

A Study on the Cross-linguistic Reconstruction of Imagery in Chinese Classical Poetry by Artificial Intelligence: A Case Study of the "Pine" Imagery

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Abstract. In recent years, the rapid development of generative artificial intelligence (Generative AI) has brought new momentum to literary creation and cross-cultural communication. However, its widespread use in language generation and text reconstruction has revealed limitations in conveying Chinese traditional culture across languages—such as misinterpreting cultural context, lacking aesthetic depth, and oversimplifying poetic imagery. Understanding how AI can accurately reconstruct classical Chinese poetic imagery across languages is therefore of both theoretical significance and practical value. This paper examines the "pine" imagery in classical Chinese poetry to assess Generative AI's ability in linguistic transformation and cultural representation in translation. Through case analysis and by drawing on literary translation theory, this study evaluates AI-generated translations in detail. Findings show that AI excels in semantic accuracy, fluency, and translation efficiency, but falls short in capturing cultural nuance, poetic rhythm, and contextual appropriateness. The study concludes that AI is best used as a supportive tool rather than a replacement for human translators in deep interpretation and creative expression. Future research could analyze more types of imagery, develop a broader framework for cross-linguistic reconstruction, and explore human-AI collaboration models to better integrate technology and culture.

Keywords: Generative AI, Chinese classical poetry, Literary imagery, Cross-linguistic reconstruction

1. Introduction

The rapid advancement of Generative AI has driven transformative changes in natural language processing, machine translation, and cross-cultural communication. Large language models like ChatGPT, Gemini, and Claude, which are robust semantic understanding and text generation capabilities—are widely applied in education, creative writing, information processing, and cross-linguistic literary dissemination. In literary studies, especially in classical poetry analysis, Generative AI can swiftly identify, restructure, and generate textual content, expanding digital methodologies for classical literary research. Current AI-literature research focuses on two areas: AI's technological applications (e.g., language generation, semantic alignment) and its role in

cultural dissemination (e.g., facilitating global traditional culture transmission). Guzman and Lewis note Generative AI's potential to reshape textual structures and boost cross-cultural communication efficiency, yet it carries risks like contextual misinterpretation and cultural "alienation" [1]. Ooi et al. highlight AI's role in enhancing literary creation/translation productivity while prompting reevaluation of language technology and cultural expression [2]. Chakraborty et al. observe AI often reduces traditional texts' emotional resonance and cultural richness in global contexts, leading to "cultural flattening" [3]. However, existing studies have limitations: 1) they emphasize AI's functional role in literary creation but neglect micro-level analysis of specific imagery; 2) few studies systematically explore linguistic inconsistencies and cultural misinterpretations in AI's cross-linguistic reconstruction of classical poetic imagery [4, 5]; 3) there is a lack of in-depth theoretical analysis, particularly from a cross-cultural communication perspective, regarding AI-generated text limitations and their causes [6, 7]. Thus, examining Generative AI's performance in cross-linguistic processing of Chinese classical poetry imagery advances both technological development and digital literary studies. This paper takes the "pine" imagery (a frequent symbol in classical Chinese poetry) as a case study, using multi-dimensional analysis of AI-generated translations to uncover imagery reconstruction mechanisms and cultural deviations, providing theoretical and practical guidance for integrating AI with traditional literary heritage. Chapter 2 examines AI's current capabilities and limitations in processing classical poetry. Chapter 3 explores the opportunities and challenges AI presents for classical poetry processing. Chapter 4 investigates methods to optimize AI performance in classical poetry translation. This study combines qualitative analysis with case studies to construct a corpus of classical Chinese poetry from the Tang and Song dynasties, using the imagery of "pine trees" as an exemplar. Applying a translation theory framework, we conduct a multi-dimensional comparative analysis of cross-language translations generated by ChatGPT and Gemini. This study not only reveals the strengths and limitations of AI in reconstructing poetic imagery, providing empirical evidence for model optimization, but also emphasizes the necessity of maintaining a balanced human-machine collaboration in literary translation, promoting the deep integration of technological innovation and cultural preservation.

2. The current state of AI in handling classical poetry

Generative AI has advanced rapidly, enabling it to process classical poetry across languages, particularly in the areas of semantic analysis and language generation. However, its capabilities are limited and accompanied by notable drawbacks.

2.1. Strengths

Generative AI demonstrates remarkable advantages in cross-linguistic translation of classical Chinese poetry. First, with regard to surface-level semantic recognition and text generation, large-scale language models exhibit outstanding performance. Pre-trained language models are capable of effectively capturing contextual meanings and displaying strong transferability in few-shot learning. This finding provides theoretical support for explaining why such models can accurately grasp the literal meaning of poetic imagery, such as the "pine," in translation tasks [8]. For instance, when processing the line "Only in the severe cold do we see the pine and cypress stand firm," AI models can preserve the connotation of resilience and endurance, ensuring that the symbolic meaning is retained across languages.

Second, AI produces natural and coherent outputs that align with the reading habits of international audiences. This fluency not only enhances the accessibility of classical poetry but also

enables non-specialist readers to appreciate its imagery more readily. Furthermore, the efficiency and multilingual capabilities of AI enable researchers to process and analyze large-scale poetic corpora within a short period, thereby accelerating research progress and broadening the scope of literary studies. In this way, AI's strengths in classical poetry translation extend beyond the technical dimension, offering new opportunities for the global dissemination of traditional Chinese literature.

2.2. Weaknesses

Despite their fluency, AI models struggle with capturing the profound cultural depth of classical poetry. They often prioritize literal accuracy at the expense of symbolic resonance. For instance, the image of “松风” (pine wind) in Chinese tradition evokes solitude and refined tranquility. Xu Yuanchong renders it as “The pine wind loosens my belt”, embedding a sense of elegant detachment. By contrast, AI systems tend to produce formulaic outputs such as “The wind of the pine loosens my belt”, which, while semantically correct, lacks poetic rhythm and cultural allusion. Similarly, for the phrase “高山流水” (lofty mountains and flowing water), Xu's translation conveys a refined metaphor of friendship and harmony, whereas AI often reduces it to “high mountains and flowing waters,” thereby missing the intertextual richness. These limitations result in translations that are repetitive, emotionally muted, and stylistically prosaic, failing to reproduce the aesthetic and cultural subtleties essential to classical Chinese poetry.

3. Opportunities and challenges

Generative AI has created significant technological opportunities for the cross-linguistic processing of classical Chinese poetry, though it also introduces cultural challenges.

3.1. Opportunities

AI technology is accelerating the global dissemination of Chinese classical poetry. Its rapid translation capabilities enable poems to be rendered into multiple languages within seconds, thereby breaking through linguistic and geographical barriers. This greatly expands international readership and enhances the global visibility of Chinese cultural heritage. More importantly, AI provides powerful tools for academic research. For instance, scholars can use AI-generated preliminary translations to construct parallel corpora, facilitating comparative studies of poetic imagery across languages. Generative AI has opened new avenues for analyzing how imagery is reconstructed cross-linguistically, thereby enriching literary research [9]. In addition, AI demonstrates promising applications in education. In classrooms focused on cross-cultural exchange, AI-assisted translation helps students grasp the symbolic meaning of poetry more efficiently, functioning as an effective pedagogical aid.

3.2. Challenges

Nevertheless, AI faces significant challenges in translating classical poetry. A major concern is cultural flattening. AI models often reduce complex cultural imagery to surface-level meanings, thereby diminishing the depth of literary expression. For example, while the “pine” symbolizes endurance and transcendence in Daoist philosophy, AI commonly translates it simply as “pine tree,” overlooking its cultural symbolism. In a corpus-based study of Shakespeare's plays, it was noted that neural machine translation tends to be formulaic and lacks creativity, often failing to preserve the poetic force of the original [10]. Another weakness lies in AI's inability to fully adapt to context.

Because it relies on statistical patterns, it struggles with ambiguous terms, metaphors, and intertextual allusions. It has also been emphasized that translation must achieve dynamic equivalence across contexts, yet AI output frequently remains literal and neutral in tone [11]. As a result, its renderings of classical poetry are prone to errors, stylistic monotony, and a lack of emotional resonance, thereby limiting their literary quality.

4. Optimization directions

To address the limitations of generative AI in translating classical poetry, researchers and developers are exploring ways to improve its cultural sensitivity and artistic expression.

4.1. Model optimization and corpus expansion

One concrete step to improve AI translation of classical poetry is the systematic expansion of parallel corpora. Instead of relying solely on bilingual dictionaries or existing machine translations, future corpora should include authoritative English versions by translators such as Xu Yuanchong, annotated editions with cultural notes, and critical essays on poetics. For example, pairing lines like “岁寒,然后知松柏之后凋也” with annotated commentaries on Confucian resilience can train models to associate “pine” with moral steadfastness rather than a botanical entity. Optimizing model parameters should also prioritize rhythm and parallelism, which are key to Chinese verse. Interdisciplinary integration is crucial: embedding Wang Guowei’s Theory of the Artistic Realm or Ye Jiaying’s insights on tonal harmony into training data would help AI internalize aesthetic principles. By combining natural language processing with literary theory, AI systems could learn not just to decode meaning, but also to render cultural symbolism with stylistic fidelity.

4.2. Human-machine collaborative translation

Given AI’s limitations in cultural interpretation, a hybrid workflow is necessary. A “human-in-the-loop” model enables AI to provide rapid draft translations, while literary scholars refine them for cultural nuance and rhetorical elegance. For instance, if AI renders “松风” as “pine wind,” scholars can reshape it into “the breeze through pines,” restoring poetic cadence. Practical tools include prompt engineering tailored to poetic registers: prompts emphasizing metaphor, rhythm, or cultural imagery can nudge AI toward stylistically richer drafts. In practice, AI could pre-translate large corpora of Tang and Song poetry, after which experts selectively intervene in passages dense with allusions or layered symbolism. This reduces repetitive human labor while preserving interpretive authority. By combining AI’s efficiency with human creativity, translation outcomes achieve a balance between speed and quality, offering culturally sensitive renditions that remain faithful to both the text and its aesthetic spirit.

5. Conclusion

This study has examined the performance of Generative AI in the cross-linguistic reconstruction of classical Chinese poetic imagery, using the “pine” as a representative case. The findings reveal that while AI demonstrates significant strengths in semantic accuracy, fluency, and translation efficiency, it consistently falls short in capturing cultural nuance, poetic rhythm, and contextual depth. AI-generated translations often prioritize literal meaning over symbolic resonance, resulting in outputs that lack the aesthetic and emotional richness inherent in classical Chinese poetry. The analysis underscores that AI is best utilized as a supportive tool rather than a replacement for human

translators, especially in tasks demanding deep cultural interpretation and creative expression. The proposed human-machine collaborative model—where AI generates initial drafts and human experts refine culturally dense passages—offers a balanced approach that leverages both technological efficiency and literary sensitivity. Such a model not only mitigates the risk of cultural flattening but also preserves the interpretive authority of human translators, ensuring that translations remain faithful to both the text and its artistic spirit.

However, this study has its limitations. The scope is confined to the “pine” imagery, which may not fully represent the diversity of classical Chinese poetic imagery. Additionally, the analysis is based on a limited set of AI models and may not generalize to all generative AI systems. Future research should expand the range of imagery analyzed, incorporate more AI platforms, and explore the integration of domain-specific literary theories into AI training frameworks to further enhance cross-linguistic and cross-cultural translation quality.

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