# CULTURE PEDIGREE AND DIGITAL EXPRESSION IN FOSHAN LION DANCE

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## ABSTRACT

"Foshan Xingshi" is an intangible cultural heritage of great significance in Lingnan Guangfu culture, containing rich historical, artistic and social values. In the research article, "Foshan XingShi" is uniformly defined as "Foshan Lion Dance". Based on the cultural core of Foshan Lion Dance, this study systematically reviews its historical background, artistic features, social functions and evolution, and combines the theory of embodiment cognition to analyze its deep cultural connotations, aiming to provide a theoretical basis for the digital living inheritance of Lion Dance culture. The study employs a combination of literature review and field investigation to extract the core value elements of Foshan Lion Dance from historical documents, folk records and expert interviews. The results show that Foshan Lion Dance has a long history, evolving from court ceremonies to folk events; The Lion Dance is exquisitely shaped and its performance form combines the beauty of martial arts and dance, embodying the social function and symbolic meaning of warding off evil and blessing and uniting the community. At the same time, the embodied cognitive perspective reveals the important role of physical participation in the inheritance of lion dance culture-through personal practice of lion dance, people's understanding and recognition of the cultural connotation are significantly deepened. Based on the above understanding, this paper discusses strategies for digital living protection and proposes to combine multi-sensory interaction design with virtual simulation technology to enhance the immersive experience of the audience and achieve "immersive" inheritance of lion dance culture in the digital environment. The research provides new ideas and theoretical support for the digital protection of intangible cultural heritage, which is of positive significance for promoting the innovative promotion of traditional culture in modern society.

**Keywords:** Foshan Lion Dance, Digital Succession, Cultural Core, Embodied Cognition, Living Protection

## INTRODUCTION

Against the backdrop of accelerating globalization and modernization, Foshan Lion Dance, as China's national intangible cultural heritage, is facing unprecedented challenges in its inheritance and protection. The traditional master-apprentice and festival performance transmission methods are becoming increasingly difficult to meet the demands of cultural dissemination and cognition in the newera. This paper takes Foshan Lion Dance as the research object, systematically analyzes its environmental background, historical evolution, artistic features, social functions and evolution patterns, explores its digital expression path based on the theory of embodiment cognition, and proposes an innovative inheritance model that integrates tradition and digital technology through the construction of cultural archives. The research employed methods such as literature analysis, field investigation, expert interviews, questionnaires and experimental design to develop the "Underwater Foshan Lion Dance Art Performance" digital experience project, empirically verifying the promoting effect of multi-sensory interaction on audience immersion, cultural understanding and emotional resonance. The results show that the digital experience based on embodiment cognitive design can significantly enhance the cultural communication effect and cognitive depth of Foshan Lion Dance, overcome the experience limitations of traditional static display, and provide theoretical support and practical paradigm for the digital living protection of intangible cultural heritage. Ultimately, this paper presents the "Digital Living Heritage Design Framework", which provides a feasible path for the protection, innovation and development of traditional culture in the context of the newera.

Intangible cultural heritage, as the collective memory and spiritual wealth of human civilization, carries a nation's history, social traditions and cultural identity. However, with the acceleration of global modernization and urbanization, the living environment of traditional cultural heritage has undergone profound changes. Especially for intangible cultural heritage in performing arts, due to multiple factors such as region, time, mode of dissemination and generational change of the audience, the inheritance and development are facing severe challenges. Foshan Lion Dance, one of the most representative southern lion dance schools in Guangdong, combines artistic elements such as martial arts, music, dance and fine arts. After hundreds of years of development, it not only reflects the religious beliefs and life wisdom of the people in Lingnan, It has also become an important cultural symbol for blessing, warding off evil spirits, and fostering community identity (Zhang et al., 2024).

In the current context, the traditional inheritance mechanism of Foshan Lion Dance is facing multiple predicaments. On the one hand, the aging of the inheritors is intensifying and the interest of the new generation of young people to participate is waning; On the other hand, traditional performance forms are disconnected from modern aesthetic tastes and media (Li & Huang, 2023). The endangered status and the risk of discontinuity of the lion dance art pose a huge threat to its sustainable development (Gao, 2024). Despite the continuous efforts of the government and all sectors of society to protect and promote the lion dance culture in recent years, such as including it in the national intangible cultural heritage list, holding lion dance competitions and establishing lion art training bases, the overall inheritance effect remains not optimistic.

Meanwhile, with the rapid development of digital technology, a new generation of digital means represented by virtual reality (VR), augmented reality (AR), 3D modeling, big data, and artificial intelligence (AI) has become an important means for the protection and dissemination of cultural heritage (Zhou & Zhu, 2025; Hu & Yan, 2024). China is also actively promoting the digitalization project of intangible cultural heritage, documenting, preserving and disseminating traditional culture through means such as video data collection, virtual display and interactive experience. However, most of the existing digital lion dance projects remain in the form of video recording and 3D reconstruction, lacking in-depth reproduction of the cultural

spirit, emotional experience and physical cognition, resulting in the widespread phenomenon of "more viewing than immersion" and "knowledge visible but emotion hard to reach" (Tang et al., 2024).



**Figure 1** VR technology experience lion dance performance

To address this issue, this paper introduces Embodied Cognition as its theoretical basis, emphasizing the deepening of cognition and memory through physical participation and multi-sensory stimulation in cultural experiences. The theory of embodied cognition holds that human cognition is not merely an information processing process of the brain, but an experiential process constructed by the interaction between the body and the environment (Jiang, 2024; Yang & Wu, 2024). Applying embodied cognition theory to the digital living heritage design of Foshan Lion Dance helps to break through the limitations of traditional static display, and through mechanisms such as multi-sensory interaction, motion imitation, and real-time feedback, stimulate the deep participation of audience and reshape the cultural cognitive experience. It truly realizes transformation from "viewing" to "experiencing" and from "passive receiving" to "active resonance".

**Research Objectives**

This study is centered around the following four core objectives:

1) Cultural sorting and analysis: A systematic analysis of the environmental background, historical development, artistic features, social values and evolution patterns of Foshan Lion Dance, and the establishment of a complete cultural archive.

2) Explore the digital expression path of Foshan Lion Dance integrating embodied cognition theory and clarify the key design elements;

3) Designed and developed a digital experience prototype titled "Underwater Foshan Lion Dance Art Performance", based on the theory of embodied cognition.

4) Constructed a digital living inheritance framework for performance-based intangible cultural heritage (ICH) projects, defining the scope of digital design content and contributing to the innovative development of ICH preservation.

By combining qualitative research with quantitative experiments, this study aims to provide theoretical guidance and practical reference for intangible cultural heritage projects in Foshan Lion Dance and beyond, and to promote the living continuation and innovative development of traditional culture in the digital age.

# LITERATURE REVIEWS

**Historical and cultural background of Foshan Lion Dance**

*1) Historical Origin and evolution*

Foshan Lion Dance, an important representative of folk art in the Lingnan region, has its historical origin dating back to the Eastern Han Dynasty (25-220 AD), when the Western Regions countries frequently presented lions as tribute to the Central Plains dynasties, marking the official entry of the lion image into the Chinese cultural system (Duan, 2006). The lion

dance is recorded many times in the Book of the Later Han, indicating that since its birth, the lion has been closely associated with power symbols and sacred connotations (Fan & Sima, 1987). During the Sui and Tang Dynasties, the lion dance was widely used in court banquets, sacrificial ceremonies and temple fairs, gradually expanding from the upper-class noble culture to the folk belief system and giving it the cultural symbolic meaning of goodluck and warding off evil.

During the Song and Yuan dynasties, the Central Plains culture and the Lingnan culture were deeply integrated, and the lion dance technique spread southward to the Pearl River Delta region. Influenced by the martial arts, folk customs and religious concepts of the Lingnan region, the southern lion dance gradually took shape, emphasizing integration of expressive spirit and martial arts. By Ming and Qing dynasties, Foshan, as a major center of handicrafts and commerce, provided fertile ground for the flourishing development of lion dance art with its strong economic foundation and active clan and guild organizations. The regular lion dance societies in clan ancestral halls and local temples were not only used for festival entertainment, but also served social functions such as community security and clan liaison.

From the early to the middle of the 20th century, Foshan Lion Dance continued to be popular locally, and on the other hand, it spread to Malaysia, Singapore, Vietnam and other places as overseas Chinese moved to Southeast Asia, becoming an important symbol of global Chinese cultural identity (Gao, 2024). However, social unrest and urbanization also had an impact on the traditional lion dance culture, resulting in a sharp decline in the number of inheritors and the gradual decline of the skills. Since the reform and opening up, the state has attached great importance to the protection of intangible cultural heritage. Foshan Lion Dance was successfully included in the national intangible cultural heritage list in 2006 and has been rejuvenated with the promotion of the cultural and tourism industry. At present, Foshan Lion Dance has expanded from a single folk performance to a variety of fields including competitive performances, international exchanges and cultural and creative development, demonstrating strong cultural adaptability and vitality.

More importantly, the historical evolution of Foshan Lion Dance reflects the distinct characteristics of intangible cultural heritage in adapting to social changes and continuing its cultural vitality by constantly adjusting its form of expression and medium of dissemination under the pressure of globalization. The blend of tradition and modernity has enabled lion dance culture to not only maintain community cohesion in its home country but also shape the cognitive image of Chinese culture on the international stage.



**Figure 2** Traditional Design of the Foshan Lion Dance Head

*2) Artistic characteristics and Performance System*
Foshan Lion Dance, in terms of artistic expression, demonstrates an extremely high level of integrated artistry and systematic structure, covering multiple dimensions such as prop craftsmanship, performance movement system, and musical coordination, forming a complete and unique performance system.

*Prop craftsmanship:* The lion head, as the core prop of the lion dance performance, is made with a combination of solid and vivid craftsmanship. The traditional craftsmanship, with bamboo strips as the framework, combines cotton paper, gold and silver foil, and painting

techniques to give the lion head a lively and dynamic spirit. The colors of the lion heads correspond to different cultural meanings, such as the red lion symbolizing joy and smoothness, the yellow lion representing power and wealth, and the black lion representing might and bravery (Thanks, 2022). In addition, the top of the lion's head is often painted with a mirror, the "magic mirror", which symbolizes warding off evil spirits and enhancing the sacredness of the ritual. In the traditional production process, bamboo weaving requires a balanced structure and good elasticity to ensure that the performance is both light and flexible, and can withstand complex and high-intensity movements. The pasting and coloring process is particularly important. It not only tests the artist's painting skills, but also accurately conveys the lion's facial features, such as its bright and piercing eyes and its powerful and upright single horn. In recent years, modern materials (such as carbon fiber, lightweight plastic) have been incorporated into some of the production techniques, enhancing durability and ease of operation while maintaining traditional aesthetics (Li & Huang, 2023).



**Figure 3** The process of making lion heads

*Action system:* The movement design of Foshan Lion Dance emphasizes the combination of movement and stillness and the integration of spirit and energy. It aims to simulate the real life state of a lion and pursues the coherence, layering and emotional expression of the movements. In traditional routines, such as "Caiqing", which means "be promoted step by step"; "Denggao", which means "to reach a higher mountain peak"; "Goqiao", which means "to cross an obstacle over a bridge and get out of a low point"; Or "Xunshi", which means "vividly reflecting the appearance of a lion's foraging", etc., both reflect the lion's natural instinct for hunting and incorporate metaphors of human social culture. The movement system of these lions is highly dependent on the martial arts foundation of the performer, and the rhythm of the movements needs to be closely coordinated with the gongs and drums to achieve "The steps follow the pulsation, and the mind follows the sound". The lion dance performance emphasizes the eight basic expressions (joy, anger, sorrow, joy, movement, stillness, shock, doubt), and the subtle expression of emotional changes through the rhythm of the movements, the swinging of the lion's head, and changes in the eyes, creating a strong dramatic and infectious effect (Zheng, 1988; Zhu, 2014; Li, 1997).

*Musical coordination:* The musical system is an indispensable and important part of the lion dance performance, with percussion instruments such as gongs, drums and cymbals forming the basic orchestration. Different combinations of rhythms and drumbeats correspond to different stages of the performance, such as the "lion drum" which is vigorous and uplifting, awakening the spirit of the lion; The marching drum, with its gentle rhythm, guides the lion's movement; The green Drum, with its tight beats, sets off a tense and intense atmosphere (Xie & Su, 2006). The lion dance music is not just an accompaniment, but through the close interaction of rhythm changes and movements, it enhances the dramatic tension and emotional fluctuations of the performance. Traditional performers usually need to practice for a long time

to develop a high degree of tacit understanding to achieve perfect synchronization of movements and music.

*3) Social function and cultural value*

Foshan Lion Dance not only has unique artistic and aesthetic value, but also plays multiple cultural and social roles in the local community.

*Religious and ritual functions:* Lion Dance is widely used in traditional festivals, temple fairs, opening ceremonies and other occasions, symbolizing good fortune, warding off evil and disasters, and strengthening the community's belief system in the protection of deities. Especially during the Spring Festival, activities such as "lion dance to pay New Year's greetings" and "green picking to celebrate the New Year" carry people's expectations for a bountiful harvest and happiness in the New Year (Li & Huang, 2023).

*Community cohesion function:* Lion Dance activities often rely on clans, guilds, and community units to organize Lion Dance teams, which not only enhances the emotional connection among members but also serves as a symbolic carrier of social identity and a sense of belonging. In the diverse modern society, this collective ritual helps to maintain local cultural identity and social stability.

*Educational and moral functions:* Lion Dance training emphasizes both skill and character, shaping teenagers' resilience, discipline, and teamwork through hard training. The Lion Dance club not only imparts skills but also takes on the dual responsibility of cultural inheritance and moral education.

*Cultural dissemination and economic function:* With the deepening integration of culture and tourism, Foshan Lion Dance has become an important brand resource of cultural tourism in the Lingnan region, participating in local economic development through various means such as performances, competitions, and cultural and creative products. In recent years, major events such as the International Lion Dance Competition and the World Lion King Contest have greatly enhanced the international reputation and cultural influence of Foshan Lion Dance (Hu & Yan, 2024).

Overall, Foshan Lion Dance has been constantly adjusting its social role and cultural function throughout history. It is both a symbol of local folk customs and an important bond of global Chinese identity, demonstrating remarkable adaptability and vitality in the era of cultural globalization.

*4) Stages of Development of Foshan Lion Dance*

The development stages of Foshan Lion Dance have gone through several periods. The usual research starts from the Qing Dynasty to the Republic of China period, during which Foshan Lion Dance was based on clans and chambers of commerce to form a systematic technical system. In the middle of the 20th century, influenced by social changes, the frequency of the Foshan Lion Dance declined for a while, but its core skills were well preserved through spontaneous folk inheritance. After that, it entered the period of China's reform and opening up. With the country's emphasis on intangible cultural heritage, Foshan Lion Dance entered a revival period, was recognized as a national intangible cultural heritage project, integrated into the cultural and tourism industry and went international.

**Digitalization and living Inheritance of Intangible Cultural Heritage**

With the development of digital technology, the digital protection of cultural heritage has become a frontier area of international concern. The 2003 UNESCO Convention advocates for the improvement of the living inheritance capacity of intangible cultural heritage through community participation and education. Some countries in Europe and the United States have accumulated rich experience, such as Italy, which uses 3D scanning technology to create virtual museums for historical sites, allowing the public to experience historical heritage as if they were there. Domestic scholars have also explored new paths for digitizing intangible cultural heritage, such as establishing multimedia archives and developing interactive display systems.

Zhou (2018) pointed out that digitalization provides a new direction for the protection of intangible cultural heritage, which helps to break through the limitations of time and space and achieve wider dissemination. However, digital means often focus on visual presentation, making it difficult to convey the emotions and practical experience contained in intangible cultural heritage. In recent years, the concept of "vitalization" has gained attention, that is, to keep intangible cultural heritage "alive" in contemporary society through dynamic participation and recreation. This requires going beyond static records and focusing on the interaction between inheritors and audiences. Especially in performance-based intangible cultural heritages that are highly physical, simple video or animation displays cannot replace hands-on experiences, which is one of the reasons why many digital projects are not effective. Therefore, it is necessary to introduce a cognitive science perspective to study how to enable the audience to have a cultural experience close to reality in the digital environment, thereby enhancing the effect of inheritance.

When discussing the digital preservation of intangible cultural heritage (ICH), scholars both in China and abroad have primarily focused on the following aspects: the visualization and interactivity of culture, the application of Virtual Reality (VR) and Augmented Reality (AR) technologies in cultural transmission (Jiang, 2024), and how digital platforms can enhance participation and interaction in ICH projects (Gao et al., 2024). With the rise of Artificial Intelligence Generated Content (AIGC), these studies have increasingly incorporated intelligent tools to create more personalized and immersive cultural experiences. Against this backdrop, the digital design and transmission of the Foshan Lion Dance have become a significant research direction in ICH preservation, particularly in leveraging AIGC technologies to enrich cultural expressions and enhance interactive experiences.



**Figure 4** Foshan Lion Dance Scenes Created with AIGC Technology

**Application of Embodied Cognition Theory in Design**

Cognition holds that human cognitive processes are inseparable from the body, and the acquisition and understanding of knowledge are deeply rooted in perception and motor experience. This theory originated from the development of philosophy and cognitive science: early phenomenologist Merlo-Ponty expounded the inseparable relationship between the body and perception, and contemporary experimental studies have shown that body movements directly affect cognitive outcomes. Teaching through gestures promotes children's understanding of mathematical concepts, for example, illustrating the supportive role of movement in cognition. In the field of design, embodied cognition emphasizes the integration of the user's body interaction into the design to enhance the intuitiveness and immersion of the experience. Some scholars have applied it to scenarios such as museum displays and educational games, demonstrating that multi-sensory interaction can enhance situational understanding and memory effects. For traditional performing arts like lion dance, embodied cognition offers a new perspective: only by getting the participants to move and through the stimulation of multiple senses such as movement, touch and hearing can they deeply appreciate

the rhythm and spirit of the lion dance. This idea points the way for digital heritage-designing immersive, interactive experiences that allow users to "learn by doing" and truly inherit the essence of the culture, rather than just watching the superficial excitement. To sum up, existing research provides valuable information for the preservation of Foshan Lion Dance culture, but there is a lack of systematic exploration on how to effectively pass on its cultural core in the digital age. The introduction of embodied cognition theory is expected to make up for this deficiency. Building on previous studies, this paper will conduct an in-depth analysis from the historical, cultural and cognitive levels and attempt to construct a theoretical framework for digital living inheritance.



**Figure 5** 3D scene construction

## RESEARCH METHODOLOGY

Research methods are the foundation of the quality of a paper. Scientific and reasonable research methods and technical routes are the basic requirements for ensuring the standardization of the research process and the scientific nature of the research conclusion. This paper comprehensively employs a combination of qualitative and quantitative research methods, giving full play to the advantages of both, and selects the most suitable approach based on the characteristics of different research questions to enhance the systematicness and credibility of the research.

This study adopts a mixed-methods approach, integrating both qualitative and quantitative data collection and analysis, with the aim of systematically exploring the cultural pedigree and digital living expression mechanisms of the Foshan Lion Dance. The rationale for selecting research methods is structured around the following three stages:

*Cultural Foundation Exploration:* Primarily using qualitative methods, this stage employs literature research and cultural archival construction to uncover the historical value, artistic characteristics, and cultural functions of the Foshan Lion Dance, laying a theoretical foundation for subsequent design work.

*Application in Digital Design:* Based on the findings of the first stage and grounded in embodied cognition theory, this stage adopts a practice-based digital interaction development approach to create the "Underwater Foshan Lion Dance" immersive prototype experience system. First-hand feedback is collected through behavioral observation and user interviews.

*User Perception Validation:* By integrating the results of the previous stages with the final design outcomes, this stage collects data on users' cultural understanding, satisfaction levels, and behavioral responses. The goal is to construct a theoretically grounded framework—based on embodied cognition—that defines key design elements for multi-sensory and motion-based interaction, as well as an evaluative system for user experience.

In this study, qualitative research methods are mainly used for cultural information extraction and exploratory design development, while quantitative methods serve to assess user experience and validate theoretical applications. These two approaches are complementary, forming a continuous research loop from cultural investigation to user-centered validation.

**1) The method of literature review (Qualitative research)**

This study employs a systematic literature search method based on the literature retrieval platform of the National Library of China, We searched for relevant literature in Chinese and English databases including CNKI (China National Knowledge Infrastructure), EBSCO, Elsevier, Wiley, JSTOR, Emerald, SAGE, SpringerLink, Informs, PQDD, Scopus, Baidu Scholar, Google Scholar, etc. During the search process, the focus was on top international journals such as ASQ, AMR, AMJ, JCR, JCP, JM, JBR, JBM, JPBM, JIM, JMR, JMS, JOM, as well as domestic CSSCI source journals. Take "Intangible Cultural Heritage", "Cultural heritage Protection", "Foshan Lion Dance Culture", "Chinese Lion Dance Culture and Inheritance", "Combination of Artificial Intelligence and culture", "Application of artificial intelligence", "Embodiment cognition theory", "multi-sensory interactive experience", "underwater performance form", etc. as the core keywords, and expand their English and synonym searches. Systematically collect, summarize and categorize the relevant research results, through literature integration and analysis, the current research status of brand value co-creation and digital protection of intangible cultural heritage in the context of the Internet is sorted out, the deficiencies and gaps in existing research are identified, and the problem setting and framework construction of this study are clarified.

**2) Cultural Archive Construction (Qualitative research)**

Systematically sort out the historical development, artistic features, social functions and evolution patterns of Foshan Lion Dance through field research, expert interviews and literature analysis, as follows:

*Field research:* The research team went deep into Foshan City and its surrounding areas to observe the lion dance performance on the spot, visited traditional heritage sites such as ancestral halls, martial arts schools and cultural centers, and recorded in detail the performance movements, ritual procedures and environmental atmosphere.

*Expert interviews:* Conduct semi-structured in-depth interviews with three national-level intangible cultural heritage inheritors of Foshan Lion Dance and two experts in the field of digital culture to collect first-hand information on the inheritance of lion dance skills, cultural value and possibilities of digital transformation.

*Literature analysis:* Systematically review existing research results on Foshan Lion Dance and the digital protection of intangible cultural heritage, and extract key cultural elements and protection strategies.

Through qualitative data coding and thematic analysis methods, core cultural characteristics and digital design requirements of Foshan Lion Dance were extracted, laying a theoretical foundation for subsequent interactive experience design.

**3) Digital Interaction prototype development (Practical research)**

Based on the sorting of cultural archives, develop an immersive interactive experience prototype of "Underwater Lion Dance", mainly including:

*Design concept:* Use virtual reality (VR) technology as a platform to create a fantastical underwater environment, place traditional Lion Dance performances in an immersive scene to attract the attention of young audiences, while strictly following the choreography and drumbeat rhythm norms of Foshan Lion Dance to ensure authenticity of cultural expression.

*Embodied interaction design:* Users engage in interactive operations such as drumming and action imitation through VR devices and motion control controllers. The system adjusts the virtual performance of the lion dance in real time according to user's rhythm and movements, achieving multi-sensory immersive experience and cultural cognition synchronization.

*Iterative optimization:* Based on internal tests and user feedback, multiple adjustments were made to the smoothness of the movements, the synchronization of the drumbeats, visual details and interactive experience, and the overall experience effect and cultural accuracy were continuously improved.
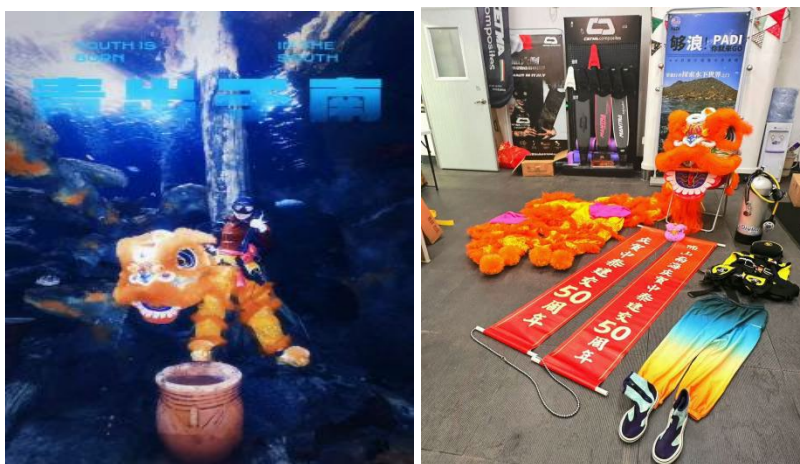
**Figure 6** Underwater lion dance performance

**4) Framework building and comprehensive analysis**
Combining qualitative and quantitative research results, a digital living inheritance design framework for Foshan Lion Dance and other performance-related intangible cultural heritage projects was refined and constructed, mainly including:
*Cultural content screening principle:* Ensure the cultural authenticity and representativeness of the digital expression.
*Elements of multi-sensory and motion interaction design:* Enhancing immersion, participation and cultural cognitive effects.
*User experience evaluation metric system:* Quantitatively assess the role of immersive experiences in promoting cultural understanding, interest stimulation, and emotional resonance.
This framework provides a theoretical basis and practical reference for the future digital protection and revitalization of intangible cultural heritage.

## RESEARCH RESULTS
This study focuses on the cultural transmission and digital expression of the Foshan Lion Dance, adopting an integrated approach that combines literature analysis, cultural archive construction, prototype development, and empirical research. It constructs and validates a digital living inheritance framework guided by embodied cognition theory, achieving the following key outcomes:

**1) Cultural Value Extraction and Elemental Construction for Digital Expression**
Through a systematic review of historical documents, intangible cultural heritage records, and expert interview data, this study comprehensively analyzed relevant domestic and international research in the areas of the historical development of the lion dance, folk traditions, embodied cognition theory, and the digitalization of intangible heritage. Based on this, four core aspects of the cultural essence of the Foshan Lion Dance were identified: historical evolution, artistic features, social functions, and cultural connotations, which are summarized as follows:
*Historical evolution:* The origin of Foshan Lion Dance can be traced back to the integration of ancient Chinese and foreign cultural exchanges. The historical book "History of the Later Han Dynasty" records that in 87 AD, the Yuezhi Kingdom in the Western Regions presented a lion to the Han Dynasty. Since then, the lion has been frequently recorded as a tribute in historical records and has gradually been endowed with the symbolic meaning of bravery and good fortune. During The Three Kingdoms and Jin Dynasties, lion dance became popular in the army to boost military might, and by the Northern and Southern Dynasties, lion dance had been

incorporated into court feasts and performances. During the Tang Dynasty, the lion dance was popular in the royal family and was used in major celebrations to show dignity. After that, the lion dance spread from the court to the common people, and in the Song Dynasty, it began to develop into a pattern of dividing the northern and southern lions. The northern lion followed the style of the Tang palace, with a grand and magnificent appearance, and was mostly used in northern temple fairs and celebrations; the southern lion, on the other hand, has developed a unique form of lion dance in the Lingnan soil. It has a single horn on its head, a powerful image, and a vigorous drumbeat, symbolizing the awakening of power, hence the name "Lion Dance". During the Ming and Qing dynasties, with the southward migration of people from the Central Plains, the culture of lion dance was deeply rooted among the people in places like Foshan, Guangdong. Folk organizations such as the Lion Club emerged, and the lion dance became an indispensable part of the Spring Festival celebrations and temple fairs. There are also many folktales about the lion dance, such as the story of the Nian beast, which links

The lion dance to warding off epidemics: It is said that in Lingnan villages, whenever a monster caused trouble at the end of the year, villagers would make colorful lions and beat drums to drive it away, and the monster would flee upon hearing the sound. Since then, every household has performed the lion dance during the Spring Festival to pray for safety. These legends have enriched the cultural connotations of the lion dance. Since the founding of the People's Republic of China, Foshan Lion Dance has been performed many times at home and abroad and was officially included in the national Intangible Cultural Heritage List in 2006, presenting a new opportunity for protection and revival. Overall, Foshan Lion Dance has evolved over a thousand years, moving from court music to folk celebrations, inheriting the ancient ritual spirit and integrating the regional culture of Lingnan, becoming a folk art with both historical and regional characteristics.

*Artistic features:* Foshan Lion Dance has distinct artistic characteristics in its form and performance. On the one hand, the modeling techniques are unique and exquisite. The lion's head is framed with bamboo strips and framed with paper pieces, with multiple layers of paper superimposed to shape the lion's head, ensuring its lightness and flexibility while giving it a solid structure and three-dimensional effect. On this basis, artisans hand-paint the lion's head with bright mineral paints. Common patterns include tiger stripes, dragon scales, etc., symbolizing warding off evil and good fortune. The lion's forehead is adorned with a small round mirror, commonly known as the "magic mirror," which, in the folk belief of Lingnan, can ward off evil spirits and enhance the lion's ability to ward off evil. The traditional lion dance also has its own color scheme: the red, yellow and black lion heads respectively symbolize the character and righteousness of the famous generals of The Three Kingdoms, Liu, Guan and Zhang. Red symbolizes bravery, black symbolizes solemnity and dignity, and yellow symbolizes loyalty and kindness, embodying the people's admiration for the virtues of loyalty and bravery. In addition, the patterns on the lion's body and trousers are rich and varied, often embroidered with auspicious totems such as cloud patterns and flames, echoing the rhythm of the gongs and drums and enhancing the visual impact. On the other hand, the performance forms are dynamic and integrated with martial arts. The Foshan Lion Dance incorporates the footwork and moves of the Southern School of martial arts, emphasizing "movement to generate momentum, momentum to generate momentum". The dancers stabilize the stance through lunges, horse steps, etc., and display the agility of the lion through leaping and dancing. The lion dance is performed by two performers, one holding the lion's head and the other playing the lion's tail, demanding a high degree of coordination. During the performance, the lion is either imposing or endearing, and the character and demeanor of the lion are vividly depicted through animal-like actions such as shaking its head and tail, winking and licking its fur. The Foshan Lion Dance has a variety of routines, with the most representative being the green-picking ceremony: the lion, with the encouragement of gongs and drums, ascends high

to pick up the lettuce hanging in mid-air (the word "green" sounds like "life") and thenscatts it, symbolizing the gathering of vitality and good fortune. The process is full of ups and downs and profound meanings, fully demonstrating the fun and interactivity of the lion dance performance. It should be noted that with the development of The Times, there have also been some innovations in the inheritance of lion dance art. Some artisans have tried to use lightweight materials instead of bamboo and wood to make the lion head lighter, but this has raised concerns about the loss of traditional craftsmanship. Overall, the Foshan Lion Dance art adheres to the traditional aesthetic-vigorous and dynamic, while also developing a distinctive system of craftsmanship and performance patterns through long-term practice.

*Social Function:* Foshan Lion Dance played multiple roles in traditional society and had rich social functions and values. First of all, it carries the religious function of blessing and warding off disasters. In folk beliefs, lions are regarded as auspicious animals that can ward off evil and bring good fortune. Lions are performed during important times such as the Spring Festival and temple fairs to pray for a peaceful and bountiful New Year. The lion throws the lettuce to the audience during the green picking, symbolizing "prosperity and the addition of children", and sending blessings to every household. In particular, the Lingnan region still preserves ritualistic performances such as the lion dance to worship temples and tour hometowns, which are full of solemn rituals and carry on the tradition of the ancient Nuo ritual. Secondly, the lion dance has the public value of uniting the community. Lion dance activities are often organized with funds raised by the community, practiced together by young people in the village, guided by elders, and performed collectively during festivals, enhancing the emotional connection and cultural identity among fellow villagers. Studies suggest that lion dance, as a collective folk sport, can "promote national culture and enhance national cohesion" and play a role in stabilizing community spirit during the transitional period of society. Thirdly, the lion dance has educational and recreational functions. Traditionally, lion dance performances have been given moral implications, such as the lion's bravery to ward off evil symbolizing justice over evil, educating through entertainment and imperceptibly conveying the concepts of good and evil. In modern society, many schools and martial arts schools have incorporated lion dance into their physical education curriculum or extracurricular activities to foster teamwork and national pride among teenagers. In addition, lion dance is a performing arts competition, evolving into competitive functions such as lion dance competitions, which demand the skills and courage of the dancers. Foshan has hosted many international lion dance events, which have not only promoted the exchange of skills but also enhanced the city's influence. It can be said that Foshan Lion Dance, which originated from religious sacrifices, has gradually expanded into multiple social functions such as entertainment, fitness and competition, and has met people's needs in terms of faith, spirit, social interaction and culture in different eras. This precisely reflects the meaning of intangible cultural heritage projects' "living" existence in society that is, constantly adapting to the new environment and the needs of the audience to diversify their functions.

*Cultural connotation:* After a long period of development and accumulation, Foshan Lion Dance has formed a unique cultural core, whose deep connotation is reflected in two aspects: spiritual value and aesthetic image. The first is the spirit of bravery and progress. The lion dance is powerful and vigorous, the beats are vigorous and rhythmic, and the overall atmosphere is inspiring and uplifting. In the traditional sense, the lion symbolizes bravery and strength, and the heroic spirit of the lion dance performance embodies the people's aspiration to drive away evil and promote good, and to strive for progress. Whenever the drumbeats of the lion dance are played, the audience are invigorated, and this emotional resonance reinforces the group's sense of identity and pride. The second is the pursuit of harmony and auspiciousness. The lion dance, as an important part of the New Year's celebration, embodies the Lingnan people's wish for a better life. The lion dance is interwoven with auspicious words

(such as picking green leaves for "lettuce" symbolizing wealth), festive music and bright colors, creating a festive and harmonious cultural atmosphere. The lion dance is often associated with the local belief in Guandi and ancestral worship, expressing the ethical concept of respecting ancestors and the spirit of reciprocity, reflecting the traditional values of harmony between man and nature and a bountiful harvest. The third is the inclusiveness of being inclusive and accommodating. The core of Foshan Lion Dance culture is not closed and rigid, but rather the continuous absorption and integration of diverse elements throughout history. Lingnan Lion Dance, for example, incorporates the aesthetic influence of Cantonese opera facial makeup, and incorporates the spirit of heroic figures into the lion face design, making the lion dance more legendary; In terms of performance, it retains the martial arts postures of the Han people and incorporates the dexterous movements of the dances of the surrounding ethnic minorities, creating a style that combines strength and grace. This open and inclusive nature has enabled the lion dance culture to remain vigorous across different social environments. To sum up, the cultural core of Foshan Lion Dance can be summarized as: using the lion as ametaphor for people, embodying the spirit of bravery, progress, warding off evil and bringing good fortune; Through the lion dance custom passed down from generation to generation, it demonstrates community cohesion and cultural identity; Through continuous integration and innovation in inheritance, it reflects the inclusive and ever-lasting nature of Chinese culture. These are the values of the lion dance as an intangible cultural heritage project and essence that its digital inheritance should strive to preserve and promote.

**2) Practice-Based Research Results of Digital Interaction Development Guided by Embodied Cognition Theory**

Based on the aforementioned findings, this study first identified the most representative core elements of Foshan Lion Dance culture, including: 1) Visual imagery (e.g., lion head design, color patterns); 2) Auditory rhythm (e.g., drumbeat structures, rhythmic logic); 3) Physical movement (e.g., probing, leaping, rolling, and other traditional footwork); 4) Symbolic meaning (e.g., warding off evil, invoking blessings, strengthening community cohesion, and promoting skill inheritance).

In addition, this study addresses the key challenges in the sustainable development and transmission of intangible cultural heritage, including: 1) Enhancing the richness and diversity of cultural performances to attract broader participation and interest in cultural inheritance; 2) Breaking the limitations of traditional stage-based performances by creating more dynamic and immersive atmospheres aligned with contemporary innovations; 3) Leveraging AI technologies to transcend spatial constraints, expand beyond physical interaction settings, and broaden the narrative and aesthetic boundaries of traditional culture. Based on these four core cultural elements and three strategic solutions, this research developed the "Underwater Foshan Lion Dance Art Performance" for the first time.

*Design Concept of the Underwater Lion Dance Performance:* This work employs AIGC technologies as an innovative tool, combined with live-action video, to create a lion dance performance set in an underwater environment—shifting the traditional lion dance from land to a virtual aquatic scene. The result is a hybrid video experience blending virtual and physical elements. By breaking through physical spatial limitations, the project creates a new form of dimension-transcending visual interaction that appeals to younger audiences, while strictly adhering to the established choreographic principles and drumbeat rhythm standards of the Foshan Lion Dance. On one hand, it ensures authentic cultural expression; on the other hand, it uses digital technologies to generate a new form of sustainable, economically valuable, and replicable "New Foshan Lion Dance Performance."

*Integration of Embodied Cognition in Interaction Design:* Users interact with the system through gesture-based devices and motion controllers. The system responds in real time by

adjusting the virtual lion dance scene according to the rhythm and actions of the user, ultimately achieving a multisensory immersive experience and simultaneous cultural cognition.

**Table 1** Workflow of Digital Interaction Design and Development
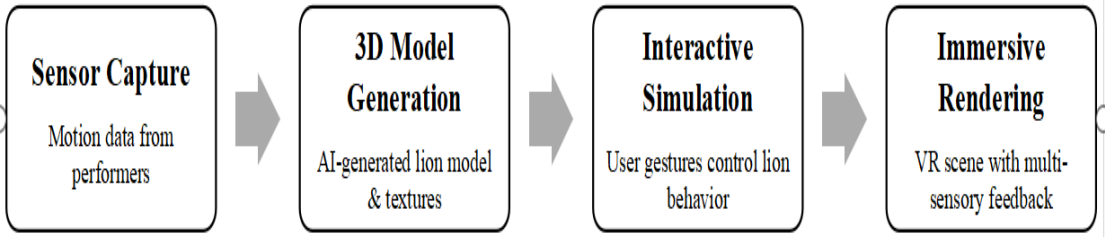


The video production process involved the use of technologies such as AIGC, AI-based image simulation, and glasses-free 3D. The development was carried out across three main categories: content creation, video synthesis and editing, and immersive scene construction. In addition, based on internal testing and user feedback, multiple adjustments were made to the underwater Foshan lion dance live-action scenes, focusing on aspects such as motion smoothness, drumbeat synchronization, visual detail, and interactive experience. Continuous iterations and technical upgrades were implemented throughout the creative process, resulting in significant improvements in both experiential quality and cultural accuracy. Details of the design and development workflow are presented in the table below:

**Table 2** AI-Driven Content Iteration, Audio Design, Sensory Feedback, and Interaction Modes

| Category | Visual Content Generation | Sound Design | Multisensory Triggers | Interaction Mode |
|---|---|---|---|---|
| **Content Creation** | 1) Live-action footage recorded according to script; 2) Prompts using keywords such as "Foshan Lion Dance," "underwater," and "Thailand" were used to generate high-fidelity Thai scenes and lion dance visuals; 3) AI image models (Midjourney, MidDream) were used to create conceptual underwater art and lion dance prototypes; 4) Short lion dance video clips were generated using OpenAI's Sora, Keling, and Vidu models. | 1) Foshan lion drum rhythms were recorded; 2) A parallel AI-assisted sound design process was employed to synchronize with visual effects. | 1) Multisensory feedback devices triggered by performance; 2) Audio controllers used to trigger scene transitions; 3) Spatial audio mixing synchronized animation with drumbeat. | 1) Generation of long HD videos from text or image prompts with animated lion dance movement; 2) Scene-based video applications generated from static images. |
| **Video Synthesis & Editing** | AI-generated segments were compiled in Adobe Premiere. Timeline was optimized, and realistic | A custom underwater ambient soundtrack was | Physical triggers (e.g., audio devices) were embedded | In VR/AR environments, when a performer produces sustained |

| Category | Visual Content Generation | Sound Design | Multisensory Triggers | Interaction Mode |
|---|---|---|---|---|
| | underwater lighting and particle effects (e.g., bubbles, glare) were added to enhance depth. The fully rendered video was color graded to match a fantastical Eastern aesthetic. | composed to simulate muffled drum echoes. Recorded lion drum audio was integrated and spatialized to align rhythm with visuals. | in the timeline to control video playback based on real-time sound input. | sound (e.g., over 30 seconds), the system captures it as a training sample to support multilingual future applications. |
| **Immersive Scene Construction** | High-definition 360° lion dance scenes were rendered in glasses-free 3D or projection-based displays, representing different performance states. | Multichannel audio (headphones/speakers) was applied with dynamic spatial effects. | In immersive environments, participants perform lion dance movements or record audio; scene states are activated based on on-site prompts. | A perception-action loop was established. The entire experience runs on a 360° AIGC system, where haptic and environmental feedback is synchronized with visuals and sound. |

**3) Construction and Promotion Potential of the Digital Living Inheritance Framework**

To enhance the practical guidance and operability of the digital living inheritance framework, this study applied the "Underwater Foshan Lion Dance Immersive Experience System" as a demonstration project, conducting systematic application testing and design validation of the key modules within the framework. The specific practices are as follows:

**Table 3** Underwater Digital Experience Design System for Lion Dance Culture

| Systematic Design | Specific Content | Illustrative Example |
|---|---|---|
| Cultural Content Selection | Selection of authentic lion dance elements: Archival performance videos were reviewed and masters were consulted to identify the core choreography. |  |
| Multisensory Interaction Design | Tactile and environmental feedback: Users wear devices to take on the role of a lion dancer, performing nodding, jumping, and leaf-grabbing actions in rhythm. |  |
| Narrative Application | Embedded cultural storytelling: The lion dance can be innovatively performed underwater, symbolizing the idea that all forms of cultural inheritance allow for innovation. |  |

| Systematic Design | Specific Content | Illustrative Example |
|---|---|---|
| Evaluation and Feedback Metrics | User evaluation: A subsample of approximately 30 participants took part in a digital experience experiment. The "Cognitive Experience Rating Scale" was used to measure levels of |  |

*Implementation of Cultural Content Filtering Principles:* In the early design stage, through in-depth interviews with cultural experts and literature synthesis, the study identified representative cultural symbols and structural elements of the Foshan Lion Dance. A prioritization system was established based on cultural value and visual expressiveness. Among them, "lion head design," "traditional drumbeat rhythms," and "martial arts footwork structure" were categorized as first-level cultural elements, prioritized for digital modeling and interaction design to ensure high fidelity in cultural restoration and recognizability in the digital presentation.

*Execution of Multisensory Interaction Design:* Grounded in the theory of embodied cognition, this project focused on the integration of three sensory channels—visual, auditory, and kinesthetic feedback—to construct a multisensory immersive experience environment. On the virtual reality (VR) platform, users could not only visually experience the underwater lion dance animation but also engage emotionally through real-time synchronization of drumbeat rhythms and ambient sound effects, with an "interactive lion head perspective" enhancing the immersive atmosphere.

*Embedding of Motion Imitation Mechanism:* To encourage users to shift from "observers" to "participants," the system incorporated motion capture and body-sensing control modules (such as handheld interaction devices and motion recognition cameras). Users could imitate basic lion dance movements (e.g., "lion leap," "high step," "object probing"), and through the dynamic feedback mechanism, achieve internalized understanding between physical execution and cultural meaning, thus realizing the practical path of embodied cognition in cultural transmission.

*Establishment of a User Feedback Loop Mechanism:* After completing the experience, the system collected user feedback data across three dimensions: "cultural resonance," "behavioral participation," and "sense of immersion." The results of data analysis were directly used to refine the design process, enabling content iteration and system optimization, ensuring the project's capacity for sustainable improvement.

In summary, this framework not only effectively guided the entire digital transmission process of the Foshan Lion Dance, but also demonstrates strong cross-cultural adaptability and promotion potential. It can serve as a systematic design reference and methodological path for other intangible cultural heritage projects with "performative characteristics" (such as the Dai ethnic Peacock Dance or Peking Opera body movement techniques), expanding the practical space of digital living inheritance in broader cultural domains.

## DISCUSSION & CONCLUSION

***Cultural cognition analysis of living Inheritance:*** Through the above study, we can see that Foshan Lion Dance is not only a lively performance, but also a cultural carrier that embodies historical memory and collective sentiment. Its historical evolution and evolution reflect the exchange and integration of Chinese culture at different times; its artistic features reflect the spirit of craftsmanship and aesthetic creativity; Its social function meets the religious, recreational and cohesive needs of the community. Together, these form the core of the lion dance culture, giving it a unique and important place in the hearts of the people of Lingnan. It

is worth noting that in the traditional context, people's understanding and recognition of the lion dance mainly come from personal experience: participating in the lion dance or watching it up close, feeling the shock and passion, and deepening the understanding of its symbolic meaning. The introduction of embodied cognition theory helps us to reveal the mechanism: there is a close connection between physical movements, sensory stimulation and cultural significance. When dancers bend down, exert all their strength to lift the lion's head, and dance to the beat of gongs and drums, they are actually "thinking" with their bodies, internalizing the spirit of loyalty and bravery; The audience claps and cheers to the rhythm and forms an emotional perception of the lion dance culture through their full engagement. This shows that physical engagement is a key way to understand and pass on the lion dance culture. Both traditional master-apprentice teaching and festival scenes rely on this. In the digital age, however, we are faced with an urgent question: How can we make the younger generation, who are mainly exposed to culture through screens and the Internet, develop the same deep understanding and emotional identification with the lion dance? If the digital presentation stays at the visual level of browsing and lacks interactive participation, it will be difficult for the audience to truly understand the spiritual core of the lion dance, and the inheritance effect will surely be compromised. Therefore, we need to explore new ways to make the audience in the digital environment "immersive" as well.

*Theoretical basis and strategy for Digital Living Protection:* Based on the above understanding, this paper advocates constructing a strategic framework for the digital living inheritance of Foshan Lion Dance with embodiment cognition as the theoretical basis. First of all, in terms of design concept, it should adhere to "people-oriented and immersive experience". This means that digital solutions should make users not just viewers, but participants. For example, an interactive VR experience of lion dance could be developed, allowing users to wear the device and act as lion dancers, following the rhythm to perform actions such as nodding, jumping, and picking green leaves. During this process, the user's body movements correspond to the virtual lion's feedback in real time, forming a perception-action loop that makes the user feel as if they were performing a lion dance themselves. This immersive experience helps users experience the strength and rhythm of the lion dance, thereby gaining a deeper understanding of its cultural implications. Secondly, in terms of technical means, multi-sensory interaction should be integrated. Research shows that multisensory stimulation can enhance memory and emotional connection. For the lion dance, visual, auditory and tactile elements can be combined: provide high-definition 3D models and real scene reproductions visually, restore the powerful sound of gongs and drums auditory, consider installing simple force feedback devices (such as controllers that simulate the weight of the lion's head) for tactile, and even create an aroma of incense to form a three-dimensional sensory experience. This multi-channel information input will fully immerse the user in the lion dance scene and enhance their cognitive understanding. Thirdly, in terms of content presentation, focus on context and story-telling. Simply showing the movements of the lion dance may not be enough to convey the cultural connotations. It should incorporate stories related to the lion dance (such as the legend of the Nian beast, historical allusions) and ritual scenes (such as the Spring Festival gathering of green flowers, temple fair lion racing), allowing users to understand the cultural stories behind it while completing the interactive tasks. This aligns with the principle of "cognitive embedding in context" emphasized by embodied cognition, which is to help understand abstract meanings through concrete contexts. For example, design a digital plot: the user plays as a villager and performs a lion dance to drive away the legendary monster Nian, and after success, the villager celebrates the New Year. This story-driven experience directly associates the lion dance movement with its symbolic meaning, deepening the user's impression. Finally, in terms of evaluation feedback, cultural cognitive metrics are established to measure the effectiveness of the digital experience, such as whether users can say the

meaning of the lion dance, whether they show interest in the lion dance, etc., to continuously improve the design. The core of this framework is to ensure that digital means serve the transmission of the cultural core rather than being a mere show-off of technology.

*Conclusion:* This article focuses on the cultural core and digital inheritance of Foshan Lion Dance. By examining aspects such as history, art and social functions, we have gained a systematic understanding of the cultural value of Foshan Lion Dance; with embodied cognition theory, we highlighted the indispensable role of physical experience in intangible cultural heritage inheritance and explored the principles and methods of digital living protection accordingly. The study suggests that in order to bring new life to physical intangible cultural heritages such as Foshan Lion Dance in the digital age, it is necessary to combine digital technology with profound cultural experiences to create inheritance models that encourage active participation and hands-on practice by the audience. Only when audiences "dance" and "move" in the digital world can we truly see intangible cultural heritage in people, objects and life, and achieve the transformation of intangible cultural heritage protection from static preservation to dynamic inheritance. The exploration in this paper provides an interdisciplinary perspective on the digitalization of intangible cultural heritage, filling the gap in current research on the integration of cognitive theory and technology. Of course, there are limitations to the research, such as the need for further verification of the technical implementation and promotion effects at the practical level. In future work, actual digital interactive lion dance products can be developed based on the framework proposed in this paper, and their impact on cultural heritage can be evaluated through user research. In conclusion, the protection of intangible cultural heritage in the digital age requires the integration of "cold technology" and "hot culture", allowing technology to serve culture and safeguarding our spiritual homeland in innovative forms. Foshan Lion Dance, this ancient and vibrant cultural treasure, will surely shine with new splendor and be passed down from generation to generation with the support of digitalization.

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