

The in-situ AI pattern merchant: A speculative intervention in Huayao embroidery futures

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Abstract: Research on AI and Intangible Cultural Heritage (ICH) often reflects a static, object-centered perspective. This paper instead explores how generative AI can be embedded in the living practices of ICH. Through a speculative intervention in a Huayao embroidery community in Hunan, China, we reframe AI not as a tool for content generation, but as a social mediator within local craft networks. By performing as an “AI Cross-stitch Pattern Merchant” during the local festival, the study reveals how AI’s creative empowerment of young women sparked intergenerational tensions around legitimacy, labor, and authority. While youth embraced GenAI for playful self-expression, elder embroiderers judged its outputs by communal aesthetics and moral hierarchies, revealing the moral economy shaping creative legitimacy. These dynamics show how after-AI practices can unsettle the domestication of women’s creativity in heritage. We argue for a shift from generation to negotiation, toward socially embedded and relational AI practices in ICH.

Keywords: Intangible Cultural Heritage, Design Anthropology, Speculative Intervention, Relational AI

1. Introduction

Research on AI and Intangible Cultural Heritage (ICH) largely positions heritage as a resource for preservation and curated public access. However, as a living and dynamic form of heritage, ICH is continuously recreated by communities in response to their environments (UNESCO, 2003). Rather than fixed or authorized traditions, this view foregrounds the everyday and vernacular dimensions of cultural practice, where people, materials, and meanings interact in context (Harrison, 2012). Within such practices, creativity departs from the modern Western notion of individual cognition and instead takes shape as a social process—one that calls for relational perspectives on AI (Lewis et al., 2025). Such an understanding invites methodologies that move beyond technology-centered and externally imposed preservation, which often detach heritage from its lived realities.



Instead, this paper approaches the intersection of AI and ICH as locally grounded and relational processes of future-making (Escobar, 2018). This calls for an interventionist practice attentive to local contexts and social relations, situating technology within the ongoing practices of living heritage. This paper adopts a design anthropology approach where AI-based speculative interventions (DiSalvo, 2020) are placed in field settings to generate ethnographic insights into possible futures (Halse, 2020). By embedding prototypes and events in real social contexts, such interventions provoke friction and foster participation (Tironi, 2018), enabling reflection on how technology (AI) may be interpreted and adapted within everyday life (Boucher et al., 2018; Singh et al., 2021).

This study draws on our long-term engagement with the Huayao embroidery community in Hunan, where generative AI is beginning to intersect with living heritage practices. Recognized as a National Intangible Cultural Heritage of China, Huayao cross-stitch continually adapts to changing social and material conditions. Yao women embroider motifs from nature, folklore, and daily life onto skirts, sleeves, and other garments (Shen & Shu, 2012), sustaining the vitality of the craft even as its aesthetics and circulation evolve with new technologies (Lü, 2016). The emergence of generative AI marks a new inflection point—introducing both uncertainty and potential into this evolving tradition. Against this backdrop, this study investigates how generative AI is taken up, interpreted, and negotiated within a living embroidery community through an in-situ speculative intervention. We ask:

1. What social and cultural dynamics emerge when AI enters the Huayao embroidery community?
2. How might alternative AI systems be designed and situated to activate collective creativity and agency within ICH communities?

This paper contributes at two levels. Empirically, it provides an account of how generative AI is socially negotiated within a living craft community, revealing tensions around legitimacy, labor, and authority. Conceptually, it advances discussions of relational AI by situating them in the context of intangible cultural heritage, showing how AI functions as a socially embedded mediator in collective practices.

2. Related Works

Early applications of AI-generated content (AIGC) in intangible cultural heritage (ICH) focused mainly on digital archiving and pattern generation, emphasizing technical capabilities in style recognition, motif extraction, and visualization. Bhattacharjee et al. (2020) reconstructed Indian textile forms through generative networks, while Xiao et al. (2025) proposed a “designer-in-the-loop” system for AI-assisted paper art, embedding craft expertise within algorithmic iteration. As AIGC expanded into cultural product design and craft innovation, researchers began to explore co-creative frameworks that integrate semantic interpretation and cultural symbolism. Examples include Wang et al.’s (2025) *HarmonyCut* system for paper craft and Tao et al.’s (2025) GAN-based framework for metal filigree. In Southeast Asia, Ardhanianto et al. (2024) and Sayuti et al. (2024) used deep generative models to encode Batik and Songket patterns, preserving symbolic elements while enabling regional reinterpretation.

More recently, research attention has expanded from *semantic representation* toward the broader *ethical and epistemic dimensions* of AI in heritage contexts. Quan et al. (2024) proposed a knowledge-driven preservation model using semantic annotation for Miao batik

patterns, while Bao et al. (2025) applied diffusion models to represent cultural “genes” in Jingdezhen porcelain. In educational contexts, Ren (2025) and Liu (2023) introduced AI-assisted learning systems for performance and embroidery arts, fostering embodied, participatory learning. However, scholars such as Fu et al. (2025) warn of semantic distortion and cultural alienation in generative models, calling for ethically sensitive and context-aware frameworks (Li, 2021; Na, 2025).

In the Huayao embroidery context, Chen et al. (2023) developed a CycleGAN-based framework for generating cross-stitch patterns with high visual fidelity but limited cultural awareness. Building on this, Yuan et al. (2025) combined LoRA fine-tuning with field engagement to reveal tensions between technical imitation and cultural meaning. Recent work has further moved beyond this paradigm by examining how generative AI is culturally situated within craft practices, highlighting how meaning is negotiated through interaction (Yuan et al., 2026; Bryan-Kinns et al., 2026). Together, these studies highlight both the growing interest in AIGC for heritage crafts and the persistent gap between algorithmic reproduction and community-based creativity.

A smaller but growing body of work has begun to rethink AI as relational - embedded within social and cultural relations rather than functioning as an autonomous collaborator. Scholars in HCI and decolonial AI studies (Dignum, 2022); (Lewis et al., 2025) critique Western rationalist assumptions and call for relational and ethical frameworks grounded in interdependence. Building on this, empirical studies in participatory AI explore how communities co-create or contest AI through shared practices (Birhane et al., 2022), investigating the collective and political nature of prompts (Mahdavi Goloujeh et al., 2024), the assemblages of creative machine learning systems (Shelby et al., 2024), and non-Western artistic participation in AI futures (Qadri et al., 2025). These works conceptualize AI as a site of shared authorship and collective agency (Safir et al., 2025), yet they remain largely design-level or theoretical rather than situated in ongoing community life.

3. Field Context: The Huayao Community and the Living Practice of Embroidery

The Huayao people are a sub-group of the Yao ethnic minority in China, where we have conducted collaborative fieldwork for over ten years on embroidery and heritage practices. Cross stitch (*tiaohua*) is central to Huayao attire, adorning skirts, headscarves, baby carriers, waistbands, cuffs, and other garments (see Figure 1). The tubular skirt (*tongqun*), with its dense geometric motifs depicting nature, myths, and daily life (Xie, 2014), carries rich cultural meaning, expressing women’s aspirations for harmony and prosperity (Shen, 2012).



Figure 1 Key Components of Huayao Yao Embroidery

Innovation has long defined Huayao craft. Embroidery remains a medium of expression, where motifs circulate through borrowing, sharing, and imitation, enriching the collective repertoire. Several embroiderers noted that skirt patterns are now “too complicated” and “time-consuming,” shifting innovation toward smaller forms—cuffs, waistbands, and accessories—that blend traditional and contemporary styles. Channels of pattern circulation have also expanded beyond face-to-face exchange. Many women now share embroidery designs through digital platforms such as WeChat groups and short-video apps. A local photo-printing merchant, who began archiving skirt photos at markets, has since become a key node in this network. Today, when Huayao women begin new pieces, they often visit his stall to browse this expanding printed repository of patterns(see Figure 2).



Figure 2 The traditional pattern merchant and his stall.

Inspired by this role, we created the *AI Pattern Merchant* to engage the community through familiar exchanges and explore how AI might spark new relational creativity in everyday embroidery.

4. In-situ Probing Futures: A Case Study of AI Interventions in Huayao Embroidery

Following Lee et al. (2021) and Nicenboim et al. (2024), we approach AI through design, using speculative experiments to unmake and reimagine its role in creative and cultural contexts. We further expand this approach by situating the experiment within a real-world field setting as interventions, seeking situated design anthropological encounters and examining the relational effects of AI in local contexts (Koskinen et al., 2013).

Our experiment took place in Chongmudang during Taoliaogui, the Huayao Yao's most important three-day festival. Shaped by tourism and modernization, the event blends remembrance, performance, social gathering, and commerce (Luo 2014). During the festival, Huayao women wear embroidered skirts, exchange patterns and stories, and publicly display their craft, showing how embroidery traditions are reimaged through collective celebration.

Given the festival's dynamic nature, the study adopted an improvisational approach, adapting to explore AI within situational practices. Fieldwork unfolded over five days (Sept 29–Oct 3, 2025) through observations, collaborative experiments, and deep interviews (see Figure 3).

1. Speculative Intervention

2. Follow-up Exploration



Days 1-2

The first two days of Taoliaogui. Performing as an AI Pattern Merchant in the spot, inviting participants to co-create embroidery motifs through real-time generative prompts.



Day 3

Last day of Taoliaogui. Visiting traditional pattern merchant and Re-encountering Senior Embroiderers



Day 4

Conducting in-depth interviews with representative participants from the first phase.



Day 5

Returning to the traditional merchant and integrating the new patterns into the archive.

Figure 3 Overview of the five-day field engagement.

Two generative models were employed: *ChatGPT on a phone*, used primarily for on-site, rapid text-to-pattern creation, and a *self-trained LoRA model on top of Stable Diffusion XL (SDXL) on a laptop*, fine-tuned on Huayao embroidery patterns to support the generation of larger and more complex designs.

Data were gathered from *complementary sources*, including participant observation, semi-structured interviews, AI-generated artifacts, and online engagement through the project's TikTok account. Prior to participation, consent was obtained for both involvement in the

study and the potential publication or online sharing of generated images and field interactions.

Data analysis followed an interpretive, material- and interaction-centered approach (Hansson et al., 2023; Pink et al., 2015). Rather than treating interviews, observations, and AI-generated patterns as separate datasets, we examined how these materials connected through situated encounters around the prototype. The unit of analysis was episodes of interaction in which participants evaluated or discussed AI-generated patterns. Instead of formal coding, we identified recurring themes of legitimacy, functionality, and value through iterative comparison of field notes, interviews, and artifacts, refined through team discussion.

As external researchers collaborating with the Huayao Yao community for over a decade, the authors moved between observer, facilitator, and participant. Their ongoing engagement shaped embroidery practices, while linguistic and gender differences influenced these encounters. The study's value lies in its situated, co-constructed understanding rather than objectivity.

4.1 *Speculative Intervention: Becoming an AI Pattern Merchant in the Festivals*

4.1.1 Experiment Design: Materiality, Ambiguity and Collectivity

We play as a carnivalesque presence in the festival—an “AI Pattern Merchant” capable of generating and printing embroidery designs that the Huayao women desired but did not yet exist. In the initial design, we materialized ourselves as a public embroidery pattern board, a mobile and participatory interface composed of four elements (see Figure 4):

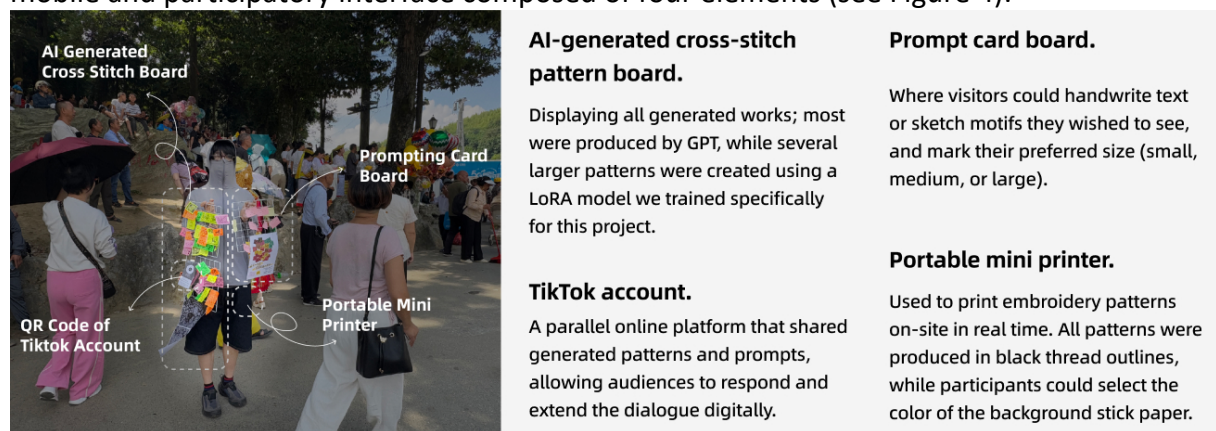


Figure 4 Components of the AI Pattern Merchant prototype.

Our experiment began by presenting AI-generated embroidery patterns to the public and demonstrating how textual prompts were translated into visual designs(see Figure 5). We invited participants to discuss and evaluate these existing works. We then posed a simple question: “If you had the opportunity to create any embroidery pattern you wished, what would it be?” Throughout this process, we maintained a neutral stance, avoiding suggestive guidance.

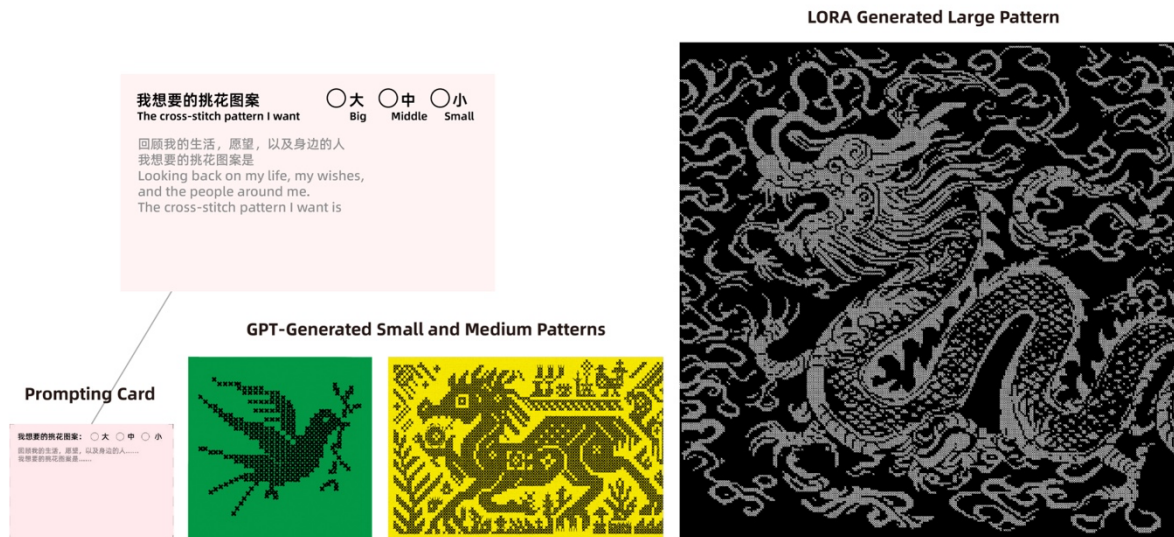


Figure 5 Visual comparison of the materials (to scale).

Participants' inputs were entered into GPT, combined with base patterns and prompt terms we had previously tested to best match the local aesthetic. The generated designs were printed on-site and shared immediately with participants (larger ones were generated later through our own LoRA model and delivered the following day). To ensure immediacy of feedback and responsiveness, we did not conduct multiple iterative generations unless specifically requested by participants. Each pattern was printed in duplicate—one copy for the participant to take home, and another for public display on the board. The base patterns, drawn from commonly used Huayao motifs collected through prior fieldwork and publicly circulating samples, were combined with prompt structures developed in collaboration with local experts through ongoing negotiation and refinement of visual references, textual formulations, and formatting strategies to align with situated aesthetic expectations. To gather richer data and open interpretive space, the prototype was guided by three design principles: ambiguity, materiality, and collectivity:

1. **Ambiguity.** Following Gaver et al. (2003), ambiguity was embraced as a productive resource that invites interpretation, speculation, and participation. The design's open-endedness was deliberately enacted through small, colorful cross-stitch stickers—objects that were familiar yet unfamiliar, playful yet opaque—encouraging participants to negotiate the meaning of embroidery and imagine possible placements for the motifs, rather than seek fixed answers (Michael, 2018).
2. **Materiality.** Although AI generated the patterns, we emphasized tangible engagement—printing them as small cards that invited collective sense-making through handling and conversation (Ravnløkke & Binder, 2023; Woodward, 2020).
3. **Collectivity.** By displaying all generated patterns publicly during the festival, the project foregrounded collectivity as a social and political condition, situating AI within the shared fabric of community life.

4.1.2 Generational Groupings in the Process and Outcomes

Rather than presenting the experiment chronologically, this section organizes the outcomes around generational differences that emerged as a salient pattern in the field. These three groupings surfaced from participants' natural clustering during the festival and from differences in embroidery skills and social roles (see Figure 6).



Children (ages 6-13)

Who generally had no embroidery experience and were mostly playing with peers in the festival grounds.



Youth (ages 13-30)

Who had some exposure to embroidery through school courses or their mothers but were not yet regular practitioners and were primarily engaged in preparing performances for the festival.



Experts (over 30)

Many of whom were mothers and possessed a deeper, embodied understanding of embroidery as both craft and labor.

Figure 6 Generational groupings of participants in the AI Pattern Merchant experiment.

All participants were female, as Huayao embroidery is traditionally made and worn by women—reflecting the craft's cultural structure rather than methodological choice.

- 1. Children.** The first group we engaged during the festival comprised children aged 6–13. We collected a total of ten prompts from this group. All of them were Yao, from Chongmudang and nearby villages, but their understanding of embroidery was rudimentary—shaped by observation and admiration rather than practice, as they had received no formal training.

Interestingly, these children became the most enthusiastic and imaginative prompters. Their prompts were often complete in structure, rich in description, and supported by small drawings. After we explained the experiment's process, one girl wrote a romantic line on her prompt card and sketched a shape beside it: "Brilliant fireworks blooming in the sky". Some even offered unexpectedly philosophical reflections such as "The free wind can topple the dull tree" and "Your eyes are like a camera." (see Figure 7)



Figure 7 Representative examples of prompts and AI-generated embroidery patterns from the children's group.

The prototype's ambiguity and open-ended structure invited the children to engage not with embroidery as a functional craft, but with the activity as a space for imaginative play and transformation. Rather than aiming for specific outcomes, they explored the system itself—experimenting with what it could produce and how their words could shape images. Several of their prompts revealed a poetic and metaphorical tone, suggesting that their creative approach was closely linked to their developmental stage.

- Youth.** The second group comprised youth aged 13–30, the largest participant group, contributing twenty-one prompts. Many performed in festival dances, returning from other towns or attending as local students and visitors. Most had some embroidery experience, learned from their mothers or school elective courses.

Compared to the children, this group demonstrated a stronger sense of self-awareness and attunement to contemporary culture, producing prompts that were more inventive and personally expressive—often referencing fashionable figures, pop-culture icons, or motifs that reflected their own identities. We observed that their inputs were generally simpler in structure but more deliberate in theme, containing fewer descriptive details yet revealing a conscious effort to engage with the embroidery tradition in their own way. At the same time, because many already held assumptions about what “proper embroidery” should look like, several participants appeared hesitant or constrained when attempting to create something new.

The content could broadly be divided into five types(see Figure. 8):



Figure 8 Representative examples of prompts and AI-generated embroidery patterns from the youth's group.

Among these, the name-based patterns were the most unexpected and improvisational, quickly becoming the most popular. This was best illustrated

by a young woman named Bu Sulian, who on the first day handed us a prompt containing only her name. At first, we assumed she had misunderstood the task, but she explained that she wanted her name itself to be transformed into an embroidery pattern. This was surprising because Huayao embroidery rarely incorporates written Chinese characters—especially personal names—into its motifs, which are typically abstract or floral. When the GPT-generated result appeared, it not only visualized her name but also spontaneously added ornamental motifs beneath it, a coincidence produced by the model’s generative process. Once the printed design was displayed on the public board, it immediately drew attention: many visitors recognized the name as belonging to someone they knew, and soon others began requesting similar name-based patterns of their own.

The next day, we encountered Bu Sulian again. This time, she proposed a new design that combined a lotus and a swan, explaining that her name contained the character for “lotus” and that she loved swans. Building on the enthusiasm and recognition sparked by her earlier pattern, she now approached AI as a creative partner, using it to articulate a more personal expression of identity.

- 3. Experts.** The final group comprised experts over thirty. We spoke with nearly twenty participants, though most declined to join. As highly skilled embroiderers and custodians of Huayao tradition, they engaged critically with the results but rarely offered new prompts, often repeating familiar motifs.

Their responses focused primarily on issues of practical use - how certain motifs might be positioned on garments, which patterns were too simple, or how increasing size and complexity might make them more appealing. One woman requested a decorative pattern which was used in the back of a bridal dress, insisting it feature a phoenix motif, “as it always does,” but emphasized that the exact dimensions must match traditional standards (see Figure 9). To better understand their preferences and needs, we decided to engage with the traditional pattern merchant, aiming to gain deeper insights into the local systems of selection, value, and aesthetic judgment.



Figure 9 Representative examples of prompts and AI-generated embroidery patterns from the experts' group.

4.1.3 Iteration through the Traditional Pattern Merchant and Experts

We revisited the local merchant selling printed photos of Huayao skirts and placed our prototype beside his stall to reach women buying embroidery samples. Like previous expert participants, most dismissed the AI-generated patterns as messy and meaningless compared with the vendor's orderly traditional samples. Watching women compare two nearly identical samples—debating stitch direction and rhythm—the vendor dismissed our results as “fake patterns,” likening them to mass-produced “fake skirts,” since authentic designs evolve through years of shared refinement. As the merchant explained: “If a pattern hasn't really been stitched before, how can you prove it actually works—the stitch count is right, and the process goes smoothly?”

This emphasis on practical validation revealed that, in local terms, authenticity is measured not by visual fidelity but by a pattern's viability within lived craft practice. Experts pausing without purchasing did not signal rejection of visual appeal, but rather a mismatch between aesthetic appearance and practical usability.

Pattern viability operates on two levels. First is its practical feasibility for stitching: patterns must function as executable guides, requiring clear “X” structures, directional logic, and compatibility with garment placement, as refined through generations of practice. Second is market legitimacy: as embroidered skirts circulate in secondary markets, conventionally recognizable patterns are more readily accepted, while uncertain outcomes are perceived as risky given the time-intensive nature of embroidery.

While the relationship between embodied skill and AI-generated patterns has been explored in prior work (e.g., Yuan et al., 2025; Yuan et al., 2026), and is clearly important, it is not the primary focus here. We draw on it to explain why certain AI-generated patterns were perceived as irrelevant, which informed our iterative redesign. In our experiment, incorporating clear “X”-stitch structures alone proved insufficient, leading us to redesign patterns into familiar cuff and waistband compositions—typically 20–50 stitches tall and dominated by red motifs—to better signal their practical application (see Figure 10).



Figure 10 Iterative refinement of AI-generated embroidery pattern form.

4.2 Follow-up Exploration: Deep Interviews to Unpack Generational Tensions

Recognizing the generational differences in how embroidery was understood and valued, we conducted in-depth follow-up interviews with two representative participants—a young girl and a middle-aged expert embroiderer—to further explore their perspectives and experiences.

4.2.1 Bu Sulian as a Young Representative

Bu Sulian, a fifteen-year-old girl, had just started high school at the time of our interview. Her mother is a skilled embroiderer, and she herself had taken embroidery as an elective course during junior high, giving her a basic understanding of the craft and her own distinct opinions about it.

Our conversation began by revisiting her previous prompt and the AI-generated pattern. Her idea stemmed from a dissatisfaction with the repetitive and prescriptive embroidery exercises she had encountered during her learning process, as well as from a growing awareness of her own identity. When learning from her mother, she had to start with simple patterns for the leg wraps, which she found monotonous. One day, she recalled, she complained: “I thought—since I’m the one wearing it, why can’t I embroider my own name? Maybe just make it small, or maybe just a single letter.”

This impulse overlapped with her classroom experience. At school, students were often assigned identical motifs to practice, leaving her uninspired to create. When we presented her design reconfigured into a sleeve-cuff format—a traditional embroidery placement—and asked if she would embroider it onto her clothing, she hesitated. She explained that she would first need to seek approval from elders, as placement and symbolism were bound by convention:

“Some parts have fixed designs, and people from the older generation decide what can go where. If I change something suddenly, I’d have to see what they think... If they agree and think my design looks good, then it can spread. But if they think it looks messy or disrespectful, then I can’t embroider it.”

This exchange illuminated how creative agency within embroidery is socially negotiated - subject to communal validation as much as personal intention. Nevertheless, she added that even if the motif could not appear on her clothing, she would still embroider it separately as a pendant or small decoration.

Building on these insights, we conducted a series of collaborative design sessions with Bu Sulian. When asked about embroidery's presence among her peers, she admitted that most of her friends were indifferent—some even disliked wearing traditional Yao garments. Given her enthusiasm for name-based patterns, I suggested designing personalized motifs for her friends to gauge their reactions. Together, we created a series of new designs (see Figure 11). She shared her progress and images in a WeChat group, inviting friends' real-time comments. Their responses—filled with laughter and curiosity—found the designs witty and refreshing.



Figure 11 Patterns we co-created for Bu Sulian's friends.

4.2.2 Chunlai as a Middle-aged Gatekeeper

Our next participant was the owner of a local bridal photography studio, Chunlai, a woman in her early thirties with a young daughter. Our conversation began with the festival itself, as she described how local women use it as an opportunity for mutual display and admiration:

“Every time during festivals, we would dress up beautifully and come out to compare who was more beautiful, who had a prettier dress. If someone's pattern was nice, we would take a photo of it and then go back home to embroider it ourselves.”

In this socially performative context, the drive for innovation is closely tied to public visibility and collective recognition. We invited her to comment on the results of our earlier experiments, including the collaborative works with Bu Sulian. Unsurprisingly, she showed little interest in the symbolic or personal meanings of the designs. Instead, her critique focused on their technical and visual complexity: “All your ideas are fine—but these patterns are not complex enough. There are too many empty spaces between the motifs.”

As she elaborated, this preference for intricacy was not simply aesthetic but deeply socialized through intergenerational expectations. She recalled the authority of the older generation and the influence of the Huayao Embroidery Association:

“Even now, members of the Huayao Association still inspect our embroidery to make sure it's intricate enough and follows traditional styles... If a woman doesn't do any needlework and just plays with her phone, people will say she's lazy and irresponsible.”

Now in her thirties, she found herself reproducing the same evaluative logic she had once learned from her seniors. When I asked how such a cycle might be broken, she replied matter-of-factly: “Only when you can convince the elders that your innovations are better than theirs—that you’re even more capable—can you afford to ignore their opinions.”

4.2.3 Revisiting the Pattern Merchant and Reflections from TikTok

On the final day of fieldwork, we brought the newly co-designed sleeve-cuff patterns—printed in the same format as traditional samples—back to the pattern vendor’s stall and quietly inserted them among the existing collection (see Figure 12). Although no one attempted to buy them, several women paused to look, suggesting that the AI-generated designs, once dismissed as “fake,” had begun to enter the visual and social field of recognition.

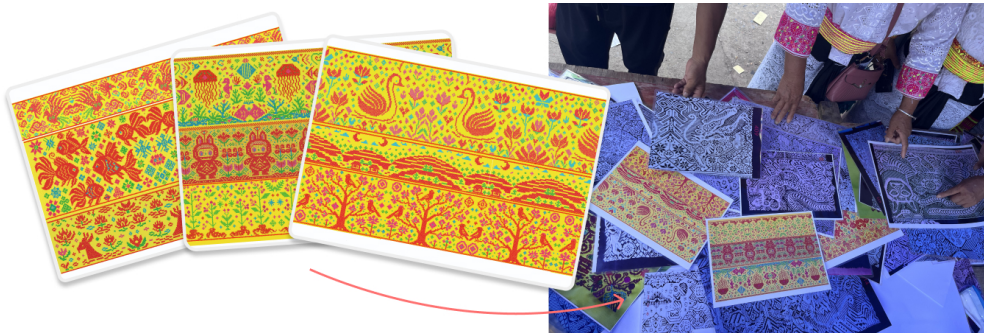


Figure 12 Putting the AI-generated samples into the existing collection.

By the end of the fieldwork, the TikTok account had begun to attract local followers, even those who did not directly participate in our activities began to add our works to their favorite. Posts such as “Pure Milk” and “Huayao Grandma” receiving the most engagement. This growing digital interaction indicates that the platform itself may evolve into a new ethnographic site—where AI, creativity, and community continue to intertwine beyond the festival(see Figure 13).

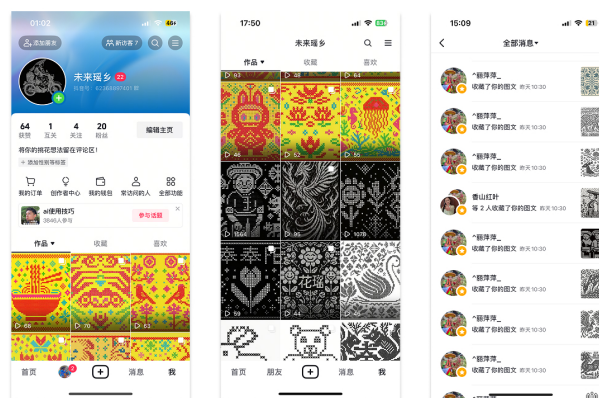


Figure 13 The homepage of the TikTok account. It has gradually started to gain attention from those who did not participate in the activity.

5. Discussion

In the tradition of research through design (RtD), ambiguity has long been valued as a productive methodological device—particularly within HCI and interaction design (cf. Gaver et al., 2003). Yet ambiguity must be carefully balanced: it needs to remain open enough to provoke reflection while retaining sufficient meaning to sustain engagement.

In response, we treated ambiguity itself as something to be continuously modulated rather than predefined. After our engagement with experts failed, we reconfigured the prototype—narrowing and reshaping its ambiguity—to better access situated forms of knowledge.

Through this dynamic adjustment, we sought to maintain openness without detachment, allowing meaning to emerge while remaining grounded in context (Pink et al., 2022).

Prototyping thus remained in a state of tension—“more than many and less than one”—continually becoming rather than resolving into closure (Corsín Jiménez, 2014).

This speculative, practice-based study also carries inherent limitations. Conducted during a short festival engagement, it captures only fleeting relations—a glimpse of possible futures rather than lasting transformation. The use of general-purpose AI models further highlights the gap between external technologies and local craft knowledge. Yet this precise entry into the festival’s liminal context also yielded productive insights into how technologies might be situated within cultural practice, creating meaningful openings for future, long-term collaboration and observation.

5.1 *Field Reflection: If Embroidery Once Shaped a Woman’s Becoming, What After AI?*

Generative AI has been celebrated as a force of creative democratization—promising to make artistic production accessible to anyone, blurring the boundaries between expert and amateur, artist and artisan (Lee, 2022; Xue et al., 2025). Yet, by collapsing the temporal distance between mastery and immediacy, generative AI altered the rhythms of making, turning time—and by extension, generation—into a site of tension. As our field experiment revealed, younger participants—more fluent in digital tools and attuned to the logic of online visual culture—were quick to adopt prompting as a new creative language. Their engagement reflected broader socio-cultural shifts: a declining interest in traditional embroidery among youth, stronger individual self-awareness, and growing digital literacy. For them, AI’s immediacy and playfulness stood in stark contrast to the repetitive discipline of hand embroidery, resonating instead with a more expressive and self-directed understanding of craft—where making becomes a means of creative agency and identity formation (Chansky, 2010).

In contrast, older embroiderers framed their practice less as an act of personal expression and more as a form of familial labor and intergenerational responsibility, where stitching was woven into the rhythms of care. This orientation was evident in their material understanding of embroidery: they valued the physicality of threads and patterns, the time and effort required to complete intricate designs as a sign of maternal devotion, and the social rather than private meaning of motifs. Chunlai, a younger embroiderer emerging as a gatekeeper, embodied this generational negotiation. Positioned between tradition and change, she saw innovation as something that must first earn the elders’ recognition—only by proving greater skill could one claim the right to differ.

As Parker (2010) notes, embroidery has historically occupied a dual position—at once a domestic obligation and a medium of feminine agency. This duality became tangible in our fieldwork: younger women used AI as a means of personal expression and public self-fashioning, while older embroiderers grounded their practice in embodied skill, moral responsibility, and maternal care. During the experiment, when a mother and her child were invited to jointly evaluate the patterns, they quickly began discussing the characteristics of each design. The mother guided her daughter by pointing out which patterns were more aesthetically appealing, while the child actively voiced her own preferences. Patterns that fell along the boundaries of acceptability sparked moments of disagreement, but also opened up space for dialogue between them. As a shared and public technology, AI began to build a bridge between the two, opening possibilities for reimagining ICH's contemporary relevance (Efilti & Çelebi, 2020).

5.2 Beyond Generation: Toward Negotiation in AI for ICH

AI systems designed for Intangible Cultural Heritage (ICH) communities must move beyond current models of individualized co-design tools, toward what we call relational AI for collective creativity. Creativity is not an isolated act, but a contextual and collective process shaped by the interplay between personal expertise, cultural traditions, and social systems of recognition (Csikszentmihalyi, 1997). In ICH contexts, cultural expression is not limited to formally recognized artists or experts; rather, every community member acts as both a creator and an evaluator of cultural meaning. Through ongoing interpersonal exchange and “weak ties” within the community, practitioners identify emerging needs, adapt to new contexts, and keep traditions dynamically alive (Cominelli & Greffe, 2012).

In contrast to the now well-established personal computing interfaces, AI for ICH communities requires a public and socially embedded interface, which we attempted to embody as an “AI Pattern Merchant.” Functioning as public prototypes, these interventions extended beyond individual interaction to become platforms for relational performance—sites where community members, technologies, and materials co-constituted what Hayles (2017) calls a cognitive assemblage, in which cognition and meaning emerged through distributed and collective engagement. As villagers gathered around the board in our experiment discussing which AI-generated designs were “beautiful,” “impossible,” or “fake,” the artifacts themselves became mediators of dialogue, prompting reflection on authorship, legitimacy, and creativity.

Through these encounters, AI's influence on the future of ICH communities revealed itself as inherently speculative. Patterns such as Labubu or Bu Sulian's name design represented unverified cultural futures, each carrying the potential to be realized, reinterpreted, or forgotten. By entering the present, these speculative artifacts ameliorate, provoke, and reshape existing cultural realities (Marres, Guggenheim, & Wilkie, 2018). The future, therefore, is not designed through predetermined plans but emerges improvisationally—in the ongoing interactions between AI-generated patterns and local communities. In this view, AI is not the ultimate author of cultural innovation but a participant in the unfolding correspondences of cultural life—an improvisational presence entangled in the relational flows of making and meaning (Ingold & Hallam, 2021).

We therefore argue for a relational AI approach to AI in ICH contexts—one that extends beyond the restoration of craft techniques or the facilitation of individual creativity, without negating their value. Instead, it complements them by attending to the cultural and social

negotiations through which AI-generated artifacts become *public matters of concern* (DiSalvo, 2009). In this view, the value of AI lies not only in the quality or novelty of its outputs, but in its capacity to cultivate relational creativity, foster community dialogue, and contribute to the collective flourishing of cultural life (Lewis, Whaanga, & Yolgörmez, 2025).

6. Conclusion

This study explored how generative AI can be relationally enacted within the living heritage practices of Huayao embroidery. Through an in-situ speculative intervention—the AI Pattern Merchant—we examined how AI not only produced images but also reconfigured relations between generations, between digital and material practices, and between personal expression and collective tradition.

These reconfigurations revealed both the potentials and tensions of AI in practice. On the one hand, AI enabled novices to engage more quickly and actively in pattern creation, opening up new possibilities for participation and experimentation. On the other hand, it risked bypassing the slow, embodied processes through which skills and cultural knowledge are cultivated. Balancing these modes of engagement thus becomes a critical question for the future of intangible cultural heritage transmission.

Taken together, these findings suggest that AI's significance in Intangible Cultural Heritage (ICH) lies not only in what it generates, but in what it mediates. Rather than functioning as a creative engine or autonomous maker, AI operates as a relational medium that provokes dialogue, negotiation, and reinterpretation across cultural boundaries. In this sense, the future of AI in heritage practice is not a matter of automated creation, but of ongoing correspondence, where making, judging, and caring remain intertwined.

7. References

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