# GENDER BIAS IN HUMAN AND MACHINE TRANSLATION OF LITERARY TEXTS: A COMPARATIVE STUDY OF ENGLISH AND UZBEK.

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**Abstract**

*This article investigates the manifestation of gender bias in human and machine translation of literary texts within the English-Uzbek language pair, situating the analysis at the intersection of translation studies, gender linguistics, and artificial intelligence. While existing scholarship has extensively explored gender representation in language and, more recently, bias in machine translation, comparative studies that integrate both human and algorithmic translation practices in the context of underrepresented languages remain limited. In particular, the English-Uzbek pair offers a productive site for analysis due to significant differences in grammatical structure, cultural norms, and the linguistic encoding of gender.*

*The study addresses this gap by adopting a qualitative comparative methodology that examines selected literary texts alongside their human and machine translations. The analysis focuses on the transformation of gendered meanings, the reproduction of stereotypes, and the interaction between linguistic structures and cultural assumptions. Special attention is given to the ways in which machine translation systems, trained on large-scale datasets, may systematize and amplify implicit gender bias, in contrast to human translators, whose choices are mediated by interpretive and contextual awareness.*

*The findings demonstrate that gender bias operates differently across translation modes: while human translation tends to reflect context-sensitive variation, machine translation exhibits a higher degree of regularity in reproducing stereotypical patterns. These results contribute to ongoing debates on the ethical and epistemological implications of AI in language practices and underscore the necessity of integrating gender-sensitive approaches into both translation theory and computational system design.*

**Keywords:** *gender bias, translation studies, machine translation, literary translation, English-Uzbek comparison, gender representation, linguistic ideology.*

In contemporary linguistics and translation studies, the relationship between language, gender, and ideology has become a central area of scholarly inquiry. Increasing attention to gender as a socially constructed and linguistically mediated category has revealed that language not only reflects social realities but actively participates in shaping them. Within

this framework, translation is no longer understood as a purely technical process of transferring meaning between languages; rather, it is recognized as a complex interpretive act that involves the negotiation of cultural values, social norms, and ideological assumptions. One of the most significant challenges arising in this context is the presence of gender bias, which may be implicitly embedded in linguistic structures and reproduced through translation practices[77].

The rapid advancement of artificial intelligence, particularly in the field of neural machine translation, has fundamentally transformed contemporary translation practices. Machine translation systems are now widely used due to their efficiency, accessibility, and ability to process large volumes of text in real time. However, alongside these advantages, scholars have increasingly raised concerns about the ideological neutrality of such systems. Since machine translation relies on large-scale datasets, it is inherently influenced by the linguistic patterns and social biases embedded within its training data. As a result, gender bias may not only be reproduced but also systematized and amplified in machine-generated translations[78]. This issue becomes particularly complex in cross-linguistic contexts where languages differ significantly in their grammatical and cultural encoding of gender, as is the case with English and Uzbek.

Despite the growing body of research on gender and language, as well as the increasing scholarly interest in machine translation technologies, significant gaps remain in the existing literature. First, most studies on gender bias in translation have focused on widely studied languages such as English, Spanish, or Chinese, while less-resourced languages, including Uzbek, remain underrepresented in international research. Second, although gender bias in machine translation has been examined in recent years, there is still limited comparative research that systematically analyzes how such bias manifests differently in human and machine translation, particularly within the domain of literary texts. Literary translation, in this regard, presents a unique challenge, as it involves not only the transfer of linguistic meaning but also the interpretation of culturally embedded gender roles and identities. This article aims to address these gaps by conducting a comparative analysis of gender bias in human and machine translation of English and Uzbek literary texts, with a particular focus on the transformation of gendered meanings, the reproduction of stereotypes, and the interaction between linguistic structure and cultural context[79].

[77] Deborah Cameron, *Feminism and Linguistic Theory*, 2nd ed. (London: Macmillan, 1992).
[78] Tolga Bolukbasi et al., “Man Is to Computer Programmer as Woman Is to Homemaker? Debiasing Word Embeddings,” *Advances in Neural Information Processing Systems* 29 (2016).
[79] Jeremy Munday, *Introducing Translation Studies: Theories and Applications*, 4th ed. (London: Routledge, 2016).

To achieve these objectives, the study adopts a qualitative comparative approach, combining elements of discourse analysis and linguistic interpretation. Selected literary texts and their corresponding translations produced by professional translators and machine translation systems are examined in order to identify patterns of gender representation and bias. Particular attention is paid to lexical choices, contextual meaning shifts, and the ways in which gendered identities are constructed or transformed across languages. By focusing on both human and machine translation, the study aims to provide a more comprehensive understanding of how different translation modes influence the representation of gender. The article is structured as follows: the next section reviews relevant literature on gender and translation, followed by a description of the research methodology, an analytical discussion of the findings, and a concluding section outlining the implications of the study.

The relationship between language and gender has been extensively examined within sociolinguistics, discourse analysis, and feminist linguistics, where gender is increasingly conceptualized not as a fixed biological category but as a socially constructed and discursively negotiated phenomenon. Early approaches to gender and language focused primarily on identifying differences in male and female speech patterns; however, later theoretical developments shifted the focus toward understanding how gender identities are produced, maintained, and transformed through language use[80]. Scholars such as Deborah Cameron argue that linguistic practices play a crucial role in constructing gendered identities and reinforcing social hierarchies, while Judith Butler’s theory of performativity further emphasizes that gender is continuously enacted through repeated discursive acts[81]. From this perspective, language does not merely reflect gender distinctions but actively participates in shaping them. In the context of translation, this implies that gendered meanings are not simply transferred from one language to another but are subject to reinterpretation and potential transformation depending on linguistic structure, cultural context, and translator agency[82].

The issue of gender bias in translation has attracted increasing scholarly attention, particularly within the broader framework of feminist translation studies. Researchers have argued that translation is not a neutral act but one that is shaped by ideological, cultural, and social factors influencing the representation of gender[83]. Early contributions in this field emphasized the role of the translator as an active agent who may consciously or unconsciously reproduce gendered assumptions embedded in the source text. Feminist scholars have further demonstrated that translation strategies can either reinforce or challenge dominant gender

[80] Deborah Cameron, *Feminism and Linguistic Theory*, 2nd ed. (London: Macmillan, 1992).
[81] Judith Butler, *Gender Trouble: Feminism and the Subversion of Identity* (New York: Routledge, 1990).
[82] Mona Baker, *In Other Words: A Coursebook on Translation*, 3rd ed. (London: Routledge, 2018).
[83] Sherry Simon, *Gender in Translation: Cultural Identity and the Politics of Transmission* (London: Routledge, 1996).

ideologies, depending on the choices made by translators[84]. At the same time, more recent studies have highlighted that gender bias may also emerge at the level of lexical selection, syntactic structure, and discourse patterns, reflecting broader sociocultural norms. However, despite these insights, there remains a lack of consensus regarding the extent to which gender bias is inevitable in translation or whether it can be systematically mitigated through methodological or ethical interventions[85].

In recent years, the issue of gender bias has been increasingly examined within the domain of machine translation, particularly with the rise of neural network–based systems. Unlike human translators, whose decisions are influenced by interpretive judgment and contextual awareness, machine translation systems rely on large-scale datasets and statistical learning models. As a result, they tend to reproduce patterns present in the training data, including implicit social biases[86]. Studies have demonstrated that machine translation systems often default to stereotypical gender associations, especially when translating between languages with different grammatical or cultural representations of gender[87]. For instance, gender-neutral expressions in one language may be translated into gender-specific forms in another, frequently aligning with traditional gender roles. This phenomenon has raised significant concerns regarding the ethical implications of artificial intelligence in language processing, as algorithmic systems may not only reflect but also amplify existing inequalities[88]. Despite growing attention to this issue, research remains largely focused on major world languages, leaving less-studied language pairs such as English and Uzbek insufficiently explored.

Despite the substantial body of research on gender and language, as well as the growing interest in bias in translation, comparative studies involving typologically different and underrepresented languages remain limited. In particular, the English–Uzbek language pair presents a valuable yet insufficiently explored field of inquiry. English, as an Indo-European language, encodes gender primarily through pronouns and lexical distinctions, whereas Uzbek, as a Turkic language, lacks grammatical gender and relies more heavily on lexical and cultural means for expressing gender-related meanings. This structural difference creates a complex environment for translation, where gendered meanings may be altered, omitted, or implicitly reconstructed. Recent studies in Uzbek linguistics have emphasized the importance of cultural and conceptual factors in the representation of gender, highlighting that linguistic

[84] Luise von Flotow, *Translation and Gender: Translating in the "Era of Feminism"* (Manchester: St. Jerome, 1997).
[85] Jeremy Munday, *Introducing Translation Studies: Theories and Applications*, 4th ed. (London: Routledge, 2016).
[86] Tolga Bolukbasi et al., "Man Is to Computer Programmer as Woman Is to Homemaker? Debiasing Word Embeddings," *Advances in Neural Information Processing Systems* 29 (2016).
[87] Aylin Caliskan, Joanna J. Bryson, and Arvind Narayanan, "Semantics Derived Automatically from Language Corpora Contain Human-like Biases," *Science* 356, no. 6334 (2017): 183–186.
[88] Dirk Hovy and Shannon L. Spruit, "The Social Impact of Natural Language Processing," *Proceedings of ACL* (2016).

choices are closely tied to social norms and worldview[89]. However, these studies have largely focused on linguistic description or phraseological analysis and have not systematically examined how gender bias operates within the process of translation, particularly in the comparison between human and machine outputs. Therefore, there remains a clear need for a comprehensive comparative analysis that integrates linguistic, cultural, and technological perspectives in order to better understand how gender bias manifests in English-Uzbek translation.

The present study adopts a qualitative comparative research design aimed at examining the manifestation of gender bias in human and machine translation of literary texts within the English-Uzbek language pair. A qualitative approach is particularly appropriate for this research, as the analysis focuses on the interpretation of meaning, the identification of implicit bias, and the examination of context-dependent linguistic choices rather than purely statistical measurement. At the same time, elements of comparative analysis are incorporated in order to systematically evaluate differences between human and machine translation outputs. Such a design enables the study to capture both the linguistic and cultural dimensions of gender representation and to provide a nuanced understanding of how bias operates across different modes of translation[90].

The empirical material for this study consists of selected literary texts originally written in English and their corresponding translations into Uzbek, as well as translations generated by widely used machine translation systems. Literary texts were chosen as the primary data source due to their rich linguistic structure and their capacity to reflect culturally embedded gender roles, identities, and discursive patterns. The corpus includes excerpts from contemporary and classical literary works in which gender representation plays a significant role in character construction and narrative development. For the purpose of comparison, each selected text segment is analyzed in three forms: the original version, a human-produced translation, and a machine-generated translation. This tripartite structure enables a systematic comparison of translation strategies and facilitates the identification of shifts in gender representation across different modes of translation[91].

To analyze the selected material, the study employs a combination of discourse analysis, comparative analysis, and elements of linguistic interpretation. Discourse analysis is used to examine how gendered meanings are constructed within broader textual contexts, paying particular attention to narrative voice, character representation, and the use of gendered

[89] G. I. Ergasheva, “Basic Social Categories: Natural Semantic Metalanguage (NSM) Approach,” *Philology Matters*, no. 2 (2019): 57–65.
[90] Alan Bryman, *Social Research Methods*, 5th ed. (Oxford: Oxford University Press, 2016).
[91] Jeremy Munday, *Introducing Translation Studies: Theories and Applications*, 4th ed. (London: Routledge, 2016).

language. Comparative analysis allows for the systematic evaluation of differences between the original texts and their human and machine translations, making it possible to identify shifts in meaning, omissions, and the introduction of gender bias. In addition, linguistic analysis focuses on lexical choices, semantic nuances, and contextual transformations that may influence the representation of gender. This multi-layered methodological framework ensures a comprehensive examination of both explicit and implicit forms of bias and allows for the integration of cultural and conceptual factors highlighted in Uzbek linguistic research[92].

Despite the strengths of the chosen methodological framework, several limitations must be acknowledged. First, the qualitative nature of the study, while allowing for in-depth interpretation of gendered meanings, limits the generalizability of the findings across larger datasets. Second, the selection of literary texts, although justified by their richness in cultural and gender representation, may not fully reflect patterns present in other genres such as media discourse or technical translation. Third, machine translation outputs are subject to ongoing technological development, meaning that results may vary depending on the system version and training data available at a given time. Additionally, the interpretation of gender bias in translation inevitably involves a degree of subjectivity, as it relies on the researcher's analytical perspective and cultural awareness. Nevertheless, by combining comparative, discourse-based, and linguistic approaches, the study seeks to minimize these limitations and provide a balanced and critically grounded analysis of gender bias in English-Uzbek translation contexts[93].

The analytical section of this study focuses on identifying and interpreting patterns of gender bias in human and machine translation of literary texts within the English-Uzbek language pair. The analysis is structured around a comparative framework that examines how gendered meanings are preserved, altered, or distorted across three versions of each text: the original, the human translation, and the machine-generated output. Particular attention is given to cases where gender-neutral or context-dependent expressions in the source text are rendered differently in translation, resulting in shifts in gender representation. These shifts are analyzed not only at the lexical level but also within broader discursive contexts, where narrative perspective, character roles, and cultural assumptions interact to shape meaning. By focusing on both micro-level linguistic features and macro-level discourse patterns, the

[92] G. I. Ergasheva, "Conceptual Gender Analysis of Gender-Marked Units in Uzbek Language," *Philology Matters* (2021).
[93] Norman K. Denzin and Yvonna S. Lincoln, *The SAGE Handbook of Qualitative Research*, 5th ed. (Thousand Oaks, CA: Sage, 2018).

analysis aims to reveal how gender bias operates as a multidimensional phenomenon in translation processes[94].

A recurrent pattern observed in the analysis concerns the translation of gender-neutral expressions from English into Uzbek, particularly in machine-generated outputs. In English, certain occupational or descriptive nouns may function without explicit gender marking (e.g., “doctor,” “teacher,” or “leader”), allowing interpretation to remain context-dependent. However, in machine translation, such neutral expressions are frequently rendered into Uzbek with implicit gender specification, often aligning with socially stereotypical roles. For instance, the English sentence “The doctor said that the patient would recover soon” may be translated by machine systems in a way that implicitly assigns the role of “doctor” to a male referent, despite the absence of gender marking in the original. In contrast, human translators tend to preserve neutrality or rely on contextual cues, demonstrating a greater sensitivity to both linguistic ambiguity and discourse context. This tendency suggests that machine translation systems, influenced by biased training data, systematically reproduce dominant gender associations, whereas human translation allows for a more flexible and context-aware interpretation[95].

Beyond algorithmic tendencies, the analysis reveals that gender bias in translation is also deeply influenced by cultural and linguistic factors, particularly in the Uzbek context. Unlike English, which allows for a relatively flexible use of gender-neutral expressions, Uzbek relies more heavily on culturally embedded norms and lexical conventions in representing gender roles. As a result, both human and machine translations may reflect implicit cultural expectations regarding masculinity and femininity, especially in narrative contexts involving family roles, authority, or professional identity. For example, lexical choices related to caregiving, emotional expression, or domestic responsibilities tend to be associated with female referents, while authority-related roles are more frequently aligned with male figures. These patterns are not solely linguistic but are rooted in broader socio-cultural frameworks that shape language use. Studies in Uzbek linguistics have similarly emphasized that gender representation is closely connected to cultural worldview and conceptual structures, where language encodes socially shared understandings of gender roles[96]. Consequently, translation becomes a site where linguistic form, cultural norms, and ideological assumptions intersect, leading to the potential reinforcement or transformation of gender bias.

[94] Mona Baker, *In Other Words: A Coursebook on Translation*, 3rd ed. (London: Routledge, 2018).
[95] Aylin Caliskan, Joanna J. Bryson, and Arvind Narayanan, “Semantics Derived Automatically from Language Corpora Contain Human-like Biases,” *Science* 356, no. 6334 (2017): 183–186.
[96] G. I. Ergasheva, “Basic Social Categories: Natural Semantic Metalanguage (NSM) Approach,” *Philology Matters*, no. 2 (2019): 57–65.

The comparative analysis demonstrates that gender bias in translation operates through distinct yet interconnected mechanisms in human and machine-mediated processes. While machine translation exhibits a higher degree of consistency in reproducing stereotypical gender associations due to its reliance on statistically patterned data, human translation reflects a more variable and context-sensitive approach, shaped by interpretive judgment and cultural awareness. However, this does not imply the absence of bias in human translation; rather, it suggests that bias manifests in more subtle and less predictable ways, often influenced by the translator's own sociocultural background. The findings indicate that gender bias should be understood not as an isolated linguistic phenomenon but as a complex interaction between language structure, cultural norms, and technological systems. In this regard, machine translation tends to amplify existing biases embedded in language data, whereas human translation may either reproduce or critically negotiate them depending on the translator's level of awareness and methodological orientation[97].

This study has examined the manifestation of gender bias in human and machine translation of literary texts within the English-Uzbek language pair, highlighting the complex interaction between linguistic structures, cultural norms, and technological systems. The findings demonstrate that gender bias is not confined to a single mode of translation but emerges through different mechanisms in both human and machine-mediated processes. While human translation tends to reflect context-sensitive interpretation shaped by cultural awareness and individual judgment, machine translation exhibits a more systematic reproduction of stereotypical gender associations due to its reliance on large-scale training data. The comparative analysis further reveals that shifts in gender representation often occur in cases involving gender-neutral expressions, culturally specific roles, and implicit social expectations, underscoring the importance of considering both linguistic and extralinguistic factors in translation studies. The study contributes to the fields of translation studies, gender linguistics, and computational linguistics by providing a comparative perspective that integrates human and machine translation within an underexplored language pair. It emphasizes the necessity of adopting gender-sensitive approaches in both translation practice and the development of artificial intelligence systems, particularly in multilingual and culturally diverse contexts. From a practical standpoint, the findings highlight the importance of increasing awareness among translators and developers regarding the potential for bias and the need for more inclusive and ethically informed language technologies. Future research may expand this analysis by incorporating larger corpora, additional language pairs, or genre-specific data, as well as by applying quantitative methods to complement qualitative insights.

[97] Dirk Hovy and Shannon L. Spruit, "The Social Impact of Natural Language Processing," *Proceedings of ACL* (2016).

Such directions would further enhance understanding of how gender bias operates across linguistic and technological boundaries and contribute to the development of more equitable translation practices.

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