

Generative Design Application for Hainan Li-Miao Cultural Codes and Disruptive Cultural Transmission Pathways

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Abstract: Hainan Li-Miao cultural codes are the spiritual achievements accumulated by the Li-Miao ancestors during their long-term production and life practice. They carry the historical memories, folk customs and value pursuit of the two ethnic groups, serving as the core logos of the autochthonous culture in Hainan. Amidst the digital age, generative AI unlocks transformative potential for creative revitalization and disruptive propagation of Li-Miao cultural codes, transcending constraints inherent in conventional transmission frameworks. This study anchors in the autochthonous attributes of Li-Miao cultural codes, integrating grounded application contexts to explore the specific application pathways for generative AI in the design of Li-Miao cultural codes, diagnose real-world transmission challenges, proposes propose culturally-grounded transmission strategies with high implementability, enabling vernacular integration of symbols into quotidian praxis for sustainable living heritage, thereby furnishing actionable frameworks for Hainan's indigenous cultural digital propagation.

Keywords: Hainan Li-Miao Culture; Cultural Codes; Generative AI; Design Application; Disruptive Transmission Pathways

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1. Introduction

Hainan Li-Miao ethnic groups are the most representative ethnic minorities in Hainan. Through thousands of years of multiplying and development, they have created unique cultural codes. Whether Li brocade patterns, Miao silver ornaments, or the folk customs of “San Yue San” and the rhythms of bamboo and wood musical instruments, all are vivid embodiments of Li-Miao cultures. As semiotic vessels of Li-Miao identity, they are critical manifestations of Hainan cultural pluralism ^[1]. With the extensive use of digital technology, the traditional Li-Miao cultural transmission methods encounter bottlenecks, failing to adapt to the acceptance habits of modern people, and some cultural codes have gradually been marginalized. The rise of generative AI, with its efficient creative capabilities and flexible adaptability, has opened up new pathways for the innovative design and extensive propagation of Li-Miao cultural codes. This paper, based on the indigenous realities of Li-Miao culture, deeply explores the application of generative AI in cultural symbol design, innovates grounded transmission pathways, enabling the ancient Li-Miao culture to regain new vitality in the digital age.

2. The Core Connotations and Transmission Status of Hainan Li-Miao Cultural Codes

2.1 The Core Connotations and Autochthonous Attributes of Li-Miao Cultural Codes

The Li-Miao cultures are the significant intangible assets in the Li-Miao regions, serving as the witness to the development and changes of the Li-Miao ethnic groups over thousands of years, and are the important logos that enable the Li-Miao people to survive and distinguish themselves from other ethnic groups. Firstly, the regional characteristics determine unique and distinctive Li-Miao cultural character that is extremely difficult to be replicated. Secondly, through the oral transmission, repeated exposure, and apprenticeship-based transmission in the long-term production and life in ethnic areas, the ethnic culture has been passed down, while equally exhibiting its life-oriented and narrative characteristics. This is also an important basis for studying ethnic history. Hainan Li-Miao cultural codes are not abstract concepts, but rather concrete carriers integrated into the daily life of the Li-Miao people. They possess distinct autochthonous attributes and real-world utility, and culturally-grounded resonance and affective materiality constitute its quintessential attributes. Among the cultural codes of the Li ethnic group, Li brocade is the most representative element. Its patterns were not created randomly but originated from the observations of the Li

ethnic ancestors on nature and the summary of their life. For instance, the geometric patterns representing mountains and rivers, the frog and bird patterns symbolizing auspiciousness, all represent the Li people's beautiful expectations for life. Each pattern carries a specific folk story. The cultural codes of the Miao ethnic group mainly consist of silver jewelry, Panhuang dance masks, and batik. The carvings on Miao silver jewelry and the patterns on batik are closely related to the Miao people's totem worship and festival customs. For instance, the wooden masks used in the Panhuang dance, with wide-open eyes and exposed fangs, exude a sense of solemnity and mystery. Only the highly respected "Dao Gong" is eligible to wear them, and they are an important symbol of the Miao ethnic group's sacrificial culture.

In addition, the folk activities, dietary culture and architectural features of the Li -Miao ethnic groups have equally formed a unique cultural symbol system [2]. The "San Yue San" festival, which is a common traditional festival for the Li and Miao ethnic groups, features activities such as thousands of people performing bamboo pole dance, holding long-table banquets, and singing in antiphonal style to pray for blessings. These activities are an important manifestation of Li-Miao cultural integration. The rice pounding dance of the Li ethnic group originated from daily rice pounding activities. The dancers strike the pestle against the mortar and also strike each other's pestles, transforming the repetitive labor movements into graceful dance, exuding a strong life climate. The Shanlan wine of the Miao ethnic group and the fish tea of the Li ethnic group are not only unique delicacies but also reflect the hospitality customs of these two ethnic groups. The brewing tools and the table etiquette are all important components of cultural codes. These cultural codes are deeply rooted in the daily life and production of the Li and Miao people. They do not deviate from reality or undergo excessive embellishment. They are the most vibrant autochthonous cultural carriers.

2.2 The Transmission Status and Challenges of Li-Miao Cultural Codes

Currently, the dissemination of Li-Miao cultural codes has achieved certain results. For instance, the "San Yue San" festival has become a tourism-cultural semiotic landmark for Hainan, and Li brocade has appeared at Paris Fashion Week. However, there are still many challenges, and these challenges are mostly practical, rather than abstract industry problems. On the one hand, the transmission methods are relatively traditional. The transmission of Li and Miao cultural codes mostly relies on oral teaching that inspires true understanding within and hands-on teaching. For instance, the weaving of Li brocade and the crafting of Miao silver jewelry all require the successors to spend many years learning. The younger generation is mostly unwilling to invest a lot of efforts to master these complex techniques, which has led to the problem of a transmission gap for some cultural codes. On the other hand, the modes of dissemination are relatively monotonous. Traditional dissemination mainly relies on offline exhibitions and folk activities, with a limited dissemination scope and rather dull forms, failing to attract the attention of modern people, especially the young cohorts [3].

Furthermore, the innovative transformation of Li-Miao cultural codes is insufficient. Most of them remain at the level of simple demonstration, lacking integration with modern life and thus failing to be integrated into the daily life of the masses. For instance, the Li brocade motifs are mostly used in traditional clothing, while silver jewelry is often employed as folk decorative items. These have not been transformed through innovative design into daily items that are popular among the masses. As a result, cultural codes have become disconnected from modern life, and the dissemination efficacy has been greatly reduced. Meanwhile, dissemination process lack specificity. The dissemination content is not designed based on the acceptance habits of different groups, which leads to poor dissemination effects and makes it difficult for the Li-Miao cultural codes to truly enter the masses' view.

3.The Concrete Application of Generative AI in the Design of Hainan Li-Miao Cultural Codes

3.1 Digital Reconfiguration of Traditional Symbols, Preserving Indigenous Charm

Generative AI can conduct precision digital disassembly and reconfiguration the traditional Li-Miao cultural codes, and optimize the presentation forms of the symbols while preserving the core essence and autochthonous

charm, to make them more in line with modern aesthetics. For the Li brocade patterns, AI can accurately extract the core elements of traditional patterns, such as the lines and colors of frog patterns and geometric patterns, analyze their composition logic, and then integrate with modern design styles to generate new patterns, which retains the traditional charm of Li brocade, and simplifies the complex weaving lines, making them more suitable for modern clothing and cultural & creative products. For instance, through AI design, Li brocade patterns can be integrated with modern T-shirts and canvas bags, enabling the patterns that were originally used in traditional clothing to enter the daily life of the masses [4].

For Miao silver jewelry and the masks of the Panhuang Dance, generative AI can use image recognition technology to restore the carving details of the silver jewelry and the shape features of the masks. Then, based on modern aesthetic requirements, it can optimize their shapes and proportion, design more lightweight and practical silver jewelry and mask designs. This retains the core essence of Miao culture while avoiding the problems of traditional silver jewelry being overly cumbersome and the masks being too mysterious to be popularized. Meanwhile, AI can also conduct digital reconfiguration of Li-Miao traditional architecture, such as the bamboo houses and boat-shaped houses, generating images suitable for poster design and background of short-form videos, enabling traditional architectural symbols to be presented more flexibly.

3.2 Innovating Application Modalities Through Quotidian Context Immersion

Generative AI can transcend the traditional application scenarios of Li-Miao cultural codes, and innovate the application forms based on the daily life needs of the masses, so that cultural codes can truly integrate into life and get closer to the masses. In terms of the design of cultural and creative products, AI can, based on the attributes of Li-Miao cultural codes and aligned with the functions of daily items, create culturally-grounded cultural and creative products. For instance, it can integrate Li brocade patterns and Miao silver jewelry elements into daily items such as phone cases, keychains, notebooks, and tableware, enabling the masses to come into contact with and understand Li-Miao cultural codes by using these daily items.

In terms of the dissemination of folk activities, generative AI can create visual materials related to the “San Yue San” festival, such as festival posters, short-form video effects, interactive emojis, etc. These materials not only retain the folk characteristics of “San Yue San” but also conform to the dissemination habits of modern people. For instance, the dynamic emojis of bamboo pole dance and rice pounding dance generated by AI can vividly depict the scenes of folk activities, suitable for dissemination on social platforms such as WeChat and TikTok. This enables more people to learn about the Li-Miao folk culture. Furthermore, AI can also leverage Li-Miao musical symbols, such as the timbre of the nose flutes and the mouth flutes to generate background music with Li-Miao characteristics, which can be used in short-form videos, live broadcasts, and other scenarios to enhance the appeal of cultural dissemination.

3.3 Human-AI Symbiosis, Catalyzing Living Heritage Transmission of Cultural Codes

Generative AI does not mean to replace traditional successors. Instead, it means to form a human-AI collaboration model with successors, facilitating the living heritage transmission of Li-Miao cultural codes. This application aligns with the actual situation of Li-Miao cultural transmission. The traditional techniques of loom weaving of Li brocade and the crafting of silver ornaments involve a complex and time-consuming process. AI can assist the successors in designing. For instance, the successors provide the core patterns and key techniques, and AI generates various design proposals for the successors to choose and optimize. This not only saves the successors' time and energy but also stimulates their innovative inspiration.

At the same time, AI can record and preserve the technical details of the successors, such as digitizing each step of the loom weaving of Li brocade and the carving techniques of silver ornaments, generating visual teaching materials that are easy for younger generation successors to learn, thus overcoming the limitations of traditional oral teaching that inspires true understanding within. Furthermore, AI can also innovate and optimize traditional cultural

codes based on the needs of the successors. For instance, by integrating modern fashion elements, it can design cultural products that young cohorts love, making them more willing to accept and transmit the Li-Miao cultural codes. This enables the sustainable development of cultural transmission.

4. Disruptive Transmission Pathways for Hainan Li-Miao Cultural Codes Based on Generative AI

4.1 Architecting Short-Form Video Transmission Matrices Aligned with Mass Communication Praxis

Currently, short-form videos are one of the most favored transmission forms among the masses. Short-form video transmission matrices that are architected for Li-Miao cultural codes based on generative AI can effectively expand the dissemination scope and align with mass communication praxis. AI can be utilized to create short-form video content related to Li-Miao cultural codes, such as the generation process of Li brocade patterns, the craftsmanship of Miao silver jewelry, and the scene restoration of the “San Yue San” folk activities, enabling the masses to gain a clear understanding of the connotations of Li-Miao cultural codes through vivid visuals. At the same time, AI can optimize the editing and special effects of short-form videos, add Li-Miao ethnic background music, and enhance the appeal of the short-form videos.

In terms of the selection of dissemination platforms, it is necessary to target popular platforms such as TikTok, Kwai, and WeChat Video Channel, and create exclusive accounts to release culturally-grounded short-form video content, such as “DIY Tutorial of Li Brocade Patterns”, “Daily Outfit of Miao Silver Jewelry”, “Tips of the San Yue San Folk Customs”, etc. These videos should align with the daily life needs of the masses in order to attract their attention and enable them to share the videos. In addition, it is necessary to encourage the masses to create short-form videos related to Li-Miao culture using AI, and launch topic challenges, such as “Restoring Li-Miao customs with AI”, in order to stimulate the masses’ enthusiasm for participation in and create a favorable climate for extensive dissemination.

4.2 Advancing Cultural-Tourism Synergetic Propagation, and Strengthening Scenario Experience

The integration of Li-Miao cultural codes with the tourism -cultural industry in Hainan is an important way to achieve extensive dissemination. Generative AI can assist in tourism-culture integration, enhance the scenario experience of the masses, and enable cultural codes to achieve sensory accessibility, tangible materiality, and immersive interactivity. In the scenic spots, homestays and intangible cultural heritage workshops in the Li-Miao ethnic areas, AI is utilized to create immersive dissemination scenarios. For instance, AI-generated wall paintings and light shows featuring Li-Miao culture themes can be employed to restore the appearance of Li-Miao traditional villages, enabling tourists to fully experience the charm of Li-Miao cultural codes during their visits.

Meanwhile, based on the actual needs of the scenic areas, AI is utilized to design cultural tourism products, such as scenic area tickets, souvenir books, and souvenirs, integrating with cultural codes like Li brocade, silver jewelry, and folk customs. This enables tourists to take away products with Li-Miao cultural characteristics while enjoying the tour, thus achieving the secondary dissemination of culture. Furthermore, during festivals such as the “San Yue San” celebration, AI is utilized to design the scenes for the festival activities, such as AI-generated festival decorations and interactive games, to enhance the climate of the festivals and enable tourists to participate in the folk activities firsthand, thereby deepening their understanding and memory of the Li-Miao cultural codes.

4.3 Targeting Youth Cohorts via Dissemination Form and Content Innovation

Youth cohorts are the core force of cultural dissemination and the future of cultural transmission. It is necessary to target the interests and hobbies of the young cohorts, innovate the dissemination content and forms of Li-Miao cultural codes based on generative AI, enabling the young cohorts to proactively accept and disseminate Li-Miao culture, and utilize AI to design cultural products that suit the aesthetic preferences of young cohorts, such as trendy clothing, game skins, digital avatars, etc., with Li-Miao cultural themes, integrating symbols like Li brocade patterns

and Miao silver jewelry with elements that young people love, in order to attract their attention.

At the same time, it is necessary to leverage AI to create interactive communication content, such as an AI tool for generating Li-Miao cultural codes, enabling young cohorts to generate their own designs for Li brocade patterns and Miao silver jewelry, thereby enhancing their participation, and launch AI design competition on Li-Miao culture, encouraging the young cohorts to show their creativity and design Li-Miao cultural products with modern features, thereby stimulating their interest in Li-Miao culture. Furthermore, through platforms such as universities and youth associations, AI can be utilized to carry out activities like Li-Miao culture entering schools and communities. Lectures and other forms can be leveraged to enable young cohorts to gain a deeper understanding of the connotations of Li-Miao cultural codes, and cultivate their cultural identity and sense of transmission.

4.4 Fortifying Local Synergy to Establish a Collaborative Dissemination Ecosystem

The dissemination of Li-Miao cultural codes cannot be achieved without the joint efforts of local forces. Based on generative AI, a collaborative dissemination system of “government + successors + enterprises + masses” should be established, enabling the dissemination more culturally-grounded and more targeted. The government plays a leading role, leveraging AI to create a digital platform for Li-Miao cultural codes, integrate cultural resources, releases authoritative cultural information and AI-designed works, and guide the direction of cultural dissemination. The successors play a central role, integrating AI technology to innovate the design and transmission methods of cultural codes, and driving the masses to participate in cultural transmission. Enterprises play market role to design products related to Li-Miao culture using AI, and then popularize these cultural codes through market channels to larger groups. The masses play the main role by using AI to generate and disseminate Li-Miao cultural content, thereby forming a widespread dissemination pattern involving the entire population.

5. Conclusion

Hainan Li-Miao cultural codes are precious treasures of the indigenous culture of Hainan. They carry the historical memories and cultural connotations of the Li and Miao ethnic groups. Their living heritage transmission and extensive dissemination are important initiatives for protecting the cultural pluralism of Hainan and enhancing the confidence in the indigenous culture. Generative AI has provided a brand-new pathway for the innovative design and dissemination of Li-Miao cultural codes. Through the digital reconfiguration of traditional cultural codes, the innovative application in quotidian contexts, and human-AI symbiosis, Li-Miao cultural codes can align more with modern life and better meet the needs of the masses. Based on the innovative transmission pathways for generative AI, by Architecting short-form video transmission matrices, advancing cultural-tourism integration, targeting youth cohorts, and fortifying local synergy, it is possible to effectively break through the limitations of traditional transmission, enabling Li-Miao cultural codes to truly enter the masses’ view and integrate into daily life.

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