

Model for Decoding Symbols in the Taishan Stone Culture

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Abstract

Background and Aims: Taishan stone culture, a UNESCO World Heritage site, embodies rich symbolic meanings spanning nature worship, imperial rituals, and folk beliefs. Current research faces fragmentation in symbolic interpretation and lacks systematic digital archive models. This study aims to: (1) analyze symbolic components, artistic structures, and cultural values of Taishan stone culture; (2) develop a symbol decoding model for digital archive construction; and (3) evaluate the model's scientificity, operability, and applicability.

Methodology: This qualitative research employs a three-stage design: theoretical and documentary analysis of 230+ academic sources; symbolic decoding through semiotic frameworks (Saussure, Peirce, Barthes); and model construction with expert evaluation (N=10), including researchers, inheritors, conservators, and creative industry professionals.

Results: Four core cultural connotations were identified: natural sacredness, religious belief, imperial authority, and folk customs. A multi-dimensional symbol decoding model was constructed with three layers (natural, cultural, artistic elements) and four analytical dimensions (formal, semantic, spatiotemporal, stakeholder). Expert evaluation indicated scientific validity (mean 4.6/5), operability (4.4/5), and applicability (4.5/5).

Conclusion: The model provides a systematic framework for interpreting Taishan stone symbols and transforming cultural elements into structured data for digital archiving, bridging traditional heritage research and modern digital preservation.

Keywords: Taishan Stone Culture; Symbol Decoding; Semiotics; Digital Archive; Cultural Heritage

Introduction

Taishan stone culture, as a UNESCO World Cultural and Natural Heritage site, has evolved over thousands of years into a diverse cultural form encompassing nature worship, imperial *fengshan* sacrifices, cliff inscriptions, and folk beliefs such as the *Shigandang* tradition. From Qin-Han dynasty institutional stone tablets to Tang-Song literati cliff carvings and Ming-Qing secular stone appreciation, its symbolic connotations have continuously evolved.

With digital technologies integrating into cultural heritage research, employing a scientific symbol decoding model to interpret Taishan stone culture's symbolic logic has become crucial. Without a standardized framework, digital archives risk becoming mere visual repositories rather than meaningful knowledge systems. This fragmentation impedes scholarly understanding and cultural transmission.

International studies on stone culture focus on rock art semiotics (Whitley, 2005; Keyser & Whitley, 2012) and digital conservation (Brady & Gunn, 2012), but lack adaptability to China's "mountain-stone-worship-ritual" cultural context. Domestic research suffers fragmentation: Li (2019) documented Taishan inscriptions without constructing a decoding model; Zhang (2018) applied digital technologies without systematic symbolic integration. This study addresses these gaps by constructing a symbol decoding model for digital archive construction.

Objectives

(1) To systematically analyze and categorize the symbolic components, artistic structures, and cultural values of Taishan stone culture using semiotic frameworks, organizing findings into data schemas compatible with digital archival standards.

(2) To develop a symbol decoding model for constructing a digital archive of Taishan stone culture and formulate practical application guidelines.

(3) To assess the model's scientificity, operability, and applicability for supporting symbolic extraction and decoding.

Assumptions

This exploratory study assumes that: (1) Taishan stone symbols have identifiable hierarchical characteristics and coherent meaning-making mechanisms; (2) the constructed model can provide systematic theoretical support for digital archiving; and (3) targeted optimization can improve the model's applicability to heritage conservation practices.

Literature Review

1. Semiotics in Cultural Heritage

Saussure's (1916/1983) signifier-signified dualism provides a basic paradigm: for Taishan *Shigandang*, the stone slab is the signifier, and evil-warding protection is the signified. Peirce's (1931-1958) triadic classification (icon, index, symbol) applies to stone texture as icon, geological connection as index, and cultural tradition as symbol. Barthes' (1957/1972) "myth" concept captures how Taishan stone's denotative meaning ("stone from Taishan") extends to national spirit and stability.

2. Cultural Symbol Decoding Models

Existing models include interpretive (meaning-oriented), multi-dimensional (integrating form, meaning, context), and field-specific (heritage-oriented) frameworks (Panofsky, 1939; O'Toole, 2011). Critiques note insufficient attention to connotative layers (Papanicolaou, 2019) and stakeholder diversity (Harrison, 2013).

3. Spatiotemporal Dimension in Symbol Decoding

Spatial distribution (Soja, 2010) and temporal evolution (Hoskins, 2012) affect symbol formation and decoding. GIS-based heritage analysis (Gregory & Ell, 2007) has advanced, but integration with semiotics remains underexplored (Zhang, 2021).

4. Taishan Stone Culture Research

Taishan stone culture originated in the Pre-Qin period with primitive stone worship, integrated imperial and religious elements during Qin-Han to Wei-Jin, and flourished from Sui-Tang to Ming-Qing (Yuan, 2009; Li, 2019). Its cultural connotations encompass natural sacredness, religious belief, imperial authority, and folk customs (Wang, 2006; Li, 2021).

5. Research Gaps

Four gaps exist: (1) lack of targeted research on dual tangible-intangible regional symbols; (2) insufficient spatiotemporal integration; (3) absence of multi-stakeholder analysis; (4) inadequate qualitative-quantitative combination. This study addresses these gaps.

Methodology

1. Overall Design

This study employs a constructive mixed-methods design, combining qualitative content analysis, semiotic interpretation, and expert evaluation to develop and validate a symbol decoding model.

2. Research Population and Sample

Literature samples: 230+ core sources (180 Chinese, 50 English) from 1995-2025, plus 40 monographs and 30 historical documents.

Expert samples: Purposively selected participants (N=10): 4 Taishan culture research experts (15+ years), 2 intangible cultural heritage inheritors (30+ years), 3 cultural relics protection workers (10+ years), 1 cultural creative practitioner (10+ years). Sample size based on expected thematic saturation.

3. Data Collection and Analysis

Data collection followed six steps: planning, literature review, semi-structured expert interviews (60-90 minutes each), data sorting, verification (member checking), and filing.

Literature analysis: Thematic coding using Nvivo 12 with three deductive levels: research field, content, and interpretive codes. Inter-coder reliability assessed on 20% sample (87% agreement).

Interview analysis: Thematic analysis (Braun & Clarke, 2006), identifying themes related to scientificity, operability, and applicability.

Ethical considerations: Approval from the institutional ethics committee; written informed consent; confidentiality; password-protected data storage.

Results

1. Symbolic Components Framework

Based on literature analysis and expert consultation, a three-layer symbolic framework was synthesized:

Layer 1: Natural Symbolic Elements

1. Shape: square (stability, integrity), round (harmony), irregular (freedom)
2. Texture: rough (fortitude), delicate (elegance), layered (historical accumulation)
3. Color: gray (modesty), black (solemnity), brown (warmth)

Layer 2: Cultural Symbolic Elements

1. Religious: lotus patterns (purity), Buddha statues (compassion), Tai Chi (yin-yang unity)
2. Imperial: dragons (imperial power), phoenixes (nobility), cloud patterns (auspiciousness)
3. Folk: "Zhen" characters (evil-warding), peach patterns (longevity), coin patterns (wealth)

Layer 3: Artistic Symbolic Elements

1. Carving techniques: relief (dignity), round (vividness), line (elegance)
2. Calligraphy: seal script (historical accumulation), regular script (integrity), cursive (freedom)
3. Painting: landscape (man-nature harmony), flower-and-bird (auspiciousness)

2. Cultural Connotations and Meaning-Making Mechanisms

Table 1 Cultural Connotations and Meaning-Making Mechanisms

Connotation	Mechanism	Carriers
Natural sacredness	Nature worship, mountain veneration	Natural formations, sacrificial stones
Religious belief	Buddhism-Taoism integration	Grottoes, stone temples, scripture carvings
Imperial authority	Fengshan sacrifices, proclamations	Imperial steles, ritual stones
Folk customs	Household protection, daily life	Shigandang, talismanic carvings

3. The Symbol Decoding Model

The model comprises four analytical dimensions:

Dimension 1: Formal Analysis (Signifier Layer) — Material attributes (stone type, texture, color, weathering), morphological attributes (shape, size, carving technique), visual attributes (pattern composition, calligraphic style).

Dimension 2: Semantic Analysis (Signified Layer) — Denotative meaning (literal content, historical context), connotative meaning (cultural beliefs, social values), mythological meaning (national identity, collective memory).

Dimension 3: Spatiotemporal Analysis — Temporal evolution (historical periodization, diachronic changes), spatial distribution (geographical concentration, regional variations), spatiotemporal interaction.

Dimension 4: Stakeholder Analysis — Expert interpretation (academic perspectives), inheritor transmission (technical knowledge), public reception (cognitive patterns), industry application (creative transformation).

4. Expert Evaluation Results

Table 2 Expert evaluation (5-point Likert scale, N=10):

Dimension	Mean	SD	Key Findings
Scientificity	4.6	0.52	Strong semiotic foundation; logical structure
Operability	4.4	0.70	Practical procedures applicable to diverse stone types
Applicability	4.5	0.53	Adaptable to digital archives; useful for management

Qualitative feedback: Experts noted strength in integrating tangible-intangible attributes and spatiotemporal dimension. Suggested optimizations: (1) detailed coding manuals, (2) spatiotemporal visualization tools, (3) stakeholder-specific guidelines.

Discussion

1. Interpretation of Findings

The three-layer framework (natural-cultural-artistic) and four-dimensional model represent a novel synthesis. Unlike prior frameworks treating material documentation separately from symbolic interpretation (Wang, 2006; Li, 2019), the present model integrates formal, semantic, spatiotemporal, and stakeholder dimensions. The natural-cultural-artistic schema directly maps onto digital archiving requirements: natural elements provide material schemas; cultural elements enable semantic tagging; artistic elements support technical classification.

2. Comparison with Prior Approaches

Compared with international rock art semiotics (Whitley, 2005; Keyser & Whitley, 2012), the present model differs in three ways: (1) inclusion of living interpretive traditions (stakeholder dimension); (2) explicit spatiotemporal integration; (3) design for digital archiving from the outset. Compared with Chinese digital heritage projects (Zhang, 2018; Zeng, 2019), this model provides explicit semiotic frameworks rather than implicit assumptions. Compared with existing symbol decoding models (Zhao, 2021; Zhang, 2020), the innovation lies in spatiotemporal integration, enabling tracking of meaning changes across time and space.

3. Practical Applications

For digital archives, the three-layer framework provides data schemas: Layer 1→material fields; Layer 2→semantic annotation; Layer 3→technical documentation. For conservation, the four cultural connotations suggest differentiated priorities. For creative industries, the stakeholder dimension distinguishes expert, inheritor, public, and industry interpretations.

4. Limitations

Five limitations are acknowledged: (1) small expert sample (N=10) from one region, lacking international or semiotics specialists; (2) no real-world implementation testing; (3) uncertain generalizability to other stone culture sites; (4) no longitudinal validation; (5) inter-coder reliability assessed on only 20% sample (87% agreement).

5. Recommendations for Future Research

(1) Test generalizability on other regional stone cultures (Mount Wutai, Dazu). (2) Conduct pilot digital archive implementation. (3) Longitudinal studies of symbol evolution. (4) Develop quantitative indicators for statistical validation. (5) Explore AI applications for automated symbol recognition.

6. Implementation Guidance for Practitioners

Step-by-step application: (1) Artifact identification and documentation; (2) Formal analysis (Dimension 1); (3) Semantic analysis (Dimension 2); (4) Spatiotemporal analysis (Dimension 3); (5) Stakeholder analysis (Dimension 4); (6) Data structuring for digital archive using a three-layer framework. Templates (artifact documentation form, symbolic coding sheet, metadata schema) are available in the Appendix.

Conclusion

This research successfully constructed a comprehensive symbol decoding model for the Taishan stone culture digital archive construction, addressing fragmentation in existing research.

First, the study systematically decoded symbolic components, revealing a three-layer system (natural, cultural, artistic elements) and four core cultural connotations (natural

sacredness, religious belief, imperial authority, folk customs) with distinct meaning-making mechanisms.

Second, the constructed model integrates interpretive, spatiotemporal, and digital approaches, providing four analytical dimensions: formal, semantic, spatiotemporal, and stakeholder that enable comprehensive interpretation. This integration advances beyond prior frameworks, addressing only one or two dimensions.

Third, expert evaluation indicated scientific validity (4.6/5), operability (4.4/5), and applicability (4.5/5), suggesting the model successfully bridges traditional heritage research and digital preservation needs.

Fourth, the research identified spatiotemporal dynamics of Taishan stone symbols, revealing evolution across historical periods and diffusion across regions.

Limitations acknowledged: small expert sample, no implementation testing, uncertain generalizability, and no longitudinal validation.

The findings demonstrate that Taishan stone culture's symbolic system possesses identifiable hierarchical characteristics and coherent meaning-making mechanisms, providing a foundation for systematic digital preservation and innovative inheritance. Future work should focus on implementation testing, model refinement, and expansion to other regional stone cultures.

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