

Visual Translation of Auspicious Beliefs in Quanzhou Xi Culture from the Perspective of Man-Machine Collaboration

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Abstract—The “Xi” concept in the inheritance of auspicious culture covers the abundance of spiritual and material life, its symbolism is gorgeous and timeless and has lasted for thousands of years. **Objective:** This study investigates the Quanzhou “happiness” culture, which embodies “reverence for virtue and auspicious beliefs,” exploring its visual symbolization, graphical derivation, redesign, and innovative cultural expressions. **Methods:** Utilizing literature analysis, field research, and a combination of shape grammar and artificial intelligence, this study dissects and evolves the visual symbols of Quanzhou Xi culture to achieve innovative design through human-machine collaboration. **Results:** The study deeply refines representative visual symbols of Quanzhou happiness culture, including the “卍” character from Quanzhou embroidery, the Eight Immortals color for wedding happiness, and the longevity turtle cake stamp for longevity happiness. It analyzes and demonstrates the innovative practice of these visual symbols, establishes a folklore perspective, and transitions the happiness culture into a modern fashion context. **Conclusion:** The research constructs a visual symbol folklore perspective of Quanzhou Xi culture, providing a systematic theoretical foundation and innovative practice paths for promoting and inheriting Xi culture in the modern design field. It promotes Quanzhou Xi culture’s innovative application and fashion transformation in contemporary design.

Keywords—Quanzhou Xi culture; symbol visualisation; shape grammar; artificial intelligence; man-machine collaborative design

I. INTRODUCTION

‘Xi’ means joy and happiness. From symbol auspiciousness to visual symbolization, both convey feelings of satisfaction, good fortune, and happiness. “Long drought meets sweet rain, foreign lands meet old acquaintances, bridal chamber flowers and candles night, and when one achieves success in the imperial examination” [1]. The symbolic meaning of “Xi” today is the visual communication method of images. Since the initial definition of “Xi” in the Song Dynasty, it refers to the folk celebration of happy events, mostly referring to men’s and women’s marriages, childbirth, and so on. Quanzhou, with a thousand-year history of navigation and exchanges between Chinese culture and overseas cultures, is known for its unique regional culture that embodies the auspicious fusion of the Song and Yuan dynasties “Individuals hailing from ten states” and “seeking common ground while reserving differences”.

Visual symbolization refers to the practical representation of images conveyed through symbols, and the design expression of

cultural symbols can be comprehended by recreating or reorganizing cultural symbols. Liao et al. proposed to interpret and assess the meaning of visual symbols and organically integrate the visual reality and objective reality of cultural symbols with natural meaning, normative meaning, and intrinsic meaning [2]. Li contends that China is constrained by the Western modernist design concept that merely emphasizes function and technology, resulting in the deficiency of its own history and culture. Chinese design demands its own language, and to restore these cultures, design support is necessary [3]. Culture bestows a soul upon design, and design showcases the vitality of culture. Outstanding design is never rootless water; it must be deeply rooted in traditional national culture and continuously evolve into modern aesthetics through cultural integration and design innovation. As proposed by Xia, the visual translation of the artistic images presented by the pleasant culture of Quanzhou is a significant aesthetic activity in human spiritual life and a means to understand the objective world through artistic images [4]. In the application of visual symbol innovation, Xi culture mainly focuses on cultural and creative products, brand design, packaging design application, and exploration of cultural connotations. Mo et al. investigated the connotation of traditional Xi culture and the form elements that constitute the “Xi” schema, deconstructed and reconstructed the “Xi” schema, and passed on the practical value and cultural value of Xi culture with cultural and creative products as the carrier [5]. Yuan, through his research on the folk culture aesthetics of Quanzhou’s “Pu” women’s headwear, put forward the philosophical thought of “harmony between nature and man”, which coexists and integrates with the local culture [6]. There is still a scarcity of a complete research system and an accumulation of achievements in the analysis and study of the symbols of Xi culture in Quanzhou.

This research aims to clarify the characteristics of Quanzhou’s “Xi” culture and analyze its connotations, conducting a study on the visual symbolization of Quanzhou’s “Xi” culture, and exploring its value in the fields of art and culture through human-computer collaborative design, thereby reshaping the artistic expression of Quanzhou’s “Xi” culture. The main innovative contributions of this study are reflected in the following three points: (1) A deep refinement of Quanzhou’s “Xi” culture visual symbols and the construction of a folk perspective; (2) The use of human-computer collaboration to further develop and redesign the visual symbols of Quanzhou’s “Xi” culture, achieving an organic integration of art and

technology, creativity, and algorithms; and (3) The reconstruction of the modern and cultural value of Quanzhou's "Xi" culture visual symbols, providing new pathways for the innovative application and fashion-oriented transformation of "Xi" culture in modern design fields.

II. RETURN TO FAITH: QUANZHOU XI CULTURE TO BE UNFOLDING

Quanzhou is renowned as "Individuals hailing from ten states" and "the forerunner of the Maritime Silk Road", and the custom of "Worship Mude" continuously gave rise to the early marriage and birthday celebration culture. Subsequently, due to the influence of a significant number of overseas Chinese returning to their hometowns throughout history, they brought back the auspicious culture of Southeast Asia and the belief culture of southern Fujian, and gradually integrated, nurtured, and developed the distinctive Xi culture of Quanzhou in the collision and accumulation of various cultures. "Tea plate round sweet tea sweet, two family marriage at the end of winter born twins, Children, and grandchildren, all being eager to learn" is a popular song about the Xi culture in the Quanzhou region. It demonstrates the inheritance and promotion of traditional values such as family concept, family affection, marriage, and descendants, and possesses regional style, converges diverse cultures, undergoes inclusive development with profound cultural forms, and serves as a bond of cultural identity and emotional exchange in the Quanzhou area. As Geertz explained, the analysis of culture is not an experimental science in search of rules, but an interpretive science in search of meaning [7].

A. The Enduring Xi Culture of Quanzhou

The Xi culture of Quanzhou is reflected in daily life which is to worship Mude, which is rooted in the tradition of Mindi, and has the connotation of cultural integration and renewal. "Wenling Old Story" describes "worship MuDe" culture as "joy", recorded in the competition to choose a day to worship the Lord of heaven and pray for blessing. The visual symbols of birthday, marriage, birth, and so on are directly evolved from the tradition, while many modern representations of Xi are produced in the unique style of Quanzhou's overseas Chinese culture and traditional culture. This so-called culture is not firmly "sealed" in the tradition, but refined and excellent integration outside the region. The perfect fusion of tradition and modernity has promoted Quanzhou Xi culture to be widely inherited and continuously developed in the local area, and deeply integrated into the folk culture, which has a deep and huge influence on contemporary society. The continuation and promotion of Quanzhou Xi culture can not only help the people feel the culture and history of their hometown, and get close to the wisdom and wealth of their ancestors, but also become more orderly, interesting, tasteful, and homelike in their daily life. The core value of Mindi traditional culture has cultivated Quanzhou Xi culture, and the Quanzhou Xi culture with the continuity of "worship Mude" has made Mindi culture more colorful.

B. A Hundred Flowers Blossom of Quanzhou Xi Culture

Quanzhou Xi culture takes Minnan belief as its source and Nanyang auspiciousness as its stream. It presents diverse and unique visual symbols, which integrate the inheritance of inland civilization and marine culture. "Have faith in ghosts and sorcery", especially among people in southern Fujian. The people of southern Fujian "respect deities as if He were present" and "prefer to believe in His existence rather than His absence". The aesthetic features of Quanzhou Xi culture's visual symbols are in accordance with the aesthetic orientation of sacrificial ceremonies, taking southern Fujian faith as the mainstream, close to the folk, deeply rooted in life, rich in the grassroots local flavor, human touch, and always maintain its vigorous vitality. The opening and expansion of the Maritime Silk Road brought together people from ten prefectures and auspicious cultures brought back from overseas Chinese villages, etc., which promoted Quanzhou to better integrate the core Chinese culture, other regional cultures, and the essential elements of foreign cultures in its internal cultural structure, thereby deepening its own cultural characteristics [8]. Influenced by the Southeast Asian and Western cultures of overseas Chinese, Quanzhou Xi culture has given rise to diversified integration and development. For example, Quanzhou wedding customs, are affected by foreign wedding gowns, since Quanzhou wedding customs do not wear white, the people will change the wedding dress to red and transform it into a Qipao. The unique blending and collision of Chinese and Western cultures present a multi-integrated development form of Quanzhou Xi culture, not only maintaining the variation of South Asian auspicious culture but also adhering to its core values in the pursuit of the core mainstream culture of southern Fujian faith, and developing in the process of modernization.

C. Formation and development of Quanzhou Xi culture

Folk marriage is referred to as "great joy", a women's pregnancy is known as "you have joy", children are termed "Add Xi", and Eggs to celebrate the birth of a baby are called "happy eggs". Marriage is joyous and having children is also a joy [9]. In Quanzhou and even across the entire country, since the advent of new life, it is all about "Xi". The first cry of a newborn is a "Xi" sound, and the first year is also a joyous event. When one reaches the age of 16, they become an adult, encounter a lover, and enter into marriage. There is also the joy of having a child, birthdays, etc. The "Five Xi culture" comes from the real scene exhibition area of the "Life Five Xi Wall" in the Quanzhou Marriage Festival Folk Culture Museum, presenting the most significant joys in the lives of Quanzhou people, namely the joy of birth, the joy of the first year, the joy of adulthood, marriage, and birthdays. Table I is a classification and analysis of the content presentation and existing development of the five great happiness cultures in Quanzhou.

TABLE I. CLASSIFICATION OF THE COMPONENTS OF QUANZHOU XI CULTURE

Compositional classification	Joy of birth	The joy of grasping week	The joy of adulthood	Wedding joy	Make a birthday celebration
Content rendering	Newborn clothing embroidery “Wan” word, package “Floral quilt”, eat red egg, full moon feast	Clean hands, roll disaster, crown, comb hair, grasp week, pick handprints, eat fu, seal wine, Family photo	Prepare the “three sacrifices”, go to the temple to pay deities set a banquet, grandma’s house As usual to send clothes, hats, shoes and socks, eggs and so on	Blind date, home visit, talk about betrothal gifts and clothes and pants money, tie Red envelopes, Lift plates, on top, tie spring flowers	Set up longevity hall, point longevity candle, eat Longevity noodles, set a birthday banquet, do Turtle kueh
Existing development	Traditional handicraft and traditional culture continue, but the scope of continuation gradually narrowed	Some traditional customs and cultural forms have gradually simplified or even disappeared, and the industry Chain related to Zhuazhou object has developed rapidly	The process is gradually simplified and the form is more modern	Traditional customs remain intact, and some bad habits such as high endowment have been abandoned, but traditional customs in urbanized areas have been simplified and gradually Westernized	Traditional ways And scope are decreasing, and Traditional gifts such as longevit Y noodles, longevity kueh, longevity peaches, longevity hangingpictures, etc, have been replaced by more high-end and customized products

III. BE CONTENT WITH ONE’S HEART: THE CONNOTATION EXPRESSION OF VISUAL SYMBOLS

The visual symbol serves as a means of expression in design and is collectively known as a visual symbol. It represents the symbolic reconstruction or reorganization of traditional images or abstract concepts, utilizing symbols such as line, light, shadow, color, intensity, expression, balance, and form to showcase modern design ideas and connotations, convey information, and exhibit its beauty and internal equilibrium. With its distinctive continuity and diversity, the visual symbols of Quanzhou Xi culture prominently demonstrate the emotional resonance of auspicious meaning and people’s modern aesthetic sense. The visual symbols of early Quanzhou Xi culture primarily centered on image art, like painting, sculpture, architecture, etc. In the modern context, visual symbols transcend the realm of image art itself and prevalently emerge in auspicious belief forms such as folk custom, sacrifice, and birthday celebrations, playing a vital role in the visual communication of clothing, decoration, and adornment in modern life and constituting an indispensable part of modern cultural symbols. Due to its outstanding design display and cultural expression, it possesses a visual form accessible to

human eyes and ears on the material form and an enlightening situation at the spiritual level.

The visual symbols of Quanzhou Xi culture are utilized in the domains of clothing, decoration, and decorative goods, and can be categorized into three types in accordance with their expression content and function, as depicted in Table II. The first type is the indicative symbol of Xi culture, such as the Quanzhou embroidered “卍” character, which conveys the happiness of life in a simple and explicit symbol form to achieve efficient dissemination of information and prompt understanding. The second category is the cultural image symbols, such as the wedding of the typical representative of Quanzhou’s eight immortal colors, through the employment of images, graphics, icons, and other visual elements, to guide, stimulate, and attract the audience’s attention, emotions, and thinking, and convey various kinds of information, appeals, and cultural symbols. The third type is the symbolic symbol of Xi culture, which is associated with a certain fixed symbol and a specific meaning, representing a specific concept or symbolizing a profound meaning, such as the turtle pattern being regarded as a symbol of longevity, and green leaves representing life and nature, etc. This symbolization can assist in conveying and reinforcing a certain emotion or value, enabling the audience to have a profound resonance and identification.

TABLE II. CLASSIFICATION OF VISUAL SYMBOLS IN QUANZHOU XI CULTURE

Constituent classification	Indicative symbol	Pictorial symbol	Symbolic symbol
Symbolic feature	Strong directness, efficient transmission, rapid understanding	High eye attraction, easy to trigger emotional resonance	Symbols are associated with meanings and have deep representation meanings
Quanzhou Xi cultural symbol	Quanzhou embroidery version “卍” character, seven niang mother, etc	Eight immortals color, paper cutting, etc	Longevity turtle cake stamp, Xiniang, Zha spring flower, etc

Besides the aforementioned three types of symbols, visual symbols can also be symbolized in accordance with visual elements like color, text, texture, etc., to maximize and effectively extract information during the process of expressing visual information and meaning.

IV. MAN-MACHINE COLLABORATION: THE VISUAL SYMBOL OF QUANZHOU XI CULTURE

With the rapid advancement of artificial intelligence technology, its introduction has ushered in a novel paradigm to

the domain of visual design and profoundly facilitated the practice of human-machine collaboration. Under this novel paradigm, artificial intelligence and designers can undertake the same or different design tasks through specific information exchange and cooperation mechanisms, collaborate to accomplish the predefined design goals, and bring about the innovation and breakthrough of visual design. In the process of

visual design, AI is relatively potent in competitive and predictable workflows, and is particularly adept at handling complexity and multitasking; Human intelligence is flexible and creative during the design process, and excels in knowledge comprehension and strategic thinking, as depicted in Fig. 1 [10]. The application of human-machine collaborative design pertains to the processing of Media collaborative technology.

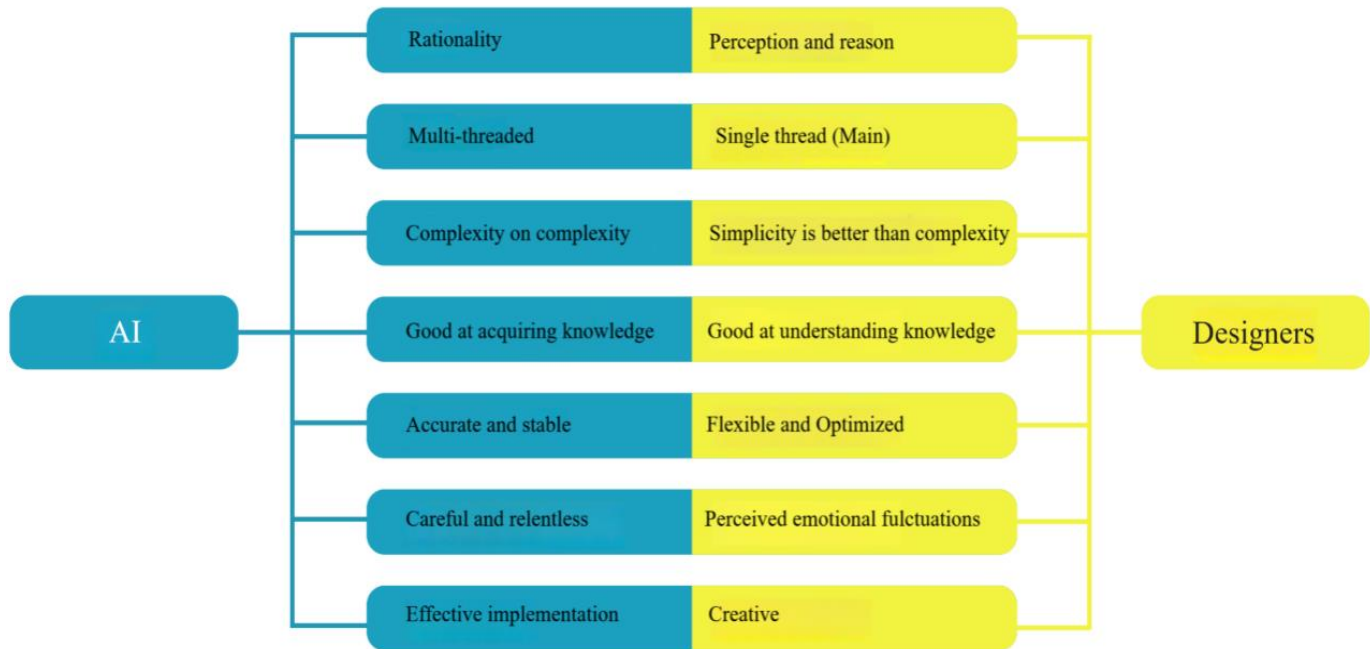


Fig. 1. Comparative paradigms of human-machine collaboration in visual symbol design.

A. Visual Symbols Driven by Shape Grammar

Shape grammar is a production system that generates a specific category of geometric shapes. It comprises shape rules and a generation engine for the selection and processing of rules. Originally put forward by George Stiny and James Gips in 1972 based on the theoretical study of “symbolic language”, they applied the initial shape rules to generate new geometric shapes and style design and analysis approaches [11].

Generally, shape grammar adheres to aesthetic principles and geometric composition, and employs rotation, movement, arrangement, scaling, displacement, and mirror switching to infer specific or extracted shapes. In the actual design and application process, there is a considerable amount of intersection and repetition of shape inference rules. As depicted in Fig. 2, during the generation of shape grammar graphics, the initial specific shape is selected, the inference rule base is

chosen, the input constraint size is specified for morphological reasoning, and the graphics are organized, screened, and reorganized in combination with modern design languages to obtain new visual symbols.

With the rapid development of artificial intelligence technology, the integration of shape grammar and AI has brought unprecedented innovative opportunities to the field of visual symbol design. AI algorithms can automatically learn and optimize shape inference rules, improving generation efficiency and accuracy. Additionally, AI can dynamically adjust rule sets and input constraints based on user feedback and design requirements, achieving personalized and intelligent design. In terms of the specific integration path, this paper will use the cases of the “Quanzhou embroidered ‘Wan (卍)’,” “Eight Immortals Color,” and “Longevity Turtle Cake Stamp” to illustrate the methods for analyzing and redesigning visual symbols.

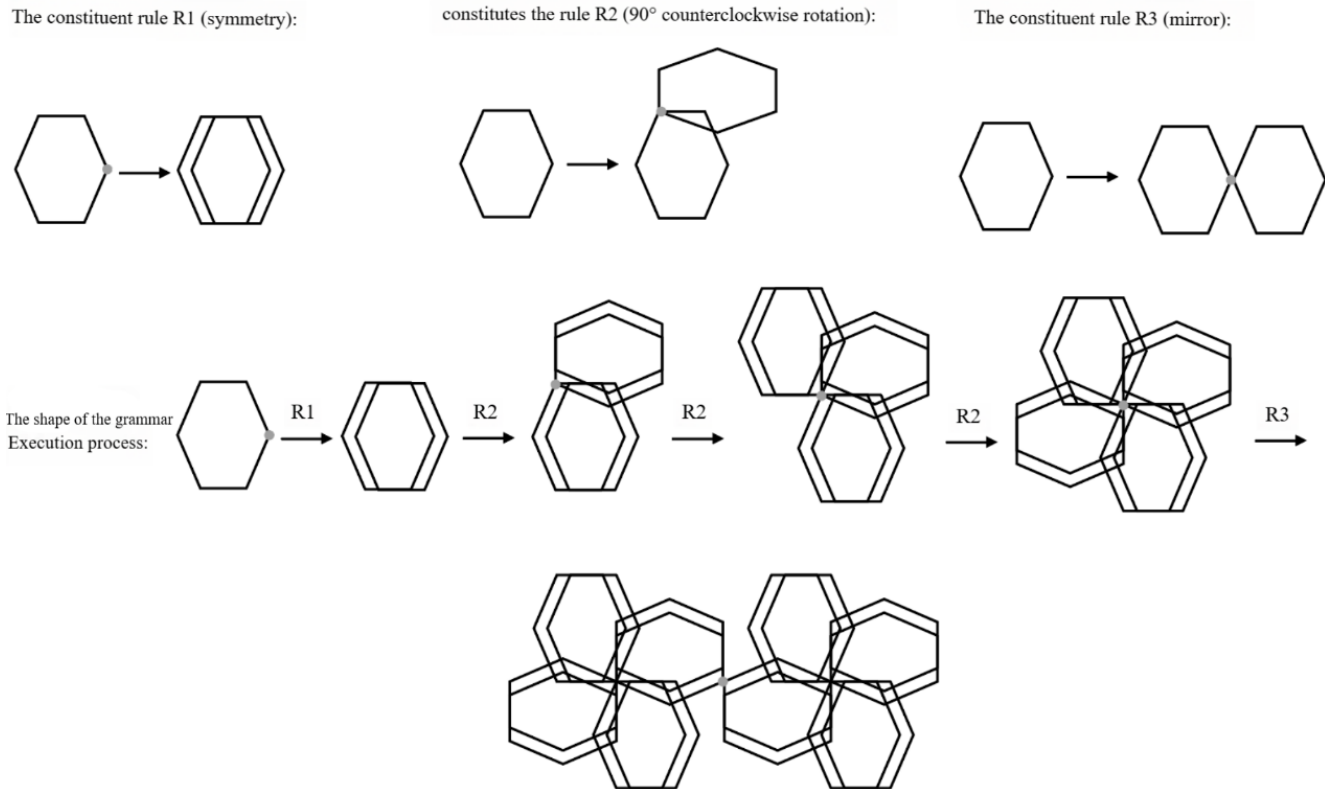


Fig. 2. Shape grammar graphic generation process.

B. Visual Symbols for Artificial Intelligence Operations

The application of artificial intelligence in the domain of graphic design constitutes an inevitable tendency. Sora, OpenAI's most recent novelty, is an AI model for generating video content based on textual prompts. The crux of Sora lies in its capacity to comprehend and execute complex visual renderings, construct intuitive physics, and even undertake long-term reasoning and semantic foundations. This implies that designers can merely furnish a one-sentence description and Sora is capable of generating a realistic video, which holds vast potential for brand storytelling, advertising creativity, product presentation, and beyond. The popularity of OpenAI constitutes a manifestation of the substantial influence exerted by the advancement of artificial intelligence technology on human production and life [12].

In March 2022, the US Research Laboratory released the first artificial intelligence painting program named Midjourney, which applies artificial intelligence technologies such as deep learning, image recognition, and natural language processing to analyze the text provided by users and generate visual graphics related to it. The program can recognize the distinctive artistic styles of different artists, and learn and analyze a wide range of works of art and design patterns to generate unlimited design suggestions that stimulate the creativity of designers and enable them to explore and realize their design concepts more efficiently. When this paper discusses the application of human-machine collaborative design in visual design, Midjourney, as a powerful AI image generation tool, offers a wealth of cases and revelations.

C. Man-machine Collaboration Design Application of Quanzhou Xi Cultural Visual Symbols

The collaboration between human intelligence and artificial intelligence varies across diverse fields. Human intelligence takes the lead in tasks that demand creativity, strategy, and empathy. In contrast to the "visual average" of the images produced by artificial intelligence, human intelligence possesses a distinctive emotional touch and understanding of culture. Artificial intelligence offers designers abundant inspiration and creativity through in-depth analysis of a wide range of design data and trends. It also significantly broadens the boundaries of design. The two complement each other, co-create symbiotically, and innovate brilliantly.

Widely utilized in Quanzhou Xi cultural visual symbols mainly consist of eight immortal colors, a pan, an embroidered version of the "Wan (卍)" character, turtle kueh printing, paper cutting, spring flowers, and Xi Niang. The symbol of happiness - Quanzhou embroidered "Wan (卍)" character is chosen, and the meaning of warding off evil and ensuring peace is conveyed through the red embroidered character; The image symbol of wedding joy - Eight immortal colors, expressing auspiciousness and adding happiness; The symbolic symbol of longevity - Longevity turtle cake stamp, symbolizing longevity and the meaning of protecting the house. The three representative symbols are subjected to graphic deduction and redesign through man-machine collaboration.

1) Indicative symbol - Quanzhou embroidered "Wan (卍)" character: The "卍" was originally a symbol of auspiciousness appearing on the chest of the Buddha. The clockwise rotating

wheel of the Buddha radiates light, symbolizing auspiciousness, blessings, and longevity. In the second year of Wu Zetian's longevity in the Tang Dynasty (693 AD), the “卍” symbol was introduced into the Chinese character system, pronounced as “Wàn”, meaning “a collection of auspicious and virtuous things”

According to the customs of Quanzhou, special ceremonies will be conducted when the newborn reaches one month old, four months old, and one year old. Grandma utilized red thread

to embroider a pattern resembling a 卍 (as shown in Fig. 3) on new clothes or items such as black and white napkins as a ritual, and placed a small piece of lead on the embroidery, known as “lead money”. The pronunciation of “lead” in the Quanzhou dialect is the same as “edge”, meaning “There exists an intersection where someone loves”, symbolizing grandma's love.

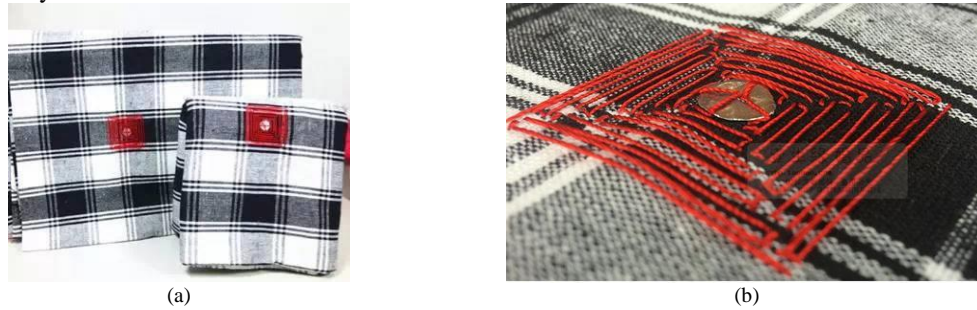


Fig. 3. Quanzhou 'Huabei' embroidery pattern of the 卍 symbol.

The original 卍 embroidery technique was employed in Quanzhou in the early stage. This custom has been handed down to the present. Owing to its regularity and systematization, it has continuously evolved and innovated in two or four directions, as depicted in Fig. 4. The million-word pattern is also known as the million-word turn or the million-word brocade. The four ends and four outer extensions are interconnected, and folk people call it the million-word continuous head or continuous, to convey its meaning of wealth and continuity.

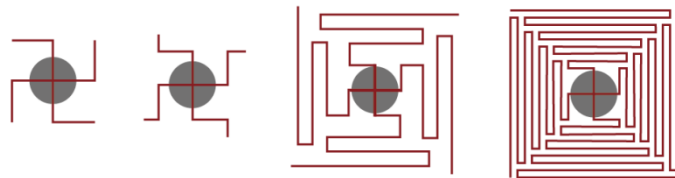


Fig. 4. Evolution of the Quanzhou embroidery pattern of the 卍 symbol.

Choose the 卍 of the square continuous and the nine-square continuous Quanzhou embroidery version, which symbolizes wealth good fortune, and double happiness Linmen, as the initial texture pattern, follows the shape rules such as full and full picture, combines the translation R1, rotation R2, and other deduction methods in the shape grammar to implement the graphic deduction, and take the most representative nine-square continuous Quanzhou embroidery version of the 卍 as the central extension point of Quanzhou Xi cultural graphics. A new graphic scheme is formed, and the design effect is presented as shown in Fig. 5. The new visual symbol of the redesign highlights the charm of the traditional symbol, integrates the modern design concept, and presents the change in the fashion image.

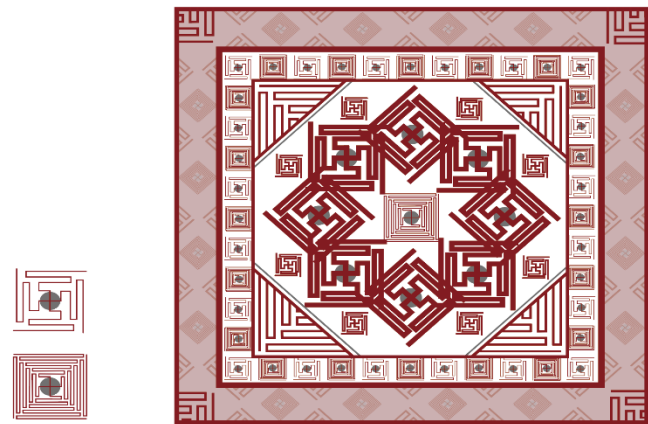


Fig. 5. The embroidery pattern of the 卍 symbol is designed with shape grammar.

Creative inspiration is the embroidered version of “卍” character graphics designed by shape grammar. Midjourney artificial intelligence drawing program is used to create graphic design works. Display the input text to generate a graphic effect as shown in Fig. 6. After adjusting the text many times, the author created a set of graphic renderings with the help of the software, but the software-generated graphic design works for art display is still good, and there is still a certain gap between the creation of Quanzhou Xi cultural heritage and humanistic feelings, and it is difficult to get a practical application in situations involving emotion, personality, and ethics.

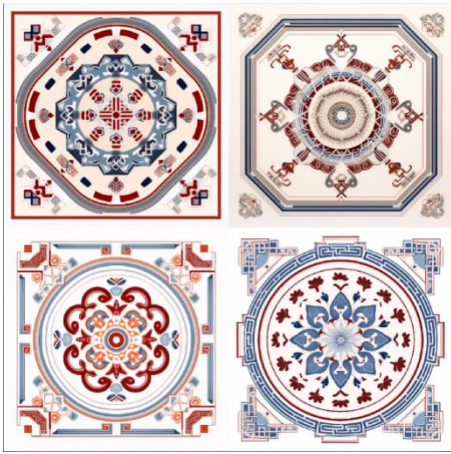


Fig. 6. Midjourney’s design of the embroidery pattern of the 卍 symbol is designed with shape grammar.

Artificial intelligence explores diverse visual styles and expressions, rapidly generates a multiplicity of design schemes, and takes graphic creation as the structural framework. The designer extracts the Quanzhou embroidery version of the 卍 as the main decorative body, presenting a symmetrical or balanced form. The man-machine collaborative design (as shown in Fig. 7) breaks through the traditional design limitations imposed by human cognition and the capabilities of material calling and copy editing. However, artificial intelligence lacks the emotional expression of the character of the “卍” in Quanzhou embroidery. By giving full play to the advantages of artificial intelligence and human intelligence, exchanging their respective strengths, and complementing each other, a complete pattern

and consistent style can be achieved. Simultaneously, it embodies the connotation of Quanzhou Xi culture.

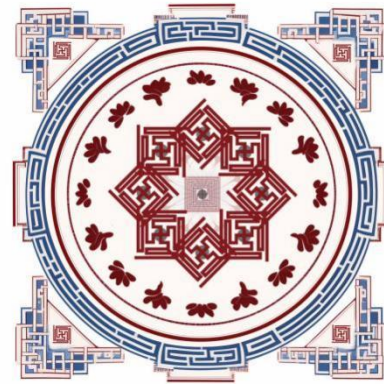


Fig. 7. Embroidery pattern of the 卍 symbol was designed through human-machine collaboration.

2) *Graphic Symbol - Eight Immortalis*: Quanzhou folk marriage customs reveal that on the day before the marriage in the woman’s home, a “red brocade” can be seen hanging on the beam. Locally, it is commonly known as “color”. As depicted in Fig. 8, the red cloth, symbolizing happiness and excitement, is frequently used as the base, complemented by gold and silver threads, enhancing the noble atmosphere of “color”. “Color” is adorned with various silk threads to depict the images of deities. Particularly, “Eight Immortals Crossing the Sea” is the most classic and widely spread one, commonly referred to as “Eight Immortals”



(a)



(b)

Fig. 8. Quanzhou eight immortals color.

The Eight Immortals are derived from folklore. In the allusion, “Eight immortals” symbolizes the divine power of the people to pray for their wishes. They are regarded as a symbol

to ward off evil spirits, implying good luck and adding joy. The rendering effect is shown in Fig. 9.



Fig. 9. Symbolic pattern of the eight immortal’s color.

Based on the Eight Immortals symbol in Fig. 9, combined with the wave patternsymbolizing long-term prosperity and strength and the lotus pattern symbolizing purity andsteadfastness, and combined with the shape grammar of R1

composition rules (translation copy), R3 composition rules (mirror), etc., shape deduces and redesign, forming a regular rectangularshape, showing the symmetry rhythm beauty. The effect is shown in Fig. 10.

Referring to the eight Immanence symbol graphics designed by shape grammar, Midjourney establishes the creative inspiration source, and the generated effect is presented in Fig. 11. Learning from the generated structural paradigm, adhering to the color attribute of “bright red and precious yellow”, and employing human-machine collaborative design. The design presentation effect is displayed in Fig. 12. Artificial intelligence can play the role of providing external stimuli in cooperation with human beings, triggering the designer’s lateral thinking and influencing creative ideas and results. Artificial intelligence introduces foreign elements to provide human cognitive stimulation, and designers utilize individual consciousness to express the emotion of the “eight Immortals” will. The two

cooperate complementarily to contribute content, accelerate the birth of ideas, and help overcome the problem of rigid thinking.

3) *Symbolic symbol - Longevity turtle cake stamp*: “Touch the turtle’s head, raise the building; Touch turtle mouth, great wealth; Touch turtle body, big turnover; Touch the turtle tail; No worries about food and drink.” Quanzhou folk turtle image of the unique culture contained in the praise. Longevity turtle cake stamp is printed with the turtle shape, turtle grain, longevity, and other auspicious patterns to symbolize Quanzhou people’s health and smoothly as sustentation, express simple good expectations. As shown in Fig. 13.



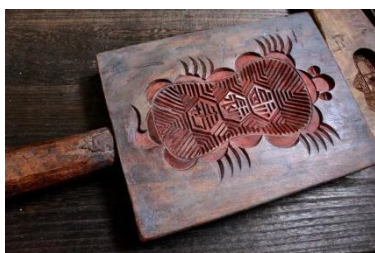
Fig. 10. Shape grammar designed symbol of the eight immortals' color.



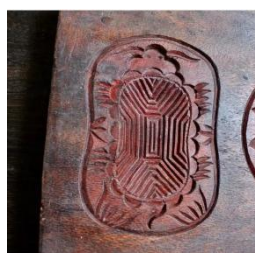
Fig. 11. Midjourney’s design of the shape grammar designed symbol of the eight immortals color.



Fig. 12. Human-machine collaborative design of the eight immortals color pattern.



(a)



(b)



(c)

Fig. 13. Handcrafted wooden longevity turtle cake stamp.

Local Quanzhou family, there is a family turtle printing said. The natural texture arrangement on the turtle shell resembles the astronomical structure pattern. The symmetrical layout is typically formed through repetition, approximation, or emission diagrams and is widely utilized in decoration and the creation of

graphic materials [13]. It has five claws at the front and four at the back, signifying being down-to-earth and reaching all over the world. Occasionally, space modeling based on turtle prints and four-sided carvings is employed, as shown in Fig. 14.

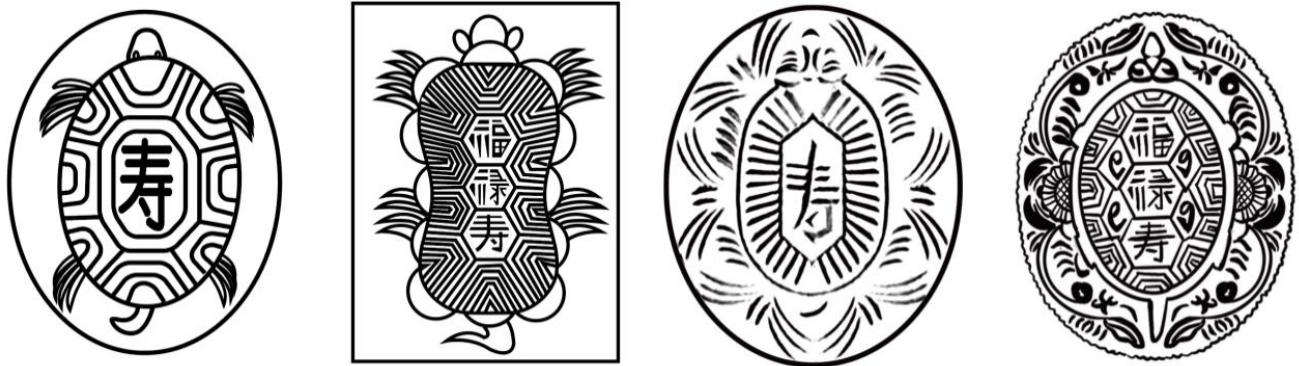


Fig. 14. Longevity turtle symbolic pattern.

The square turtle print was simplified as the initial pattern, supplemented by the peony edge pattern and turtle back pattern, etc., and the shape deduction and redesign were carried out by implementing the R1 constitution rules (translation copy) and R2 constitution rules (counterclockwise rotation 15° and 60°) in the shape grammar. The results are shown in Fig. 15.



Fig. 16. Midjourney's design of the shape grammar designed longevity turtle cake stamp.



Fig. 15. Shape grammar designed longevity turtle symbolic pattern.

Based on the structural framework generated by Midjourney, the long-lived turtle serving as the central graph is designed through man-machine collaboration. There exists vivid long-lived turtle culture, along with abstract and summarized auspicious symbols such as twig patterns and curly grass patterns, as shown in Fig. 16. The presentation effect is demonstrated in Fig. 17. With the designer's emotional expression of the longevity turtle cake stamp symbol integrated with the creation efficiency and cognitive memory of artificial intelligence, the thinking significance of the emotional communication and symbol of the Longevity turtle culture was fully manifested, and the cooperation advantage was significantly reflected [14, 15].



Fig. 17. Human-machine collaborative design of the longevity turtle cake stamp.

In the context of changing times and shifting public aesthetics, symbolic design has also undergone transformation and innovation. It is necessary to incorporate diverse and personalized elements into design to meet the demands of social transformation and the diversification of folk beliefs. The innovative, symbolic approach in human-computer collaborative design highlights the characteristics and style of the “Xi” (joy) culture, achieving the cultural transmission and innovation of symbolic elements while deepening and extending its rich regional characteristics and cultural connotations. However, the integration and application of shape grammar and AI also face a series of challenges and limitations. The construction and optimization of rule sets are key challenges in the application of shape grammar. As the number of shape inference rules and the diversity of generated shapes increase, it poses challenges to the quality and efficiency of generation. Additionally, maintaining a balance between creativity and personalization during the design process, and improving user interaction experiences, are also important issues that need to be addressed in the integration of shape grammar and AI.

V. QUANZHOU XI CULTURE: VISUAL APPLICATION OF AUSPICIOUS BELIEFS

A. Construction of Quanzhou Xi Cultural Elements

After thousands of years of evolution, numerous forms and types of cultural elements exist in Quanzhou. Many artists are dedicated to exploring the fusion of traditional art and modern symbols and seeking transformative innovations, enabling non-local people to better comprehend the artistic value and significance of these symbols.

In the realm of modern design, integration constitutes one of the most prominent characteristics. Even traditional and intricate patterns and configurations can be rejuvenated in contemporary applications. In contrast to modern elements that are more prevalently utilized in visual design, the application of traditional Quanzhou Xi cultural elements is relatively restricted and the audience is narrow. Different from ancient times, contemporary public aesthetics places greater emphasis on color and form simplification, employs the application of space, proportion, and dislocation integration, and the traditional visual symbolic design conforms to the trend of the times, undergoes continuous changes and developments, and broadens the visual dimension of the public [16, 17].

B. Example of Visual Symbolic Design of Quanzhou Xi Culture

1) *Example of Quanzhou 卍 packaging design:* In the theme of the 2022 LaiWangLiangPingTang Quanzhou Ancient and early taste inheritance base “Research on Quanzhou Xi·Chinese Red Xi culture Creative design” the author selected the Quanzhou embroidered version of the “Wan (卍)” character and black and white napkin as the elements of the packaging design, the color of the most representative symbol of Quanzhou Xi culture - Quanzhou red, the color of the blazing sun, all things are alive. The design effect is shown in Fig. 18. The use of the visual symbol design of Quanzhou embroidered “Wan (卍)” character activated the great potential of the visual

symbol of Quanzhou Xi culture, disseminated excellent traditional cultural thoughts, and enhanced the public’s resolution of Quanzhou Xi culture.



Fig. 18. Quanzhou Embroidered ‘Wan (卍)’ character element packaging design.

2) *An example of visual symbolization design of longevity turtle cake stamp:* In Quanzhou, among Buddhism, Taoism, and folk beliefs, the longevity turtle cake stamp holds a significant position. It can be utilized for sacrificing to deities, expressing wishes for longevity, or repelling evil spirits. As an essential sacrificial image for the people of Quanzhou, the “turtle” originated from the recognition of the ancient Central Plain’s “longevity turtle” totem and the perception of their own marine culture. This folk traditional craft has been passed down for five generations in the Quanzhou region, boasting a history of over 100 years, and has emerged as one of the most representative visual symbols of Quanzhou Xi culture.

The design team led by LAYAN chief designer Johhanness Hartruss and located in the lobby of the Seven-style hotel Wanshou wall is a typical representative of the visual symbol of longevity turtle kuey printing. The Wanshou wall employs shape grammar for copying translation rules and is arranged in glazed texture turtle kueh pie molds. The simple copying and translation operation can better achieve the continuation of the form style compared with the long-lived turtle graph with thousands of years of history. The presentation effect is shown in Fig. 19. It fully demonstrates the unique ideological connotation and cultural heritage of Quanzhou Xi culture and spreads the positive significance of health, longevity, and prosperity.

The visual symbol of longevity turtle kuey printing is no longer confined to its initial function but has evolved into a symbol of spiritual belief and psychological suggestion. The public’s aspiration for a better life is transformed into an optimistic attitude and beautiful vision through the visual symbol of longevity turtle cake stamp, promoting the recognition of the cultural value of Quanzhou Xi and further enhancing its cultural consciousness.

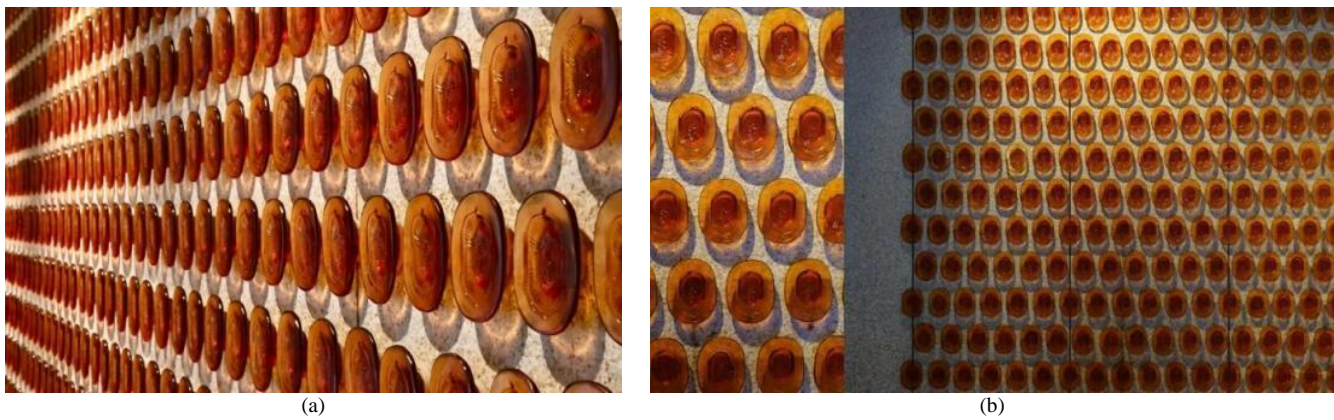


Fig. 19. Lohkah hotel-glazed longevity wall.

VI. RESULTS AND DISCUSSION

This study has deeply refined representative visual symbol elements of Quanzhou's "Xi" culture, such as the Quanzhou embroidered "Swastika" character, the wedding joy "Eight Immortals Color," and the longevity "Longevity Turtle Cake Stamp." These visual symbols go beyond mere decorative art, profoundly embodying the emotional aspirations, life philosophies, and core values of the people. This is one of the key research findings uncovered through an in-depth analysis of Quanzhou's "Xi" culture. Furthermore, through analysis and practice, the innovative application of visual symbolization has been verified, not only constructing a framework for the folk perspectives of Quanzhou's "Xi" culture but also facilitating its transformation into modern fashion culture. Leveraging a human-computer collaborative design model, this study promotes a deep integration of artistic creativity and advanced technology, making the visual language of Quanzhou's "Xi" culture more aligned with contemporary aesthetic trends.

Future research will further explore the iterative redesign of Quanzhou's "Xi" culture visual symbolization, aiming to innovate both the expressive forms and the depth of connotations in these visual symbols. At the same time, it will confront the limitations of human-computer collaboration in the visual design process. Through interdisciplinary cooperation, the study will deepen the understanding of the cultural connotations of Quanzhou's "Xi" culture, combining modern technological means such as artificial intelligence algorithms to seek a balance between human creativity and AI advantages in collaborative design. This approach aims to overcome AI's deficiencies in emotional expression and cultural understanding, with the goal of building a visual symbol system for Quanzhou's "Xi" culture that not only reflects the essence of traditional culture but also meets modern aesthetic trends, promoting its transformation into fashion and ensuring its modern value and transmission.

VII. CONCLUSION

The continuity of the "worship Mode" and the diversity of "Minnan belief as the source, Nanyang auspicious as the flow" jointly constitute the distinctive flavor of Quanzhou Xi culture. Quanzhou Xi culture originates from the five Xi cultures, inheriting the core of the regional humanistic spirit, reflecting the folk customs of the people, and serving as an important

resource base of Chinese auspicious culture. The visual symbolization of Quanzhou Xi culture explores the rich symbols contained in Quanzhou's traditional Xi culture, leading to an aesthetic trend of modern auspicious symbol design. Its symbols are not only decorations but also a means to express people's inner emotions, life attitudes, and values. The visual symbols of Quanzhou Xi culture extract the essence of its traditional culture, adhere to the concept of keeping pace with the times, and innovate and renovate. By introducing a new paradigm of human-machine collaboration design, the symbol design is re-innovated, and the modern and cultural values of the visual language of Quanzhou Xi culture are inherited. In future work, as some traditional symbols gradually fade out of the mainstream vision and cannot be inherited, we should further study and discuss the visual symbols of Quanzhou Xi culture to achieve the organic integration of traditional culture and modern values and present the more outstanding cultural spirit of Quanzhou Xi culture.

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