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MAPPING CULTURAL ART GENES: A VISUAL GENEALOGY FRAMEWORK FOR CULTURAL REPRESENTATION AND TRANSLATION

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Abstract: This article proposes a visual genealogy framework for mapping cultural art genes, reconceptualizing cultural representation as a structured and transferable visual system. Cultural art genes are understood as dynamic units shaped through historical accumulation, aesthetic conventions, and symbolic articulation. By emphasizing genealogical relationships among visual elements, the framework explains how cultural meanings are encoded, reorganized, and translated across media contexts. Visual representation is thus approached as a process of translation rather than static depiction. The proposed framework shifts analytical focus from surface aesthetics to structural relations, offering a theoretical foundation for systematic analysis of cultural representation and visual translation across diverse visual practices.
Keywords: Cultural art genes; Visual genealogy; Cultural representation; Visual translation; Gene mapping

1 INTRODUCTION

Visual culture plays a central role in shaping how cultural meanings are produced, perceived, and transmitted across different contexts. In contemporary visual environments, cultural representation increasingly operates through complex systems of images, symbols, and design conventions rather than through isolated artifacts. As visual practices expand across media platforms and communicative settings, the need for systematic frameworks capable of explaining underlying cultural structures becomes more pronounced. Conventional approaches that focus primarily on stylistic description or iconographic interpretation often struggle to account for the continuity, transformation, and adaptability of cultural meaning within evolving visual systems.

Recent discussions in visual culture studies and design theory have emphasized the importance of structure, relationality, and process in understanding cultural expression. Cultural meaning is not embedded solely in individual images, but emerges through networks of visual elements shaped by historical accumulation, aesthetic norms, and symbolic conventions. These networks enable cultural forms to remain recognizable while undergoing reinterpretation across different media and contexts. However, existing analytical models frequently lack a coherent method for tracing such structural relationships in a systematic and transferable manner.

In response to this gap, the concept of cultural art genes offers a productive theoretical lens. Cultural art genes may be understood as foundational visual units that carry accumulated cultural meanings while remaining capable of variation and recombination. Unlike surface motifs or stylistic features, these genes operate at a structural level, organizing visual expression through recurring forms, symbolic patterns, and representational logics. When examined collectively, cultural art genes form interconnected systems that shape how cultural representation is visually constructed and interpreted.

Mapping these systems requires an analytical approach that moves beyond linear classification or descriptive cataloging. Genealogical thinking provides such a perspective by foregrounding relationships, origins, and transformations rather than static typologies. A visual genealogy framework emphasizes how visual elements are linked through shared structural principles and how these links evolve over time. This approach allows cultural representation to be analyzed as a process of visual translation, in which meanings are encoded, reorganized, and rearticulated across different visual environments.

Within this framework, visual translation is not treated as simple reproduction or stylistic adaptation. Instead, it is understood as a dynamic process involving the interaction of form, symbolism, and contextual meaning. Visual elements retain continuity through genealogical connections while simultaneously adapting to new representational conditions. Such a perspective highlights the mechanisms through which cultural art genes sustain coherence while enabling transformation, offering a structured way to examine both stability and change in visual culture.

This article proposes a visual genealogy framework for mapping cultural art genes as a methodological tool for analyzing cultural representation and translation. By conceptualizing cultural expression as a gene-based visual system, the framework shifts analytical focus from surface aesthetics to underlying structural relations. The proposed approach contributes to theoretical discussions on visual representation by offering a systematic model capable of supporting comparative analysis across diverse visual practices. It also establishes a conceptual foundation for subsequent investigations into visual translation and cultural circulation within broader communicative contexts.

2 ONCEPTUALIZING CULTURAL ART GENES

The concept of cultural art genes is introduced to address limitations in conventional approaches to cultural representation that rely primarily on surface symbolism, stylistic classification, or isolated visual motifs. Existing frameworks in visual culture and design studies often emphasize descriptive analysis, which can obscure the deeper structural logic through which cultural meaning is sustained and transformed over time [1]. As visual practices increasingly operate across diverse media environments, a more systematic conceptual model is required to explain continuity and variation within cultural expression.

Cultural art genes refer to foundational visual units that encode accumulated cultural meaning through form, composition, and symbolic structure. Unlike individual icons or decorative elements, these genes function at a relational level, organizing how visual elements interact within a broader representational system. They emerge through long-term processes of historical sedimentation, aesthetic normalization, and repeated visual articulation, allowing cultural expression to maintain recognizability while adapting to new contexts [2–3]. From this perspective, cultural meaning is not embedded in isolated images but distributed across interrelated visual structures.

The use of the term "gene" does not imply biological determinism, but rather serves as an analytical metaphor emphasizing inheritance, variation, and recombination within visual systems. Similar metaphorical frameworks have been employed in cultural theory and design research to explain how structural elements persist while undergoing transformation [4]. Cultural art genes thus operate as flexible carriers of meaning, capable of recomposition without losing their core representational logic. This property distinguishes them from stylistic features, which are often bound to specific historical periods or media forms.

Conceptualizing cultural art genes also requires a shift from object-centered analysis to system-oriented thinking. Visual artifacts are understood as manifestations of underlying gene configurations rather than as self-contained units of meaning. This approach aligns with relational models in visual semiotics and design theory, which emphasize networks, hierarchies, and structural dependencies among visual elements [5]. Through this lens, cultural representation becomes a dynamic system shaped by internal coherence rather than external resemblance.

Importantly, cultural art genes provide the conceptual foundation for visual translation. Because these genes encode meaning at a structural level, they enable cultural expression to be rearticulated across different media and communicative settings. Visual translation is therefore not a process of direct replication, but one of selective activation and reconfiguration of gene structures in response to contextual conditions [6–7]. This capacity for adaptability allows cultural representation to circulate while preserving structural continuity.

By defining cultural art genes as relational and transferable units, this section establishes the theoretical basis for subsequent discussion of visual genealogy and gene mapping. The conceptual clarity offered here supports a systematic examination of how cultural representation operates as a structured visual system, providing a foundation for analyzing translation processes beyond descriptive or stylistic comparison [8].

3 A VISUAL GENEALOGY FRAMEWORK FOR GENE MAPPING

Building on the conceptual definition of cultural art genes, this section proposes a visual genealogy framework that enables systematic gene mapping within cultural representation. The framework is designed to move beyond descriptive analysis by emphasizing structural relations among visual elements, allowing cultural meaning to be examined as an interconnected system rather than as isolated symbols. Similar relational approaches in visual semiotics and multimodal studies have demonstrated that meaning emerges through patterned associations rather than individual forms [9].

The visual genealogy framework is grounded in the assumption that cultural representation is organized through recurring structural principles that persist across visual expressions. These principles function as cultural art genes when they demonstrate continuity, relational dependency, and adaptability within representational systems. Gene mapping, therefore, requires an analytical structure capable of tracing both inheritance and variation. Genealogical thinking provides such a structure by foregrounding lineage, transformation, and recombination as analytical dimensions rather than chronological sequence [10].

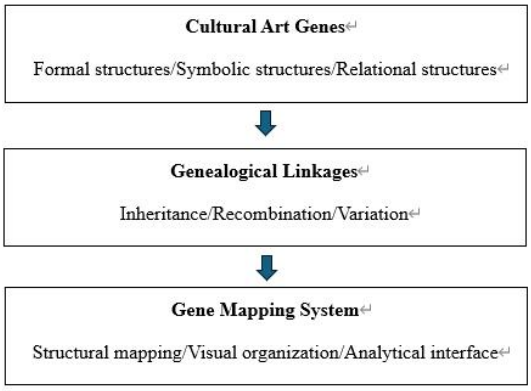

Figure 1 Digital Representation of a Sample Cell in a Board Maze

As illustrated in Figure 1, the proposed framework consists of three interrelated layers: gene identification, genealogical linkage, and mapping articulation. The first layer focuses on identifying cultural art genes as foundational visual units embedded within cultural representation. These units may take the form of compositional logics, symbolic structures, or formal configurations that recur across visual practices. Identification prioritizes structural relevance over stylistic similarity, aligning with semiotic approaches that distinguish deep representational structures from surface appearance [11].

The second layer establishes genealogical linkages among identified genes. This process examines how visual genes relate through shared structural functions, historical continuity, or contextual equivalence. Rather than implying linear development, genealogical linkage reveals networks of association that allow genes to coexist, diverge, and recombine. Such relational mapping reflects findings in multimodal and cultural analysis that emphasize non-linear meaning construction within visual systems [9].

The third layer articulates gene mapping as a visual system. At this stage, identified genes and their genealogical relations are organized into a structured map that represents the internal logic of cultural representation. This map functions as an analytical interface, making visible how visual genes are activated, reorganized, or suppressed under different representational conditions. Similar mapping strategies have been shown to support comparative analysis by revealing structural correspondences across diverse visual contexts [12].

An important advantage of the visual genealogy framework lies in its transferability. Because cultural art genes operate at a structural level, the framework remains applicable across different media forms without reliance on direct visual similarity. Gene mapping thus provides a flexible analytical model for examining cultural representation as a dynamic system, establishing the methodological foundation for subsequent analysis of visual translation and structural adaptability.

4 VISUAL TRANSLATION AND STRUCTURAL ADAPTABILITY

Based on the visual genealogy framework established in the previous section, this section examines how cultural art genes undergo visual translation while maintaining structural adaptability. Visual translation is understood not as direct replication of visual forms, but as a structural process through which cultural meaning is rearticulated under changing representational conditions. From this perspective, translation operates at the level of relational organization rather than surface appearance, allowing visual systems to adapt without losing internal coherence [13].

Cultural art genes enable visual translation because they encode meaning at a structural level. When representational contexts shift, visual expression may change in form, medium, or composition, while underlying gene structures remain operative. Structural adaptability refers to this capacity of cultural art genes to sustain coherence through selective activation and reorganization. Rather than producing uniform outcomes, translation generates variation grounded in shared structural logic, reflecting a balance between stability and transformation [14].

Table 1 Mechanisms of Visual Translation and Structural Adaptability

Dimension	Gene-Level Operation	Description	Visual Outcome
Encoding	Activation of foundational gene structures	Cultural meaning is embedded into core visual structures through recurring compositional and symbolic principles	Preservation of representational logic
Reconfiguration	Reorganization of genealogical relations	Relationships among cultural art genes are adjusted to respond to contextual or medial conditions	Variation in visual composition
Adaptation.	Context-sensitive modification of gene expression	Gene structures are selectively modified to enhance communicative compatibility	Increased contextual intelligibility
Continuityr	Maintenance of relational coherenceRoman	Genealogical constraints regulate transformation to prevent semantic fragmentation	Recognizable cultural coherence

The mechanisms through which visual translation occurs can be analytically decomposed into a set of recurring operations. These include the initial encoding of cultural meaning into visual structures, the reconfiguration of genealogical relationships in response to contextual demands, and the adaptive modification of visual expression to enhance communicative compatibility. Table 1 provides an overview of these core mechanisms, linking gene-level operations to their corresponding visual outcomes. By organizing translation processes into discrete dimensions, the table clarifies how continuity is preserved alongside visual variation.

Table 2 Levels of Structural Adaptability in Visual Translation

Level	Structural Focus	Description	Function in Visual Translation
Formal Level	Visual form and composition	Adjustment of layout, proportion, color relations, and visual rhythm	Enables surface variation without structural loss
Symbolic Level	Meaning-bearing structures	Reinterpretation of symbolic associations and representational conventions	Supports semantic flexibility

Relational Level.	Genealogical connections	Reorganization of relationships among cultural art genes	Maintains internal coherence
Systemic Level	Overall visual system	Integration of multi-level adaptations within a unified structure	Ensures structural stability across contexts

To further specify how adaptability operates across different representational conditions, structural adaptability can be examined at multiple levels. As summarized in Table 2, these levels range from formal adjustments in visual composition to systemic maintenance of overall coherence. At the formal level, adaptability manifests through changes in layout, proportion, or visual rhythm. At the symbolic and relational levels, adaptation involves reinterpretation of meaning-bearing structures and reorganization of genealogical connections among cultural art genes. At the systemic level, adaptability ensures that these changes remain integrated within a coherent visual system. This layered perspective highlights that adaptability is not a singular operation but a distributed process operating across multiple structural dimensions.

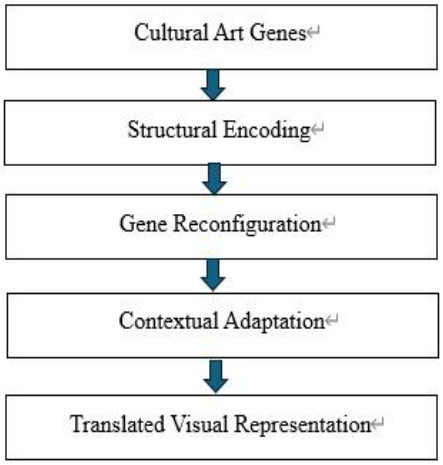

Figure 2 Process of Visual Translation Based on Cultural Art Genes

Visual translation can also be understood as a sequential process through which cultural art genes are progressively transformed. As illustrated in Figure 2, translation begins with the activation of foundational gene structures, followed by structural encoding and gene reconfiguration, and culminates in contextual adaptation within a specific representational environment. This process-oriented view emphasizes that translation unfolds through ordered yet flexible stages, rather than through abrupt or arbitrary modification. The figure complements the tabular analysis by visualizing the dynamic flow of translation across structural stages.

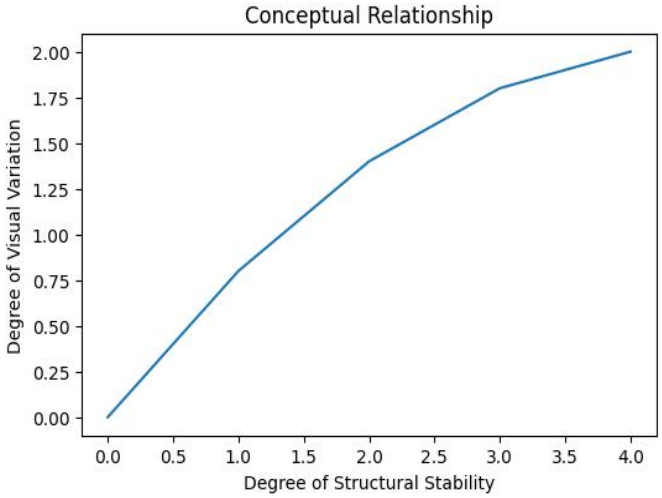

Figure 3 Relationship Between Structural Stability and Visual Variation

Importantly, structural adaptability is constrained rather than unlimited. Cultural art genes impose genealogical boundaries that limit the range of permissible variation, ensuring that translation does not result in semantic fragmentation. The relationship between structural stability and visual variation is conceptualized in Figure 3, which illustrates how increasing variation can coexist with stable structural foundations up to a critical threshold. Beyond this

threshold, loss of genealogical coherence may occur, underscoring the importance of constraint-based adaptability in visual translation processes [15].

Through the integration of mechanisms, levels, and processes, this section demonstrates how cultural art genes function as stabilizing agents within visual translation. Structural adaptability emerges as a form of negotiation between inherited representational logic and situational demands, mediated by genealogical constraints. By articulating these dynamics through both textual analysis and visual instruments, this section provides a structured foundation for understanding how cultural representation circulates while maintaining coherence across diverse visual contexts [16].

5 DISCUSSION AND CONCLUSION

This study set out to address a fundamental challenge in visual culture analysis: how cultural representation can be examined as a structured system rather than a collection of isolated images or stylistic features. By introducing the concept of cultural art genes and developing a visual genealogy framework, the article offers a systematic approach to understanding how cultural meaning is organized, sustained, and transformed within visual practices. The discussion that follows reflects on the theoretical implications of this framework, its methodological contributions, and its potential limitations.

One of the primary contributions of this study lies in its conceptual reorientation of cultural representation. Rather than locating meaning at the level of individual symbols or visual motifs, the proposed framework situates meaning within relational structures formed by cultural art genes. This shift allows cultural representation to be understood as an internally coherent system shaped by genealogical connections, rather than as a surface-level aggregation of visual elements. Such a perspective aligns with relational and semiotic approaches in visual studies, while extending them through a gene-based analytical logic that emphasizes continuity alongside transformation.

The visual genealogy framework further advances methodological discussions by providing an operational structure for mapping cultural representation. Unlike descriptive or iconographic models, which often remain tied to specific media or historical contexts, the framework abstracts cultural art genes to a structural level. This abstraction enables comparative analysis across diverse visual practices without relying on direct visual similarity. By integrating gene identification, genealogical linkage, and mapping articulation, the framework establishes a clear analytical pathway through which cultural representation can be systematically examined. The inclusion of visual instruments, such as framework diagrams and process models, reinforces analytical transparency and supports interpretive consistency.

The discussion of visual translation and structural adaptability highlights how cultural representation circulates without dissolving its internal logic. Visual translation, as articulated in this study, operates through selective reconfiguration rather than replication. Cultural art genes function as stabilizing agents that mediate between inherited representational structures and contextual demands. The layered analysis of adaptability demonstrates that transformation occurs across multiple structural levels, from formal adjustments to systemic coherence. This finding contributes to ongoing debates on how visual systems balance variation and stability, particularly in contexts characterized by frequent media shifts and expanding communicative environments.

At the same time, the framework proposed in this article is not without limitations. By prioritizing structural relations, the analysis intentionally abstracts away from material specificity and reception-based variability. While this abstraction strengthens theoretical clarity, it may limit direct engagement with audience interpretation or affective response. Additionally, the identification of cultural art genes requires interpretive judgment, which may vary across analytical contexts. These limitations suggest that the framework is best understood as a foundational analytical tool rather than a comprehensive explanatory model.

Future research may extend this framework by integrating empirical analysis, comparative case studies, or reception-oriented approaches. Such extensions could test the applicability of gene mapping across different visual domains and refine criteria for gene identification. Nonetheless, as a conceptual and methodological contribution, the visual genealogy framework provides a structured lens for examining cultural representation as a dynamic yet coherent visual system, offering new possibilities for analyzing visual translation within broader cultural circulation processes.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

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