, profit, and self-denial and retribution. This profound ideological concept not only influences the socio-cultural and aesthetic trends, but also deeply reflects in the pattern design, especially in the application of the turtle back pattern. This design is not only a combination of technology and aesthetics, but also a reflection of the literati's pursuit of order and harmony.

In the context of this era, the design of the turtle back pattern shows a rigorous skeleton relationship, which not only reflects the progress of textile technology and the complexity of patterns, but more importantly, it reflects the essence of order and self-denial advocated by the literati of the Song Dynasty [15]. The order in the pattern is not only the pursuit of beauty, but also the embodiment of social ideals, reflecting the ultimate yearning for harmony and order in that era.

With the passage of time into the Ming and Qing dynasties, although the society experienced wars, the worship of the literati ideas of the Song Dynasty did not diminish. In terms of aesthetics, the trend of imitating the Song Dynasty has intensified, and the progress of technology has made the pattern design more elaborate and

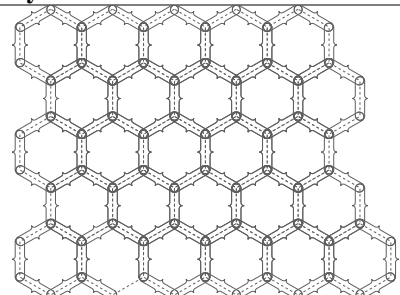
complex, but in-depth research has found that although the surface pattern is constantly changing, the core skeleton relationship has maintained a consistent order, which is the profound embodiment of the literati thought of the Song Dynasty in the pattern design. The rich variation of decorative patterns and colors not only shows the development of technology, but more importantly, inherits the pursuit of the aesthetic concept of order and harmony of the literati of the Song Dynasty.

Table 7 the turtle back pattern is used as a skeleton

Unit pattern	Skeletal relationships	Cultural relics case
		

As shown in Table 7. In the above example, we can see that although the overall pattern is particularly gorgeous and complicated, it still follows the basic hexagonal structure of the turtle back pattern. Therefore, the evolution of the turtle back pattern and the orderliness of the skeleton relationship embodied in the pattern design are not only the result of technological progress and aesthetic pursuit, but also the concrete embodiment of the cultural and aesthetic tendencies under the influence of the literati of the Song Dynasty. This not only deepens our understanding of the socio-cultural and aesthetic trends of the Song Dynasty, but also allows us to witness the profound significance of the influence of literati thought on the art and design of later generations. The semiotic analysis of the turtle back pattern as a skeleton pattern is as follows Table 8.

Table 8 The semiotic analysis of the turtle back pattern as a skeleton pattern

Symbol	Object	Interpretation
	<p>The sense of order and rhythm of the turtle back pattern</p>	<p>The embodiment of cultural and aesthetic tendencies under the influence of literati thought in the song dynasty. The essence of the idea of order, self-denial and retribution.</p>

4.4 Pragmatics

This semiotic analysis emphasizes the dynamic interplay between traditional art forms and their evolving meanings in the modern context. From the aesthetic perspective of symbolic pragmatics, we explore the interpretations that make up aesthetic symbols or the meaningfully connections behind them, i.e., the utilitarian nature of symbols, their environmental impacts, and their relationship with people. Therefore, the factors affecting the pragmatics of symbols include not only cultural and technological influences, but also changes in people's aesthetics, thinking patterns and aesthetic logic [16].

Fiske and Hartley argue that the most profound meanings arise from ideologies in society [17]. In social and cultural contexts, the interpretation of information needs to be based on the social experience and cultural background of the audience, which is largely influenced by ideology and reflects the continuity of nature, history, and culture. Fiske and Hartley argue that the most far-reaching meanings should derive from an ideology in society that reflects major cultural variables that support a particular worldview. Since pragmatics is concerned with the actual use of human beings, there are differences in people's understanding of culture, interpretation of symbols, and emotional responses in different regions and different historical periods, which in turn leads to diversified changes in aesthetic contexts.

In the process of expanding the connotation of symbols to ideology, three levels of analysis can be distinguished. First, the most basic level is emotional association, which refers to the emotional understanding of the form of a figure, such as an intuitive response to beauty and ugliness, preferences, interests, etc. While appreciating the graphics, the viewer may experience a series of aesthetic perceptions, such as modernity, serenity, pleasure, elegance or technology. At this stage, associations and imagination activate people's aesthetic perception, which enhances people's love and interest in graphics. This level is closer to Susan Lange's concept of representational symbols, which focuses on integrating individual emotions and feelings into the form, emphasizing emotional resonance.

Traditional Chinese patterns were the aesthetic and emotional expression of people at that time, and in modern society, the diversified evolution of values has become a common trend, but also an inevitable phenomenon. This is especially evident in the changing aesthetic values and needs.

In China, with the rapid development of society and the deepening of globalization, aesthetic needs have undergone significant changes. From the traditional and collectivist aesthetic to the individualized and pluralistic aesthetic. People are beginning to pay more attention to the cultural significance and aesthetic value behind designs and products and pursue uniqueness and difference that match their personal identity and lifestyle. This change has prompted designers and artists to pay more attention to the cultural connotation and emotional expression of the work when creating, rather than just the functionality or practicality of the work.

Changes in China's aesthetic needs have also brought about a re-evaluation and use of traditional cultural elements. Incorporating traditional elements into design is not only a tribute to China's rich cultural heritage, but also a way for modern design to seek innovative and personalized expression. By combining tradition and modernity, it has become a major trend in the field of Chinese design to create design works that are both culturally deep and in line with contemporary aesthetics. This trend not only reflects the dynamic changes in Chinese society and culture, but also shows how the Chinese design community can maintain cultural confidence and innovation in the context of globalization.

In the context of different eras, each has its own unique cultural characteristics, and then forms its own cultural form. Among these cultural formations, the most striking features are called cultural causes. At present, we can clearly perceive that vision has become one of the important cultural factors, and its position in the field of design is becoming more and more prominent.

Cultural traditions are formed by adding new cultural elements, abandoning some old concepts that are not suitable for the times, and refining and carrying forward excellent cultural achievements in the cultural accumulation of past dynasties. So, in a way, cultural traditions are a spiritual bond between the past, the present, and the future.

The development of internationalization has made people's creative style of graphics more inclined to artistic and visual excavation, but it is easy to ignore the value and culture it conveys[18]. It is the patterns derived from traditional Chinese culture that show profound cultural characteristics. These patterns are not just visual decorations, they carry rich historical and cultural connotations, reflecting the values, religious beliefs and aesthetic concepts of ancient Chinese society. Behind each pattern, there is a story and a symbolic meaning. In the context of globalization, traditional Chinese patterns have become an important cultural identity, helping to promote Chinese culture and enhance people's cultural self-confidence.

IV. MODERN APPLICATION AND INNOVATION OF TURTLE BACK PATTERN

Having explored the historical significance, we now turn to its modern applications and innovations [19]. Based on Morris's semiotic theory, I modernized the parametric redesign of the traditional turtle back pattern to meet modern aesthetic needs while retaining its classic hexagonal structural framework. This is based on the findings of previous studies that the basic structure of the turtle's back pattern, no matter how it changes, its hexagonal frame always remains the same. The following Fig.2 is an illustration of a turtle-back battery module created using the parametric design tool Grasshopper.

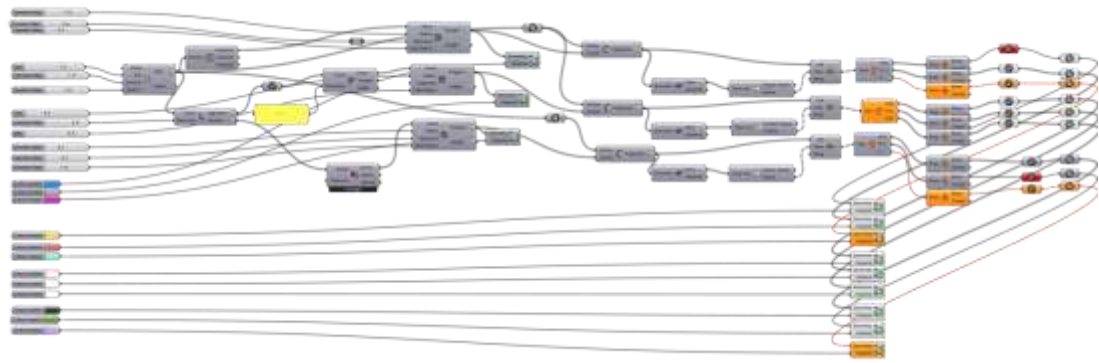


Figure 2 Diagram of a battery component based on Grasshopper's tortoise back design

In the design, I carefully retained the traditional characteristics of the turtle back pattern, and cleverly used the combination of neighboring colors and contrasting colors in the color matching. According to the pragmatic analysis of the turtle back pattern discussed earlier, the modern turtle back pattern design should reflect a more modern design concept, so the design elements I used are all geometric shapes with a sense of order and simple beauty. As shown in Fig. 3.

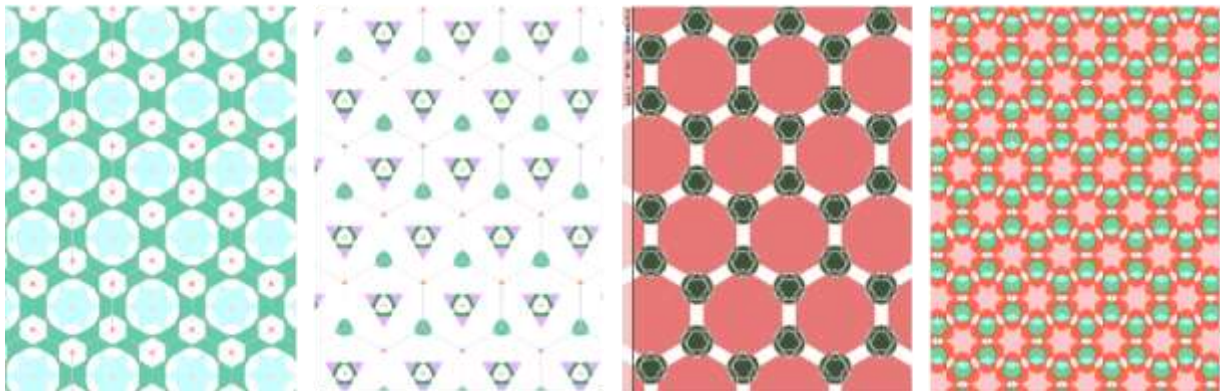


Figure 3 A redesigned pattern that retains the turtle back frame.

As we have previously analyzed the traditional turtle back pattern, the way it is arranged is heavily influenced by the social and cultural ideas of the time. Nowadays, we live in an era of open intellectual and cultural exchanges, and the design in the context of this era is reflected in the skeleton structure and arrangement of the patterns, as shown in the figure below. As shown in Fig. 4.

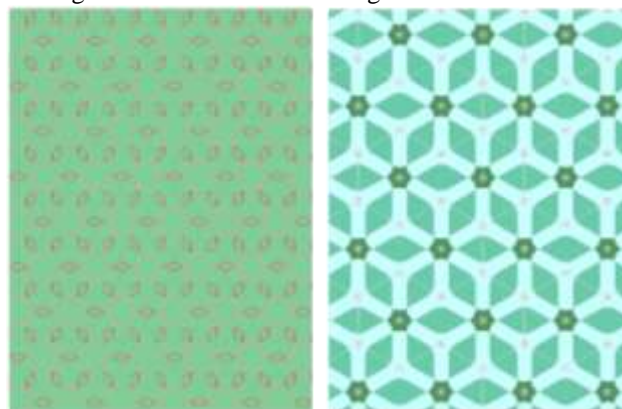


Figure 4 Redesign to change the arrangement.

V. CONCLUSION

Based on the detailed exploration of traditional Chinese geometric patterns, particularly the turtle back pattern, through the lens of Morris's semiotics, this study has illuminated the intricate relationship between cultural symbols and their evolving interpretations in the realm of design. The conclusion drawn from this

investigation underscores the profound cultural significance and aesthetic versatility of these patterns, revealing their capacity to bridge the gap between historical tradition and contemporary innovation.

The turtle back pattern, with its deep cultural roots and symbolic meanings, has demonstrated remarkable adaptability in the face of modern aesthetic demands. Through parametric design techniques, this study has successfully reimagined the pattern, maintaining its iconic hexagonal structure while infusing it with modern design elements. This fusion of tradition and modernity highlights the enduring relevance of traditional Chinese geometric patterns, showcasing their potential to inspire and inform contemporary design practices.

Furthermore, the study's application of Morris's semiotic theory has provided a comprehensive framework for analyzing the syntactic, semantic, and pragmatic dimensions of these patterns. This approach has not only deepened our understanding of the cultural narratives embedded within traditional Chinese patterns but also emphasized the importance of cultural identity and innovation in the global design landscape.

Future research could explore how these traditional patterns influence modern design, potentially in digital media or virtual environments.

In conclusion, the exploration of traditional Chinese geometric patterns through semiotic analysis affirms the significance of cultural heritage in shaping contemporary design. It advocates for a design approach that respects and revitalizes traditional motifs, ensuring their continued relevance and appreciation in a rapidly evolving world. This study serves as a testament to the dynamic interplay between tradition and modernity, urging designers to engage deeply with cultural history as a source of inspiration and innovation.

REFERENCES

- [1] Feng, Z. The history of Chinese silk art (Beijing: Cultural Relics Publishing House, 2005)
- [2] Kun, B. An overview of traditional Chinese patterns (Beijing: People's Fine Arts Publishing House, 2002)
- [3] Chunming, G. A study of Chinese clothing and accessories (Shanghai: Shanghai Culture Publishing House, 2001).
- [4] Barthes, R. (1977). Image-Music-Text. Fontana Press.
- [5] Jiaqi, W. Exploration of traditional graphics from the perspective of design semiotics. *Design*, 2020, 33(20), 126-128.
- [6] Morris. Signs, language, and behavior (Yi Zhou, Trans.) (Shanghai: Shanghai People's Publishing House, 1989).
- [7] Wanli, Z. *The historical evolution of the tortoise shell pattern and its application in modern textile design* [Doctoral dissertation, Jiangnan University]. (2021)
- [8] Yanzu, L. The way of decoration (Beijing: China Renmin University Press, 1993).
- [9] Jiaqi, W. Exploration of traditional graphics from the perspective of design semiotics. *Design*, 2020, 33(20), 126-128.
- [10] Fenliang, Z. Analysis of the turtle button form in ancient Chinese seals. *Decoration*, 2006, (10), 25.
- [11] Zixin, C. On the historical evolution of turtle worship in China. *Journal of Anhui University*, 1995, (01), 43-46.
- [12] Lüping, S., & Jianfu, L. The evolution of turtle worship in China and its relationship with the divinity of turtles. *EntrepreneurWorld*.
- [13] Bo, D. Analysis of the source of tortoise shell patterns on silk in the Ming Dynasty. *Silk*, 2013, 50(08), 63-69.
- [14] Lichun, X. Order and complexity - From M=O/C to M=O·C on the complexity editing of basic geometric bodies in architecture. *WorldArchitecture*, 2006, (11), 131-133.
- [15] Xiaoping, Q. Chinese Song brocade (Suzhou: Soochow University Press, 2011).
- [16] Yanzu, L. New exploration of patterns. *Literature and Art Studies*, 1992, (06), 115-135.
- [17] Fiske, J. (1989). *Understanding Popular Culture*. New York: Routledge.
- [18] Jianhui, W. Graphic design and semiotics. *Art and Design (Theory)*, 2012, 2(12), 49-51.
- [19] Xiaoyu, Z. Study on the application of geometric patterns in modern clothing design. *Industrial Design*, 2020, (04), 109-110.