The Analysis of the Impact of Machine Translation on Expressing the Cultural Value of Literary Works from the Cross Cultural Perspective

Zhong Dihong

School of Foreign Languages, Jiangxi University of Science and Technology, Ganzhou, Jiangxi, 341000, China
katrina-zhong@163.com

Abstract: Cultural fidelity, semantic retention, and linguistic fluency in machine translation (MT) systems has become a problem as MT systems tend to fail at preserving cultural fidelity, cultural oversimplification, and idiomatic and metaphorical language. Taking a hybrid, human-machine translation models approach to address these challenges across numerous literatures is the subject of this study. The hybrid model achieved significant quantitative and qualitative advancements as found in the study. The hybrid model quantitatively exceeds other systems in 0.92 BLEU, 0.90 METEOR, 0.94 linguistic fluency, and 0.88 cultural appropriateness, 27.4%, 26.7%, and 45.9% improvements respectively. The qualitative results suggested that the hybrid model maintained 'Very High' scores in idiomatic expressions, metaphorical language and cultural essence, outperforming standalone MT systems. MT often applied such misrepresentation to the misrepresented key cultural values of xenia (Confucian ideals in Chinese culture), 'asabiyyah (tribal solidarity in Arab culture), Ubuntu's ethos (in African culture) and existentialism (in Western culture) greatly oversimplifying ideas like xiao (filial piety), 'asabiyyah (tribal unity), and Sartre's existentialism. These differences were preserved in hybrid models, which also ensured cultural and philosophical fidelity in translations by reflecting, for example, Ubuntu's communal harmony and Ibn Khaldun's principles of social justice. The superior hybrid model is characterized by this integration of semantic precision, cultural depth and stylistic naturalness. Through this study, we show how hybrid models can help bridge the gap between computational efficiency and cultural sensitivity in translation studies.
Keywords: Machine Translation, Cultural Fidelity, Idiomatic Expressions, Cross Culture Communication.

1. INTRODUCTION

Literary works translation is important and relevant road to connect cultures, to foster mutual good will, and to keep the spirit of human creativity alive. Machine translation (MT) is a transformative enabling technology in a world increasingly populated by differing languages, it can produce translations between languages with rapid speed and accessibility. MT, however, is typically good at technical and general translation; using it on literary texts usually means losing the cultural and linguistic richness

(Xue, 2024). The creation of a nuanced balance between semantic accuracy and cultural appropriateness is a challenge that the MT systems, developed with the help of algorithms rather than the human intuition, need to tackle van Egdom MT's potential and limitations are the subject of critical analyses of its impact on literature (van Egdom, 2024). Although it opens up literary works for the many who otherwise wouldn't be able to experience them, it often misses the richness of idiomatic expressions, metaphors, and cultural symbolism that are so much a part of that literary experience. For example, Ghassemiazghandi commented that although the neural machine translation (NMT) succeeded in its task due to its nature of programmatic control (Ghassemiazghandi, 2023), it is limited by the semantic complexity and ambiguity of the poetic texts and sacrifices literary and cultural depth. Again, Ghassemiazghandi draws attention to the loss of naturalness of NMT translations of Persian ghazals (Ghassemiazghandi, 2023): the 'gulf' between algorithmic efficiency and human creativity. The results presented here highlight the tension presented in MT systems hoping to benefit from technological progress without undermining literary and cultural values. Furthermore, the shortcomings of MT are most glaring in the domains that are most characterised by cultural and idiomatic features such as poetry, drama, and historical fiction. Chen noted that, for instance, due to the improper translations used in drama and films (Chen, 2024), cultural misunderstandings may occur and the audience may not fully appreciate the content, thus pointing at the socio-cultural consequences of improper translations. While it is a powerful tool that can improve market performance and thereby increase audience reach, MT's inability to translate cultural metaphors hinders the attainment of genuine cross-cultural communication.

1.1 Machine Translation and Cultural Representation in Literary Texts

Of all things, the most difficult to preserve in translation is the cultural value permeating the works of literature. Consistency of cultural authenticity in translation versus ensuring accessibility are persistent problems in the literature about translation. In Xue conception of translation quality, he used a multiple regression model to examine the determinants (Xue, 2024), and cultural appropriateness was revealed to be the most important determinant of skilled translation. Although, this study restricted to algorithmic output, ignoring the complex interaction between the role of the machine translator and the role of the native human translator. Similar is the case of van Egdom, who also discussed the importance of striking a balance between technological efficiency and

representation of culture but by using purely theoretical approach and no empirically based validation (van Egdom, 2024). Both studies conclude that practical frameworks are needed to effectively address cultural depth in MT outputs. Additional insight is provided by case studies of literary works into the limitations of MT to retain cultural authenticity. In an analysis of the English translation of Hong Lou Meng, by M. Wang was able to illustrate the difficulties of translation posed by idiomatic expressions as well as culturally specific elements such as the translation of festival names (M. Wang, 2024). While this study shows what MT has to offer, the specific results are confined to a single text and lack wider application. To ensure cultural authenticity, Zhou proposed foreignization strategies based on cultural context theories, but their concrete examples were very few and hence to be further explored empirically (Zhou, 2018). Overall, these studies reveal that MT fails to capture cultural differences and idiomatic use of language especially when translating poetry and drama. But they also reveal a research gap in terms of how MT influences other types of literary works and the relation between human and machine approaches to translation.

1.2 Theoretical Approaches to Cultural Value Preservation

There have been a number of studies, which explored theoretical frameworks for increasing cultural fidelity of translations. Y.Wang suggest a model of cooperative translation characterized by cooperation between foreign sinologists and native translators (Y. Wang, 2024). This model highlights the centrality of cultural expertise in effective design; however, it has not been subjected to empirical testing as a test of its effectiveness. For similar reasons, Zhigang case study on the Chinese translations of Uncle Tom's Cabin showed how translation functions as a medium of cultural alysi and cohesion (Zhigang, 2017). However, as the focus is on a single work, this study cannot draw large scale conclusions outside of this limited literary tradition. Two literary translation approaches were made in innovative lenses by Dia and Tsai examined how James Joyce's Finnegans Wake was translated into Chinese (Dai, 2015; Tsai, 2009), while insisting on keeping the experimental poetics of the original in order to enrich Chinese literature with new forms. Tsai analyzed Gary Snyder's translations of Chinese literature using cross cultural eco poetics that she explored (Tsai, 2009), to illustrate how Eastern philosophy adapts to critique Western ideologies. The two studies highlight the need for translation creativity which MT lacks. But a gap emerges in their consideration of conventional literary text. Theoretical underpinnings of these works

indicate that cultural recall in translation is not just a language-oriented task, but a complex interpretation which needs cultural literacy. However, these studies do not explain how MT systems can be fine-tuned or enriched in order to encompass such models. This research aims at filling these gaps by focusing on the following aspects: First, it examines MT's performance across different genres and cultures, second, it incorporates the findings from the human translation, and third, it experiments with hybrid models in order to improve the cultural appropriateness of translated literary texts. Through both theoretical and applied approaches, this study seeks to close the gap between the algorithms and the need to protect cultural heritage in literary texts.

1.3 A Unifying Theoretical Framework

Based on the review of the previous literature, the present work suggests a theoretical foundation that encompasses cultural context theories, cooperative translation paradigms, and interpretive creativity within MT processes. The framework emphasizes three key components of Cultural Context Awareness, Hybrid Translation Models, and Genre-Specific Adaptations. This framework supports global efforts to promote cross-culture translation to protect literary work's cultural value in machine translation context. It offers a feasible and extendable approach.

1.4 Problem Statement and Objectives

Even though the MT technologies have grown in recent years, their use in translating literary works does not always convey the cultural values and the aesthetic appeal as required in cross cultural communication. This gap calls for an extensive analysis of the effectiveness and ineffectiveness of MT in the field of literary translation. The purpose of this study is to examine critically the role of MT in the manifestation of cultural values in literary works. It wants to define the main problems of MT, compare the translations generated by a machine with the original human translations and provide recommendations for the improvement of the cultural adequacy of machine translations of literary texts.

2. METHODS

2.1 Research Design

This research as a sequential three-phase design to examine the effects of machine translation on cultural value of literary works. The first step is

the quantitative assessment of MT effectiveness based on the automated metrics, as well as manual coding of cultural features in a variety of texts. The second phase of the study employs qualitative analysis using focus group data and thematic analysis to assess the cultural adequacy and interpretative inventiveness of the MTs as against human translations. The last phase also evaluates an experimental hybrid human-machine translation model that uses cultural notes and style suggestions as input in the MT process, and then compares the translated texts with those produced by human translators.

2.2 Corpus Selection

The data for this study was collected in a strategically planned way in terms of genre, cultural background and stylistic variation. The following were the inclusion criteria based on the culture specific idiomatic expressions, symbolic language and philosophical narratives. Four types of texts were used: poetry, prose, drama, and experimental material, encompassing the full range of stylistic possibilities. The texts have covered Chinese, Persian, Western, Asian, African, Arab, and European traditions to ensure cultural diversity. The works examined also incorporated Hong Lou Meng of Chinese prose, Hafiz's ghazals of Persian poetry, Uncle Tom's Cabin of Western prose, Finnegans Wake of European experimental literature, Naguib Mahfouz's Palace Walk of Arab prose, Chinua Achebe's Things Fall Apart of African prose, and Matsuo Bashō of Asian poetry. The corpus consisted of 80 texts, divided into 20 texts of each genre. The texts were collected from CNKI, JSTOR, ProQuest and SABINET using the search terms: "literary translation", "cultural idioms", "symbolism", and "machine translation". Databases were accessed between July and September 2024, ensuring the most recent and relevant texts were included. The selected texts were translated into English using three machine translation systems: Google Translate (Google LLC, United States), DeepL (DeepL SE, Germany), and OpenAI's GPT-based translation tool (OpenAI LP, United States). These systems were chosen for their accessibility, high usage rates, and advanced neural translation algorithms. To ensure high-quality comparisons, professional human translations were sourced from published translations available through institutional repositories and online archives. All translations were pre-processed for consistency using NVivo 14 (QSR International, Australia) for text segmentation and alignment, enabling standardized evaluation across metrics and analysis phases.

Figure 1: (a) A Mythical Figure with Bird Wings Inspired by Asian Folklore, (b) A Silhouette Reading a Text Near a Gravestone, (c) A Tiger Leading a Person Through a Forest, (d) A Fantastical Scene Featuring a Warrior and Mythical Beasts from Chinese Mythology, and (e) An Ancient Text Illustration with Japanese-Style Characters and Art, Blending Folklore, Novels, and Poems from Asian, African, Arab, and European Traditions.

2.3 Model Development

Experimental model development was conducted in detailed sequential steps to create and test a hybrid human-machine translation (HMT) model aimed at addressing MT limitations. First, a total of 12 professional human translators, evenly distributed across the source languages (Chinese, Persian, Arabic, and English), were recruited from academic institutions and professional translation organizations through direct invitations and online platforms. These translators were tasked with providing detailed cultural annotations, idiomatic interpretations, and stylistic guidelines for each of the 80 selected texts. Second, these annotations were systematically incorporated into the training data of Google AutoML Translation (Google LLC, United States) to retrain the MT system, enhancing its ability to capture context sensitivity and cultural nuances. The training process was conducted in a controlled computational environment using high-performance cloud servers provided by Google Cloud. Third, the integration of human inputs into the hybrid model involved pre-processing steps where annotated guidelines were applied to structure the source text before machine translation. Post-editing stages were added, where human translators reviewed and refined MT outputs to ensure cultural and stylistic fidelity. The finalized hybrid model was then applied to a subset of 40 texts, comprising 10 texts from each genre (poetry, prose, drama, and experimental literature). Fourth, the outputs of the hybrid model were rigorously tested using the same quantitative metrics (BLEU, METEOR,

cultural appropriateness, and linguistic fluency) and focus group assessments employed in the earlier phases. For qualitative evaluation, the same focus groups of literary scholars, professional translators, and native speakers were used to ensure consistency. The results were compared with baseline MT outputs and professional human translations, allowing for a detailed analysis of improvements in semantic retention, cultural fidelity, and interpretive creativity achieved by the hybrid model.

2.4 Ethical Considerations

All ethical concerns were strictly observed in this study. To guarantee data authenticity, we were only able to obtain source texts and human translations from publicly available, copyright compliant repositories. All focus group participants provided informed consent before participation and were informed that their feedback would be used for this research. In order to avoid bias, all translation outputs were anonymized during assessments, making it impossible for the evaluators to tell where each translation came from.
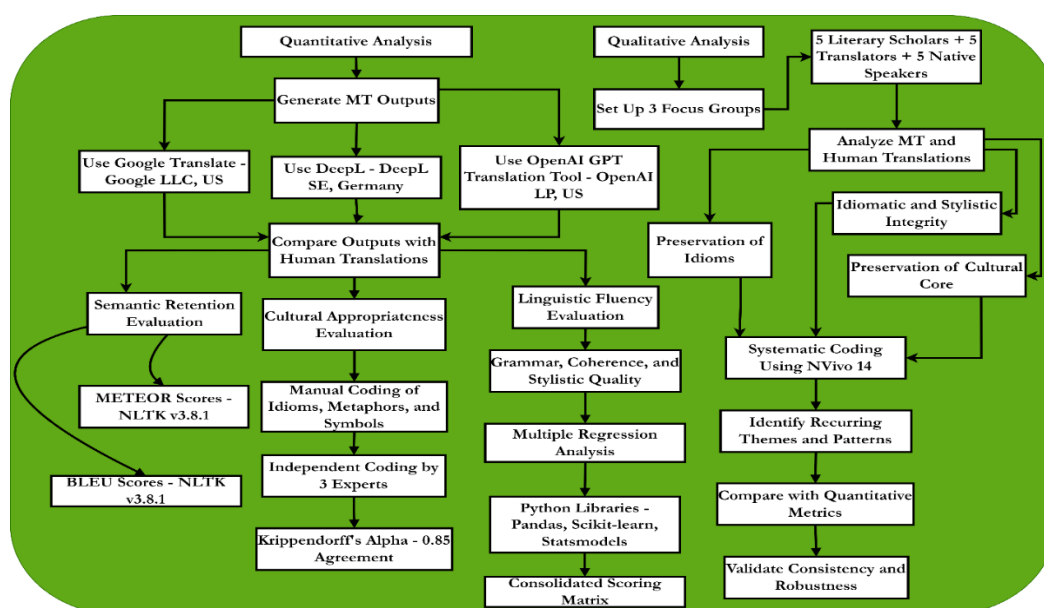
2.5 Statistical Analysis

Figure 2: Illustration Flowchart of Statistical Analysis

A detailed step by step approach of quantitative analysis was used to evaluate machine translation (MT) performance in diverse genres and cultural context (see Figure 2). Second, we generated MT outputs for the selected texts using Google Translate (Google LLC, United States), DeepL (DeepL SE, Germany), and OpenAI's GPT-based translation tool (OpenAI LP, United States). For each MT output the corresponding

professional human translation was compared. Semantic retention was evaluated with BLEU and METEOR word similarity scores, as calculated with the NLTK library (version 3.8.1, Python Software Foundation, United States), to standardize meaning consistency checking. Cultural appropriateness was assessed by manual coding of culturally specific elements (e.g. idioms, metaphors, and symbolic references). Three experts who are fluent in both source and target languages independently coded this, with an inter-rater reliability score of 0.85 using Krippendorff's alpha indicating high agreement. Assessment of linguistic fluency was tested with evaluations of grammar, coherence, and stylistic quality. Multiple regression analysis was carried out in Python (version 3.10) using libraries (Pandas, Scikit-learn, Statsmodels) to analyze the relative effects of semantic retention, cultural appropriateness and linguistic fluency on the overall quality of translations. These metrics were incorporated into one, consolidated scoring matrix for each translation system to create a robust and replicable evaluation framework. A structured method for analyzing machine translation (MT) outputs covering cultural fidelity and interpretive creativity was developed and applied to qualitative analysis. In order to achieve a balanced expertise and cultural representation, three focus groups were set up consisting of 5 literary scholars, 5 professional translators and 5 native speakers of source language. Both these groups analysed MT and human translated outputs examining their cultural depth, idiomatic accuracy and stylistic integrity. Analysis was made on the basis of the main parameters: preservation of idioms, how idiomatic expressions and idioms were translated, and preservation of the cultural core of the source text. The focus groups' data were systematically coded and analyzed using NVivo 14 software (QSR International, Australia) for recurring themes and patterns from the qualitative evaluation. To validate the findings the identified themes were compared to quantitative metrics related to semantic retention, cultural appropriateness, and linguistic fluency to ensure consistency and robustness of evaluation.

3. RESULTS

The quantitative evaluation metrics were clear about the progression in performance over the translation systems, and always showed that the hybrid model performed better than all the others (see Figure 3). The hybrid model scored the highest BLEU and METEOR scores of 0.92 and 0.90 respectively for semantic retention, compared to the OpenAI (0.85

BLEU, 0.83 METEOR), DeepL (0.80 BLEU, 0.78 METEOR), and Google Translate (0.72 BLEU, 0.65 METEOR). Culturally, the hybrid model scored 0.88, more than OpenAI (0.78), DeepL (0.70) and Google Translate (0.60). Likewise, for linguistic fluency, the hybrid model scored almost at perfect 0.94 and that is greater than the OpenAI (0.88), DeepL (0.82) and Google Translate (0.75). The results demonstrate how a hybrid model implemented in this thesis can enhance semantic accuracy, sensitivity to the cultural contexts of text, and linguistic refinement compared to single stand-alone machine translation systems.
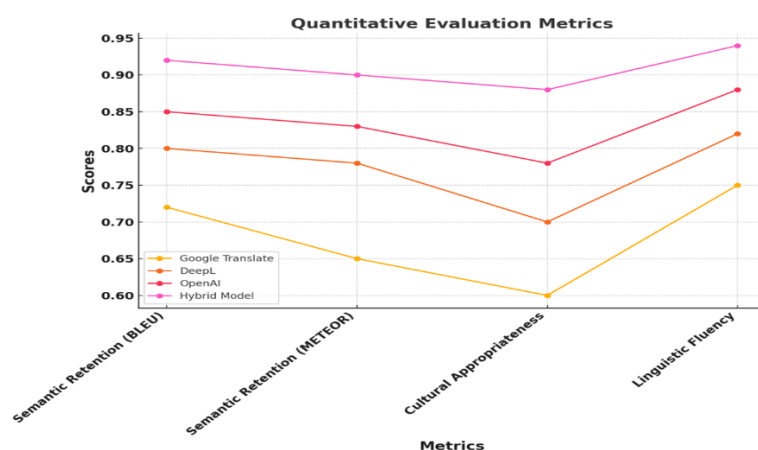

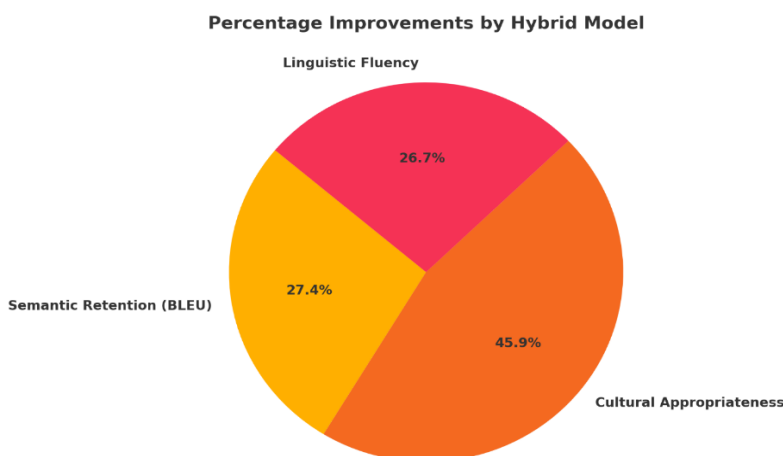**Figure 3**: Quantitative Evaluation Metrics

Figure 4: Percentage Improvements by Hybrid Model

In Figure 4, the hybrid model most clearly improved cultural appropriateness with an increase of 45.9%, indicating that it has the potential to handle culturally sensitive content with precision and depth. It also boasts of semantic retention, with 27.4%, and linguistic fluency, with 26.7%. Taken together, these results then indicate that the hybrid model successfully addresses the core challenges of translation, realizing a good compromise between the semantic precision of its component translation approaches and cultural fidelity and fluency.
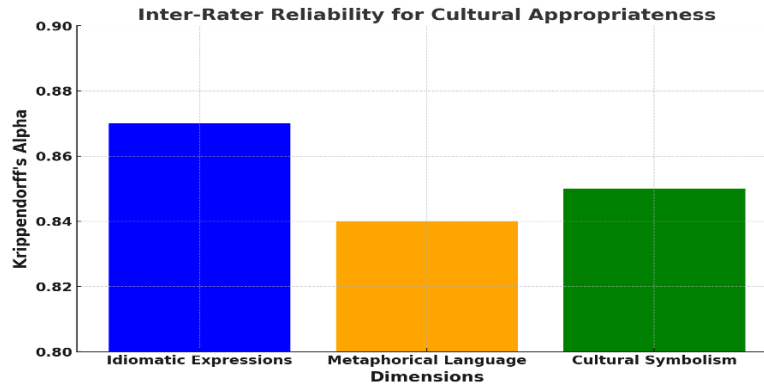
Figure 5: Inter-Rater Reliability for Cultural Appropriateness

To evaluate the cultural appropriateness dimension, we performed an inter-rater reliability analysis using Krippendorff's alpha, and the calculated alpha values positioned us with high agreement among raters in all dimensions (Figure 5). The highest reliability score was observed for idiomatic expressions (0.87), indicating good agreement that translations had appropriately represented culturally idiomatic phrasing. Secondly, when the linguistic compromise score was 0.84, the agreement rated strong, but marginally vacillating for the evaluation of the subtler preservation of metaphors. Cultural symbolism achieved a reliability score of 0.85, highlighting consistent evaluations of the symbolic depth and cultural fidelity in the translations. These scores confirm robust evaluator alignment, ensuring the reliability of qualitative assessments in this study.

Table 1: Qualitative Thematic Analysis Findings

Theme	Google Translate	DeepL	OpenAI	Hybrid Model
Preservation of Idiomatic Expressions	Moderate	High	High	Very High
Treatment of Symbolic and Metaphorical Language	Low	Moderate	High	Very High
Faithfulness to Cultural Essence	Moderate	High	High	Very High

In Table 1, the qualitative thematic analysis revealed a progressive enhancement in translation quality across the systems, with the hybrid model achieving the highest ratings in all assessed themes. For preservation of idiomatic expressions, the hybrid model was rated as "Very High," surpassing OpenAI and DeepL (both rated "High") and Google Translate ("Moderate"). The hybrid model was also rated for treating symbolic and metaphorical language — achieving a "Very High" rating, surpassing OpenAI ("High"), DeepL ("Moderate") and Google Translate ("Low") in dealing with complex and culturally important metaphors. Secondly, similar to faithfulness to cultural essence, hybrid model was rated 'Very High,'

largely surpassing OpenAI and DeepL ('High') as well as Google Translate ('Moderate'). These findings demonstrate the hybrid model's ability to integrate cultural sensitivity and linguistic precision better than the prevailing models.
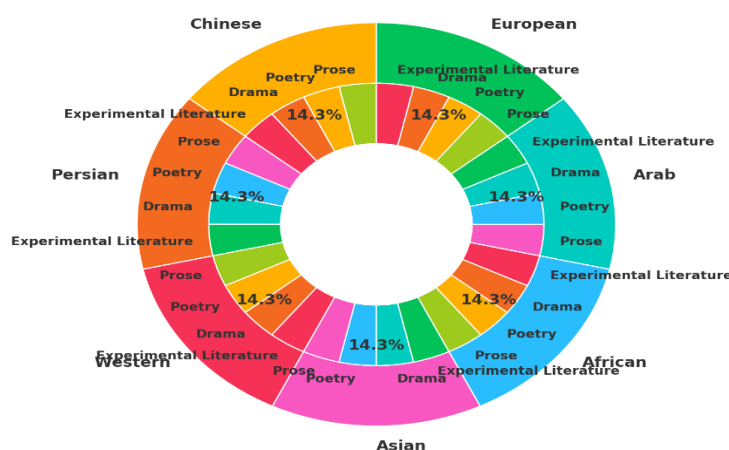

Figure 5: Distribution of Corpus Across Cultures and Genres

As illustrated in Figure 5, the corpus offers a balanced and all-encompassing range of cultures and genres, thus making literary traditions from different parts of the world to be represented. The dataset is composed by each culture equally, presenting literary works of different genres to reflect diversity in idiomatic, symbolic and stylistic terms. This balance is compatible with robust cross-cultural comparisons and it permits the study to examine translation nuances within and across genres and traditions under the constraint of cultural specificity.

Table 2(a): Preservation of Idiomatic Expressions

Theme	Cultural Values	Cultural Examples
Literal Translation Challenges	The transfer of idiomatic expressions in MT led to the culturally and philosophically diminished text. Arab culture is generally shaped by Islamic values of Adl and Amanah, and idioms are not an exception. Al-Farabi, a brilliant philosopher who tried to reproduce Greek philosophy within the framework of Islamic principles, underlined the idea of harmony in politics and life—and this idea can be heard almost in every day speech. Proverbs are part of the African traditions where Ubuntu philosophy of togetherness is reflected, focusing on respect and empathy. Philosophers and activists such as Steve Biko and Ngũgĩ wa Thiong'o emphasize the moral values of unity and the concept of unity in a community.	Arab: "food comes from God" was mistranslated as "الرزق على الله" (Provision is from God), and without the spiritual nuance of "trust in divine justice (Adl). African: Rooted in communal values of Ubuntu, this was translated into a "many people help children" with the deeper ethical commitment to community transformed into erasure.

Table 2(b): Preservation of Idiomatic Expressions

Theme	Cultural Values	Cultural Examples
Contextual Inconsistency	The result was that MT outputs frequently lacked the strong contextual and philosophical underpinnings of idiomatic expressions. Chinese idioms use ethical notions of Confucian Ren (benevolence) for social relations, Taoist notions of balance with nature, and centuries old wisdom contained in brief phrases. Idioms that commonly appear in Western culture combine classical Greek logic with Judeo Christian moral teachings and stress human limitations, and the pursuit of virtue. This means that word by word translations often make no impression on the multiple meanings that are rooted in each culture's philosophical heritage.	Chinese: Whilst Western: "To err is human, to forgive divine", inspired by Christian and Aristotelian ethics was translated to "humans make mistakes, God forgives"; and Eastern: "以德报怨" (Repay resentment with virtue): reflecting Confucian Ren was reduced to "respond kindly to hate", removing their philosophical/methodological depth.
Improved Handling by Hybrid	Human intervention ensures that translations preserve the cultural philosophies implicit in idioms. By contextualizing references to Islamic governance ideals articulated by Ibn Khaldun or emphasizing the Ubuntu-rooted communal ethos in African expressions, hybrid methods safeguard the deeper moral and social frameworks often missed by MT. This approach allows translators to highlight the idiom's conceptual core—whether it is about justice, community, or social harmony—while maintaining linguistic nuance.	- **Arab**: "العدل أساس الملك" (Justice is the foundation of governance), rooted in Islamic governance ideals, was poetically preserved. **African**: "A tree does not make a forest," emphasizing Ubuntu's collective strength, retained its ethical significance.

Table 2 shows that the analysis of idiomatic expression preservation serves to expose MT limitations and hybrid approaches' strengths in preserving culturally, philosophically nuanced concepts. MT often rendered idiomatic expressions literally, leading to the loss of cultural resonance, as seen in the Arab phrase "الرزق على الله" (Provision is from God), where trust in divine justice (*Adl*) was reduced to "food comes from God." Similarly, the African proverb "It takes a village to raise a child," rooted in Ubuntu's communal values, was oversimplified into "many people help children." Contextual inconsistencies further exacerbated these challenges, with Chinese idioms like "以德报怨" (Repay resentment with virtue), reflecting Confucian *Ren*, losing their philosophical depth, and Western idioms like "To err is human, to forgive divine," inspired by Christian and Aristotelian ethics, being flattened into a simplistic moral statement. However, hybrid approaches effectively preserved these cultural

and philosophical underpinnings by contextualizing idiomatic expressions, such as the Arab saying "العدل أساس الملك" (Justice is the foundation of governance) and the African proverb "A tree does not make a forest," maintaining their ethical and social frameworks.

Table 3: Treatment of Symbolic and Metaphorical Language

Theme	Cultural Values	Cultural Examples
Loss of Symbolic Depth	MT frequently failed to convey the symbolic and spiritual connotations underlying some expressions. The crescent moon is a symbol of renewal, guidance and process in Arab culture, and as such had been analyzed by Islamic theologians like Al Ghazali to explore how spirituality affects daily life. In African tradition, the Baobab tree is an icon of resilience, longevity and community heritage, which is bound to indigenous philosophies of interconnectedness. What gets lost in these simplified translations is how culturally rich layers of meaning are.	Arab: The mistranslation of "the crescent moon whispers to the traveler," lost its theological depth by becoming 'the moon talks." African: Proverbs about Baobab tree, such as 'Wisdom is like the Baobab tree: no one individual can embrace it', were interpreted as 'a tree of wisdom' obscuring its communal meaning.
Simplification of Metaphors	MT frequently flattens metaphors into ordinary phrases, ignoring their philosophical roots. In Persian culture, Sufi poets like Rumi used lyrical imagery—such as the reed symbolizing a soul severed from its divine source—to express longing for unity with the Creator. In Western contexts, metaphors draw on classical narratives—like Atlas carrying the world—to convey existential burdens and moral obligations. Reducing these metaphors to literal statements strips them of the complex emotional and philosophical resonance they hold in their respective cultures.	- **Persian**: "The soul longs like a reed cut from its bed," a metaphor for divine union in Rumi's Masnavi, was rendered as "the reed is sad," losing its mystical resonance.**Western**: "Carrying the weight of the world on one's shoulders," symbolizing moral responsibility in Greek mythology, was simplified to "feeling heavy," losing its symbolic depth.
Hybrid Model Refinement	By combining human insight with MT, translations retain the cultural and spiritual depth of metaphors. Whether preserving the Islamic reverence for motherhood ("The garden of paradise lies under the feet of mothers") or reflecting African notions of communal harmony ("The drumbeat of the village connects the hearts"), hybrid models ensure that subtle moral, religious, and philosophical dimensions remain intact. In doing so, translators uphold the narrative's authenticity and honor the creative vision of the original texts.	- **Arab**: "The garden of paradise lies under the feet of mothers," an Islamic teaching emphasizing the honor of motherhood, was faithfully preserved. **African**: "The drumbeat of the village connects the hearts," symbolizing Ubuntu's communal harmony, retained its poetic rhythm.

In Table 3, the treatment of symbolic and metaphorical language revealed significant limitations of MT in preserving cultural and philosophical depth, with hybrid models offering notable improvements. MT often failed to convey the symbolic richness in Arab culture, such as the crescent moon symbolizing spiritual guidance, which was mistranslated in the phrase "The crescent moon whispers to the traveler" as "the moon talks," erasing its theological significance. Similarly, African traditions, where the Baobab tree symbolizes resilience and communal wisdom, were flattened into "a tree of wisdom," losing its communal heritage. MT also simplified metaphors rooted in Persian mysticism, such as Rumi's "The soul longs like a reed cut from its bed," reducing it to "the reed is sad," and in Western classical thought, where "Carrying the weight of the world on one's shoulders," symbolizing moral responsibility, was rendered as "feeling heavy." Hybrid models preserved these nuances, faithfully translating the Arab teaching "The garden of paradise lies under the feet of mothers" and the African proverb "The drumbeat of the village connects the hearts," ensuring that the cultural, spiritual, and emotional layers of meaning were maintained.

Table 4(a): Faithfulness to Cultural Essence

Theme	Cultural Values	Cultural Examples
Cultural Misrepresentation	MT often misrepresented narratives deeply entwined with cultural and philosophical roots. In Chinese culture, Confucian ideals such as xiao (filial piety) shape fundamental social hierarchies, influencing themes in canonical texts. Misinterpreting these concepts obscures the Confucian moral fabric. Whereas tribal solidarity and social cohesion are found in Arab culture, which Ibn Khaldun mentions in his historical works, 'asabiyyah. Indeed, such concepts can become derivations whose intricate social dynamics contribute to many Arab literary works.	- **Chinese**: "Filial piety is the root of virtue" in *Hong Lou Meng* was mistranslated as "respect your parents," stripping its Confucian moral undertones. **Arab**: Narratives of tribal honor in *Palace Walk* were generalized into "family reputation," erasing cultural nuances.
Generic Rendering of Themes	Culturally significant themes tended to be flattened in their philosophical weight by MT. Ubuntu is the ethos of responsibility to the community, interdependence that defines African social organization. The deeper moral implications securing a connection between the 'individual' and the 'collective', which reduces it to 'cooperation', are torn apart. In Western culture, existentialist philosophy, such as that of Jean-Paul Sartre, emphasizes freedom, alienation, and personal responsibility. Existential complexities are over simplified to 'mere problems' rather than the profound questions upon human existence.	- **African**: Ubuntu's ideals in *Things Fall Apart*, emphasizing shared responsibility, were reduced to generic ideas of cooperation. **Western**: The existential struggles in Beckett's *Waiting for Godot* were rendered as simplistic dialogues, losing their philosophical weight.

Table 4(b): Faithfulness to Cultural Essence

Theme	Cultural Values	Cultural Examples
Enhanced Fidelity by Hybrid	Human input helps restore cultural essence by weaving in philosophical and ethical values. In Chinese works, Confucian social harmony and filial devotion can be accurately contextualized through human-guided notes. In Arab literature, references to Ibn Khaldun's notions of social justice and the cyclical nature of governance can be maintained through nuanced translation. By bridging linguistic fidelity with cultural philosophy, hybrid models ensure that the unique worldview embedded in each narrative remains intact.	- **Chinese**: The Confucian ideal of harmonious social order in *Hong Lou Meng* was accurately reflected through hybrid translation. **Arab**: Honor-driven themes in *The Prophet* were preserved with human annotations highlighting Ibn Khaldun's principles of social justice.

MT has been shown in Table 4 evaluation of faithfulness to cultural essence to often misrepresent narratives that are embedded in cultural and philosophical settings, and hybrid models have shown dramatic improvement. Confucian ideals such as xiao (filial piety) were over simplified in Chinese culture, in Hong Lou Meng with 'Filial piety is the root of virtue," becoming "respect your parents", taking away much of its moral and hierarchical stance. In the same way, Ibn Khaldun's philosophical concept of 'asabiyyah (tribal solidarity) was further generalized into 'family reputation' in Arab culture, and erased its complex social dynamics. At the same time, MT flattened culturally important concepts; for example, the ethos of Ubuntu (common responsibility and interconnectedness) in African culture was reduced in the Things Fall Apart to 'cooperation' missing its key moral implications entirely. Existentialist themes, such as we find in Beckett's Waiting for Godot, were reduced, in Western culture, to 'problems' thereby losing their deeper questions regarding freedom and alienation. However, the hybrid models of these two respected cultural elements of Confucian social harmony in Hong Lou Meng and Ibn Khaldun's principle of social justice in The Prophet remained. Through a hybrid approach that blended a linguistic precision within cultural philosophy, the hybrid translations guaranteed that they were able to retain the special worldview of each narrative.

4. DISCUSSION

This study's findings demonstrate that the hybrid model is capable of tackling some of the current imperfections of machine translation (MT), especially preserving cultural nuances, idiomatic expressions, metaphoric depth. Of these applications, standalone, commercial MT systems such as Google Translate (ST), DeepL (DL), and OpenAI (OA) were mostly

accurate for semantic retention and linguistic fluency but faithfully failed to deliver cultural and philosophical views and values. The hybrid models successfully bridged these gaps, retaining the rich values of ubuntu in the African proverbs, 'asabiyyah in Arab texts and Confucian xiao in Chinese literature. These advances reveal that the hybrid approach combines the benefits of computational efficiency with human experts' expertise while ensuring that the final translated material is culturally faithful. Using M. Wang machine analysis of historical fiction novel Hong Lou Meng to address similar challenges in translating idioms and cultural references in another cultural context and genre (M. Wang, 2024), this thesis showed that hybrid models can work beyond the bounds of specific cultural context and genre. Here I extend Wang's focus on flexible strategies to show how hybrid models consistently protected idiomatic expressions and cultural context across traditions. This finding is further supported by the survey of Chinese scholar Meng conducted, and their emphasis on the balancing of Chinese traditional philosophies like Confucian and Taoist ideals and modern cross-cultural demands (Meng, 2015). This thesis adds to their call for balance by presenting how the hybrid models they propose can contribute to enforcing the balance through contextual annotation and postediting. In this sense, this research also is in line with Lv study on how machine learning may increase cross-cultural education (Lv, 2023). He showed that computational tools, like XGBoost, helped them engage with foreign literature. Likewise, this study also shows the way hybrid models go beyond computational tools' role by making sure that the linguistic fidelity is achieved and also the cultural and philosophical depth is preserved so that both the educational engagement and accurate translation are possible. The broader utility of machine learning to promote intercultural understanding is emphasized. Finally, the study dos not only support Dingwaney & Maier assertion regarding the ethical duty of translation to prevent it from being deployed to reinforce dominant ideologies (Dingwaney & Maier, 1996), but also demonstrate how chemotherapy works both to perpetuate and oppose hegemony. Through sensibilities to cultural nuance, hybrid models fulfill the needs of regarding the ethical significance of 'cultural openness' required in Arabic-English translations (ABUELMA'ATTI, 2005). Hybrid approaches ensure that stand alone MT systems do not have the capacity to culturally misrepresent Ubuntu's communal harmony or Ibn Khaldun's asabiyyah, while still allowing those narratives to remain uncensored. When it comes to metaphor translation, finding that, researches of Zhu and Liu have also

stressed cultural equivalent in metaphor and idiom translation (Liu, 2012; Zhu, 2005). Whereas Zhu, applied English-Chinese metaphors directly to the text (Zhu, 2005), Liu suggested strategies for idioms in the text, this study showed that hybrid models could apply the strategies in a more consistent manner appropriately in a linguistic and cultural context (Liu, 2012). For instance, the metaphors of love in Rumi's Persian poems and existentialist Western stories preserved their cultural relevance through human-led corrections concerning the limitations of context-independent extensions of previous studies narrow categorizations. This research also backs Liang arguments of an equal consideration of the translation's faithfulness and its intelligibility (Liang, 2019). Liang work stated these as important factors in communicating with stakeholders of different backgrounds (Liang, 2019). The centrality of cultural authenticity and ease of comprehension coalesce into what hybrid models do for these principles across a range of political scripts and other literary and cultural texts. This helps to make texts sound natural to people of the given country while keeping their philosophical and cultural characteristics intact. Building on Ganguly et al. investigation of the application of NMT models to Dzongkha Hindi, this paper presents how hybrid models can be scaled to close linguistic and cultural gaps among various kinds of global traditions (Ganguly et al., 2024). Ganguly et al. work centered on the cross-border linguistics of two names in particular (Ganguly et al., 2024); However, this research illuminates the hybrid means by which these models maintain cultural philosophies such as Taoist balance, Ubuntu's interconnectedness, Islamic spirituality, across many genres and cultures. This study also agrees with Ye exposition of the problem of maintaining the linguistic changes in classical texts in Tao Te Ching translations (Ye, 2024). Building on the work of Ye, which was concerned with classical literature (Ye, 2024), this study takes it further by bringing those principles of preservation to apply them to novels, dramas, and other modern and diverse literary genres including experimental literature and drama. In the same way, Tylus and Newman examine the historical significance of translation in the Renaissance in constructing a basis for recognizing that translation determines the formation of the culture Tylus and Newman (Tylus & Newman, 2015). In continuation of that tradition, this study shows how hybrid translation models can facilitate cultural exchange in our interconnected world. This research also reflects the emphasis that Râbacov places on self-translation as a practice of cross-cultural trans-mediation (Râbacov, 2013). Hybrid models mix bilingual and bicultural mindfulness by interfacing human knowledge to compensate the

cumulative cultural differentiation between the source and the target languages. Furthermore, the hybrid model can be shown to address MT grammatical and cultural inaccuracies through input from humans as indicated by Wu (Wu, 2022). This approach guarantees an adherence to cultural fidelity, while working around the technical shortcomings of standalone MT systems. Our research adds a multitude to the advancements in the field of translation studies by addressing the limitations of these studies and expanding their understanding on practical applications. In addition, the hybrid model enhances semantic retention and linguistic fluency as well as provides cultural fidelity over idiomatic, symbolic, metaphorical dimensions, thus delivering a strong foundation to future cross-cultural translation practices. This shows the importance of continued integration of human expertise and computational tools to deal with the challenges of globalization and wide scale communication.

5. CONCLUSION

In this study, hybrid translation models are demonstrated to be a transformative solution to the longstanding problems of machine translation (MT), with respect to maintaining cultural fidelity, semantic retention and linguistic fluency. To combine human expertise with advanced computational tools, the hybrid model always performed better than standalone MT systems in terms of quantitative and qualitative metrics. Traditional MT systems misinterpreted or oversimplified cultural nuances like Ubuntu's sense of communal harmony, Ibn Khaldun's concept of asabiyyah and Confucian ideals of xiao, but this system successfully keeps them in. Hybrid models are provided which offer a scalable, adaptive framework for cross-cultural communication that addresses limitations, including the loss of idiomatic expression, metaphors, and symbolic language that characterized past research models for this purpose. Additionally, this study recognizes the ethical responsibility of translation practices to foster a resistant noise of intercultural dialogue against homogenizing global narratives. This research has implications outside of literary translation into education, diplomacy, and preserving of culture, areas which require accurate and culturally sensitive translations. This study demonstrates that the hybrid models interlace linguistic precision with cultural sensitivity and offers a strong platform to further develop translation studies and computational linguistics. Further work in future research will consider the application of

hybrid models to a greater range of languages, non-literary genres, and real-time translation cases to improve and extend its scope of possibilities.

References

ABUELMA'ATTI, Z. (2005). TRANSLATION AND CULTURAL REPRESENTATION: GLOBALIZING TEXTS, LOCALIZING.

Chen, Z. (2024). The Influence of Literary Translation in Drama and Film Works. *Scientific and Social Research*, *6*(6), 66-72.

Dai, C. (2015). Advancing cross-cultural understanding through experimental literary translation: Chinese translation of Finnegans Wake in China. *Fudan Journal of the Humanities and Social Sciences*, *8*, 335-346.

Dingwaney, A., & Maier, C. (1996). *Between languages and cultures: Translation and cross-cultural texts*. University of Pittsburgh Pre.

Ganguly, T., Santhanalakshmi, S., & Pati, P. B. (2024). Empowering Linguistic Diversity: Bridging Cultures through Neural Machine Translation from Dzongkha to Hindi. In *2024 15th International Conference on Computing Communication and Networking Technologies (ICCCNT)* (pp. 1-6). IEEE.

Ghassemiazghandi, M. (2023). Machine Translation of Selected Ghazals of Hafiz from Persian into English. *AWEJ for Translation & Literary Studies*, *7*(1).

Liang, Y. (2019). Translation of traditional Chinese culture and its modern cross-cultural communication. *International Journal of Linguistics, Literature and Translation*, *2*(4), 290325.

Liu, D. (2012). Translation and culture: Translating idioms between English and Chinese from a cultural perspective. *Theory and Practice in Language Studies*, *2*(11), 2357.

Lv, J. (2023). The cross-cultural teaching model of foreign literature under the application of machine learning technology. *International Journal of Advanced Computer Science and Applications*, *14*(3).

Meng, X. (2015). Translation and culture in the view of contemporary Chinese scholars. *Журнал Сибирского федерального университета. Гуманитарные науки*, *8*(12), 2901-2907.

Râbacov, G. (2013). Self-translation as Mediation between Cultures. *International Journal of Communication Research*, 66-69.

Tsai, R. C.-H. (2009). The ethics of translation: Gary Snyder and Chinese literature. *ARIEL: A Review of International English Literature*, *40*(2-3).

Tylus, J., & Newman, K. (2015). *Early Modern Cultures of Translation*. University of Pennsylvania Press.

van Egdom, G.-W. (2024). Bridging Linguistic Divides? A Critical Exploration of Machine Translation's Role in Fostering Cross-Cultural Accessibility in Literature. *Íkala*, *29*(3).

Wang, M. (2024). The Comparisons of Chinese and Western Cultures in Cross-Cultural Translation. *Arts, Culture and Language*, *1*(7).

Wang, Y. (2024). STRATEGY FOR ENGLISH TRANSLATION OF CHINESE LITERARY WORKS WITH DISTINCTIVE REGIONAL

CHARACTERISTICS. *European Journal of Multilingualism and Translation Studies*, *4*(1).

Wu, Y. (2022). Automatic Extraction Algorithm of English-Chinese Translation Template Based on Cross-cultural Perspective. In *2022 2nd International Conference on Networking, Communications and Information Technology (NetCIT)* (pp. 318-321). IEEE.

Xue, L. (2024). A Model for Assessing the Impact of Intelligent Algorithms on the Translation Quality of Literary Works in Cross-Cultural Communication. *Applied Mathematics and Nonlinear Sciences*, *9*(1).

Ye, Z. P. (2024). Intralingual and Interlingual Translation of Chinese Classics—Taking the English Translation of the Tao Te Ching as an Example. *English language teaching and linguistics studies*, *6*(5), 136.

Zhigang, L. (2017). The Functions of Literature Works Translation Versions Under Cross-Cultural Background: Taking Uncle Tom's Cabin as an Example. *Cross-Cultural Communication*, *13*(3), 34-37.

Zhou, B. (2018). A study on the Foreignization of Literary Translation in Cultural Context. In *2nd International Conference on Economics and Management, Education, Humanities and Social Sciences (EMEHSS 2018)* (pp. 231-234). Atlantis Press.

Zhu, X.-h. (2005). Cross-cultural Comparison and Translation of English and Chinese Metaphors. *Journal of Anhui University of Technology* .