

Designing visual identity systems for intangible cultural heritage: from digital archiving to regional cultural tourism product integration

Tianni Yang

University College London, London, United Kingdom

yangtianni123@outlook.com

Abstract. This study proposes a comprehensive solution integrating digital archiving, semantic analysis, and design translation to customize a visual identity system for intangible cultural heritage. In collaboration with the inheritors, research is conducted, integrating image-aggregating artificial intelligence and text mining technologies to extract basic cultural symbols from mountain sacrificial music, simple embroidery techniques, and coastal festival dances. Through iterative design workshops, the symbols are transformed into unified logos, color matching systems, and font systems to ensure cultural authenticity. The expert committee evaluates the semantic fidelity of each component, while for the survey of local residents and tourists, it measures the recognition rate, participation rate, and purchase intention. The results show that the recognition rate of each visual system in the resident group reaches 90%, and in the tourist group it reaches 78%. The interest scores were all above 4.0 points (out of 5). After being applied to silk scarves, gift box packaging, interactive mobile applications, and festival-related products, it effectively increased product sales, the number of registrations for craft workshops, and the number of festival visitors. Empirical evidence shows that this three-step integration route promotes the commercial value of cultural tourism while preserving cultural authenticity, providing a replicable model for other regions to strengthen heritage and regional brand building through design.

Keywords: visual identity system, intangible cultural heritage, digital archiving, cultural tourism, design integration

1. Introduction

The world's intangible cultural heritage—including sacrificial music, traditional embroidery, and seasonal dance—faces serious challenges from globalization, urban-rural migration, and the iteration of digital technology. Mountain communities preserving the music and dance of their ancestors, simple ethnic groups transmitting embroidery patterns, and coastal towns performing festival dances—their living traditions are at risk of being overlooked or misinterpreted in the contemporary context. Visual design provides a powerful bridge connecting heritage protection with modern applications. When the visual identity system deeply encodes central cultural symbols, it can become a dual medium for preserving the essence of culture and promoting regional cultural tourism. However, the current development process often separates digital archiving from brand promotion, resulting in a lack of semantic depth in promotional materials or a separation of digital archives from the needs of community marketing. This study therefore proposes a trinitarian development path: digital documentation of artifact exhibitions and oral history; semantic clustering of basic patterns is achieved through AI image classification and text mining; relying on the design translation workshop, the symbols are transformed into system identifiers, color schemes, and application standards. This framework has been verified in three major intangible cultural heritage projects: mountain sacrificial music with cloud pattern cards and Gongche music scores; plain embroidery, renowned for its geometric and floral patterns; a coastal festival dance with dynamic silhouettes and undulating curves [1]. By inviting inheritors, designers, and brand experts to participate throughout the process, it is ensured that each visual element not only carries multiple cultural semantics, but also meets the cognitive needs of the local community and foreign tourists. The following text separately discusses the theoretical basis of visual semiotics and digital archiving technology (Section 2), the process of designing and implementing hybrid research methods (Section 3), and the results of expert review and visitor participation evaluation (Section 4).

2. Literature review

2.1. Visual identity systems and cultural semiotics

A visual identity system is a visual medium for the core values and symbolic narratives of an institution, community, or region. In the field of cultural heritage, visual identity goes beyond a simple icon, encompassing color pairing systems, font standards, graphic symbols, and layout rules, all working together to convey a unified cultural narrative. Cultural semiotics provides the theoretical foundation for this—from fabric patterns to the structure of ritual costumes, all can be decoded as visual elements. Understanding cultural semiotics allows designers to interpret the multi-layered implications of traditional motifs, such as auspicious patterns symbolizing prosperity or continuous patterns evoking historical events. When the visual system strictly adheres to the principles of semiotics, public perception can resonate with the intangible value contained within heritage practices [2]. However, developing visual systems for intangible cultural heritage is different from building commercial brands: first, heritage symbols often carry multiple semantics intertwined with society, spirit, and community; second, stakeholders should include not only traders and tourists, but also the heritage community, the elderly, and practitioners. Therefore, effective development requires adopting a participatory approach, integrating semantic analysis of heritage into design specifications. Only by placing semiotic interpretation at the heart can designers create logos, patterns, and layouts that embody living traditions, rather than merely superficial aesthetic elements [3].

2.2. Digital archiving and heritage preservation

Digital documentation of intangible cultural heritage uses cutting-edge technologies to capture, store, and index multidimensional information about living traditions. Contemporary archiving practices encompass not only textual descriptions and flat-panel photography, but also 3D modeling of crafts, high-quality audio recording of music and oral history, and panoramic metadata frameworks that connect people, regions, and practices. These digital assets form the basis of protection and design efforts [4]. By systematically integrating and archiving content—for example, by adding context tags such as village of origin, historical context, and symbolic meaning to traditional embroidery designs—practitioners build a library of retrievable resources, providing raw material for semantic analysis. Many intangible cultural heritage projects exist only in oral or performance form. Without digital object preservation, they risk being lost. Video motion capture, multispectral imaging, and other technologies can accurately record the dynamic performance or color stability of craft materials, ensuring visual system designers have access to high-quality source data.

2.3. Tourism design and cultural branding

Tourism design and cultural brand building are dedicated to packaging and presenting regional cultural heritage, aligning it with tourists' knowledge and promoting economic circulation. Regional branding relies on unique cultural assets—such as food traditions, crafts, and festival activities—to evoke local identity. The visual system of cultural tourism must strike a balance between the authenticity of local community culture and the cognitive threshold of external audiences. In successful practices, designers integrate heritage elements into product packaging, wayfinding signs, digital experiences, and promotional materials, building a narrative loop that extends from initial interests (such as stylized logos in advertisements) to in-depth experiences (such as augmented reality tours with overlaid heritage information) [5]. The visual framework carries this journey: the color palette echoes the natural dyes of traditional crafts, the patterns imply ritual motifs, and the font inspiration comes from the practice of calligraphy.

3. Methodology

3.1. Research design

This study was conducted using a mixed-method approach combining qualitative analysis, a design workshop, and a quantitative evaluation. It began with in-depth interviews with successors and digital construction documents, followed by the systematic collection of textual and audiovisual material. The basic symbols were then refined using image classification and AI text analysis. Designers, academics, and community representatives participated in iterative workshops to develop and optimize the visual components. Finally, a team of experts assessed the degree of cultural reduction, while data on recognition rates, engagement, and purchase intentions of residents and tourists were collected to validate validity [6].

3.2. Case selection and sampling

Three non-heritage cases with distinct geographical and cultural characteristics were selected: mountain sacrificial music, plains embroidery techniques, and coastal festive dances. Each case possesses a rich symbol system and potential for tourism development. 5 to 8 representative heirs (musicians / embroiderers / dancers / organizers) are invited in each case to provide a semantic interpretation and 50 visitors (including 25 nationals and 25 internationals) are invited to participate in cognitive tests during the tourist season [7]. The double sampling plan ensures that the visual framework takes into account the internal cultural heritage and the perceptual needs of the external public.

3.3. Evaluation criteria

The effectiveness of the visual system was assessed based on three dimensions: cultural fidelity (the expert group rated the basic components on a scale of 1 to 5), visual identity (the percentage of participants correctly matching the visual elements to the source cases), and tourist conversion potential (understanding heritage desire and purchase intention using a Likert-scale questionnaire). The visual system is considered compliant with the standard if the degree of cultural restoration is ≥ 3 points, the tourist recognition rate is $>70\%$, the resident recognition rate is $>90\%$, and the average conversion intention score is >4 points (out of a full 5-point score) [8].

3.4. Cultural symbol extraction and digital archiving

Collaborate with local institutions to complete the collection of high-definition images of sacrificial musical instruments, embroidery samples, and festival costumes, supplemented by 3D scanning of key objects and dynamic video capture of dances. The metadata model records the origin, background, symbolic meaning, and craft techniques [9]. AI image clustering technology classifies similar visual motifs such as cloud patterns on the drum surface or geometric embroidery stitches. By combining oral interviews and chanting text extraction, core thematic terms such as “mountain spirit worship”, “ethnic cohesion” and “ocean worship” were extracted. This comprehensive digital archive provides a semantically rich resource base for further design translation.

3.5. Visual identity system development

Based on archived symbol resources, the multi-party design workshop involved produces systematic visual components for each case. The logo for Case A integrates abstract cloud and thunder patterns with musical stave elements. The color combinations of indigo, flame orange, and earth brown are derived from ritual costumes and the natural environment. The symbol system for Case B adopts simplified geometric checkered patterns and floral embellishments. The madder red and navy blue echo traditional dyes, and the rounded sans-serif font reflects the continuity of hand embroidery. Case C takes the circular composition of a dancer’s silhouette in sea blue and coral orange as its core, and combines the expanded font design to simulate dynamic waves. All visual specifications—including logo application, color codes, and font rules—are compiled in a style manual jointly approved by the designer and the successor [10].

4. Results and discussion

4.1. Semantic integrity and visual recognition

The expert group assessed the cultural fidelity of the visual components (see Table 1): the mountain ritual music logo (cloud and thunder patterns) received 4.6/5 points, and the key element 4.4 points; the plain embroidery control pattern scored 4.2 points and the floral details 4.1 points. The dynamic silhouette of the coastal festival dance 4.7 points, Wave 4.3 points. The user knowledge test (see Table 2) shows that the overall average recognition rate of the three models by local residents is 92% and that of tourists is 78%. Specifically, 85% of tourists accurately identified the ritual music logo, 73% recognized the embroidered control pattern, and 87% matched the festival dance silhouette. The data confirm that each visual system effectively carries the basic cultural semantics.

Table 1. Expert panel authenticity scores

Project Description	Component	Score (out of 5)
Mountain Ritual Music	Cloud Emblem	4.6
Mountain Ritual Music	Musical Staff Motif	4.4
Plains Embroidery Craft	Embroidery Grid Pattern	4.2
Plains Embroidery Craft	Floral Accent Element	4.1
Coastal Festival Dance	Dancer Silhouette	4.7
Coastal Festival Dance	Wave-Inspired Typography	4.3

Table 2. Recognition rates (%)

Audience Group	Mountain Ritual Music	Plains Embroidery Craft	Coastal Festival Dance
Local Residents	95	92	90
Tourists	85	73	87

4.2. User engagement in cultural tourism contexts

Among the 120 tourists surveyed, the average interest score for mountain ritual music reached 4.2 points (out of 5), for simple embroidery 4.0 points, and for coastal festival dance 4.3 points. Purchase intention points reached 4.0, 3.8, and 4.1, respectively (see Table 3). International tourists gave the coastal festival dance the highest score (4.4 points compared to 4.1 points for local tourists). Qualitative feedback shows that the deep indigo blue of the ritual music conveys a sense of mystery, and the coral orange accents of the festival dance create a festive atmosphere. Visitors who used the ritual music augmented reality app reported a deeper emotional connection with local musicians. 95% of residents agree that the visual system “respects” traditional culture. One embroiderer said, “The appearance of family motifs on modern packaging has injected new vitality into the craft.”

Table 3. Engagement and commercial metrics

Metric	Mountain Ritual Music (%)	Plains Embroidery Craft (%)	Coastal Festival Dance (%)
Average Interest Score (1–5)	4.2	4.0	4.3
Purchase Intent Score (1–5)	4.0	3.8	4.1
Sales Increase	32	15	—
Workshop Enrollment Increase	—	25	—
Festival Attendance Increase	—	—	40

4.3. Cross-disciplinary value and commercial viability

The application of the visual system has brought obvious economic benefits: sales of records and silk scarves in the field of sacrificial music increased by 32% and 28%, respectively; enrollment in study classes in the Embroidery Village increased by 25%, and revenue from tea products increased by 15%. Revenue from the coastal festival stalls doubled, and the number of visitors increased by 40%. Cross-sector collaboration is also taking place: embroidery artisans collaborate with fashion designers to create eco-friendly handbags, and coastal dancers team up with graffiti artists to project dynamic silhouettes during night performances. These achievements confirm that the authentic visual system can simultaneously promote cultural heritage and grow the cultural tourism economy.

5. Conclusion

This study constructed a replicable operational framework. By integrating the three major components of digital archiving, semantic analysis, and design translation, it developed an authentic visual recognition system for intangible cultural heritage. Applying this framework to cases such as mountain sacrificial music, simple embroidery techniques, and coastal festival dances, the research confirmed that AI-assisted symbol extraction combined with multi-stakeholder collaborative design workshops can produce identification systems, color schemes, and font standards that accurately convey cultural narratives. Expert review shows that the average semantic restoration score for key elements exceeds 4.2 points (out of 5 points), the recognition rate for resident groups is over 90%, and that for tourist groups is 78%. These indicators confirm that the framework can not only

preserve the subtle connotations of culture but also improve external cognitive effectiveness. In practical application scenarios, the implementation of the visual system in physical products (silk scarves/handbags/tea boxes) and digital platforms (AR apps/e-passports) generated clear economic benefits: sales of records and silk scarves in the field of sacrificial music increased by 32%; enrollment in study classes at the Embroidery Village increased by 25%, and revenue from tea products increased by 15%. Revenue from festival stalls doubled, and the number of visitors increased by 40%. This resulted in interdisciplinary collaboration—fashion designers collaborated with embroiderers to co-create handbags, and choreographers joined forces with graffiti artists to develop dynamic projections. The results show that the developed visual system can simultaneously enhance cultural protection, promote community participation, and stimulate the cultural and tourism economy. On a theoretical level, this study offers a systematic path for cultural semiotics to transform intangible symbols into modern visual language. On a practical level, it indicates the direction for cultural institutions, design teams, and tourism management departments to integrate heritage protection and brand building.

References

- [1] Hou, Y., Kenderdine, S., Picca, D., Egloff, M., & Adamou, A. (2022). Digitizing intangible cultural heritage embodied: State of the art. *Journal on Computing and Cultural Heritage*, 15(3), 1–20. <https://doi.org/10.1145/3494837 biblhertz.it>
- [2] Ruiz-Ruiz, I. N., Teruel-Serrano, M. D., & Miranda-Sánchez, S. I. (2022). Visual identity based on ancestral iconography: A strategy for re-evaluation of the Caranqui cultural heritage in the Gualimán archaeological site (Ecuador). *Heritage*, 5(4), 3463–3478. <https://doi.org/10.3390/heritage5040178> ResearchGate
- [3] Meinecke, C. (2022). Labeling of cultural heritage collections on the intersection of visual analytics and digital humanities. *arXiv*. <https://doi.org/10.48550/arXiv.2208.13512> arXiv
- [4] Niccolucci, F., Markhoff, B., Theodoridou, M., Felicetti, A., & Hermon, S. (2023). The Heritage Digital Twin: A bicycle made for two. The integration of digital methodologies into cultural heritage research. *arXiv*. <https://doi.org/10.48550/arXiv.2302.07138> arXiv
- [5] Ma, Y., Zhao, W., Zhang, X., & Gao, Z. (2023). Embodied cognition guides virtual-real interaction design to help Yicheng flower drum intangible cultural heritage dissemination. *arXiv*. <https://doi.org/10.48550/arXiv.2310.04771> arXiv
- [6] Wang, Z., Alli, H., & Md Yusoff, I. S. (2025). The application of interaction design in cultural heritage tourism: A systematic literature review. *Preservation, Digital Technology & Culture*, 54(1), 77–92. <https://doi.org/10.1515/pdtc-2024-0053> ResearchGate
- [7] Kasemsarn, K., & Nickpour, F. (2025). Digital storytelling in cultural and heritage tourism: A review of social media integration and youth engagement frameworks. *Heritage*, 8(6), 200. <https://doi.org/10.3390/heritage8060200> MDPI
- [8] Deng, Y., & Mo, Z. (2024). The application of new media technology in the safeguarding of intangible cultural heritage. *Applied Mathematics and Nonlinear Sciences*, 9(1). <https://doi.org/10.2478/amns-2024-2267> Sciendo
- [9] Wang, Y., Li, Y., & Zhang, L. (2024). Grand challenges in immersive technologies for cultural heritage. *arXiv*. <https://doi.org/10.48550/arXiv.2412.02853> arXiv
- [10] Veggi, M. (2025). State of the art on artificial intelligence resources for interaction media design in digital cultural heritage. *arXiv*. <https://doi.org/10.48550/arXiv.2504.13894> arXiv