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The Paradox and Approach of the Development of China's Symphony in the Age of Artificial Intelligence

Yun Zhang

Graduate University of Mongolia, Ulaanbaatar, 11000, Mongolia

Abstract: The deep integration of artificial intelligence technology is reshaping the creative paradigm, performance forms, and dissemination logic of China's symphonic music. However, beneath the mainstream narrative of "technological empowerment," there lies a deeper cultural anxiety in the development of China's symphonic music: when the carrier form of Western classical music encounters the expressive demands of China's aesthetic spirit and is further intervened by artificial intelligence, a complex cultural tension arises among the three. Based on empirical investigations of the 2025 World Symphony Beijing Forum, the Major Research Project on Music Artificial Intelligence at the Central Conservatory of Music, and the Shanghai National Orchestra's "Zero·One|China Color" concert, this paper reveals the "triple aphasia" dilemma faced by China's symphonic music in the age of artificial intelligence from three dimensions: creative subjectivity, aesthetic evaluation rights, and cultural discourse power. The study argues that the key to resolving this dilemma lies not in catching up at the level of technical tools, but in achieving a paradigm shift from "technological empowerment" to "cultural reconstruction" -by constructing a Chinese national music corpus, reconstructing the ethical framework of human-machine collaboration in creation, and establishing a localized aesthetic evaluation system-to safeguard the cultural subjectivity of China's symphonic music in the gaps of algorithms.

Keywords: Artificial Intelligence, China Symphony, Cultural Subjectivity, Human-machine Collaboration, Aesthetic Evaluation.

1. Introduction

In December 2025, at the World Symphony Beijing Forum, Sibben Deeter, Executive President of the Philharmonic Orchestra, posed a question to global peers: "In the digital age, should symphony orchestras embrace the digital world to the fullest extent, or should they join the trend of countering mainstream culture and returning to the era of texture?" [1] The reason this question resonated widely lies in its touching upon the fundamental existential anxiety of symphonic art in the digital era. For China's symphony, which is at a critical transition from "Western form, Chinese application" to "cultural self-awareness," this choice appears particularly complex.

The century-long development history of Chinese symphonic music is essentially a cultural adjustment history in handling "Sino-Western relations" [2]. From the early explorations of symphonic nationalization by Xiao Youmei and Huang Zi to the theoretical construction of the "Chinese School" by contemporary composers, Chinese symphonic music has always faced the core proposition of how to express Chinese aesthetic connotations through Western instrumental carriers. When artificial intelligence intervenes in this process as a "creative subject" or "collaborative author," the original binary relationship is broken, replaced by a tripartite entanglement of "Western form-Chinese spirit-global technology." This is both an opportunity and an unprecedented challenge. However, upon examining current research, there is a clear "technical bias" in academic discussions on "AI + music": a large number of papers focus on engineering issues such as algorithm model optimization and generation effect evaluation, while few humanistic reflections remain at the general level of "whether AI can replace humans," with little comprehensive examination of artificial intelligence within the historical context and cultural context of Chinese symphonic music development. This blind spot may lead to a dangerous consequence: while we enthusiastically discuss "how to use AI to create better symphonic music," we forget to ask, "Whose symphonic music is this ultimately?"

Based on this, this paper proposes an analytical framework of "technological empowerment and cultural anxiety", using the landmark AI practices in the field of Chinese symphonic music around 2025 as observation samples. It reveals the structural dilemmas faced by Chinese symphonic music in the era of artificial intelligence from three dimensions: creative subjectivity, aesthetic evaluation rights, and cultural discourse power, and attempts to explore a possible path from "tool application" to "cultural reconstruction".

2. Current Situation: The Three-Dimensional Landscape of AI in Symphonic Music

In recent years, China's layout in the field of music artificial intelligence has shown an accelerating trend from "following" to "running side by side". Since the establishment of the Department of Music Artificial Intelligence and Music Information Technology at the Central Conservatory of Music in 2019, artificial intelligence has been identified as a strategic direction for disciplinary development [3]. The major project of the National Social Science Fund of China approved in 2025, "Theoretical Research on the Collaborative Innovation and Development of Music and Artificial Intelligence", further marks the entry of this field into the stage of systematic theoretical construction. Under this macro background, the intervention of artificial intelligence in Chinese symphonic music has formed observable practical landscapes in three dimensions: creation, performance, and dissemination.

2.1. Creative Dimension: From Auxiliary Tools to Collaborative Authors

The world's first AI symphonic variation "Me and My Motherland", created by China Ping An AI Research Institute in 2019, was an early milestone in China's AI symphonic composition. The work employed the AVM automatic variation system, using over 700,000 musical pieces as training data, and completed the symphonic composition covering five variation sections through deep reinforcement learning. Although this attempt still had the nature of a "technical demonstration", it conclusively proved that artificial intelligence has the capability to process multi-part, lengthy, and complex-structured symphonic genres [4].

More academically significant is the pioneering work of the Central Conservatory of Music team. The SymphonyNet model established by Liu Jiafeng, a doctoral student at the university, and his team is the world's first deep learning-based symphony generation model without predefined constraints. Its proposed 3D positional encoding feature representation and musical notation sequence aggregation algorithm significantly outperform existing models in subjective evaluation metrics such as coherence and novelty. Professor Li Xiaobing, the project's chief expert, revealed at the "Future Music Symposium" that the research group has achieved verifiable results in symphony generation, automatic orchestration, and performance motion capture. Notably, the "Zero·One|China Color-Traditional Chinese Music and AI Concert" jointly launched by the Shanghai National Orchestra and Tencent Music's Tianqin Lab in 2024 marked the transition of AI creation from "technical validation" to the "artistic practice" phase. This world's first AI-based traditional Chinese music concert, using China's traditional color system as its cultural motif, was collaboratively created by musicians and AI-AI generated the initial version based on cultural keywords set by experts, followed by secondary revisions after six full rehearsals. This "human-machine co-creation" model, along with the "triple co-creation" (AIGC-led efficiency, public input for vitality, and professional musicians serving as curators and gatekeepers) proposed by Li Xiaobing's team at the Central Conservatory of Music, forms a dual validation of theory and practice.

2.2. Performance Dimension: Reconstructing the Boundaries of Human-Machine Relationship

In the performing arts, AI is redefining the professional boundaries between "performers" and "conductors." The 2024 opening ceremony of the Central Conservatory of Music saw a groundbreaking performance by a "robotic conductor symphony orchestra," which garnered widespread attention. Utilizing motion capture, semantic modeling, and stage synchronization technologies, the system enabled robotic arms to mimic and collaborate with human conductors. Meanwhile, the Cable-Driven AI robot developed by Stardust Intelligence [5], employing a "harmonious blend of rigidity and flexibility" in its muscular bionic design, has formed the "Xiao Yang Robot Band" and completed tours across multiple regions in China.

Digital twins and holographic technology further blur the boundary between physical and virtual presence. The holographic concert by the Swiss Romande Orchestra was a pioneer in this field, and its experience has also drawn attention from China's peers. Domestically, experimental projects such as metaverse concerts and virtual instrumental modeling have been added to the research team's list of achievements. These technological practices collectively point to a fundamental question: when the baton can be precisely held by a robotic arm and the timbre of instruments can be perfectly simulated by algorithms, does the presence of "human" on stage still hold irreplaceable value?

2.3. Communication Dimension: Audience Reformation in the Algorithmic Era

Digital technology has revolutionized the dissemination of symphonic music across all dimensions. The Singapore Symphony Orchestra's digital transformation serves as a prime example: since launching its digital media roadmap in 2020, the orchestra's video platform has seen its subscriber base triple and viewing time quintuple. Meanwhile, the Radio France Orchestra's observations highlight a paradox of the streaming era-while classical music's audience has grown exponentially, the ability for 'deep listening' has paradoxically declined [6].

In the context of China, the digital dissemination of symphonic music exhibits stronger "platformization" characteristics. Short video platforms such as TikTok and Bilibili have become the main battleground for symphony orchestras to "break through" and reach young audiences, with the phenomenon of "digital China-fashion" being a typical example. However, while algorithmic recommendation mechanisms achieve precise targeting, they also create new divisions: can audiences accustomed to 3-minute "symphony hits" clips still return to the 40-minute symphony suite listening experience [7]?

3. Deep Dilemma: Threefold Aphasia Under the Technology

If the above landscape depiction remains confined to the one-sided narrative of "AI-enabled symphony," it obscures the complexity of the issue. Beneath the surface of technological advancement, China's symphony is experiencing three interrelated cultural aphasia-not a "failure to speak" due to insufficient technical capability, but rather a "lack of knowledge on how to speak" caused by the loss of cultural identity [8].

3.1. Creation Aphasia: The Inertia of "Western Centrism" in Corpus

Artificial intelligence creation relies on training data. Currently, the mainstream global music generation models primarily use Western classical-romantic symphonic literature from Bach and Beethoven as their training corpus. Although the Central Conservatory of Music team has open-sourced large-scale symphonic MIDI datasets, the model architecture still adheres to the underlying logic of the Western functional harmonic system. This means that AI-generated "symphonies" inherently carry the temporal, harmonic progression, and structural thinking of Western musical grammar. The issue is not that AI "resembles the West," but that when AI is used to create "China symphonies," the core grammar of Chinese music-linearly unfolding melodic thinking, timbral aesthetics centered on "tone cavities," and the interplay of reality and void in artistic conception-is marginalized due to the difficulty of representation by existing models. In the "Zero·One|China

Color" project, the Shanghai National Orchestra specifically hired experts in traditional Chinese music and aesthetics for cultural interpretation, using manual intervention to "make up for" AI's shortcomings, which paradoxically highlights the systemic estrangement of existing AI systems from the vocabulary of Chinese music. A deeper crisis lies in the fact that when a generation of young composers becomes accustomed to using AI as a creative partner, Western musical grammar will, through the dual cycle of training data and generated results, unconsciously "discipline" Chinese composers. This is not a technical issue, but a cultural-political one [9].

3.2. Evaluation of Aphasia: The Dilemma of "Double Standards" in Aesthetic Measurement

Current evaluations of AI-generated music predominantly exhibit a tendency toward "technological metric worship." In SymphonyNet's assessment, researchers employed subjective criteria such as coherence, originality, and structural integrity, inviting listeners to conduct blind comparisons between AI-generated and human-composed music. While this framework appears objective, it implicitly presupposes an unexamined premise: AI creations should be deemed successful only if they approach the "standard of professional human composers," with the archetype of such "human composers" still being the aesthetic paradigm established by Western symphonic music history.

Wang Cizhao, former president of the Central Conservatory of Music, acutely pointed out this dilemma. He warned that the "formal precision" generated by algorithms could lead to "aesthetic emptiness" -AI can achieve impeccable technical indicators such as harmonic progression and thematic development, yet it cannot produce truly culturally meaningful aesthetic expressions. The more challenging issue is: when AI works compete with traditional works, what criteria should we use for evaluation? Should it be "whether it resembles Beethoven" or "whether it has a China flavor"? The former has mature quantitative indicators, while the latter lacks an operational evaluation system.

This double standard of evaluation scales is particularly prominent when it comes to works involving ethnic styles. The research team from the Central Conservatory of Music on the automatic recognition of China's ethnic pentatonic modes, although establishing the CNPM dataset and achieving a high recognition accuracy rate, still focuses on "making AI understand China's music" rather than "making AI create China's music." A cultural hermeneutic gap exists between understanding and creation [10].

3.3. Identity Aphasia: Confusion of the Functions of Cultural Institutions

Amid the technological revolution, symphony orchestras are redefining their roles. At the 2025 World Symphony Forum in Beijing, the global community agreed that 'technology serves as a tool, not an end in itself.' Yet this consensus remains theoretical, leaving orchestras perplexed in strategic implementation: Should they preserve traditional culture or pioneer technological experimentation? Should they invest in developing proprietary AI systems or outsource technical operations to tech firms? These choices demand systemic adjustments in resource allocation, talent structure, and evaluation criteria.

The unique predicament of the China National Symphony Orchestra lies in its triple mission: inheriting the cultural legacy of Western symphonic music, exploring innovative expressions of China's national symphony, and responding to the call of the era for the national cultural digitalization strategy. The intervention of AI technology has not resolved the inherent tension within these three missions, but rather made them more explicit. When the Shanghai National Orchestra won 43 million topic views with its "world's first AI Chinese music concert," there were hidden concerns behind the applause: will the next work still rely on the expensive model of "AI composition + expert polishing"? As the public expects AI to become the orchestra's "resident composer," can the orchestra still adhere to the pursuit of originality and uniqueness?

4. Cultural Analysis: The Essential Conflict Between Technological Logic and Cultural Logic

When examining these dilemmas from a broader theoretical perspective, their root cause lies in the fundamental clash between technological logic and cultural logic [11].

4.1. Decontextualization of Algorithms and Cultural Locality

The fundamental approach of artificial intelligence in processing musical information is feature extraction and pattern recognition. This process inherently exhibits a tendency to "decontextualize": the timbre of the erhu is transformed into spectral features, the melodic lines of Kunqu opera are deconstructed into melodic contours, and the harmonies of bianzhong are sampled as audio materials. From an algorithmic perspective, Jiangnan silk and bamboo music and German-Austrian symphonies are not fundamentally different-they are both training data resources. However, the aesthetic essence of China's music lies precisely within the "context." The tradition of "transcribing" guqin grants performers the rights of creators, the aesthetic pursuit of "echoes in the empty valley" rejects precise pitch quantification, and the creation of artistic conception through the interplay of reality and illusion relies on the synchronous presence of performers and listeners. These cultural genes, which cannot be represented by algorithms or encapsulated in datasets, face the risk of systematic obfuscation in the AI-dominated creative ecosystem.

4.2. Value Conflict between "Efficiency First" and "Slow Inheritance"

The fundamental logic of AI technology prioritizes efficiency. Achievements like composing a song in 23 seconds or generating symphonic variations within minutes starkly contrast with the core values of symphonic art. The reason symphonies stand as treasures of human musical civilization lies not in their replicability, but in their embodiment of composers 'lifelong experiences, musicians' decades of technical refinement, and orchestras' seamless coordination through countless rehearsals. Sergei Doni, President of the Bavarian State Opera, noted in his forum speech: "Contemporary music art bears a dual mission-first, innovating audience engagement; second, preserving the social and spiritual essence of live performances." This reminds us that while embracing technological efficiency, we must preserve space for "inefficient" cultural practices-slow,

meticulous creative cycles, performance training that prioritizes depth over speed, and deep listening that rejects fragmentation [12].

4.3. "Subjectivity Anxiety" as the Theoretical Implication of China's Issues

The tension between "technological universalism" and "cultural particularism" is not unique to China, but the response of Chinese symphonies carries special theoretical implications. Indian classical music can choose to "non-participate" when facing AI-because it possesses a complete musical system independent of the West; European symphony orchestras are in a "native language state" when confronting AI-technology is an extension of their own culture. However, Chinese symphonies find themselves on a double edge: they must address the historical tension between Western paradigms and local expressions, while also responding to a new round of collisions between global technology and national culture. This "middle-ground state" determines that the AI practices of Chinese symphonies cannot simply apply Western experiences. The question we need to answer is not the universal one of "how symphonies survive in the AI era," but rather the particular one of "how Chinese symphonies become themselves in the AI era."

5. Strategy Construction: From "Technology Empowerment" to "Cultural Reconstruction"

5.1. Cultural Foundation: Building the "China National Music Corpus"

Data is the cultural infrastructure of the AI era. Currently, China's music AI research heavily relies on overseas open-source datasets, which are preset with Western music as the default in terms of instrument timbre, modal systems, harmonic vocabulary, and structural thinking. The fundamental way to change this situation is to build a national-level "China National Music Corpus". This corpus should not be a simple pile of sound data, but should include three levels: first, the audio layer, covering high-quality recordings of various ethnic instruments, opera singing styles, and folk music genres; second, the symbolic layer, containing structured information such as musical scores, modes, and forms; third, the semantic layer, annotating the cultural connotations, aesthetic features, and historical context of the works. Professor Huang Zongquan from the Central Conservatory of Music pointed out that large-scale data collection and annotation work is the foundation of AI development and the key to China's music AI achieving a "leapfrogging" in the field. This project requires cross-departmental collaboration: the Ministry of Culture and Tourism will coordinate, professional music colleges will undertake the establishment of academic standards, the National Art Fund will provide special funding, and symphony orchestras and national orchestras will contribute performance resources.

5.2. Evaluation Revolution: Constructing a Three-dimensional Model of "Technology-Art-Culture"

The key to resolving the aphasia of aesthetic evaluation lies in breaking the "monism of technical indicators" and establishing a multi-dimensional, hierarchical evaluation system. This paper proposes a three-dimensional evaluation model of "technology-art-culture" as a tentative framework: the technical dimension assesses the engineering implementation level of AI systems, including indicators such as generation efficiency, structural integrity, and acoustic realism. The artistic dimension evaluates the aesthetic quality of the work, inviting professional musicians to conduct subjective evaluations from perspectives such as melodic individuality, harmonic color, and orchestration imagination. The cultural dimension assesses the Chinese characteristics of the work, with sub-items including the use of ethnic musical vocabulary, expression of traditional cultural spirit, and projection of contemporary life emotions. It is important to emphasize that the three-dimensional model is not a parallel listing but should establish the "veto power" of the cultural dimension-no matter how high the technical indicators or how proficient the artistic techniques of a work are, if it fails to reflect the pursuit of the subjectivity of Chinese symphonic music in the cultural dimension, it should not be included in the evaluation scope of "Chinese symphonic AI creation." The establishment of this principle has guiding significance for directing research directions and standardizing creative practices.

5.3. Ethical Reset: AI as a "Folk Musician" rather than a "Court Musician"

In the history of China's music, there are two archetypes of music producers: court musicians who oversee elegant music, pursuing norms and rituals; and folk musicians who thrive in urban and rural areas, preserving improvisation and vitality. The current mainstream AI research path positions technology as a "super musician" -attempting to algorithmically summarize all creative rules and generate standardized musical scores applicable to everyone. This orientation deviates from the essence of artistic innovation. This article advocates resetting AI's role from "court musician" to "folk musician." This means AI should not seek to replace composers as the primary creative force but rather become a conversational partner that inspires creativity and an experimental collaborator that expands imagination. The six rehearsal revisions by the Shanghai National Orchestra provide a referenceable operational paradigm-AI offers material prototypes, and human musicians complete genuine compositions based on them. The "human-machine collaboration" concept advocated by Professor Yu Feng's team at the Central Conservatory of Music should also deepen understanding at this ethical level.

5.4. Institutional Support: Talent Cultivation and Institutional Transformation

The implementation of policy measures requires institutional safeguards. In talent development, establishing a "Music AI and Interdisciplinary Creation" program in music conservatories would break down disciplinary barriers between computer science and composition departments, cultivating interdisciplinary talents with both technical expertise and humanistic literacy. The Central Conservatory of Music's doctoral training model in Music AI (co-guided by Tsinghua University) could serve as a replicable model. For institutional transformation, major symphony orchestras should create positions like "Digital Creative Director" or "AI Art Consultant," filled by professionals with artistic vision and technical proficiency to oversee digital strategies, AI project planning, and technical collaborations. This initiative

elevates technical decision-making from administrative tasks to artistic decisions, ensuring technology serves artistic objectives rather than replacing artistic judgment.

6. Conclusion

The symphony of China in the era of artificial intelligence stands at a dual crossroads. Horizontally, it must safeguard cultural individuality amidst the global wave of technological homogenization; vertically, it must reserve space for "useless aesthetics" and "slow inheritance" within the algorithmic logic that prioritizes efficiency. These two dimensions of choice collectively determine the future form of China's symphony. The core judgment of this article is that the greatest challenge posed by artificial intelligence to China's symphony is not technological backwardness, but cultural aphasia. To resolve this dilemma, we should not rely on developing algorithms that "better understand China" - technical problems have their own solutions, but the real challenge lies in whether we possess the cultural awareness to define the problem. When we ask "Can AI create China's symphony?", the first question to clarify is: What is the "China symphony" we are willing to acknowledge? Is it a hybrid of Western symphonic forms and Chinese melodic materials, or an art form that re-emerges from aesthetic roots? The answer to this question lies not in iterative versions of algorithms, but in the daily practices of every composer, performer, educator, and manager. Technology can generate notes, but it cannot replace human responsibility for cultural inheritance. As the consensus echoed at the World Symphony Beijing Forum: no matter how technology evolves, concert halls remain the "spiritual haven" of the digital age. And China's symphony practitioners should be more acutely aware that what we need to protect is not just the ritual of listening, but a cultural subjectivity that has been repeatedly squeezed by algorithmic logic yet persists tenaciously.

This may well be the most precious gift that artificial intelligence has bestowed upon China's symphony-through the profound entanglement with technology, we are compelled to re-examine those long-put-aside fundamental questions: What is tradition? What is creation? What is "China"? And the sincere responses to these questions will shape the spiritual portrait of China's symphony for the next century.

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