Artificial "Authentic" Intelligence: Can AI Systems Embody and Evolve Cultural Heritage? A Case Study of "Cyber Subin" and Thai Traditional Dance

Pat Pataranutaporn[1] **Chayapatr Archiwaranguprok**[2] **Phoomparin Mano**[2]
Piyaporn Bhongse-tong[3] **Pattie Maes**[1] **Pichet Klunchun**[3]

[1]MIT Media Lab, Massachusetts Institute of Technology
[2]Creatorsgarten, Bangkok, Thailand
[3]Pichet Klunchun Dance Company, Bangkok, Thailand

{patpat, pattie}@media.mit.edu, {pub, poom}@creatorsgarten.org,
{bopipee, pichetklunchun}@gmail.com

Abstract

Authenticity emerges from the dynamic tension between tradition and innovation, continuity and change, preservation and evolution. We propose Artificial Authentic Intelligence (AAI)—computational systems that embody, transmit, and evolve cultural knowledge. Through Thai traditional dance, we explore how AI navigates this apparent paradox via two implementations: Cyber Subin, enabling real-time human-AI co-dancing, and Open Dance Lab, a web-based educational platform. Both systems translate Mae Bot Yai's 59 fundamental poses into six generative principles derived from choreographer Pichet Klunchun's analysis, creating rule-based AI that enables new forms of expression through human-machine collaboration. We evaluate authenticity across three dimensions: depth (embodied knowledge transfer), legitimacy (community validation), and resonance (cross-cultural communication). Our findings reveal that AI creates cultural authenticity through creative tension rather than perfect mimicry, generating new expressions that unite ancestral wisdom with algorithmic possibility.

1 Introduction: The Paradox of Artificial Authentic Intelligence

Cultural authenticity resists simple definition. Rather than a fixed property, authenticity emerges through ongoing negotiations between tradition and innovation, continuity and change, preservation and evolution [1, 2]. Living traditions survive not through perfect replication but through adaptive transformation that maintains essential qualities while responding to new contexts.

This adaptive nature of tradition becomes particularly complex when considering embodied cultural practices like dance, where knowledge exists not in texts or artifacts but in moving bodies and their accumulated wisdom [3, 4]. Traditional transmission through apprenticeship creates intimate chains of embodied knowledge passing between generations, a process that seems fundamentally at odds with computational representation. When we introduce computational mediation, we risk severing these chains or reducing complex embodied knowledge to simplified parameters. Yet paradoxically, this same computational intervention creates possibilities for new forms of cultural vitality that transcend the limitations of purely human transmission. If authenticity emerges through transformation rather than replication, then artificial systems might achieve their own form of cultural legitimacy—not by mimicking human transmission but by creating new pathways for cultural evolution. This possibility

Submitted to 39th Conference on Neural Information Processing Systems (NeurIPS 2025). Do not distribute.

Figure 1: The evolution of Mae Bot Yai documentation across three centuries. (Left) Temple mural from 1782 (Center) photograph from 1923. (Right) Cyber Subin Project in 2024

raises a fundamental question: "Can artificial systems achieve authentic engagement with cultural heritage?"

To explore this question, we turn to Thai traditional dance as a critical case study, specifically through the development of Cyber Subin and Open Dance Lab—two systems that encode the fundamental principles of Mae Bot Yai into computational procedures. Rather than attempting to replicate traditional movements perfectly, these systems extract generative principles that can produce both recognizable traditional forms and novel choreographies that extend beyond human physical capabilities. Through this work, we propose Artificial Authentic Intelligence (AAI) as a framework for developing and evaluating AI systems that embody cultural knowledge in ways that maintain legitimacy while enabling transformation. This approach suggests that artificial systems can achieve a form of authenticity measured not by indistinguishability from tradition but by their capacity to maintain cultural essence while enabling evolution.

2 From Sacred Poses to Computational Systems

Mae Bot Yai, the 59 fundamental poses of Thai classical dance, embodies centuries of accumulated cultural knowledge [5, 6]. These movements encode not merely aesthetic preferences but cosmological beliefs, social norms, and spiritual practices. Each gesture carries multiple layers of meaning—a hand position might simultaneously represent a lotus flower and a narrative element from the Ramakien epic. This semantic density makes Mae Bot Yai both a technical foundation for dance training and a compressed archive of Thai cultural memory.

The challenge of preserving this multidimensional knowledge has shaped Mae Bot Yai's evolution across centuries. Temple murals from 1782 captured poses in static visual form, preserving spatial arrangements but losing temporal dynamics. Photographic documentation in 1923 increased detail but maintained the limitation of frozen moments. Film and video in the 20th century restored the temporal dimension but fixed performances to specific interpretations. Each technological intervention both preserved and transformed the tradition, revealing that "pure" transmission has always been mediated by the tools available to each generation.

It was within this context of technological mediation that Pichet Klunchun, one of Southeast Asia's most innovative contemporary choreographers, recognized an opportunity for radical reimagining. Having spent decades deconstructing Thai classical dance for modern audiences—from "I Am a Demon" (2005) to his acclaimed collaboration with Jérôme Bel in "Pichet Klunchun and Myself" (2006), Klunchun possessed a unique ability to see beyond surface forms to underlying structures [7, 8]. His work consistently demonstrated that respecting tradition did not require frozen preservation but could instead involve dynamic reinterpretation.

This philosophy reached its fullest expression in 2017 with "No. 60," a project that crystallized two decades of Klunchun's research into Thai classical dance. Rather than viewing Mae Bot Yai as 59 discrete poses to be memorized and replicated, Klunchun undertook a systematic deconstruction to extract their underlying choreographic logic. Through meticulous movement analysis and creative experimentation, he identified six principles that govern the aesthetic system: Energy (dynamic range

Figure 2: Photographs from the performance "Cyber Subin in 2024

and vitality), Circles & Curves (movement trajectories), Axis Points (pivot references), Synchronous Limbs (coordinated movement), External Body Spaces (negative space geometry), and Shifting Relations (attention direction) [9]. This analytical framework transformed Mae Bot Yai from a fixed canon into a generative system capable of producing infinite variations—including a hypothetical "60th movement" that could extend beyond traditional boundaries.

Klunchun's analytical breakthrough provided the conceptual foundation for our computational approach. In 2024, we conducted motion capture sessions using Perception Neuron suits and Axis Studio, recording dancers performing all 59 Mae Bot Yai poses. This process converted embodied movement into numerical data—3D coordinates, rotation quaternions, and timing sequences. What might have been merely another technological reduction—stripping dance of its human essence—became instead a translation guided by Klunchun's principles. His six-element framework offered a bridge between embodied and computational knowledge, allowing us to encode not just the movements themselves but the generative cultural logic that produces them. This approach suggests that with proper cultural grounding, digital transformation can reveal rather than reduce the complexity of traditional knowledge.

The translation from Klunchun's analytical principles to computational procedures required careful consideration of how to maintain cultural integrity while enabling generative possibility. Each principle became a parametric algorithmic operation that transforms movement data while respecting the underlying logic of Thai dance aesthetics.

For example, Circles & Curves—the aesthetic preference for flowing, non-linear trajectories—transforms into mathematical operations on rotation data. Where human dancers internalize these curves through years of training their bodies to trace circular pathways through space, our system applies Gaussian smoothing, derivative calculations, and frequency domain manipulations to shape angular movements into flowing arcs. The parametric control, adjustable from 0% (completely linear) to 100% (maximum curvature), serves both analytical and generative purposes. It allows us to isolate and examine how even subtle curves contribute to Thai dance's distinctive liquid quality, while also enabling explorations of hyper-curved movements that push beyond traditional boundaries. Through this computational lens, we discover that what appears as effortless flow in performance actually emerges from precise mathematical relationships between sequential positions.

These computational procedures do not attempt to replicate the full complexity of embodied dance knowledge. Instead, they function as "cultural knobs"—transformational rules that maintain essential relationships while enabling variation. This approach prioritizes interpretability over sophistication, ensuring that generated movements remain traceable to traditional principles.

3 The Cyber Subin Ecosystem: Platforms for Artificial Authentic Intelligence

3.1 Cyber Subin

The interdisciplinary collaboration between choreographer Pichet Klunchun and MIT Media Lab researcher Pat Pataranutaporn, supported by technologists and dance practitioners, culminated in Cyber Subin—a performance framework that establishes dialogical spaces between human dancers

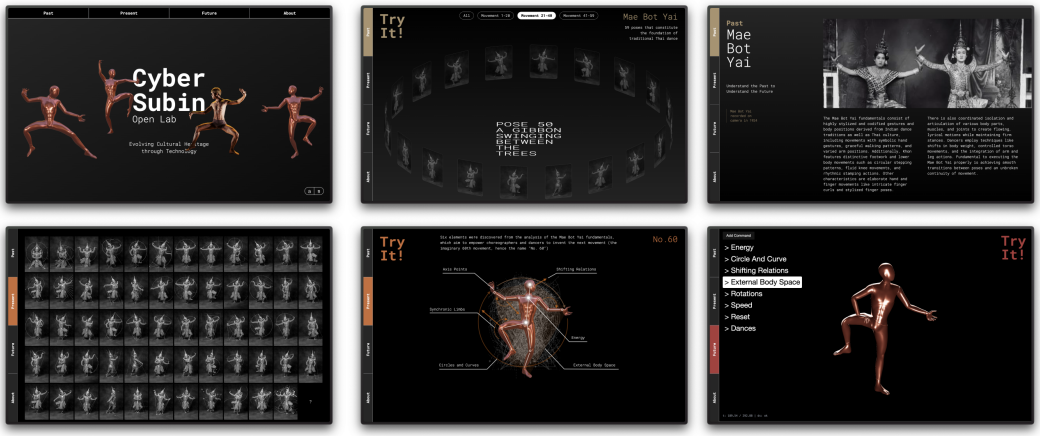

Figure 3: The interface of the Open Dance Lab web platform

and AI-generated virtual partners [10, 11]. Klunchun's six principles were translated into a rule-based AI system that controls virtual avatars through parametric manipulation of movement data. This system employs voice recognition to enable real-time control, permitting dancers to invoke specific computational principles during improvisational sequences. Commands trigger the rule-based system to immediately transform the avatar's movement generation through corresponding algorithmic procedures. These responsive modifications produce choreographic outputs that maintain fidelity to Mae Bot Yai's foundational principles while simultaneously transcending the biomechanical constraints of human embodiment. This human-machine interaction creates what we term "posthuman choreography"—movement vocabularies that exist at the intersection of traditional knowledge and computational possibility.

The premiere performance at Taiwan's National Theatre in March 2024 revealed unexpected forms of authenticity emerging from human-AI interaction. Audience members familiar with Thai dance recognized traditional elements in the virtual character's movements, yet also perceived something unprecedented—a "posthuman Mae Bot Yai" that extended tradition into new expressive territories [12, 13]. Dancers reported complex negotiations with their virtual partners. Initial sessions involved attempting to "lead" the AI, treating it as a responsive tool. As comfort developed, dancers began following the AI's suggestions, allowing computational interpretations to influence their own movement choices. Eventually, a third mode emerged—neither leading nor following but co-creating, where human and machine intelligences generated choreography that neither could produce independently.

3.2 Open Dance Lab

Open Dance Lab translates the Cyber Subin system into an accessible web platform, enabling global engagement with Thai dance principles without requiring specialized hardware or dance training [14]. The platform's three modes—Examining, Experimenting, and Evolving—create graduated pathways from observation through exploration to generation.

The Examining mode reconceptualizes Mae Bot Yai as an interactive 3D archive, enabling users to manipulate viewing angles through rotation and zoom functions while accessing layered expert annotations. This multi-perspectival approach transcends the inherent limitations of traditional video documentation, where fixed camera positions necessarily privilege certain viewpoints over others.

Building upon this foundational understanding, the Experimenting mode transforms passive observation into active engagement by enabling users to manipulate Klunchun's six principles in real-time. Through parametric adjustment and immediate visual feedback, users develop an intuitive comprehension of Thai dance's underlying logic—knowledge that traditionally emerges only through years of embodied practice. This mode effectively democratizes access to tacit choreographic knowledge by making implicit principles explicit and manipulable.

The platform's most radical proposition emerges in the Evolving mode, which invites users to transcend the traditional canon by generating novel choreographies through algorithmic recombination

Figure 4: Participatory engagement with AI avatars across different performances

of principles and poses. Here, users can pursue Klunchun's conceptual challenge of creating the "60th movement"—extending Mae Bot Yai beyond its established boundaries while maintaining fidelity to its generative logic. This system represents not just creative output but an evolving dialogue about tradition's future possibilities, where each contribution potentially influences subsequent iterations.

4 Three Dimensions of Artificial Authenticity

Having established how Cyber Subin and Open Dance Lab translate Klunchun's six principles into computational procedures, we now examine how these systems achieve authentic engagement with cultural heritage through three interconnected dimensions.

First, **depth** emerges through the transmission of embodied knowledge, where computational systems reveal the hidden structures within traditional practice [6, 15]. Working with the system revealed that algorithmic principles could articulate aspects of practice that practitioners had never verbalized—what exists as feeling in the body becomes visible as parametric relationships. The computational model provided a new vocabulary for discussing subtleties that traditionally transmitted only through metaphor and demonstration into precise combinations of parameters. Practitioners found that computational mediation accelerated certain aspects of learning while potentially bypassing others. The ability to visualize and manipulate principles independently helped them understand structural relationships between movements. Yet there is also concern that learning through computation might skip the physical struggle that builds not just technique but character. This tension reveals that artificial authentic intelligence creates alternative epistemological pathways rather than replicating traditional pedagogical journeys.

Second, **legitimacy** arises through community validation and negotiation, as authenticity emerges through recognition by cultural stakeholders rather than declaration [16, 17]. Within Thai communities, computational mediation provides what audiences describe as "permission to play" with traditional forms in new and creative ways. The virtual avatar can explore variations that extend beyond natural human movement, creating an experimental space where tradition meets innovation. This artificial mediation enriches engagement with cultural heritage by offering fresh perspectives on familiar forms. The machine becomes a valued participant in cultural dialogue precisely because of its unique position—its non-human status allows it to explore aesthetic possibilities that complement human performance. Through this computational partner, the Thai dance community discovers expanded ways to celebrate and evolve their tradition while honoring its foundations. The avatar serves not as a replacement for human dancers but as a collaborative tool that opens new creative pathways, demonstrating how technology can respectfully participate in cultural expression.

Third, **resonance** facilitates cross-cultural communication without appropriation through embodied participation rather than passive observation [18, 19]. During Cyber Subin's performance tours in Europe and Asia, international audiences were invited on stage to dance alongside the AI avatar while simultaneously controlling it through voice commands. These participatory moments transformed cultural exchange from one-directional presentation to bidirectional exploration. As audience members moved their own bodies in dialogue with the virtual dancer, they experienced Thai dance principles through physical engagement—the avatar becoming an embodied manifestation of cultural knowledge that, while not perfect, transmitted understanding through movement rather than passive explanation. The joy and curiosity evident in these cross-cultural experiments demonstrated that computational mediation creates genuine resonance through kinesthetic empathy rather than formal

instruction. The AI avatar serves as a cultural bridge—simultaneously Thai and non-Thai, traditional and futuristic—allowing international participants to engage with Mae Bot Yai principles without appropriation concerns. This suggests that artificial authentic intelligence succeeds not through perfect transmission but through creating spaces for meaningful encounter between different movement traditions.

5 Posthuman Choreographies: When Authenticity Transcends the Human

The emergence of choreographies that exceed human biomechanical constraints necessitates a reconceptualization of authenticity itself. If we accept that cultural traditions evolve through technological mediation—from oral transmission to written notation, from live performance to recorded media—then computational generation represents not a break from tradition but its logical extension into posthuman territories. The question shifts from whether AI can preserve culture to how culture transforms with new technological medium.

Posthuman authenticity operates through "algorithmic ancestry", a lineage traced not through human bodies but through computational procedures that maintain fidelity to cultural logic while exploring parameter spaces beyond physical reach. When Cyber Subin's avatar rotates its torso segments independently or performs polychronic compositions with different limbs in different temporal streams, it demonstrates that cultural principles can exist independently of their original embodied constraints. This separation of cultural logic from human limitation reveals tradition as a generative system rather than a fixed repertoire—Mae Bot Yai becomes not 59 poses but infinite possibilities.

This reconceptualization challenges Western notions of authenticity rooted in originality and individual expression. Instead, posthuman choreography aligns with Asian philosophical concepts of authenticity as proper relationship and harmonious pattern. The AI does not create ex nihilo but discovers pre-existing possibilities within the cultural matrix—movements that were always latent in the system but required non-human cognition to actualize. This positions artificial authentic intelligence not as simulation or replacement but as revelation—technology as a lens that makes visible what human perception alone cannot access. The resulting hybrid aesthetics suggest that authenticity in the age of AI emerges not from pure preservation or unconstrained innovation but from the productive tension between cultural continuity and computational possibility.

6 Conclusion: Towards Artificial Authentic Intelligence

This exploration of Thai traditional dance through computational systems reveals that artificial intelligence can indeed achieve authentic engagement with cultural heritage, though not in the ways we might initially expect. The translation of Mae Bot Yai into parametric principles demonstrates that computational mediation can illuminate rather than diminish tradition, providing new vocabularies for tacit knowledge while enabling exploration beyond human physical constraints. When Cyber Subin's avatar performs Klunchun's hypothetical "60th movement," it demonstrates that cultural principles can manifest across different substrates, including computational ones. The implications extend beyond dance to all forms of intangible heritage facing technological transformation. Critical questions remain: How might similar approaches apply to other embodied practices? What ethical frameworks should guide computational interpretation of sacred knowledge? How can democratized access strengthen rather than appropriate cultural heritage? These require continued collaboration between technologists and cultural communities to develop AI systems that respect sovereignty while enabling evolution.

Ultimately, Artificial Authentic Intelligence succeeds by maintaining the essential tension between continuity and change that keeps traditions alive. By encoding cultural principles into computational systems that both honor and extend traditional knowledge, we create not artificial replicas of authentic culture but authentic cultural processes that bridge human wisdom and computational possibility, generating new forms of expression that are simultaneously ancient and unprecedented.

References

[1] Andreas Aristidou, Alan Chalmers, Yiorgos Chrysanthou, Céline Loscos, Franck Multon, J Parkins, Bhuvan Sarupuri, and Efstathios Stavrakis. Safeguarding our dance cultural heritage.

In *Eurographics' 2022*, 2022.

[2] Valeria Lo Iacono and David HK Brown. Beyond binarism: Exploring a model of living cultural heritage for dance. *Dance Research*, 34(1):84–105, 2016.

[3] Maria Skublewska-Paszkowska, Pawel Powroznik, Jakub Smolka, Marek Milosz, Edyta Lukasik, Dilbar Mukhamedova, and Elzbieta Milosz. Methodology of 3d scanning of intangible cultural heritage—the example of lazgi dance. *Applied Sciences*, 11(23):11568, 2021.

[4] Ioannis Rallis, Athanasios Voulodimos, Nikolaos Bakalos, Eftychios Protopapadakis, Nikolaos Doulamis, and Anastasios Doulamis. Machine learning for intangible cultural heritage: a review of techniques on dance analysis. *Visual Computing for Cultural Heritage*, pages 103–119, 2020.

[5] Amolwan Kiriwat. Khōn: masked dance drama of the thai epic ramakien. 2001.

[6] Lowell Skar. Reimagining classical thai dance for the 21st century: The evolution of pichet klunchun's "no. 60". In *Lives in Motion*, pages 65–80. Routledge India.

[7] Jérôme Bel. Pichet klunchun and myself. *J. Bel, & P. Klunchun, Artistas) Bangkok Fringe festival, Banguecoque, Tailândia*, 2006.

[8] SanSan Kwan. Even as we keep trying: An ethics of interculturalism in jerome bel's pichet klunchun and myself. *Theatre Survey*, 55(2):185–201, 2014.

[9] Lim How Ngean. Choreographic modernities: Movement, mobility and contemporary dance from southeast asia. 2014.

[10] Pat Pataranutaporn, Phoomparin Mano, Piyaporn Bhongse-Tong, Tas Chongchadklang, Chayapatr Archiwaranguprok, Lamtharn Hantrakul, Jirach Eaimsa-ard, Pattie Maes, and Pichet Klunchun. Human-ai co-dancing: Evolving cultural heritage through collaborative choreography with generative virtual characters. In *Proceedings of the 9th International Conference on Movement and Computing*, pages 1–10, 2024.

[11] Pat Pataranutaporn, Chayapatr Archiwaranguprok, Piyaporn Bhongse-tong, Pattie Maes, and Pichet Klunchun. Bridging tradition and technology: Human-ai interface for exploration and co-creation of classical dance heritage. In *Proceedings of the Extended Abstracts of the CHI Conference on Human Factors in Computing Systems*, pages 1–6, 2025.

[12] Graham Francis Badley. Human (and posthuman?) dancing: An assemblage. *Qualitative Inquiry*, 26(6):697–702, 2020.

[13] Kaisa Kortekallio. Dancing with the posthumans: Readerly choreographies and more-than-human figures. *Partial Answers: Journal of Literature and the History of Ideas*, 20(2):277–295, 2022.

[14] Chayapatr Archiwaranguprok, Pat Pataranutaporn, Phoomparin Mano, Piyaporn Bhongse-Tong, Pattie Maes, and Pichet Klunchun. Open dance lab: Digital platform for examining, experimenting, and evolving intangible cultural heritage. In *Proceedings of the 24th ACM/IEEE Joint Conference on Digital Libraries*, pages 1–12, 2024.

[15] Iris Kico, Nikos Grammalidis, Yiannis Christidis, and Fotis Liarokapis. Digitization and visualization of folk dances in cultural heritage: a review. *Inventions*, 3(4):72, 2018.

[16] MR Reshma, Balakrishnan Kannan, VP Jagathy Raj, and S Shailesh. Cultural heritage preservation through dance digitization: A review. *Digital Applications in Archaeology and Cultural Heritage*, 28:e00257, 2023.

[17] Rachel Adams. Can artificial intelligence be decolonized? *Interdisciplinary Science Reviews*, 46(1-2):176–197, 2021.

[18] Deborah H Williams and Gerhard P Shipley. Enhancing artificial intelligence with indigenous wisdom. *Open Journal of Philosophy*, 11(01):43–58, 2021.

[19] Matthew Crosston. Cyber colonization: The dangerous fusion of artificial intelligence and authoritarian regimes. *Cyber, Intelligence, and Security Journal*, 4(1):149–171, 2020.