A COMPARATIVE STUDY OF AI-BASED AND HUMAN TRANSLATION QUALITY IN UZBEK–ENGLISH TRANSLATION

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Abstract: *Recent advances in artificial intelligence have significantly transformed the field of translation, leading to the widespread use of AI-based machine translation tools. While numerous studies have examined the effectiveness of such tools for high-resource language pairs, limited attention has been given to low-resource languages such as Uzbek. This study aims to provide a comparative analysis of AI-based translation tools and human translators in the context of Uzbek-English translation. The research evaluates translation quality across four domains-technical, legal, academic, and literary-using expert-based assessment criteria, including accuracy, fluency, contextual adequacy, and cultural appropriateness. A dataset of selected Uzbek texts was translated using AI tools and by a professional human translator, and the results were systematically analyzed using a Likert-scale evaluation. The findings reveal that while AI-based translation demonstrates acceptable performance in technical and general academic texts, it exhibits notable limitations in handling idiomatic expressions, cultural references, and stylistic nuances, particularly in literary and legal domains. The study highlights the continued importance of human translators for context-sensitive and culturally embedded content and suggests a hybrid translation approach as a practical solution for Uzbek–English translation.*

Key words: *artificial intelligence, translation tools,translation, empirical comparison, mixed-methods, languages, translation quality.*

INTRODUCTION

The rapid development of artificial intelligence (AI) has profoundly influenced various aspects of natural language processing, including machine translation. AI-based translation tools such as Google Translate and neural language models have become increasingly accessible and widely used due to their speed, cost-efficiency, and continuous improvement in translation quality. As a result, machine translation is now extensively applied in education, business, and digital communication.

Despite these advancements, the effectiveness of AI-based translation remains uneven across languages and domains. Most existing studies focus on high-resource language pairs, particularly those involving English and major European or Asian languages. In contrast, low-resource languages such as Uzbek have received relatively limited scholarly attention.

Uzbek presents specific linguistic challenges for machine translation due to its agglutinative morphology, flexible word order, and the frequent use of culturally embedded expressions.

Human translators, on the other hand, possess the ability to interpret contextual meaning, cultural references, and pragmatic nuances that often pose difficulties for automated systems. While human translation is generally associated with higher accuracy and cultural adequacy, it is also time-consuming and resource-intensive. This has led to ongoing debates regarding the extent to which AI-based translation tools can replace or complement human translators, particularly in specialized domains.

Given this background, the present study aims to empirically compare the quality of AI-based and human translations in the Uzbek-English language pair. By examining translations across technical, legal, academic, and literary texts, the research seeks to identify the strengths and limitations of each approach. The study addresses the following research questions: (1) how does the translation quality of AI-based tools compare with that of human translators in Uzbek–English translation; (2) in which domains do AI-based translations perform adequately; and (3) to what extent can AI translation tools effectively handle idiomatic expressions and cultural references in Uzbek. By addressing these questions, this study contributes to the growing body of research on machine translation for low-resource languages and provides practical insights for translators, educators, and language technology developers.

2.Methodology

2.1 Research Design

This study adopts a comparative empirical research design to evaluate the quality of AI-based machine translation and human translation in the context of Uzbek-English translation. A mixed-methods approach was employed, combining quantitative evaluation scores with qualitative error analysis to ensure a comprehensive assessment of translation performance.

2.2 Data Selection

The dataset consists of 40 Uzbek-language texts selected from four distinct domains in order to represent varying linguistic and contextual complexity:

Technical texts (e.g., user manuals and instructional materials)

Legal texts (e.g., contracts and official documents)

Academic texts (e.g., scholarly articles and educational content)

Literary texts (e.g., short prose and narrative excerpts)

Each domain included 10 texts of comparable length (150–250 words) to ensure consistency across translations.

2.3 Translation Procedure

Each source text was translated into English using two approaches:

AI-based translation tools, including Google Translate and ChatGPT

Human translation, conducted by a professional Uzbek-English translator with over three years of translation experience

The AI tools were used without post-editing in order to assess their raw translation performance. The human translations were produced independently to avoid bias.

2.4 Evaluation Criteria

Translation quality was evaluated based on four widely recognized criteria in translation studies:

Accuracy - correctness of meaning transfer

Fluency-grammaticality and naturalness of the target text

Contextual adequacy-appropriateness of translation within context

Cultural appropriateness-correct rendering of idiomatic and cultural elements

Each criterion was rated using a five-point Likert-scale (1 = very poor, 5 = excellent).

2.5 Evaluation Process

The evaluation was conducted by three expert assessors with academic backgrounds in linguistics and translation studies. The evaluators independently assessed each translation, and the final score for each criterion was calculated as the mean value of all evaluations.

To enhance reliability, evaluators were not informed whether a given translation was produced by an AI tool or a human translator.

3. Results

3.1 Overall Translation Quality Comparison

The quantitative evaluation results indicate a clear difference between AI-based and human translation quality across all assessed criteria. Overall, human translations achieved consistently higher mean scores compared to AI-based translations.

The analysis showed that AI-based translations performed moderately in accuracy, fluency, and contextual adequacy, with scores of 3.6, 3.8, and 3.4, respectively, but struggled with cultural appropriateness (2.9). Human translations consistently outperformed AI, scoring 4.6 in accuracy, 4.5 in fluency, 4.7 in contextual adequacy, and 4.6 in cultural appropriateness, demonstrating superior precision, naturalness, and cultural sensitivity.

The results demonstrate that while AI-based tools produce grammatically acceptable and fluent translations, they show noticeable weaknesses in conveying contextual and cultural meaning.

3.2 Domain-Specific Performance

Technical Texts

AI-based translations performed relatively well in technical texts, achieving high scores in accuracy (4.1) and fluency (4.0). Terminology was generally consistent, although occasional mistranslations of compound technical terms were observed. Human translations slightly outperformed AI translations, particularly in terminological precision.

Academic Texts

In academic texts, AI-based tools demonstrated moderate effectiveness, especially in translating general academic language. However, issues related to sentence structure and register appropriateness were identified. Human translations maintained higher consistency in style and clarity.

Legal Texts

AI-based translations showed significant limitations in legal texts. Errors included incorrect rendering of legal terminology and ambiguity in sentence interpretation. Human translations achieved substantially higher scores, reflecting a deeper understanding of legal conventions and precision requirements.

Literary Texts

The lowest performance of AI-based tools was observed in literary texts. AI translations struggled with idiomatic expressions, metaphors, and stylistic nuances, resulting in literal and sometimes misleading translations. Human translators demonstrated superior performance in preserving narrative tone and cultural meaning.

3.3 Qualitative Error Analysis

Qualitative analysis revealed recurring error patterns in AI-based translations, including:

Literal translation of idioms

Inaccurate handling of culturally embedded expressions

Misinterpretation of context-dependent meanings

Inconsistent rendering of polysemous words

These issues were particularly prominent in literary and legal texts, whereas technical texts exhibited fewer critical error

5. Discussion

The findings of this study confirm that AI-based translation tools and human translators exhibit distinct strengths and limitations in Uzbek–English translation. AI-based tools demonstrate satisfactory performance in domains characterized by standardized terminology and predictable sentence structures, such as technical and general academic texts. This supports previous research suggesting that machine translation is most effective in low-context and formulaic domains.

However, the results also highlight substantial limitations of AI-based translation when dealing with culturally rich and context-sensitive content. Uzbek idiomatic expressions, metaphorical language, and culturally specific references pose significant challenges for automated systems. These difficulties can be attributed to the limited availability of high-quality parallel corpora for Uzbek, as well as the language's agglutinative morphology and flexible word order.

Human translators consistently outperformed AI-based tools across all evaluation criteria, particularly in contextual adequacy and cultural appropriateness. This finding underscores the continued importance of human linguistic competence, interpretive skills, and cultural awareness in translation tasks that require nuanced understanding.

Importantly, the results suggest that AI-based translation tools should not be viewed as replacements for human translators, but rather as complementary resources. A hybrid translation model-where AI-generated translations are refined through human post-editing-

emerges as a practical and efficient approach, especially in professional and academic contexts.

6. Conclusion

This study provided an empirical comparison of AI-based and human translation quality in the context of Uzbek-English translation. The results demonstrate that while AI-based tools offer speed and accessibility and perform adequately in technical and general academic texts, they remain limited in handling legal and literary materials that require contextual and cultural sensitivity.

Human translators continue to play a crucial role in ensuring translation accuracy, cultural appropriateness, and stylistic fidelity, particularly for low-resource languages such as Uzbek. Based on the findings, the study recommends the adoption of hybrid translation workflows that combine the efficiency of AI tools with the expertise of human translators.

Future research may expand the dataset size, include additional AI translation systems, or investigate the effectiveness of post-editing strategies to further enhance translation quality for Uzbek–English language pairs.

REFERENCES::

1. Toury, G. (2012). Descriptive translation studies-and beyond (2nd ed.). John Benjamins.

2. Way, A. (2018). Quality expectations of machine translation. Translation Spaces, 7(2), 159–178. https://doi.org/10.1075/ts.18014.way

3. Newmark, P. (1988). A textbook of translation. Prentice Hall.

4. Koehn, P. (2020). Neural machine translation. Cambridge University Press. https://doi.org/10.1017/9781108600106