European International Journal of Philological Sciences (ISSN: 2751-1715)

Received: 22 November 2025 | Accepted: 14 December 2025 | Published: 19 January 2026

DOI: 10.55640/eijps-06-01-09

RESEARCH ARTICLE

Effectiveness Of Ai-Based Contextual And Culturally Adaptive Translation Models And Their Linguistic Analysis

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VOLUME: Vol.06 Issue01 2026

PAGE: 31-33

Abstract

This article analyzes the effectiveness of AI-based contextual and culturally adaptive translation models from a linguistic perspective. The study examines the ability of modern AI translation systems to process context, polysemy and culture-specific units. Using Uzbek culture-bound words such as "mahalla", "palov" and "toy" as examples, the paper demonstrates typical semantic and pragmatic difficulties of automatic translation. It is argued that despite the high level of formal accuracy, AI translation still requires linguistic and cultural supervision and should be regarded as a supportive rather than fully autonomous tool.

KEYWORDS

Artificial intelligence, machine translation, context, cultural adaptation, translation studies, pragmatics, culture-specific units.

INTRODUCTION

In recent years, artificial intelligence has fundamentally transformed the field of translation. Traditional rule-based and statistical machine translation systems have been gradually replaced by neural machine translation and large language models capable of generating fluent and coherent texts in many languages. Today, translation systems are no longer expected to transfer only the basic meaning of words and sentences, but also to preserve contextual coherence, pragmatic intention and cultural specificity of the source text (Jurafsky & Martin, 2020).

However, translation is not a purely technical operation. In linguistics and translation studies it has long been emphasized that translation is a complex communicative process in which not only language, but also culture, worldview and social norms are involved (Baker, 2018). This makes the evaluation of AI-based translation systems particularly important from a linguistic perspective.

Despite their impressive achievements, modern AI systems still demonstrate serious difficulties in dealing with context-dependent meanings, pragmatic nuances and culture-specific elements. Therefore, a detailed linguistic analysis of their effectiveness and limitations is required, especially when translating between languages with different cultural and conceptual systems, such as Uzbek and English.

The aim of this article is to analyze the effectiveness of AI-based contextual and culturally adaptive translation models and to identify their main linguistic strengths and weaknesses using examples from Uzbek–English translation practice.

Theoretical Background of AI-Based Translation Models

Modern AI-based translation systems are primarily based on neural networks and large language models. Unlike earlier approaches, which relied on predefined rules or statistical correlations between words, neural models operate with multidimensional semantic representations and process texts as sequences of interrelated units (Jurafsky & Martin, 2020).

From a linguistic point of view, this has significantly improved the quality of translation in terms of fluency and grammatical correctness. In many cases, AI-generated translations are indistinguishable from human ones at the surface level. However, fluency should not be confused with full semantic and pragmatic adequacy.

In translation studies, it is commonly accepted that equivalence is not only a matter of lexical meaning, but also of function, style and cultural value (Baker, 2018). This means that a translation can be formally correct and yet communicatively inappropriate.

Uzbek scholars have repeatedly emphasized that translation must preserve not only the informational content, but also the national and cultural specificity of the original (Rahmatullayev, 2006; Hojiyev, 2007; Yo'ldoshev, 2010). This requirement becomes especially challenging for AI-based systems, which mainly rely on statistical and probabilistic models rather than on conceptual cultural knowledge.

Context Modeling in Modern AI Translation Systems

One of the main advantages of modern AI translation systems is their ability to process context. Earlier machine translation systems often translated sentences in isolation, which resulted in numerous errors related to polysemy, reference and coherence. Modern systems, by contrast, can analyze larger textual segments and adjust their output accordingly.

For example, the English word "bank" can mean either a financial institution or the side of a river. In the sentences: "He sat on the bank and watched the river."

"She went to the bank to open an account."

Modern AI systems usually choose the correct Uzbek equivalents depending on the context. This shows a significant improvement compared to older systems. However, problems still arise when context requires not only textual, but also pragmatic or cultural interpretation. For instance, in narrative texts, reference resolution (who "he" or "she" refers to) is sometimes handled incorrectly when the system cannot properly model discourse structure.

In Uzbek–English translation, similar problems can be observed with words that have broad contextual usage. For example, the Uzbek word "gap" can mean "word", "speech", "matter", "issue" or even "promise", depending on the situation. AI systems do not always choose the pragmatically appropriate equivalent.

Cultural Adaptation and Ethnocultural Units in Translation

A much more difficult problem for AI-based translation systems is the translation of ethnocultural and culture-specific units. Such units are deeply embedded in the cultural and social life of a nation and cannot be fully understood outside this context (Rahmatullayev, 2006).

For example, the Uzbek word "mahalla" is often translated as "neighborhood" or "community". While this translation is partially correct, it does not reflect the institutional, social and cultural role of mahalla as a specific form of social organization in Uzbek society.

Similarly, the word "palov" is often translated as "rice dish" or "pilaf". From a purely denotative point of view, this is acceptable, but it ignores the symbolic and cultural significance of palov as a central element of hospitality, celebrations and social rituals. The word "to'y" is another illustrative example. It is usually translated as "wedding", but in Uzbek culture to'y is not only a wedding ceremony, but a large social event with complex traditions, norms and expectations. AI systems rarely provide any indication of this broader cultural meaning.

As Yo'ldoshev (2010) notes, translation should transfer not only linguistic meaning, but also cultural content. In this respect, AI systems still remain at a very limited level.

Typical Linguistic and Pragmatic Errors of AI Translation

From a linguistic perspective, AI translation errors can be divided into several main types.

First, semantic errors occur when the system chooses the wrong meaning of a polysemous word. Second, pragmatic errors appear when the translation is grammatically correct but communicatively inappropriate. Third, cultural errors arise when culture-specific meaning is lost or distorted. For example, in Uzbek polite speech, indirect forms and respect markers play an important role. The sentence "Siz o'tiring" can be translated simply as "Sit down", but in English this may sound too direct or even rude in certain contexts. A more appropriate translation would be "Please, have a seat." AI systems do not always take such pragmatic nuances into account.

Another typical problem is stylistic neutralization. As Mahmudov (2008) points out, expressive and emotional elements are essential in many texts. AI systems often simplify

such texts and reduce their stylistic richness.

Effectiveness and Limits of AI-Based Translation Models

There is no doubt that AI-based translation systems are extremely effective in technical, scientific and informational texts. They provide fast, relatively accurate and economically efficient translations. However, in literary, culturally rich and pragmatically complex texts, their limitations become evident. From a linguistic point of view, these systems still operate mainly on formal correlations rather than on deep semantic and cultural understanding.

Hojiyev (2007) emphasizes that translation always requires linguistic awareness and cultural competence. This means that AI translation should not be regarded as a full replacement for human translators, but rather as a powerful assisting tool.

The most promising approach seems to be a hybrid model in which AI performs the main translation work, while human specialists ensure semantic, pragmatic and cultural adequacy.

In fact, the current stage of AI-based translation development clearly shows that the main challenge is no longer purely technical, but conceptual and linguistic in nature. Modern systems already demonstrate high speed and acceptable semantic accuracy, yet they still treat language primarily as a formal structure rather than as a carrier of culture, values and social experience. This becomes especially evident in translations involving Uzbek culture-specific concepts, where the system often chooses formally correct but culturally shallow solutions. From this perspective, the future of AI translation should not be seen as a competition between human and machine, but as a process of functional cooperation, in which artificial intelligence performs large-scale and routine operations, while the human specialist remains responsible for interpretative, pragmatic and cultural adequacy. Such a division of roles seems not only realistic, but also methodologically justified, because it allows technological efficiency to be combined with linguistic and cultural competence. Therefore, the real progress in this field should be measured not only by improvements in algorithmic performance, but also by the extent to which AI systems become more sensitive to discourse, culture and communicative intention.

CONCLUSION

The article shows that AI-based contextual and culturally adaptive translation models represent a significant technological achievement. They are highly effective in processing context and ensuring general semantic coherence.

However, their ability to deal with cultural and pragmatic meaning remains limited. Using Uzbek culture-specific units such as “mahalla”, “palov” and “to‘y” as examples, it becomes clear that AI systems often produce formally correct but culturally impoverished translations.

Therefore, from a linguistic perspective, AI translation should be considered not as an autonomous solution, but as a tool that requires human supervision and cultural expertise. Further development of such systems should focus on integrating cultural knowledge, pragmatic models and discourse-level semantics.

REFERENCES

1. Baker, M. (2018). In Other Words: A Coursebook on Translation. London: Routledge. pp. 1–15, 233–245.
2. Hojiyev, A. (2007). An Explanatory Dictionary of Linguistic Terms. Tashkent: Fan. pp. 10–22.
3. Jurafsky, D., & Martin, J. H. (2020). Speech and Language Processing. Pearson. pp. 1–10, 345–360.
4. Mahmudov, N. (2008). Issues of Speech Culture and Stylistics. Tashkent. pp. 85–102.
5. Rahmatullayev, Sh. (2006). Modern Uzbek Lexicology. Tashkent. pp. 45–62, 110–125.
6. Yo‘ldoshev, M. (2010). Text and Its Linguistic Analysis. Tashkent. pp. 30–45, 150–165.