

A Study on Semantic Default of Culture-Loaded Words in Intangible Cultural Heritage Folk Songs Empowered by AI

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Abstract: Taking culture-loaded words in intangible cultural heritage (ICH) folk songs as the research object, this paper explores the semantic default phenomenon in artificial intelligence (AI) translation. Based on Nida's Functional Equivalence Theory, this study focuses on ICH folk songs in northern and southern China, and analyzes translated examples of material culture-loaded words, social relation culture-loaded words, and ideological and philosophical culture-loaded words with representative works such as *The Sun Rises Joyfully* and *Going to the West Gate*. Taking DeepSeek as a case, the analysis finds that AI encounters difficulties in processing various types of culture-loaded words: due to the lack of cultural background and lexical gaps, the translated versions fail to effectively convey cultural images, emotional connotations, and aesthetic experiences. To improve the quality and efficiency of AI translation, this paper proposes to enhance AI's ability to recognize and extract cultural elements by constructing a high-quality cultural corpus.

Keywords: Artificial intelligence; Intangible cultural heritage folk songs; Culture-loaded words; Semantic default

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1. Introduction

Against the background of Chinese culture "going global," as an important carrier of Chinese culture, Chinese intangible cultural heritage (ICH) folk songs have become a key part of international communication with their distinct nationality, regionality, and artistry. With profound connotations, they are rich in culture-loaded words; dialects and slang highlight linguistic diversity, while rhythm and imagery pose translation difficulties in bilingual conversion. Chinese culture-loaded words are the concentrated embodiment of traditional Chinese culture and the most core external form of traditional culture ^[1]. Therefore, the translation of culture-loaded words plays an irreplaceable role in the translation of ICH folk songs, and its quality directly affects the effect of cultural communication ^[2].

Meanwhile, with the integrated development of artificial intelligence (AI) technology and various

industries, AI provides convenience for human translators with its high efficiency. However, due to technical defects and limitations, a large number of culture-loaded words in ICH folk songs have not been accurately translated. AI causes massive semantic loss in the translation process, and minimizing such loss is the goal pursued by translation ^[3]. Therefore, taking DeepSeek as an example, this study aims to improve the efficiency of AI translation, minimize the distortion of AI translation in the rendering of culture-loaded words, facilitate subsequent manual fine-proofreading, and benefit the dissemination of ICH folk songs.

2. Core theory

Proposed by Nida in 1969, Functional Equivalence Theory holds that the primary task of translation is to achieve functional equivalence, that is, target-text readers should obtain similar understanding and emotional experience as source-text readers. He argued that translation consists in reproducing in the receptor language the closest natural equivalent of the source-language message, first in terms of meaning and secondly in terms of style ^[4]. This theory shifted translation from traditional “word-for-word correspondence” to “functional equivalence,” paying more attention to readers’ reading experience and reflecting the communicative nature of translation.

Folk songs are a form of music orally handed down among the people with strong ethnic characteristics. The principle of good folk song translation is loyalty to the music. The translated lyrics should not only convey the thoughts, emotions, and artistic conception of the original lyrics, but also integrate with the original music to be “recitable, singable, and listenable.” The equivalence of aesthetic experience requires that folk song translation attaches importance to the use of unique rhetoric such as puns and metaphors, the philosophical thoughts conveyed, and loyalty to the music itself ^[5]. To make folk songs understandable to more people, translation should be guided by functional equivalence to achieve multi-dimensional equivalence in utensils, concepts, social relations, and other aspects, so that target-text readers can obtain similar emotional experience and cultural association as source-text readers. Specifically, folk song translation under the guidance of Functional Equivalence Theory should accurately convey utensil forms, tool purposes, and the lifestyles behind them; faithfully present social relations, kinship terms, and etiquette norms in the text; and comprehensively use formal equivalence and dynamic equivalence to build a bridge between culture-loaded words and target-language audiences ^[6].

3. Semantic default of AI translation of culture-loaded words in folk songs

3.1. Translation of material culture-loaded words

The significant differences between Chinese and Western civilizations are rooted in production modes. Ancient China was dominated by self-sufficient small-scale peasant economy, which gave birth to a large number of proper nouns referring to farm tools, as reflected in folk songs depicting people’s lives. Utensil and food vocabulary in folk songs often become difficulties in AI translation, and their cultural connotations are hard to be fully conveyed.

Take the line “carrying a shoulder pole up the hill” from Sichuan work song *The Sun Rises Joyfully* as an example. A shoulder pole is a bamboo or wood tool for manual handling in Chinese agricultural society, while medieval Europe mostly relied on livestock for loading, so there is no equivalent in Western history. DeepSeek translates it as “load,” which conveys the meaning of carrying but eliminates the form feature of

the shoulder pole; the literal translation “shoulder pole” enables English readers to associate a slender pole carried on the shoulder, forming a cultural association closer to the original meaning.

Food culture-loaded words also face mistranslation risks. In the Shanghai folk song *Little Boy*, DeepSeek translates “niangao” (New Year rice cake) as “New Year cake.” Although it indicates the festival background, the solidified impression of “cake” in the Western context easily misleads readers to associate it with Western desserts. In contrast, “niangao” included in the Oxford English Dictionary is a more respected translation in academia, retaining its cultural specificity.

Clothing imagery in folk songs is also a cultural carrier. Take the line “Grandpa taught me to wear a straw rain cape” from Hakka folk song *Rainy Day* as an example. A straw rain cape, a grass-woven rain gear, is a typical image of farmers in traditional agricultural society. Since getting wet in the rain is mostly regarded as an act of being close to nature in Western culture, rain gear is less frequently used, so there is no fully corresponding item.

DeepSeek translates “straw rain cape” as “straw-cloak.” Although the material is reflected by the compound word, “cloak” is inaccurate to refer to its form. According to the Collins Dictionary, a “cloak” is a loose sleeveless outer garment reaching the ankles, while a “cape” is a short cloak reaching the waist. Referring to the standard style recorded in *Three Illustrations* in the Ming Dynasty, the length of a straw rain cape is more consistent with a “cape.” Therefore, translating it as “straw-cape” is more appropriate, retaining both material features and accurately conveying its length.

In summary, there are systematic lexical gaps between China and the West in utensils and clothing due to different production modes. Translation is needed to bridge the gaps and optimize with theories to promote cross-cultural understanding ^[7]. Wang also pointed out that AI has semantic default in processing material culture-loaded words such as “Huizhou merchant spirit” ^[8]. At present, DeepSeek misselects words for proper nouns without English equivalents, failing to match semantics accurately like human translators. As a result, the translation dilutes the traditional Chinese living scenes inherent in culture-loaded words, and readers cannot perceive the basic outline of utensils.

3.2. Translation of social relation culture-loaded words

Folk songs are rooted in life, and colloquial communicative lyrics often contain social culture-loaded words such as “a ge” (elder brother) and “a mei” (younger sister). Take the line “Brother, you go to the West Gate; little sister, I really can’t keep you” from Shanxi folk song *Going to the West Gate* as an example. DeepSeek literally translates “brother” as “brother,” which corresponds to the literal meaning but loses the implicit intimacy and affection in the source text. According to the Collins Dictionary, “brother” is only a neutral kinship or generalized term, unable to convey the emotional color of the original text. In contrast, translators such as Gou Bin and Wen Shilong translate it as “Honey” or “My Love,” which is closer to the expression of beloved ones in English culture, enabling target-text readers to truly perceive the affection in the folk song.

DeepSeek has a similar problem in translating “a gong” (grandpa/elderly man) in Minnan nursery rhyme *Under the Banyan Tree*. In Chaoshan and other regions, “a gong” refers to both grandfather and a respectful title for elderly men, bearing the dual meanings of family authority and inheritor of oral culture in the original lyrics. Translating it as “grandpa” corresponds to kinship but weakens the implicit respect. In comparison, “elder” in the Collins Dictionary emphasizes seniority and respect, which is more suitable for the original context.

It is obvious that DeepSeek adopts formal literal translation in handling address terms, ignoring their pragmatic functions in social communication and stripping the specific social relations and emotional values inherent in these words. When translating such terms, it is necessary to consider readers' horizon of expectation to bridge the understanding barriers caused by cultural default ^[9].

3.3. Translation of ideological and philosophical culture-loaded words

Philosophical culture-loaded words in folk songs often reflect the ancient people's worldview and life thinking. In processing such sentences, DeepSeek mostly adopts formal equivalence, which maintains structural consistency but is stiff and hard to convey the implication and emotion behind the words. Take Hubei rice-planting work song *Luoluodong* as an example: "Hey luoluodong, sai luoluodong; holding green seedlings and planting all over the field, bowing my head to see the sky in the water; purity of the six roots is the way, retreating turns out to be moving forward." This folk song integrates Jianli traditional work songs and *Rice-Planting Poem* by Monk Budai in the Five Dynasties, depicting farmers planting rice and embodying the way of cultivation—not being trapped by circumstances, and retreating is also moving forward. DeepSeek literally translates "purity of the six roots" as "six roots are purified," which not only fails to convey the original meaning but also easily confuses target-text readers. For religious and philosophical vocabulary, it is necessary to balance cultural transmission and readers' acceptance ^[10]. "Six roots" is a Buddhist concept referring to eyes, ears, nose, tongue, body, and mind, and "purity" means being free from worldly contamination. The religious definition is "purity of six sense organs," and *A New English-Chinese Dictionary* uses "The six roots of sensations are pure and clean." Both translations help readers understand "purity of the six roots" more accurately.

Based on the above types of cultural semantic default, the drawbacks of DeepSeek in translating culture-loaded words in folk songs are obvious. It cannot select appropriate translation methods according to different semantic features of words. Meanwhile, the "cramming" translation of DeepSeek can hardly retain the inherent culture during translation.

4. AI-empowered translation of ICH folk songs

Although AI technology has promoted a qualitative leap in machine translation, far exceeding statistical models in fluency and context grasping, it still has obvious limitations. The mistranslation rate of current systems for culture-loaded words is as high as 34.8% ^[11]. Taking DeepSeek as an example, cultural semantic default often occurs in translation, that is, deep cultural background, historical implications, and emotional colors are filtered or simplified, leading to misunderstanding and aesthetic loss in translations. Yang *et al.* found that mainstream models such as GPT-4 and DeepL generally have semantic drift in processing culture-embedded sentences, with accurate grammar but insufficient cultural interpretation ^[12], which is consistent with the conclusion of this study.

The above phenomenon stems from the dominance of general corpus in the initial training of AI models, resulting in innate insufficient cognition of niche and profound cultural fields such as ICH and the dilemma of cultural vacancy. Dialects, archaic words, customs, and allusions in ICH folk songs often have no cross-cultural equivalent concepts, which is a common difficulty for both human and machine translation and must rely on human intervention ^[13].

Taking DeepSeek as an experimental model, the study finds two paths to improve AI recognition ability: first, manual accurate proofreading to ensure the accuracy and cultural adaptability of translations; second, fundamentally empowering AI by feeding high-quality cultural corpora, such as cultural classics, academic papers, and a specially constructed parallel corpus of culture-loaded words. Zhang also proposed a culture-aware model that recognizes idioms and emotional tones through a context embedding layer, significantly improving the understanding of culture-loaded words^[14]. Such methods can enhance AI's perception and expression of cultural details, providing strong support for the translation and external promotion of ICH folk songs, enabling them to retain the original artistic conception while conforming to the aesthetic habits of overseas audiences when crossing language boundaries^[15].

5. Conclusion

Against the background of Chinese culture “going global,” this study discusses the semantic default phenomenon of AI in translating culture-loaded words in ICH folk songs. Guided by Nida's Functional Equivalence Theory, through specific folk song cases, it analyzes the deficiencies of AI in translating three types of culture-loaded words (material, social relations, ideology and philosophy), and reveals the semantic default problem in cultural transmission, making it difficult for target-text readers to obtain similar emotional and aesthetic experiences as source-text readers. Therefore, the study proposes to construct a high-quality cultural corpus to train AI, enhance its perception and expression of cultural details, so as to more accurately promote the international communication of ICH folk songs.

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