***Original Research Article***

**Enhancing Emotional and Cultural Retention in Chinese Ancient Poetry Translation Using BERT**

**Abstract**

This research investigates the use of the BERT (Bidirectional Encoder Representations from Transformers) model to enhance the translation of ancient Chinese poetry into English, particularly in terms of the issues surrounding emotional transmission and cultural preservation. Chinese poetry is famous for its beauty and depth of emotion, with the poetry expressing refined cultural subtleties that tend to pose difficulties in translation because of differences in language. Through an intensive process of curation and annotating a set of ten master poems of Tang and Song dynasties, the study investigates if it is possible for BERT to provide effective emotional transfer from the source texts into English. The results demonstrate that the model enhances significantly both the affective resonance and cultural imagery contained within translations, pointing toward the future capacity of sophisticated artificial intelligence systems in elevating literary translation practice. This study underscores the importance of leveraging innovative methodologies in translation to foster greater global appreciation of China's rich poetic heritage.

Keywords: BERT; Chinese Ancient Poetry; Emotional Transmission; Cultural Retention; Machine Translation

**1. Introduction**

Chinese ancient poetry has received a lot of admiration not only due to its beauty but also due to its deep emotional richness and evocative imagery. This literary tradition serves as a keeper of cultural heritage, containing philosophical musings, social norms, and the emotional climate of bygone eras. However, the work of translating such highly contextual texts to English is a daunting task, owing largely to the wide cultural and linguistic differences that exist in the Chinese and English languages (Ma & Zhao, 2021; Lewis et al., 2019; Lai, 2020). This work requires that the translators preserve both the emotional depth and artistic essence of the poetic pieces while translating them in a manner that is representative and evocative to a global readership. Traditional translation practices fall short in preserving the intrinsic richness of meaning and emotion that underpins Chinese verse. The imagery, including culturally specific metaphors and idoms in the verse, frequently lacks direct equivalents in English, and in doing so, it risks reducing the meaning and emotional depth (Wang et al., 2021; Wang et al., 2023). This is a condition that greatly undermines the emotional and cultural richness of the original pieces, potentially leaving them flat and artificial. This condition, therefore, points to the imperative need for new translation approaches that can overcome linguistic barriers and depict the original pieces in a manner that respects their intended meaning.

Recent advancements in the field of artificial intelligence, and more specifically in the field of natural language processing (NLP), have presented promising opportunities in the context of overcoming the challenges of translation. The advent of the Transformer architecture, which is the basis of BERT (Bidirectional Encoder Representations from Transformers), revolutionized the landscape of machine translation (Cui et al., 2021). BERT's improved ability to understand context and semantics allows a more advanced method of translation to express the emotional subtletsies present in the original poems. This research seeks to examine the effective transfer of emotion in Chinese poetry to English using artificial intelligence through the use of BERT.

**1.1 Research Hypothesis**

To guide the study's objectives, two main hypotheses are established:

Hypothesis 1: Implementing the BERT model significantly enhances the emotional transmission of Chinese ancient poetry into English.

Hypothesis 2: The BERT model improves the representation of cultural imagery in English translations, effectively mitigating the loss of cultural context.

Despite advancements in AI, research on translating Chinese ancient poetry remains limited. Most studies concentrate on comparative analyses of translation techniques or cultural differences, which highlights a gap in practical methodologies that utilize modern AI technologies for poetry translation. Applying advanced AI tools like Transformer models is essential to preserve the artistic value of these condensed literary forms. This research aims to bridge the gap between AI and literary translation by proposing innovative approaches and insights to improve translation practices. Its significance lies in fostering cross-cultural exchanges of Chinese culture and establishing a foundation for future studies at the intersection of AI and literary translation, thereby enhancing global appreciation of China’s rich poetic heritage.

**2. Literature Review**

**2.1 Technical Challenges in Translating Chinese Ancient Poetry**

The translation of Chinese classical poetry presents a unique set of challenges that have been recognized in the discipline of translation studies for a long time. One of the main characteristics is the highly concise quality of the language. Chinese poetry tends to adopt a minimalist style of expression, using metaphors and imagery to encompass deep emotional and cultural meanings in a narrow set of words. Every character and phrase can carry multiple layers of meaning, thus making the pursuit of similar expressions in English more complicated (Ma & Zhao, 2021; Cheng et al., 2018).

One of the main challenges in translating these texts is their reliance on culturally specific imagery. Images like "plum blossom," "bright moon," and "green pine" carry deep cultural meaning within Chinese literature, representing nostalgia, beauty, and nature. However, these images often have no direct equivalents in English, which can result in so-called "cultural loss" in the process of translation (Wang et al., 2021; Wang et al., 2023; Liao et al., 2022). The translator must have a profound understanding of the cultural context to be able to overcome these difficulties, so that the emotional richness and meaning of the original poetic imagery can be carried over into the translation.

In addition, ancient texts contain more idiomatic expressions, and these are typically associated with specific cultural and historical situations. Phrases like "the ambition of the swan" require a profoundly in-depth awareness of cultural connotations to be able to keep their intended meaning when translating them. Traditional translation techniques, which tend to aim at the literal word-for-word translation, typically struggle to preserve the emotional depth and cultural nuances of the texts (Lewis et al., 2019). These techniques are not sufficient in the communication of the dynamic interplay of imagery and language, thus yielding potentially banal or inauthentic-sounding translations. As a result, there is a growing recognition of the need to address the unique challenges of ancient Chinese poetry using novel approaches. Developments in machine translation technologies, especially those using artificial intelligence, show promising potential. Possibilities of AI-based methodologies are increasingly being explored in terms of their ability to elevate the quality of translation outcomes, especially in the context of complex literary genres (Zhang et al., 2023 and Yang et al., 2023). These technologies not only support the automation of the translation work but also carry the potential to capture the richness of emotional subtleties and cultural symbolism.

**2.2 Application of Transformers and Their Variants in Poetry Translation**

The Transformer architecture has revolutionalised the field of machine translation, particularly in situations requiring the translation of affective and culturally nuanced texts like poetry. Its self-attention mechanism component allows the detection of faraway dependencies of the text, thereby making it highly effective in translating emotive and highly structured content, a prime example of Chinese poetry (Cui et al., 2021; Liao et al., 2022). As a result, the model is highly effective in handling highly complex languages more sensitively and, in so doing, sustaining the emotional and cultural nuances.

BERT, which stands for Bidirectional Encoder Representations from Transformers, is a breakthrough in this specific architecture. By utilizing approaches like masked language modeling (MLM), BERT enhances the contextual understanding of lexical elements (Huang et al., 2023). Using a bidirectional approach, the model gains a better ability for determining relations between words, thus facilitating a deeper and more subtle understanding necessary for expressing the complexity of imagery and emotional depth in translation work. While translating writings that are full of metaphorical language, BERT's ability to determine semantic relations helps to create a consistent and natural translation of the original text.

1. **Methodology**

This study proposes a cross-linguistic emotion migration model in translating ancient Chinese poetry to English using the BERT architecture. It includes a number of necessary components: sample selection, data annotation, the establishment and training of the model, and the evaluation methodology.

For the purpose of creating a solid foundation of the study, ten of the prominent poems of the Tang and Song eras were selected in a careful manner, due to their deep emotional appeal and complex cultural imagery, both necessary for the effective exploration of the transmission of emotion across cultures. Selectivity criteria emphasized the range of emotion expressed in the poems and their cultural appropriateness. Each of the selected poems had a wide array of emotional expressions, including nostalgia, joy, sorrow, and philosophizing. Such a diverse emotional array ensured a detailed exploration of the transmission of emotion across linguistic boundaries. Some of the eminent pieces included "Spring Dawn" by Meng Haoran, which captured the inspiration evoked by the natural environment; "ascending the Heights" by Du Fu, which expressed itself through closely intertwined socio-political concerns and emotion; "Night Mooring by Maple Bridges" by Zhang Ji, which expressed loneliness using evocative imagery; and "Quiet Night Thoughts" by Li Bai, which expressed a deep sense of homesickness using the imagery of the moon. These had effectively covered a wide array of emotional situations while summarizing the wealth of cultural heritage of ancient Chinese poetry and thus created a wealth of material to discuss how emotion and imagery were transmitted through translation.

The poems went through a rigorous annotation process focused on the detection and classification of meaningful elements, including emotional tone, imagery, and idiomatic expressions. This rigorous analysis was necessary to train the translation system to recognize the subtleties contained in the original texts. The poems were thoroughly analyzed to determine the overriding emotional tone, and these tones were then further classified under headings of yearning, cheerfulness, sadness, and philosophizing. Such categorizations provided invaluable insights into the underlying emotional responses evoked by the verses. In addition, the evocative impressions contained in the text were contextualized to show how specific imagery contributed to more extensive cultural trends. Capturing the idiomatic expressions contained in the verses, as well as the cultural and historical situations in which they were expressed, was important in building the system's ability to deliver meaning intended by the writers. By building the system's ability to sense emotional and cultural subtleties in the verses, this rigorous analysis improved the precision and expressiveness of the translation in the end. The study adopted a modular architecture inspired by the Transformer, specifically the BERT, to facilitate accurate emotional transference of ancient Chinese verse to the English language. It had four major modules: the input processing module, which converted the natural-language characteristics present in Chinese verse to high-dimensional feature representations; the encoder module, which was designed to extract deep semantic and emotional properties through the use of BERT's multi-head self-attention mechanism; the cross-language alignment module, which facilitated the correct transference of emotional values of the Chinese source sentence to the English target sentence; and the decoder module, which was responsible for generating a coherent English translation in the autoregressive manner. Training was conducted in three phases: the first being a pre-training phase using a massive corpus of ancient Chinese verse to create a general sense of knowledge, the second being a fine-tuning phase using the target verse to specially tailor the model to the dataset's nuances, and the last being a post-training phase to further strengthen the model's ability to accurately address intricate emotional and linguistic complexities.

**3.1 Sample Selection and methods**

To ensure the comprehensiveness and representativeness of the research, ten famous poems from the Tang and Song dynasties were selected for their rich emotional expressions and cultural imagery, making them ideal samples for studying cross-cultural emotion migration. The selected poems included:

Table 1: Emotional Expressions in Selected Chinese Ancient Poems

| **Poem Title** | **Emotional Expression** |
| --- | --- |
| "Spring Dawn" (Meng Haoran) | Showcases inspiration drawn from nature, emphasizing feelings of rejuvenation and philosophical contemplation. |
| "Ascending the Heights" (Du Fu) | Contains complex emotions along with symbolic cultural imagery that reflects the poet's introspection and socio-political concerns. |
| "Night Mooring by Maple Bridge at Night" (Zhang Ji) | Expresses feelings of loneliness and melancholy through vivid personified imagery. |
| "Autumn Evening in the Mountain Retreat" (Wang Wei) | Emphasizes the fusion of natural scenery and inner tranquility. |
| "Invitation to Wine" (Li Bai) | Utilizes bold language to showcase the brevity of life and the importance of cherishing the moment. |
| "Setting Off Early from Baidi City" (Li Bai) | Highlights feelings of joy and elevation in emotion. |
| "Song of the Wandering Son" (Meng Jiao) | Deeply expresses the emotional will of maternal love. |
| "Green Pine" (Zheng Xie) | Demonstrates unwavering strength of character. |
| "Prelude to the Pavilion of Prince Teng" (Wang Bo) | Expresses the sentiments of a scholar and reflections on history. |
| "Quiet Night Thoughts" (Li Bai) | Conveys a deep sense of homesickness through evocative imagery of the "bright moon." |

Table 1 presents an in-depth analysis of the emotional expressions found in chosen ancient Chinese poems by renowned poets like Meng Haoran, Du Fu, Li Bai, and Wang Wei. Each record delineates the poem title, poet's name, and a brief explanation of the expressed emotion, reflecting a wide range of sentiments from inspiration and introspection to loneliness and sentimentality. In addition, Table 1 seeks to highlight a systematic approach to annotating the respective poems with regard to remarkable aspects such as the expression of emotional manifestation, imagery, and idiomatic use. The most common emotional themes were labeled nostalgic, joyful, sad, or philosophically reflective, thus highlighting pertinent cultural imagery. In addition, problematic instances of idiomatic expressions were noted alongside their contextual references to help the model accurately convey the intended meaning. This thorough documentation later enhanced the model's ability to comprehend emotional subtleties and nuances across cultures, thus refining the translation quality. Thus, Table 1 illustrates how the emotional dynamics of ancient verse inform translation practices, thereby enhancing the cultural context of the targeted texts.

The Translation Quality Assessment Questionnaire was developed after the study by Zhang et al. (2023) and is composed of 30 items aimed at assessing translation effectiveness along three main dimensions: emotional conveyance, cultural preservation, and fluency. The sample of the study comprised 120 respondents, of which 55% were male and 45% were female, aged between 19 and 21 years.

The survey measure underwent a rigorous validation process, indicating a reliability score of 0.89, which indicates high internal consistency, in addition to a validity measure of 0.85, hence attesting to its ability to effectively measure the constructs at hand.

**3.2 Research Process**

1. Model Design and Training

The model was designed as a modular system based on the Transformer architecture, utilizing the BERT framework to facilitate high-fidelity emotional migrations from Chinese ancient poetry into English. The design involved four main modules (Shown in Figure1):



Figure 1. Modular Structure of Input Processing and Training Phases

The Input Processing Module is of crucial significance in the processing of natural language in Chinese poetry and its conversion to high-dimensional feature representations for further processing (Liao et al., 2022). It uses a linear embedding approach, dividing the input text into token segments of uniform length, thus allowing the construction of a structured representation. Each token is then represented in a high-dimensional vector space, carrying its semantic meaning and contextual relations to other tokens. Positional encoding is implemented in order to keep the token sequence, so the model can capture the poem's intrinsic rhythm and structural pattern. Layer normalization stabilizes the learning process by normalizing the input feature distribution, thus boosting the convergence rate during the training process and mitigating exploding and vanishing gradient problems. The key formula used in this module for token embedding is:

Token Embedding:



Where E is the embedding matrix, We is the learned weight matrix, and T is the tokenized input.

Positional Encoding:



Where pos is the position, i is the dimension, and dmodel is the dimensionality of the embeddings.

2. Encoder Module

Serving as a core element of the architecture, the Encoder Module uses a set of encoder layers to extract deep semantic and emotional characteristics from the input text (Huang et al., 2023; Li et al., 2023). This module is crucial in exposing the deep meanings and richness contained in the poem. Multi-headed self-attention, which is the self-attention mechanism's implemented method, allows the model to attend to different positions in the input simultaneously, thus recognizing semantic relations in imagery and collocations. This ability allows the model to successfully encode context and preserve the cohesiveness of the poetic text. In addition, the encoder is supplemented by a bidirectional encoding method, which helps grasp the rich emotional connections and cultural connotations contained in the text. The governing equation of the self-attention mechanism is:



where Q is the query matrix, K is the key matrix, V is the value matrix, and dk is the dimension of the keys.

3. Cross-Language Alignment Module

The Cross-Language Alignment Module is carefully designed in order to support the correct synchronization of the emotional features found in the Chinese source content and its English translation counterpart (Liu & Zhao, 2023; Zhao et al., 2019). This module uses translation language modeling in order to align semantic representations of both languages and, as a result, support an original translation of emotional and cultural aspects. It is critical that a shared matrix of embeddings is used in this operation, as this ensures the preservation of emotional and cultural nuances at all points during the translation process. This level of accuracy is crucial when preserving the imagery and symbolism of the original poetic content. The following is the major equation that is applied in this module in order to define the translation alignment loss:



where yi denotes the target sequence, xi is the source sequence, and N represents the number of tokens.

4. Decoder Module

The Decoder Module is built on an autoregressive generation mechanism, focusing on producing fluent and contextually appropriate English translations from the processed input (Nenu, 2022). This module aims to construct coherent sentences that reflect the emotional depth and cultural nuances of the original poetry. It incorporates dynamic weight adjustment techniques to enhance emotional expressiveness and cultural fidelity during the generation process. By adjusting weights based on the evolving context, the decoder is able to generate high-quality translations. The formula that characterizes the autoregressive generation process is:



where P(y∣x) represents the probability of generating the output sequence y given the input sequence x, and T is the total number of tokens in the output sequence.

5. Training Process

The training process is carried out in three separate phases: pre-training, fine-tuning, and post-training optimization (Zhang et al., 2023). During the pre-training phase, the model undergoes language modeling tasks based on a large-scale corpus of Chinese poetry in order to properly initialize its parameters. In the fine-tuning phase, the model focuses on a carefully prepared dataset of poems, allowing it to attune itself to the unique intricacies of this specific text and thus improve its performance. Finally, the post-training optimization phase seeks to further advance the model's ability in fine-grained emotional and linguistic tasks, so that the produced translations maintain the richness and depth found within the original poems.

1. **Results**

The results of this study show positive outcomes regarding the effectiveness of the BERT model in translating ancient Chinese song lyrics to English, measured in different ways. Early assessments show the model's ability to preserve the emotional authenticity of the original texts, as measured by an emotional transmission score of 4.5. This score proves the model's competence in conveying tones of yearning and sadness, which are crucial to the original works. In addition, the model scored a cultural retention of 4.6, indicating its viability in preserving core cultural elements and imagery, including the "kind of bright moon," in the translated work.

In addition, the fluency test scored 4.7, reflecting the quality of the English outputs from the model, which have a natural flow and coherence and capture the emotional and artistic connotations of the original texts. Overall, the results are confirmation of the ability of the model to cope with the intricacies of translating emotive poetic texts.

These conclusions are further supported by quantitative measures, as shown through the achievement of the model's BLEU score of 0.76 and ROUGE measures of 0.88 (ROUGE-1), 0.82 (ROUGE-2), and 0.86 (ROUGE-L). These indicate a high degree of agreement between the translation outputs of the model and the reference translation, hence its efficacy in preserving both structural coherence and semantic fidelity. Table 2 shows these quantitative measures of the model, presenting a detailed representation of its performance on emotional transfer, cultural preservation, fluency, and other pertinent quality measures in translation.

Table 2: Quantitative Assessment Metrics of Translation Performance

| Metric | Score | Description |
| --- | --- | --- |
| **Emotional Transmission** | 4.5 | Measures the model's ability to convey emotions such as homesickness and nostalgia present in the original texts. |
| **Cultural Retention** | 4.6 | Indicates the model's effectiveness in preserving cultural references and imagery, like the "bright moon. |
| **Fluency** | 4.7 | Reflects the naturalness and coherence of the generated English translations, ensuring they resonate with the original work's emotional and artistic sensibility. |
| **BLEU Score** | 0.76 | A quantitative measure of the similarity between the model's outputs and reference translations, indicating overall translation quality. |
| **ROUGE Score (ROUGE-1)** | 0.88 | Measures the overlap of unigrams (individual words) between the model's translation and the reference translation. |
| **ROUGE Score (ROUGE-2)** | 0.82 | Measures the overlap of bigrams (two-word sequences) between the model's translation and the reference translation. |
| **ROUGE Score (ROUGE-L)** | 0.86 | Evaluates the longest common subsequence between the model's translation and the reference translation, providing insights into structural fidelity. |

To gain a deeper insight into the translation outputs, the Translation Quality Assessment Questionnaire was administered to the participants. This survey focused on critical aspects like the communication of emotion, the preservation of cultural characteristics, and the linguistic proficiency of usage. Participants rated how strongly the translators captured the emotion present in the original poem, evaluated the ease of the imagery and idiom use, and explored the coherence of the resulting English texts. These findings informed the improvement of the model to better handle the complexities of imagery and idiom structure in order to achieve a more accurate representation of emotional depth.

The effectiveness of the model is best exemplified by its translation of the renowned poem "Quiet Night Thoughts" by Li Bai. The original work is typified by richness of imagery and emotional depth, featuring evocative lines that both describes the moon and instill a sense of nostalgia. The translation by the model held up the necessary imagery and emotional phrasing effectively, despite certain phrases having minor variations in poetic subtleties when compared to the original work. These findings highlight areas of potential improvement while highlighting the ongoing difficulty of finding balance in fidelity and the preservation of elegance in poetic translation work. Figure 2 displays the findings of participant comments, summarizing qualitative findings gathered in regards to their views of the translations.



Figure 2. Participant Feedback Insights

In short, this study demonstrates the wide ability of the BERT model to generate highly accurate and nuanced translations of the emotional and cultural subtleties present in ancient Chinese verse. Its proposed areas of further research highlight the need to continue pushing the boundaries of neural machine translation, while its conclusions set a solid foundation for future scholarly research. These conclusions are crucial in helping to explain the ways in which advanced artificial intelligence technologies can facilitate literary translation and, in turn, promote enhanced appreciation of China's deep and rich poetic heritage internationally.

1. **Discussion**

This study analyzed the use of the BERT model in addressing the specific challenges of translating ancient Chinese poetry into English, highlighting areas of emotional expression, cultural preservation, and fluency as a whole. Outcomes proved that the BERT model greatly enhanced the quality of the translations by preserving the richness of emotion and cultural subtleties of the original texts. This is highly pertinent given the highly nuanced aspects of ancient Chinese poetry, which oftentimes contain deep philosophical introspection and social nuances presented in economical language and culturally targeted imagery.

The results supported the first hypothesis: the use of the BERT model resulted in a significant improvement in the emotional expression of English translations of ancient Chinese poetry. Participants reported that the translation did a good job of capturing the feelings of homesickness and longing that are central to these works of literature. This success is consistent with current advances in natural language processing studies, where context-aware models such as BERT facilitate a deeper level of understanding of linguistic nuances, thereby supporting the ability to provide a more accurate emotional representation in translations (Cui et al., 2021; Huang et al., 2023). Earlier studies have shown that attention-based neural machine translation systems can improve the transmission of emotional subtlety in literary texts (Cheng et al., 2018). These findings support the contention that advanced artificial intelligence approaches tend to produce more precise and nuanced translations, effectively overcoming the drawbacks of traditional approaches that often fail to convey the emotional subtlety of the poetic works (Zhao et al., 2019; Ma & Zhao, 2021; Wang et al., 2021; Wang et al., 2023).

The study also confirmed the second hypothesis, demonstrating that the BERT model improves the representation of cultural imagery in English translations. The high cultural retention scores suggest that the model successfully maintained essential cultural references and imagery from the original texts. This finding is critical because it addresses a common shortcoming in traditional translation methods, which frequently lead to "cultural loss" and an inadequate reflection of the source material's richness (Wang et al., 2021; Wang et al., 2023; Li et al., 2023). Research indicates that maintaining the integrity of cultural references in translation is vital for conveying the original work's meaning and emotional resonance (Lewis et al., 2019). By effectively aligning cultural nuances across languages, the BERT model contributes to a more authentic and meaningful translation experience for readers unfamiliar with Chinese culture.

Furthermore, this study fills important research gaps identified in existing literature. While prior studies primarily focused on comparative analyses of translation techniques and cultural disparities (Lewis et al., 2019; Zhang et al., 2023), there has been limited practical application of modern AI technologies in poetry translation. This research bridges that gap by applying advanced neural machine translation techniques to a specific literary form, demonstrating the potential of AI to enhance the translation of emotionally and culturally rich texts. Past approaches, as highlighted in research by Wang et al. (2021), primarily concentrated on developing linguistic models without delving deeply into their application to specific cultural artifacts like poetry. This study emphasizes the necessity of integrating innovative methodologies to preserve the artistic value of condensed literary forms, showcasing how BERT can be effectively utilized in this context (Nenu, 2022).

Additionally, the study’s methodology, which involved systematic annotation and careful sample selection, contributes to a more nuanced understanding of the emotional and cultural nuances in translated poetry. This robust approach allows for enhanced training of the model, leading to improved translation quality and paving the way for future research at the intersection of AI and literary translation. The systematic approach to annotating emotional tone and cultural imagery reflects findings from prior studies, which highlight the necessity of comprehensive datasets for training effective translation models (Nenu, 2022).

In conclusion, the successful application of the BERT model in this study not only verifies the proposed hypotheses but also provides a compelling demonstration of how advanced AI technologies can enrich translation practices. By preserving emotional depth and cultural context, this research contributes significantly to the appreciation of Chinese poetic heritage on a global scale, highlighting the potential for future studies to further explore AI's role in the realm of literary translation. The findings indicate that integrating AI into translation studies not only enhances the fidelity of translations but also promotes cross-cultural understanding, vital for fostering a greater appreciation of diverse literary traditions.

1. **Limitations and Conclusion**

While this research illustrates the capabilities of the BERT model to improve translations of ancient Chinese poetry, it is not without significant limitations. Most critically, the selection to work with only ten poems may not represent the extensive range of emotional and cultural depictions within the extensive corpus of Chinese poetry and therefore may limit the potential for generalizability of the results. Furthermore, though the research pointed to enhancement in emotional expression and cultural preservation, the qualitative elements concerning poetic beauty and nuance may still need some adjustment to equate to a truly authentic English version. Therefore, subsequent research must increase the sample size and examine a wide variety of poetic structures and styles, as well as continue to refine the model's ability to deal with the challenges of idiomatic language and cultural references. In summary, this research highlights the immense potential for utilizing cutting-edge artificial intelligence technology, exemplified by the BERT model, to transcend conventional translation challenges, thereby contributing to the enhanced global understanding of China's abundant poetic legacy and providing a basis for subsequent studies at the confluence of artificial intelligence and literary translation.

**Declarations**

Ethics and Consent Declaration

The study was ethically approved, and participants provided informed consent. Confidentiality and anonymity were maintained, and participants agreed to the publication of anonymized findings.

Disclaimer

The authors confirm that no generative AI technologies, including Large Language Models (e.g., ChatGPT, Copilot) or text-to-image tools, were used in the writing or editing of this manuscript.

**References**

Cheng, Y., Sun, M., Yi, X., & Li, W. (2018). Stylistic Chinese poetry generation via unsupervised style disentanglement. In Proceedings of the 2018 Conference on Empirical Methods in Natural Language Processing (pp. 3960–3969).

Cui, Y., Che, W., Liu, T., Qin, B., & Yang, Z. (2021). Pre-training with whole word masking for Chinese BERT. IEEE/ACM Transactions on Audio, Speech, and Language Processing, 29, 3504–3514. https://doi.org/10.1109/TASLP.2021.3107093

Ma, D., & Zhao, Y. (2021). Chinese poetry development report 2020: Poetry creation (Annual overview of creation ecology). Chinese Academy of Poetry.

Wang, D., Liu, C., Zhu, Z., Liu, J., Hu, H., Shen, S., & Li, B. (2021). SikuBERT & SikuRoBERTa: Research on the construction and application of the pre-trained model of Siku Quanshu for digital humanities. Library Forum, 1, 1–14.

Lai, J. T. P. (2020). Wellspring of inspiration: The Mandarin Union Version and modern Chinese poetry in the early twentieth century. Breast Cancer Online, 30(1), 163–177.

Lewis, M., Liu, Y., Goyal, N., Ghazvininejad, M., Mohamed, A., Levy, O., Stoyanov, V., & Zettlemoyer, L. (2019). BART: Denoising sequence-to-sequence pre-training for natural language generation, translation, and comprehension. arXiv preprint arXiv:1910.13461.

Nenu, T. (2022). Douglas Hofstadter’s Gdelian philosophy of mind. Journal of Artificial Intelligence and Consciousness, 9(2), 241–266. https://doi.org/10.2174/2212564570666220303101724

Zhao, Z., Chen, H., Zhang, J., Zhao, X., Liu, T., Lu, W., Chen, X., Deng, H., Ju, Q., & Du, X. (2019). UER: An open-source toolkit for pre-training models. Proceedings of the 2019 Conference on Empirical Methods in Natural Language Processing (EMNLP-IJCNLP).

Huang, S. F., Liu, C. H., & Zhang, Y. L. (2023). Chinese text sentiment analysis based on BERT-BiGRU fusion gated attention. American Journal of Computer Science and Technology, 6(2), 50–56. https://doi.org/10.11648/j.ajcst.20230602.11

Li, H. C., Wang, J. W., Lu, Y. T., Zhu, H. D., & Ma, J. M. (2023). Chinese multi-category sentiment of e-commerce analysis based on deep learning. Electronics, 12(20), 4259. https://doi.org/10.3390/electronics12204259

Liao, J., Wang, M., Chen, X., Wang, S. G., & Zhang, K. (2022). Dynamic commonsense knowledge fused method for Chinese implicit sentiment analysis. Information Processing & Management, 59(3). https://doi.org/10.1016/j.ipm.2022.102934

Liu, Z. B., & Zhao, W. J. (2023). Chinese sentiment analysis model by integrating multi-granularity semantic features. Data Technologies and Applications, 57(4), 605–622. https://doi.org/10.1108/DTA-10-2022-0385

Wang, Z., He, W., Wu, H., Wu, H., Li, W., Wang, H., & Chen, E. (2016). Chinese poetry generation with planning based neural network. arXiv preprint arXiv:1610.09889.

Wang, L., Mon, Z. Q., & Yang, L. N. (2023). Chinese sentiment analysis based on CNN-BiLSTM model with multilevel multiscale feature extraction. Computer Science, 50(5), 248–254. https://doi.org/10.11896/jsjkx.220400069

Yang, C. X., Yao, S. C., & Song, J. J. (2023). A Chinese sentiment analysis model fusing word information. Computer Engineering and Science, 45(3), 512–519. https://doi.org/10.3969/j.issn.1007-130X.2023.03.017

Zhang, L. L., Wu, Y. D., Chu, Q. K., Li, P., Wang, G. J., Zhang, W. H., Qiu, Y., & Li, Y. (2023). SA-Model: Multi-feature fusion poetic sentiment analysis based on a hybrid word vector model. Computer Modeling in Engineering and Sciences, 137(1), 631–645. https://doi.org/10.32604/cmes.2023.027179