An Artistic Approach To Intangible Heritage Documentation In Vietnam: Xoan Singing

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Abstract

This research explores generative art as a method for preserving Vietnam's intangible cultural heritage, specifically focusing on Xoan singing, a traditional practice combining ritual singing and dancing with significant communal value. Traditional archival approaches such as static video and audio recordings often fail to capture the dynamic and embodied nature of these cultural practices. Adopting a practice-led research methodology, this study investigated how generative art systems can document and interpret the intangible aspects of Xoan singing. Through artistic experiments, sound, dance movements, and ritual objects related to Xoan singing were transformed into dynamic, real-time visuals, emphasising the interplay between cultural symbolism and digital aesthetics. Instead of creating fixed archives, the project developed practical workflows that position generative art as a creative tool for cultural preservation. This thesis includes an analysis of case studies and experimental outcomes, illustrating how generative systems visually represent symbolic elements, such as repetition, cyclical patterns, and embedded ritual symbolism. It also explores broader implications, providing new methodologies for artists and cultural researchers and interactive educational tools for younger audiences. By prioritising artistic innovation over static preservation, this research contributes to discussions on the role of contemporary art in cultural heritage. This demonstrates how generative art can effectively bridge traditional expressions with digital practices, ensuring that intangible heritage such as Xoan singing remains accessible and relevant for future generations.

Keywords: Intangible heritage, Generative arts, heritage safeguarding

Introduction

Cultural heritage preservation is vital for maintaining societal identity (Universal Business School, Karjat, Raigad et al. 2024). Although advancements have improved tangible heritage archiving, safeguarding intangible cultural heritage (ICH)such as traditional music, dance, and ritualsremains challenging. UNESCO advocates video archiving on platforms such as YouTube (Pietrobruno, 2013), yet researchers have highlighted that textual documentation abstracts ICH from its landscape context (Nic Eoin et al., 2013). Static methods, such as video and audio recordings, often overlook the fluidity and contextual depth of ICH, prompting the exploration of dynamic digital representations. Generative systems that respond to real-time inputs, such as sound and user interactions, offer a more dynamic alternative. Using a visual programming platform for real-time media creation, this research investigates generative systems as an artistic approach to preserving Xoan singing, a complex Vietnamese practice integrating rituals, dance, and communal participation. Targeting art practitioners and researchers in generative art and cultural preservation, this project provides insights into experimental workflows, data visualisation, and audio-driven interaction using TouchDesigner. By translating sound, dance, and symbolic objects into real-time visuals, this approach facilitates deeper engagement and broader accessibility, particularly for the younger generations and educational audiences.

Intangible Cultural Heritage

Definition and the differences between ICH and tangible heritage

In 2003, UNESCO (United Nations Educational, Scientific, and Cultural Organization) convened a seminal conference, "Safeguarding of the Intangible Cultural Heritage," endorsed by 130 countries. This gathering articulated five key elements of cultural heritage and solidified a definition for intangible cultural heritage as "the practices, representations, expressions, knowledge, skills—as well as the instruments, objects, and cultural spaces associated therewith—that communities recognise as part of their cultural heritage'(UNESCO, 2003) (UNESCO, 2003). ICH encompasses elements that are non-physical yet culturally significant, such as performing arts, rituals, stories, and traditional knowledge systems, often referred to as 'living heritage'. This heritage is characterised by its transmission within communities across generations and can also include the non-tangible significance attached to physical items and locations (Deacon, 2006).

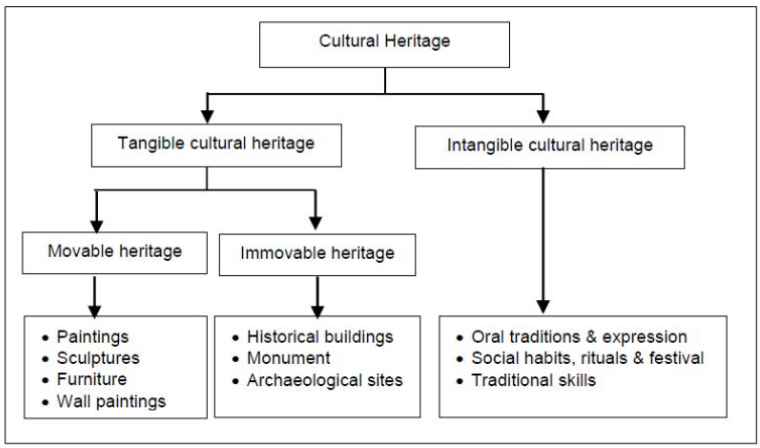

Figure 23. Cultural Heritage Classification from UNESCO

Tangible heritage, as defined by Deacon, 2006), includes physical objects and places of historical, aesthetic, and cultural value while (Condominas, 2004) noted: "The most tangible manifestations of heritage are simply anything material." The evaluation of intangible heritage is a complex process that often involves comparison with tangible heritage (Rosaldo, 2013). This heritage is dynamic and constantly evolving through practices that communities actively maintain and transmit, such as the verbal and hands-on transmission of craftsmanship skills, as described by Wan Isa et al. (2018). For example, a master woodworker might instruct an apprentice to "Hold the plane in your right hand and watch the angle", integrating speech, gestures, and tradition into the learning process (Condominas, 2004). The dynamic and evolving nature of ICH, along with its dependence on community participation and oral transmission, often makes it less valuable than tangible heritage, which can present challenges in its preservation (Rosaldo, 2013).

Toward Convergence

The concept of convergence in preserving heritage is increasingly recognised as crucial in cultural preservation, highlighting the interdependent nature of these heritage sites. Despite having separated definitions and categorisations, UNESCO was still "considering the deep-seated interdependence between intangible cultural heritage and tangible cultural heritage' (UNESCO, 2003). This holistic approach to preservation emphasises that the significance of tangible heritage often resides in intangible experiences and associated practices, thereby requiring integrated conservation strategies that address both forms.

(Munjeri 2004) and Hallam (2008) both highlight the need for a more integrated approach, with Munjeri emphasising “Intangible heritage provided the larger framework within which tangible heritage could take shape and significance”. This perspective promotes a deeper analysis of how cultural artefacts interact with and reflect their surrounding cultural, social, and environmental factors, thereby providing a more comprehensive understanding of heritage and history. (Hassard 2006) and Lane 2016) explore the ideological and practical implications of this convergence. Hassard criticises the division between tangible and intangible heritage, whereas Lane supports a closer integration of ethnoarchaeology. This integrated approach to heritage conservation emphasises the interconnectedness of tangible and intangible elements, highlighting the importance of considering both preservation strategies (Maharjan and Barata, 2018). In 1994, the Expert Meeting on the "Global Strategy" and thematic studies also emphasized the importance of understanding "the multiple reciprocal relationships that each piece of evidence had with its physical (i.e., tangible) and non-physical (i.e., intangible) environment." This perspective encourages a deeper analysis of how cultural artefacts interact with and reflect the surrounding cultural, social, and environmental factors. This offers a richer and more interconnected understanding of heritage and history.

ICH Preservation in Vietnam: Challenges and Opportunities

My cultural background as an artist and researcher from Vietnam deeply informs the focus and direction of this research. Having been immersed in the rich traditions of Vietnam, I developed a profound appreciation for the country's intangible cultural heritage, including practices such as Xoan singing, which are rooted in communal participation, symbolism, and rituals. This personal connection to my cultural landscape motivated me to explore how contemporary digital tools can not only document but also meaningfully engage with these traditions. My situated knowledge, encompassing an understanding of the cultural, historical, and spiritual layers of Xoan singing, uniquely positions me in approaching this project with both insider awareness and critical sensitivity. This perspective enables me to identify nuances that external observers may overlook, ensuring that the generative system developed in TouchDesigner reflects the aesthetic depth and cultural significance of practice. My decision to work with generative art stems from my personal interest in merging traditional storytelling with emerging digital technologies, using creative systems not solely for preservation, but also to invite active engagement with cultural narratives. This project represents both a reflection on my personal connection to Vietnamese heritage and a critical exploration of how digital tools can help sustain cultural knowledge for future generations.

This study focuses on intangible heritage documentation and archiving in Vietnam, with eight intangible cultural heritage items honoured by UNESCO (Hong, 2015). Vietnam's cultural policymakers and academic institutions have shown marked openness to employing new technologies to document and sustain cultural practices. The scope of this research concentrates on a specific, yet significant facet of the broad field of heritage safeguarding, which involves considerations ranging from financial aspects to tourism and legal frameworks. Specifically, this study focuses on the methodologies used in archiving and displaying heritage with an emphasis on intangible cultural heritage. This includes examining the existing limitations of these methods and exploring the opportunities available to artists to contribute to the archival process.

Currently, the academic sphere features diverse perspectives on the safeguarding and promotion of cultural heritage, leading to ongoing debates. G. J. Ashworth, a British scholar, summarised the views on heritage preservation in various countries, categorising them into three distinct viewpoints: intact safeguarding, inheritance-based safeguarding, and safeguarding and development. The current state of heritage safeguarding in Vietnam can be examined through the lens of the three viewpoints proposed by G.J.. Ashworth. These

categories provide a structured framework to evaluate the strategies employed in Vietnam to preserve its rich cultural heritage, particularly intangible cultural heritage (Từ Thị Loan, 2019). Vietnam's increasing openness to innovative methods, including artistic approaches, to safeguard its intangible cultural heritage highlights the potential for generative art as a medium of exploration for Vietnamese artists.

Generative arts

Generative art, as defined byMonro (2007), refers to the creation of art through an autonomous process. This approach to art creation is rooted in the concept of a generative system, which involves actively making sense of information and applying it to new situations (Edmonds 2017)(Fiorella 2016). This element of randomness and the system's autonomy often result in each output being unique and not entirely foreseeable by the artist, thus introducing the concept of emergence (McCormack 2007). Frieder Nake (2009), a pioneer in computer art, describes generative art as **"art that is in a state of becoming, of emergence"**. Emergence in generative art refers to the complex patterns, forms, and behaviours that arise from relatively simple rules and interactions but cannot be predicted from those rules alone. The beauty of generative art often lies in this emergence, as unexpected aesthetics or concepts materialise from the computational process, providing a rich field for exploration and interpretation by both the artist and audience (Edmonds, 2017). Dorin (2001) and Galanter (2003) highlighted the role of generative processes in art production, emphasising the freedom and unique means of artistic expression they offer. In the 1960s and the 1970s, artists and mathematicians, such as Frieder Nake and Harold Cohen, further advanced the field of generative art by exploring the intersection of mathematical principles and artistic expression. This period marked a significant expansion in the understanding and use of algorithms as a medium for creative exploration and aesthetic productions. The subsequent discussion examines selected projects and provides a critical analysis of their approach to generative art and intangible elements.

Hong Kong Martial Arts Living Archive

The Hong Kong Martial Arts Living Archive (HKMALA) is a collaboration between the International Guoshu Association (IGA) and the City University of Hong Kong (CUHK) to preserve martial arts as part of Hong Kong's intangible heritage (Lau, 2022; Chao et al., 2018). Facing social change and the risk of decline, Chinese martial arts require cultural safeguarding (Fan, n.d.). HKMALA seeks to "enliven heritage" rather than "fossilise" fossilise' (Kenderdine, 2020). Masters wear body sensors to record speed, torque, torsion, and force, and translate movements into precise digital data (Fan, n.d.). This motion capture archive preserves Southern Chinese kung fu styles with technical and expressive accuracy, hosts exhibitions such as *Kung Fu Motion*, and advances academic research on digital heritage.

Voice Gems

Voice Gems: 1000 Year Archive is a generative art project that preserves voices—from endangered bird calls to celebrity voice notes—by transforming them into digital "gems." High-quality recordings capture the nuances of pitch, resonance, and emotion, which algorithms then analyze to generate unique gem designs and colours. These are presented through interactive installations and online platforms, allowing audiences to explore and listen to the voices. Creator Harry Yeff (Reeps One) describes the work as both artwork and monument, existing in forms from small sculptures to building-sized projections. The project reframes voice as a tangible aesthetic object, merging sound, memory, and symbolism. This convergence transforms an ephemeral element into a visual artefact, bridging traditional oral heritage with contemporary digital archiving. While these algorithmic translations offer emotionally resonant and visually engaging preservation, they are interpretive rather than exact representations, raising questions about authorship, authenticity, and cultural mediation.

Nonetheless, *Voice Gems* demonstrates how generative art can expand archival practice, engaging audiences through multisensory, symbolic preservation that goes beyond storing data to reimagining how it is experienced.

Archiving the Intangibles through the Lens of Generative Art

Projects like *Voice Gems* and the *Hong Kong Martial Arts Living Archive* use generative art to turn intangible cultural data—such as voices or gestures—into interactive, multisensory forms. Algorithms analyse unique patterns in sound or movement and translate them into visual or auditory outputs, engaging contemporary audiences who prefer experiential encounters over passive viewing. This "living archive" approach (Edmonds, 2017) allows real-time, evolving representations of traditions, enhancing cultural education and accessibility (Candy & Ferguson, 2014). *Voice Gems* exemplifies this shift, converting vocal qualities—pitch, resonance, timbre—into unique digital sculptures. This process is not a direct technical translation but an interpretive one, shaped by aesthetic choices and cultural context. The visual outcome may diverge from the sonic "beauty" of a voice, underscoring how identity is reframed when sound is mapped to image. Generative systems thus act as intermediaries, making intangible identity markers tangible.This practice reflects broader "ocularcentric" tendencies (Jay; Crary), where vision dominates cultural memory, and aligns with Bolter and Grusin's (1999) *remediation* theory. Yet generative art departs from remediation's fixed-source model: instead of refashioning an existing object, it creates work in real time, distributing authorship among artist, code, machine, and sometimes viewer. While this openness invites bias and raises questions about authenticity, it also redefines heritage as a living, iterative process. Generative systems remix rather than simply record, translating rhythm, symbolism, and atmosphere into evolving visual forms. Where remediation asks how an object is refashioned, generative art asks what counts as an object when its form is never fixed.

Methodology

The research predominantly employs a practice-led methodology augmented by focused case studies and field research. These methods include iterative experimentation with generative systems, direct observation of cultural performances, comprehensive documentation of ritualistic spaces and artefacts, and a systematic collection of audio-visual materials. Collectively, these approaches offer both creative insights and essential contextual foundations for investigations. Prior to the more detailed discussion in this chapter, the table below illustrates each component of the overall approach and their interconnections.

Table 2. Methodology: Quick Roadmap.

Method	Details	Core Aim	Key Actions / Tools
1. Case-study focus (Xoan singing, Phú Thọ)	Literature review	Ground the project in cultural, historical, and academic context; identify the importance and basic structure of Xoan singing	Literature and archive review; UNESCO documents; existing recordings and scholarly texts
	Field visits	Collect primary data and directly experience the practice in its cultural setting	On-site visits during and festival; audio, video, photography, notes; informal conversations with performers and locals
⇅			
2. Practice-led research (with generative art)	Data collection => Data processing	Convert raw recordings, imagery, and observations into usable inputs	TouchDesigner for sound/ image analysis and parameter mapping
	Generative System build	Re-encode rhythm, tonality, text, and spatial forms as real-time visual behaviors	TouchDesigner node networks (CHOPs, SOPs, TOPs, GLSL)
	Iterative evaluation	Test visual expressiveness, cultural resonance, and system stability	Studio playbacks, journal reflections, visual comparisons

Case Study Focus

As the foundational methodology, this research adopts a case study approach centred on Xoan singing, a UNESCO-recognised form of intangible cultural heritage (ICH) from Phú Thọ, Vietnam. Rather than generalising across various Intangible Cultural Heritage practices, the project strategically centres on this culturally rich, context-specific tradition. This focused strategy allows for a more profound exploration of Xoan's intricate elements, including musical composition, ceremonial significance, spatial arrangements, and oral transmission methods. The selection of a single case enables a detailed examination of how generative art systems can effectively translate and reinterpret intangible practices in contemporary new media art. The original Xoan villages, situated in Phú Thọ Province, are conveniently located near the researcher's base in Hanoi, facilitating frequent field visits, engagement with local performers, and the direct observation of performances in authentic settings. This accessibility fosters continuous engagement, ethical collaboration, and iterative data collection, which are all vital for practice-led research.



Figure 2. Live Xoan singing performance inside a communal house in Phú Thọ Province.

Practice-Led Methodology

This study adopts a practice-led research methodology (PLR) to engage in intangible cultural heritage. PLR emphasises practice as central to knowledge production (Barrett & Bolt, 2014) and recognises creative processes as valid forms of scholarly enquiry (Hamilton & Hansen, 2024). Unlike traditional detached research methods, PLR integrates experiential knowledge and theoretical frameworks through artistic creation (Stewart 2006). This approach is particularly suited for intangible heritage, such as Xoan singing, which integrates musical, ritualistic, and social dimensions. Using generative arts as the primary medium, this study examines Xoan singing, an intangible cultural heritage practice in Vietnam. Selected for its cultural significance and researcher accessibility, Xoan singing combines ritual singing, storytelling, and symbolic dance movements, thus offering rich possibilities for generative art. Generative art employs computational systems that evolve in response to sound, lyrics, and movement, resulting in emergent visual forms (Annunziato and Pierucci 2002; Seevinck 2015).

PLR methodology embeds the researcher within the process, fostering a deeper understanding through direct interaction with generative systems (Hamilton & Hansen, 2024). These dynamic frameworks facilitate iterative experimentation and adaptation as cultural expressions evolve. Reflective documentation captures the interplay between practice and researcher insight (Nimkulrat, 2007) and contributes to innovative approaches to cultural preservation (Brown, 2020; Lawson, 2012). Ultimately, this practice-led approach views intangible heritage as dynamic, creating documentation that itself evolves, reflecting the ongoing creativity and vitality of Vietnam's Xoan singing tradition (Stewart 2006).

Field Study within a Practice-Led Research Framework

To complement the experimentation and theoretical framing of this research, a field study was undertaken in Phú Tho province, the birthplace and active home of the Xoan singing tradition. Rather than adopting an anthropological or ethnographic approach, this fieldwork was conceived as an embodied, sensorial engagement intended to inform artistic practice. The

researcher approached the site as an artist observer, attending Xoan performances both within and outside the ritual context, engaging in informal dialogue with local practitioners, and absorbing the spatial, atmospheric, and social dynamics of animate tradition. These direct experiences became a form of "material sourcing", providing culturally grounded insights that informed the development of generative system experiments.

Xoan Singing (Case study)

The Intangible behind the Performance

This project uses case studies and practice-led research to explore how data from Xoan singing transforms into generative art. Recognised as part of Vietnam's intangible cultural heritage, Xoan singing reflects national identity and local preservation efforts. Originating in Phu Tho Province, it blends singing, dancing, costumes, and rituals, central to spring festivals where entertainment, spirituality, and social interactions converge. Historically, it has deep roots in Vietnamese religion and culture, combining song, dance, and drama inspired by legends and expressing the spirit and patriotism of the Phu Tho people (Phuong et al. 2024).

Xoan has two forms: ceremonial and festive. Ceremonial singing features 14 *Qua Cach* recitations, prayers and stories for peace and prosperity - performed in three parts: *Giao Cach* (solo), *Dua Cach* (male lead with female artists), and *Ket Cach* (female lead closing). Festive singing is dynamic, with troupe members and young locals performing together. Spirituality plays a key role, with performances often starting with incense offerings and ancestral veneration. Singing techniques and improvisation, such as An Thái guild's subtle pitch and tempo changes in *Hát Xướng*, are integral yet difficult to capture in written or recorded forms. Lyrics like those in "Nhập Tịch Mời Vua" invite ancestral rulers to join celebrations, linking past and present through evolving oral traditions. Rituals, such as symbolic offerings in Phượng Lâu village, reflect shared values and unity. Social participation—seen in events like Hội Đình Hùng Lô, where audiences clap, respond, and dance—turns spectators into contributors. Together, spirituality, cultural memory, vocal skills, storytelling, ritual, and community solidarity shape the intangible heritage of Xoan singing.



Figure 3. Xoan Singing performance in Phu Tho province, Vietnam

Data Collection and Categorization

The Xoan singing case study began with a structured, yet flexible process of data acquisition and classification to identify the tangible and intangible elements of this heritage. The aim was to determine which components could be effectively translated into generative art while recognising the challenges posed by abstract, spiritual, or relational aspects. Data encompassed sounds, movements, symbolic artefacts, and spatial arrangements, collected in iterative cycles, where each artistic experiment informed further refinement. This responsive approach mirrored tradition's fluid nature. Materials were categorised by cultural significance and technical viability: direct inputs such as vocal recordings or photographs shaped visual outputs, while intangible elements such as communal ambiance or ritual meaning guided tone and symbolism. Distinguishing tangible from intangible components, common in heritage discourse - served here as a practical framework for creative decision-making, leading to the table of key elements observed during fieldwork in Phú Thọ.

Table 3.Tangible and intangible components of Xoan Singing

Element Type	Subcategory	Examples from Xoan Singing	Relevance to Research / Notes
Tangible	Performance Space	Communal houses (Đình), village courtyards, temple grounds	Architecturally significant; visually documentable; can be recreated in GA environments as spatial context.
	Objects and Materials	Mats used during performance, ceremonial offerings, incense holders, decorative items	These artifacts carry symbolic weight but are physically accessible and visually distinct—ideal for object-based representations.
	Costumes and Props	Traditional attire of Xoan singers, headscarves, fans or drums (if used)	These physical features mark roles and traditions; useful in designing avatars or referencing visual styles.
	Written/ Recorded Materials	Documented lyrics, video footage, photographs	Useful reference materials for analyzing and reinterpreting performance in generative systems; essential for sound analysis.
Intangible	Vocals/ Singing	Melodic structures, rhythm, improvisational flow, call-and-response, conversation	Translation into visual or audio-reactive forms; central to GA experiments involving sound input.
	Ritual Meaning and Spirituality	Songs performed to welcome ancestral spirits or invite the king; symbolic gestures	Deeply embedded in local cosmology; difficult to visualize without risking misrepresentation or simplification.
	Atmosphere	Quiet, respectful, focused ambiance during ritual performances (vs. festive tourist shows)	Affects how sound and visuals are composed—atmospheric qualities inspire aesthetic decisions.
	Oral Knowledge Transmission	Songs passed down by memory through generations, informal learning from elder guild members	This form of cultural continuity is non-visual and difficult to externalize in generative systems; must be acknowledged as background context.
	Community Interaction	The way performers coordinate, the relationship between the singers and local audience	Hard to encode in GA but contributes to the interpretation of collective energy and group dynamics.
	Cultural Values	Respect for ancestors, seasonal and festival alignment, gender and age roles	Symbolically present but non-material; not easily embedded in generative systems without risking misreadings.

Acknowledging both tangible and intangible aspects ensures that generative representation moves beyond visual abstraction and offers a layered experience that reflects symbolism, participation, and cultural depth. This dual focus enables the generative system to act as a dynamic archive, linking traditional heritage with digital tools so that physical artefacts and performative knowledge remain accessible. A second categorisation assessed which intangible elements could be translated into generative experiments and which could not, involving not only technical but also cultural, ethical, and conceptual considerations. The table below outlines these decisions:

Table 4.Intangible Elements – Suitability for Generative Arts (GA)

Intangible Aspect	Included in GA Experiments?	Why Included / Not Included
Vocal qualities (rhythm, tone)	✓	Mapped into visual patterns using audio analysis in TouchDesigner. This offered a direct, reactive link between sound and image.
Oral transmission of lyrics	✓ (partially)	The linguistic complexity and poetic symbolism embedded in the lyrics could not be easily represented visually without reducing their meaning.
Spiritual/ritual meaning	X	These layers are culturally specific and often ineffable. Representing them visually risked over-simplification or misinterpretation.
Communal participation and emotional atmosphere	✓ (partially)	Translated into immersive ambient visuals to evoke a sense of shared space and energy, though limited by lack of intersubjective engagement.
Improvisation & live dynamics	✓	Reflected through the generative system's incorporation of randomness and real-time visual shifts.
Cultural identity and historical memory	X	These aspects go beyond sensory representation and require narrative or contextual framing that falls outside the capabilities of GA tools alone.

Several intangible aspects of Xoan singing were excluded from the generative experiments, not due to a lack of importance but because of practical limits. Conducted within a short timeframe and using a practice-led approach, the project prioritised hands-on experimentation and data-driven visual output. Elements such as oral transmission, spiritual meaning, and cultural identity require extensive ethnographic research, historical study, and cross-disciplinary collaboration—beyond this study's scope. These aspects also demand interpretive frameworks beyond generative systems, visually representing spiritual significance, such as risk misinterpretation. Therefore, the focus shifted to elements more readily translated into responsive visuals, such as sound quality, performance dynamics, and communal atmosphere. This selective approach acted as both a methodological filter and an ethical stance, recognising the limits of digital translation in working with living heritage.

Experiments and discussions

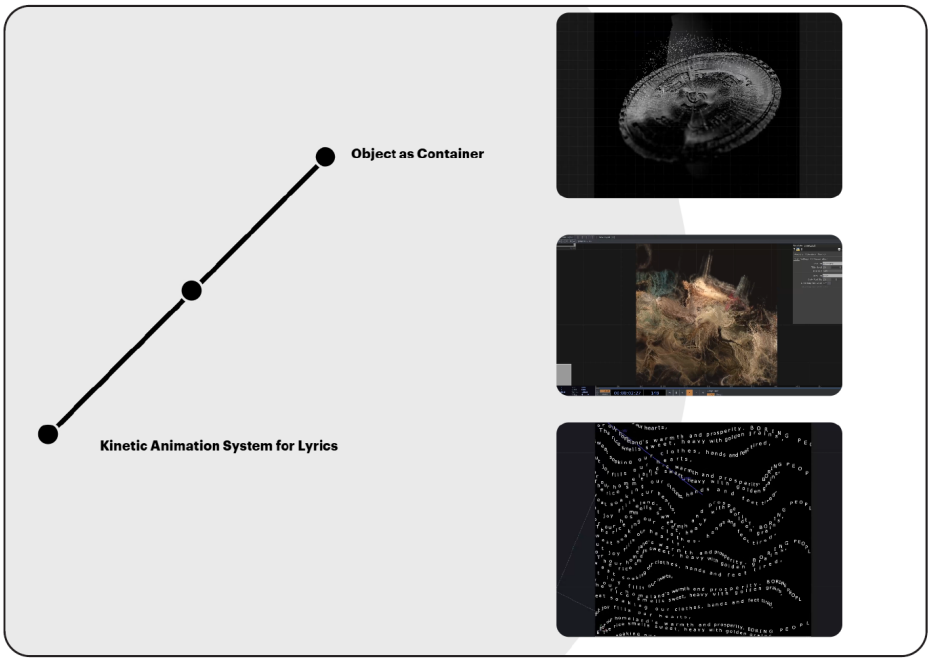

Figure 4. The main directions for the generative system experiments were as follows

Data Processing

The data processing phase transformed fieldwork and archival materials into structured inputs for generative experimentation. Cultural data, lyrics, audio recordings, ritual gestures, and symbolic artefacts were analysed and formatted for TouchDesigner, prioritising the preservation of cultural nuances alongside creative manipulation. Each experiment required tailored datasets to produce distinct visual and interactive results and to bridge traditions with computational representation.

- **Transcription and Analysis of Lyrics**

Xoan lyrics were transcribed from field recordings, YouTube videos, and institutional archives in Phú Thọ, then translated into English to preserve poetic and cultural detail. Lyrics were categorised into themes, such as ritual invocations, agricultural work, blessings, and myths, revealing recurring motifs and cyclical narratives. This classification linked lyrical meaning to choreographic gestures and framing performances as microarchives of ancestral life.

One example, *Hò nhịp gặt lúa* (Harvesting Song), celebrates rural resilience and communal labour through a call-and-response format. Within the generative system, its rhythmic simplicity drove animated text and wave-like visuals, evoking agricultural cycles and a collective identity.

Table 5. Performances, songs are categorized based on the order of performance in cultural event

Category	Purpose	Themes	Performance Style
Hát Thờ	Sacred ceremonies, spiritual	Blessings, prosperity, gods	Slow, reverent, ceremonial
Hát Quả Cách	Storytelling, moral lessons	Labor, history, nature	Call-and-response, symbolic lyrics
Hát Hội	Festivals, communal celebrations	Love, playfulness, bonding	Lively, dance-driven, participatory

- **Extraction of Patterns from Tangible Elements**

Visual motifs were drawn from mats (*chiếu*), architectural carvings, and ritual instruments photographed in Phú Thọ. Mat patterns were converted into height maps and imported into TouchDesigner as reactive textures controlled by the vocal frequencies. Architectural carvings have become layered backgrounds, providing a cultural context without literal replication. Owing to the lack of point cloud scans, still images were repurposed into particle systems simulating the depth and motion in response to sound. This adaptive approach reflects the iterative, practice-led nature of the work, ensuring that visuals remain culturally grounded, yet dynamically responsive.



Figure 5. Architectural motifs extracted from field photographs for generative visual processing.

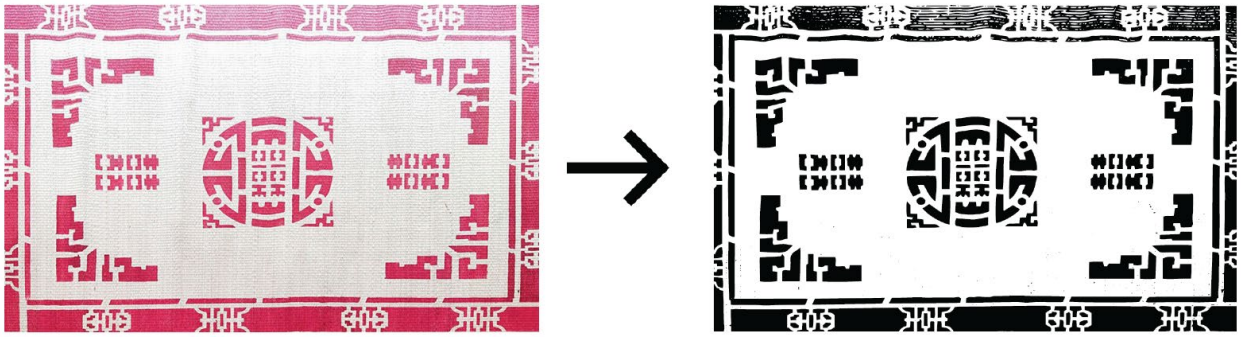

Figure 6. The traditional mat pattern is converted into a black-and-white height map for generative design.

- **Sound and Singing Analysis**

TouchDesigner's audio tools (Audio Spectrum CHOP, Audio Analysis CHOP, Band EQ CHOP) converted sound data into visual parameters: low-frequency altered scale and brightness, and high-frequency triggered particle dispersion. Songs like *Nhập Tịch Mời Vua* shifted from solemn to celebratory, with visuals reflecting tonal changes through light, motion, and density. Ambient sounds—villagers' chatter, temple footsteps, drums, and rustling leaves—were layered to enhance the atmosphere and situate visuals within the place and context.



Figure 7. Different sound analysing technique test for Xoan singing using TouchDesigner

The mapping diagram (Figure 8) shows how cultural inputs—sound, lyrics, objects, and gestures—were grouped under themes (instrumental, voice, material, and symbolic) and translated into generative outputs, such as particles, animated text, point clouds, and reactive lighting. Cross-influences between layers create an immersive interplay, allowing intangible

heritage to live within a responsive system. Balancing the data structure with poetic interpretation is central to this practice-led approach.

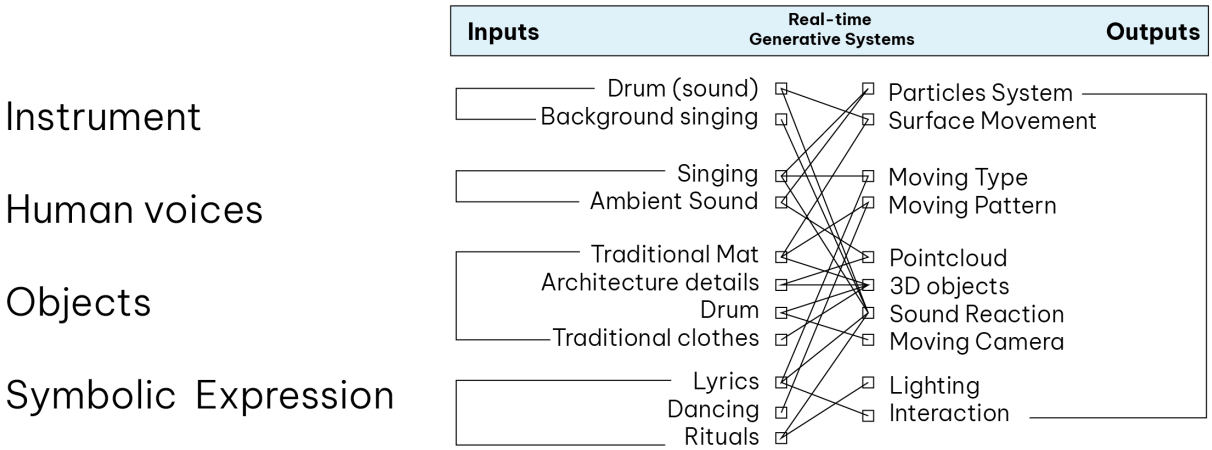

Figure 8. Mapping of inputs for generative arts

Physical Object as a Container for Sound and Symbolism

This experiment reimagined Xoan singing's ritual objects, mat, drum, and architectural motifs as active, responsive elements within a generative system. Instead of static symbols, they became dynamic vessels that reacted in real time to the ceremonial songs. Audio frequencies were mapped onto 3D representations, allowing material forms to reflect intangible values, such as ritual rhythm, vocal cadence, and communal energy. Traditionally, mats and drums are spatial anchors of performance; embedded in a generative system, they extend their cultural role to the digital realm. The woven pattern of the mat was pulsed with vocals, while the drum surface responded to low-frequency beats. This convergence of tangible and intangible heritage reflects Munjeri's view that the former gains meaning through the latter (Munjeri 2004). The result is a hybrid form in which generative visuals extend tradition, making the connections between objects, sounds, and symbolic depth visible.

The experiment focused on three tangible components central to Xoan singing: the mat, drum, and communal house (*Đình*), each chosen for its physical form and symbolic ties to rituals, rhythm, and communal space. The drum, the sole percussive instrument, anchors the performance's beat, while the mat serves as the physical and symbolic ground for singing, dancing, and acts such as *Nhập Tịch Mời Vua*. In the generative system, mat motifs are applied as textures to the drum model, creating a hybrid object responsive to both beats and vocal frequencies—pulsing, deforming, and shifting in colour and ripple motion. The *Đình* was represented through a point cloud particle system simulating its interior and exterior. Initially, generic files were used to rebuild the model from field photographs processed into custom point clouds animated by ambient audio to evoke the interaction of sound with architectural space. While the system lacked full navigable depth, it conveyed ephemeral and communal energy of the performance. Guided by cultural logic and the performance context, these design choices visualise convergence by uniting tangible and intangible heritage in responsive, symbolic forms—preservation as an active and embodied process.

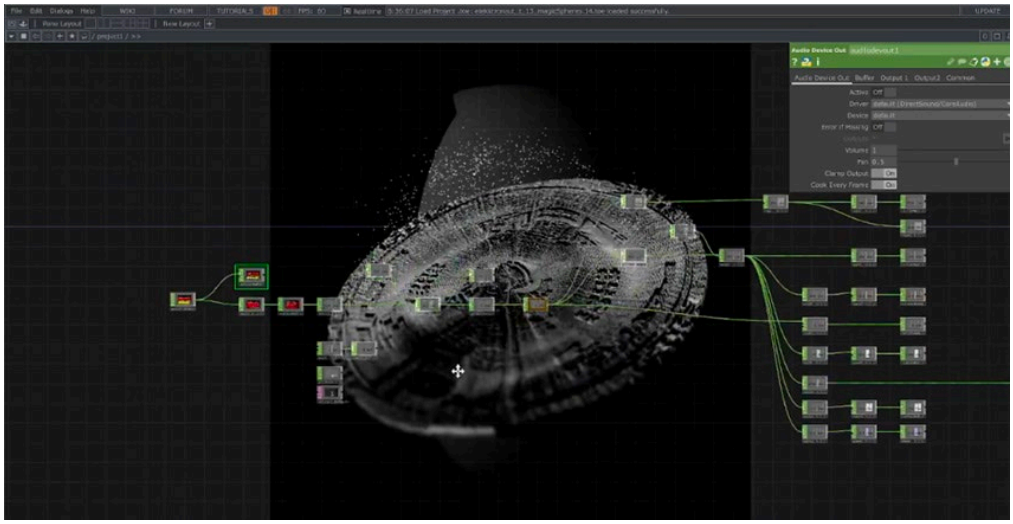

Figure 9. Diagram illustrating the audio spectrum mapping process in TouchDesigner.



Figure 10. Image-to-particle workflow simulating a point

Transforming static artefacts into sound-responsive surfaces reinterpreted the Xoan performance space and demonstrated how generative art can connect physical forms with symbolic meaning. The most effective outcome was the mat's dynamic response to vocal frequencies, with visuals drawn from textile motifs pulsing in sync with the audio, preserving aesthetic continuity, while adding temporal variation. Kinetic text animations further enriched the experience by aligning visual rhythm with a lyrical cadence. Limitations included visuals that occasionally overwhelmed cultural specificity, with texture layering and particle behaviours remaining abstract and lacking ritual logic. Sound–visual interaction, based on generic frequency bands rather than content-aware analysis, sometimes produced arbitrary rather than semantically aligned responses.

Kinetic Animation System for Lyrics

This experiment explored how Xoan lyrics, particularly those depicting everyday life activities, such as harvesting, fishing, and washing clothes, could be translated into kinetic visuals that reflect their poetic structure, rhythm, and cultural symbolism. These songs were chosen for their accessibility and symbolic depth without requiring the extensive cultural and spiritual contextualisation demanded by ceremonial pieces, making them ideal for early stage visual experimentation.

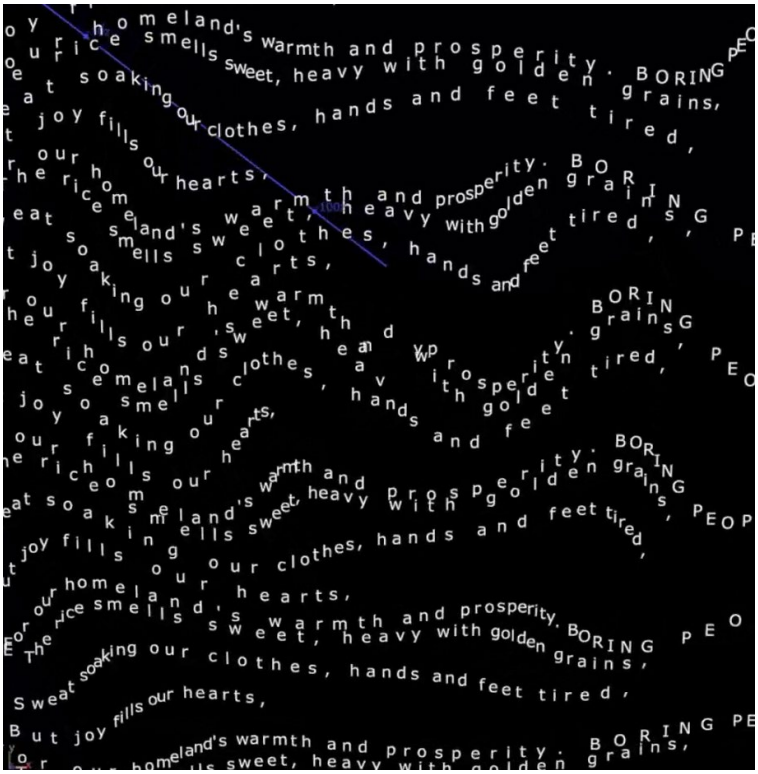

Figure 11. Screenshot of real time kinetic animation

The generative system developed in TouchDesigner was designed as a looping and flexible framework, allowing lyrics to be updated in real time through a dynamic text box. This feature mirrored the adaptive and iterative nature of oral transmission in Xoan singing, where songs change depending on the context, performer, and occasion. Animated with wave-like motion, the text visuals symbolised cyclical patterns of oral performance and natural rhythms, such as water flow and seasonal change, central to Vietnamese agricultural life.

Functioning as a complementary layer to other generative experiments involving mat, drum, or ritual space, the dynamic lyric system adds narrative richness and highlights the emotional and performative nuances of Xoan. In doing so, it reinforced the role of language, delivery, and poetic metaphors as vital carriers of cultural memory, enhancing the capacity of the generative system to represent intangible heritage in a layered and meaningful way.

Layered Convergence

The final stage combines elements from previous experiments, stacking sound, space, text, and symbolic patterns within one generative system to represent Xoan singing's convergences: voice with space, objects with rituals, and rhythm with memory. The point cloud environment from the field trip imagery was layered with animated lyrics (Experiment 2) and sound-reactive patterned surfaces (Experiment 1). Each element responded to a

different audio band: low frequencies deformed the mat-patterned drum, mid-range vocals animated kinetic text, and high frequencies/ambient textures influenced the point cloud particles.

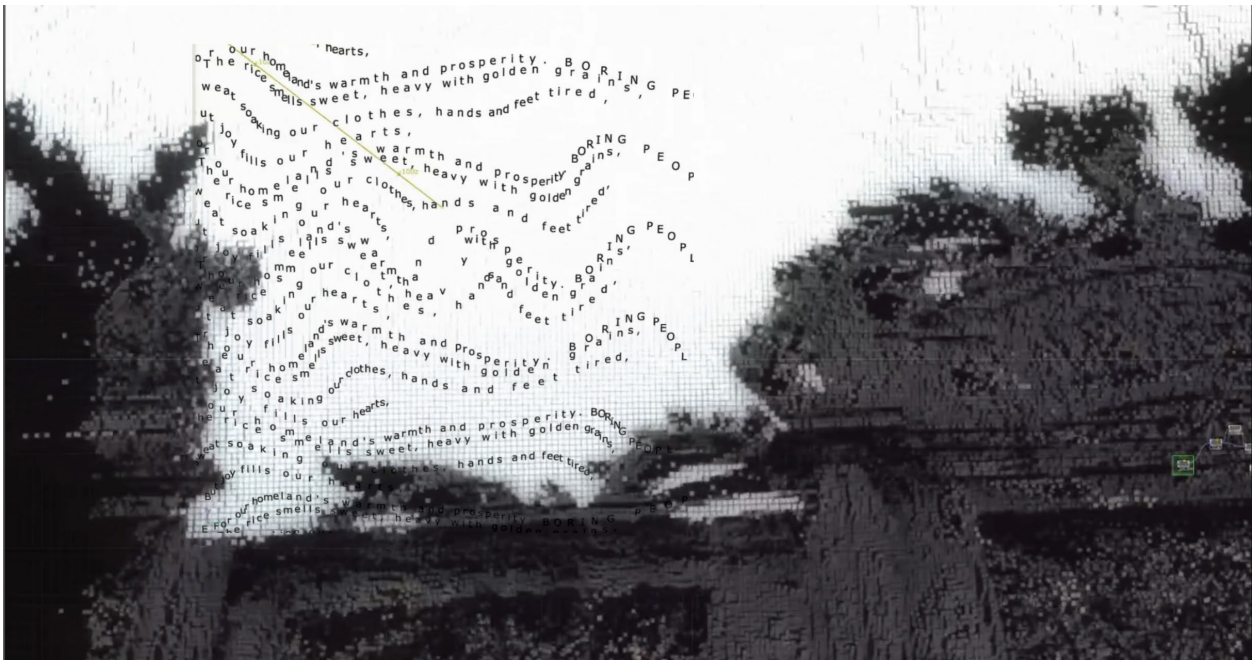

Figure 12. Layered Convergence experiment combining text, sound, and spatial imagery.

The result was a dynamic composition in which spatial, poetic, rhythmic, and symbolic qualities coexisted without replicating the ritual in full. Instead, it illustrates how generative systems can combine multiple interpretations and sensory channels. The strength of generative art lies in layering and interconnecting textual, sonic, spatial, and symbolic data without flattening them, thus creating a flexible, evolving archive.

The experiment also revealed the following challenges: symbolic transitions lacked fine control, some visual elements competed for attention, and the absence of authentic 3D scans reduced spatial specificity. Future development will focus on incorporating accurate point cloud data, structuring the temporal arc of Xoan performances, improving symbolic cohesion, and adding interactive audience input. This marked a shift from isolated tests to an integrated multimodal framework to represent living heritage.



Figure 13. Layered Convergence experiment combining text, sound, and spatial imagery.

Conclusion

This research explores how generative art can engage with Vietnam's intangible cultural heritage by focusing on Xoan singing from Phú Thọ Province. Rather than aiming for static preservation, it seeks to evoke and reinterpret tradition's ritual rhythms, storytelling, and spatial symbolism through real-time visual systems built in TouchDesigner. Generative art is positioned as a medium for cultural reanimation, enabling heritage to be experienced in a dynamic and evolving manner.

The project adopts a practice-led methodology that balances creative experimentation with cultural sensitivity and critical reflection. Fieldwork in Phú Thọ, including participation in the Hùng Kings Festival and direct engagement with Xoan practitioners, provided invaluable insights into the social and symbolic dimensions of the performance. In addition, archival materials, audio recordings, transcribed lyrics, gesture analyses, and visual references to ritual objects and performance spaces were also collected. This combination of tangible and intangible data ensured that generative outcomes remained grounded in authentic cultural contexts.

Working with intangible heritage in Vietnam presents a challenge. Distinguishing between tangible and intangible aspects is complex, and oversimplification risks stripping away nuanced meanings embedded in performance traditions. Access to reliable archival resources is limited, and specialised expertise is often needed for advanced processes, such as spatial modelling, interactive system development, and accurate cultural interpretation. These constraints highlight the importance of collaboration with experts in anthropology, digital humanities, architecture, and interactive media.

This research reflects on how generative systems can offer new methods for cultural documentation— those that adapt to the evolving nature of living traditions. This study proposes a model of heritage representation that is participatory, immersive, and open-ended by transforming sound, gestures, and symbolic forms into responsive, layered digital environments. This approach aligns with contemporary safeguarding strategies that value ongoing cultural vitality over a fixed preservation.

Ultimately, the project reframes intangible heritage as a living process rather than a relic, with generative art serving as both a creative tool and framework for cultural storytelling.

The methods developed here suggest possibilities for broader applications, from deeper collaboration with cultural practitioners to immersive installations and real-time interactive systems. Through this lens, traditions such as Xoan singing can continue to resonate with diverse audiences while maintaining relevance and embracing the possibilities of the digital age.

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