LatIA. 2025; 3:311
doi: 10.62486/latia2025311
ISSN: 3046-403X

SYSTEMATIC REVIEW

Artificial intelligence tools for automating philological text research

Herramientas de inteligencia artificial para automatizar la investigación filológica de textos

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Cite as: Bakhov I, Ishchuk N, Hrachova I, Dzhydzhora L, Strashko I. Artificial intelligence tools for automating philological text research. LatIA. 2025; 3:311. https://doi.org/10.62486/latia2025311

Submitted: 03-06-2024 **Revised:** 18-12-2024 **Accepted:** 11-07-2025 **Published:** 12-07-2025

Editor: PhD. Rubén González Vallejo

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ABSTRACT

Introduction: in recent years, artificial intelligence (AI) has significantly advanced across various fields, including linguistics, particularly in translation. While AI offers substantial opportunities for translation automation, scholarly debates continue regarding its reliability and impact on the translation process.
Objective: this study aims to analyze the role of artificial intelligence in automating linguistic research and to provide a comprehensive evaluation of its main advantages and limitations compared to human translation.
Method: the study employs a systematic literature review based on scientific articles from Google Scholar, ResearchGate, and Scopus. A total of 55 scientific articles were analyzed, 25 specifically focused on automated translation's characteristics and challenges.
Results: the findings indicate that collaboration between human translators and artificial intelligence is the most effective approach. AI is an auxiliary tool that enhances translation efficiency but cannot fully replace human translators due to their unique ability to convey emotions, cultural subtleties, and linguistic nuances. AI has great potential in overcoming language barriers but remains limited in comprehending cultural context and stylistic intricacies.
Conclusions: the optimal use of AI in translation is in cooperation with human translators. While AI can significantly augment translation efficiency, it cannot entirely replace human expertise, particularly in literary and academic texts.

Keywords: Artificial Intelligence as a Support Tool; Automatic Translation; Human Translator, Literature; Philology, Text Analysis Tools.

RESUMEN

Introducción: en los últimos años, la inteligencia artificial (IA) ha avanzado significativamente en diversos campos, incluida la lingüística, especialmente en el ámbito de la traducción. Si bien la IA ofrece amplias oportunidades para la automatización de la traducción, persisten debates académicos sobre su fiabilidad y su impacto en el proceso traductológico.
Objetivo: este estudio tiene como objetivo analizar el papel de la inteligencia artificial en la automatización de la investigación lingüística y proporcionar una evaluación integral de sus principales ventajas y limitaciones

en comparación con la traducción humana.
Método: el estudio se basa en una revisión sistemática de la literatura utilizando artículos científicos obtenidos de Google Scholar, ResearchGate y Scopus. Se analizaron un total de 55 artículos científicos, de los cuales 25 se centraron específicamente en las características y desafíos de la traducción automatizada.
Resultados: los hallazgos indican que la colaboración entre traductores humanos e inteligencia artificial es el enfoque más eficaz. La IA actúa como una herramienta auxiliar que mejora la eficiencia de la traducción, pero no puede sustituir por completo al traductor humano debido a su capacidad única para transmitir emociones, sutilezas culturales y matices lingüísticos. La IA tiene un gran potencial para superar barreras idiomáticas, pero sigue siendo limitada en la comprensión del contexto cultural y las complejidades estilísticas.
Conclusiones: el uso óptimo de la IA en la traducción se da en cooperación con traductores humanos. Aunque la IA puede aumentar significativamente la eficiencia de la traducción, no puede reemplazar por completo la experiencia humana, especialmente en textos literarios y académicos.

Palabras clave: Inteligencia Artificial como Herramienta de Apoyo; Traducción Automática; Traductor Humano; Literatura; Filología; Herramientas de Análisis de Texto.

INTRODUCTION

Artificial intelligence (AI) is rapidly developing in various fields, influencing society by changing language and cultural habits in the arena of translation and overcoming language barriers.[1] The possibilities offered by AI for translation are promising, but the use of such rapidly evolving translation machines raises questions among specialists about their reliability and significant impact on the translation industry,[2] further investigations arise concerning the effects and comparative roles of AI in relation to human translators. Thus, this paper aims to analyze the current state of AI, its capabilities and tools used in text automation in linguistic research. In addition, the paper explores the limitations and risks associated with artificial intelligence, with a focus on the leading role of human translators in the translation process. In recent years, artificial intelligence (AI) has become an important tool for automating philological textual research, offering great opportunities for learning and analyzing linguistic content.[3] AI algorithms such as BERT, RankBrain, and Google's Neural Matching have meaningfully improved the capability of search engines to construe and respond to user queries – even when those questions include spelling mistakes, vague wording, or grammatical errors. These technologies help match user determined with appropriate information, refining the overall correctness and practicality of search results. Such AI capabilities allow correcting spelling mistakes in queries and even recognizing musical compositions from fragmented data stored in memory. Similarly, voice assistants such as Alexa, Siri, and Google Assistant are rapidly improving and are able to understand user speech and queries. Natural language processing (NLP) is used in search engines, but AI is also used to create, edit and structure texts, especially in the field of philology, journalism and literary studies.[4] For a philologist, AI offers great opportunities by automating the analysis of massive textual data, which allows you to identify recurring themes, structures, and linguistic constructions.

This creates new perspectives for cross-linguistic text analysis, style comparison, and the detection of hidden meanings. Modern AI tools are already being used in web editing to improve SEO and optimize text content, speeding up research, analyzing user preferences, finding keywords, and optimizing page structure.[5] Today, OpenAI's ChatGPT is capable of performing tasks such as text writing, translation, code development, and SEO optimization. The AI-enabled SiteW editor allows users to automatically optimize texts for SEO and improve existing content, saving time and allowing authors to focus on deeper research.

Artificial intelligence (AI) is developing rapidly, covering more and more areas and having a significant impact on society. In the translation industry, AI has the potential to change traditional approaches to interacting with languages and cultures, which is aimed at reducing language barriers. This is what strengthens the position of artificial intelligence applications, including machine translation and its use in such fields as medical sciences, computer science, etc. AI is changing the way humans interact with the linguistic environment and altering traditional approaches. Though AI proposes several advantages – such as amplified efficiency, data processing, and automation, it also increases important ethical, social, and security fears. Consequently, its expansion and application should be moved toward with careful attention and controlling oversight. AI has its limitations, contradictions, and drawbacks. In the context of automated translation, the accuracy and care of a human translator remains crucial, as AI still makes some mistakes in translation. Therefore, this article examines the boundaries between the roles of human translators and AI in the field of translation studies and in the humanities and social sciences. Thus, the main research question is whether it is possible to use AI to automate philological textual research in the above-mentioned academic fields.

While the field of artificial intelligence has great potential for text analysis and linguistics in general,

there are significant challenges in automating complex linguistic texts that require subtle interpretation across different language and contextual sets. While AI models have significant capabilities, they often face the challenges of linguistic ambiguity, lexical variation, and limited resource availability for less common languages.

Thus, the aim of this article was to systematically review and critically analyze the state-of-the-art AI tools currently being actively used to automate linguistic text analysis. The analysis focused on assessing the use of natural language processing (NLP) methods in the above-mentioned tools, their potential to manage linguistic diversity, and their corresponding efficiency in processing massive texts.

Research Focus

Research Aim and Research Questions

Therefore, the aim of this article is a comprehensive review of the literature and study of existing AI tools for the automation of philological texts. The leading question of the research was whether automated translation with AI is effective for the humanities. The hypothesis of the work was that the human translator is still the main one in the translation process. Human knowledge and experience are crucial for the authenticity and accuracy of the translation.

Theoretical Framework

AI in natural language processing (NLP) is a leading area of research. AI helps humans and machines interact, thus playing a leading role in the development of automated text analysis tools. Thanks to machine learning techniques and modern language models, NLP is driving the development of processes such as sentiment analysis, text summarization, and chatbot creation, which have already become part of everyday services.[6] However, NLP faces a number of challenges, including linguistic ambiguity, lack of resources for processing less common languages, and ethical issues arising from the bias of the data used to train models.

According to Kaliuta, the use of machines and software that can think like humans was a real breakthrough that shaped the evolution of artificial intelligence. With the growing access to large amounts of data, in particular due to the development of the Internet, companies have begun to use this information to improve their products and services. Deep neural networks, which mimic the structure of the human brain, have made an important contribution to machine learning, leading to significant advances in the fields of image recognition and automatic translation.[7] Neural networks have a multi-layered structure that allows for efficient processing and analysis of complex data, providing a new level of automation.

NLP also plays an important role in the development of artificial intelligence tools for automating philological textual research, providing opportunities for analyzing linguistic content that were previously unavailable. The integration of machine and deep learning algorithms, image processing, computer vision, and expert systems into research allows automating text processing and analyzing literary sources, speeding up and improving the work of researchers.

From the perspective of modern AI, software agents are being created that can learn and make decisions by interacting with the environment through reinforcement learning.[8] In medicine, in particular, probabilistic thinking helps in making critical decisions. At the same time, recommender systems and process automation, surpassing human efficiency, are actively used in areas where fast information processing is required. Recommender systems create personalized suggestions based on user preferences, while automation optimizes processes in the financial sector and management.

Automated translation systems, for example, are already exceeding the expectations of many users. According to Pelau, Dabija, Ene, such systems can translate large volumes of text quickly and efficiently, which significantly reduces costs and speeds up the translation process.[9] For example, books written in foreign languages can be translated in seconds when connected to the Internet, making translation more accessible. According to research, "the advantage of automatic translation is not so much the quality of the text as the speed and reduced costs. These platforms also demonstrate high translation quality for languages with a large amount of available data, such as English, as AI is able to recognize even cultural and historical nuances.[10] Some systems have learned to reproduce the author's style, making the translation closer to the original. This is especially useful in philological research, allowing you to dive deeper into the text, even without a perfect knowledge of the source language.

Automated translation has also become a powerful tool for scientific research, changing traditional approaches to publishing and interacting with foreign language sources. According to Suter, the traditional model of publishing scholarly works, which used to be based on printed publications, is rapidly evolving thanks to digital innovations and multilingual platforms that use automatic translation.[11] Today, these technologies make it possible to create access to information for researchers in different countries and with different language abilities.

Thus, AI enables the integration of tools such as translation memories, terminology databases, stylistic and grammatical correctors, which greatly facilitates text analysis and can be used to train automatic

translation models. However, despite the benefits of automation, AI cannot completely replace a professional translator, especially in terms of creative adaptation and subtle nuances of the text. The role of the translator remains critical, even with the development of automated systems, which demonstrates the complexity and multifaceted nature of translation, where the advantages and disadvantages of AI coexist, expanding the horizons for automating linguistic research.

METHOD

The systematic literature review (SLR) method was used in the work. A clear and structured approach enabled the identification, selection and analysis of scientific sources related to the use of AI for automating linguistic analysis of texts. With the help of (SLR) information was obtained and a summary of relevant research (publications, methodologies, results and potential avenues for further research in this area) was made. The described stages of the analysis were systematically planned and documented. This ensured transparency and demonstrability of the results.

Planning Phase

The planning stage included outlining the main research objectives and analyzing the research questions. Such planning enabled prioritizing tasks for data collection and analysis, including identifying critical aspects of the role of AI in automating philological text analysis. For this purpose, a protocol was created defining the criteria for inclusion and exclusion of publications. Keywords were used to search the literature. They were used to filter materials and standardize the quality assessment of publications.

Conducting Phase

The study primarily established eligibility criteria for publications, allowing the selection of articles that addressed the research questions and met the predetermined inclusion and exclusion requests. The succeeding step involved conducting an extensive literature search across scientific databases such as Google Scholar, ResearchGate, and Scopus, which helped identifying relevant sources pertinent to the research topic. The search string for databases was the following keywords: “artificial intelligence”, “philological analysis”, “text automation”. The search was limited to articles published between 2015 and 2024, in English.

After collecting a pool of potential publications, they were systematically evaluated based on specific criteria, warranting that only the most pertinent studies were engaged. The quality of each selected source was then evaluated to establish the credibility and reliability of the publications. During the data extraction process, key information was systematically gathered, including significant findings, methodological approaches, and results. These stages guaranteed rigorous data collection and processing for succeeding analysis.

Documenting Phase

The documentation phase involved presenting the findings of the systematic literature review in an ample report, which provided an in-depth analysis of the main insights resulting from the reviewed scientific publications. The results were dispersed to the academic community, contributing to the exchange of knowledge and offering suggestions for future research in the automation of philological text analysis through the application of artificial intelligence tools (figure 1).

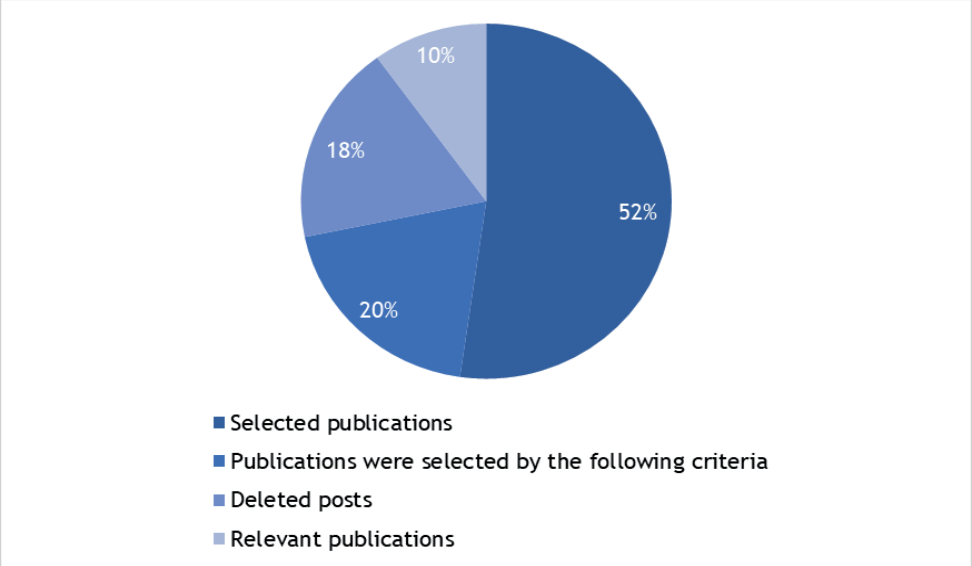

Figure 1. Diagram of the screening process of the publication selection process

Inclusion Criteria

For this purpose, publications published between 2019 and 2024 were selected. The chief criterion for inclusion was the accessibility of the publications in open full text, guaranteeing maximum accessibility to the information. The selected publications were mandatory to be in one of three main languages: English (80 % of sources), Ukrainian (10 %), and French (10 %). This language sharing was intended to provide a diverse range of sources and ensure demonstration from key scientific communities engaged in the automation of philological research.

Also, publications had to cover relevant terms such as "artificial intelligence," "automatic translation," "philology," or related keywords in their title or abstract, simplifying the identification of sources pertinent to the research topic. The inclusion parameters were the availability of peer-reviewed articles and conference presentations. This guarantees high academic quality and reliability of the sources.

Exclusion Criteria

Scientific papers published before 2019 were excluded, as these articles may be irrelevant to the trends in the application of AI in philology. Review articles were also excluded due to the lack of new empirical data. They may not contribute to the systematic analysis aimed at this study. Scientific papers written in languages other than English, Ukrainian, or French were also excluded. A quality assessment system was used in the work, which also enabled consistency in the language base and reduced possible problems with translation and interpretation of the results. The next step was to extract similar articles and analyze the relevance of the results of each study to the objectives of the literature review. The main criteria for inclusion were relevance to the topic and consistency in goals, objectives, and methodology.

Instruments and Procedures

In total, 55 scientific papers were analyzed from a total list of 287 publications found in the selected databases related to the use of AI for automating philological text analysis. The purpose of these manipulations was to identify gaps in current research and describe the prospects for further research, revealing the presented topic. Data collection involved a comprehensive search of academic databases such as Google Scholar, ResearchGate, and Scopus to identify appropriate publications. Following the selection process, a detailed analysis and synthesis of the information were conducted, which enabled the formulation of the main conclusions regarding the use of AI in automating philological text analysis. Lastly, a thorough data analysis was undertaken, which comprised processing and summarizing the findings to identify key trends, research gaps, and potential directions for future studies (table 1).

Table 1. Categories and description of data selection

The aim of the study	Identification of AI tools for automating philological text analysis, their advantages and limitations
Research questions	What is the current state of research on AI in automated linguistic text analysis? What are the advantages and limitations of AI tools in linguistic research? What are the gaps and prospects for future research in automated linguistic analysis?
Inclusion criteria	Publications from 2019 to 2024 80 % in English, 10 % in Ukrainian, 10 % in French. - The presence of keywords such as "artificial intelligence", "automatic translation", "philology", etc. in the title or keywords Access to the full text Publications in peer-reviewed journals or conferences.
Exclusion criteria	Publications by 2019 Review articles Publications in languages other than English, Ukrainian and French
Keywords	Artificial intelligence, automatic translation, philology, literary studies, text analysis tools
Quality assessment criteria	Eliminating duplicate publications The findings are in line with the research objectives Clearly define goals and objectives Full description of the methodology for reproducing the experiment

The entire number of records were 287 articles identified from selected databases which icluded Google Scholar (152), Scopus (95), and ResearchGate (40). After eliminating 32 duplicate records, 255 titles and abstracts were marked off for relevance. Based on the inclusion/exclusion criteria, 140 records were excluded for being off-topic, non-peer-reviewed, or published in non-target languages. 115 full-text articles were evaluated for suitability, and 60 were omitted for not meeting methodological transparency or for being review articles. This gave the possibility for the final selection of 55 publications for full analysis.

The selection procedure tracked a structured screening protocol inspired by PRISMA guidelines. A PRISMA flowchart (figure 1) summarizes this process.

In order to support the process, Zotero was utilised for reference organization, duplication removal, and tagging based on inclusion/exclusion status. Each article was evaluated using a adapted CASP-based quality checklist. It evaluated lucidity of research objectives, methodology transparency, and configuration with the study's focus on AI in philological analysis.

RESULTS

Automatic natural language processing (NLP) is becoming increasingly popular in the digital humanities, especially in the context of analysing digitized literary and philological texts. NLP tools, such as machine learning algorithms and neural networks, create new opportunities for in-depth text analysis, allowing scholars to more effectively identify stylistic, thematic and linguistic features, conduct thematic analysis and classification of texts, analyse sentiment and tone, recognize stylistic patterns and lexical features, conduct syntactic and morphological analysis, and identify keywords and concepts.

Wei draws the attention of literary scholars and philologists to the development of novel methods for automatic identification and categorization of linguistic expressions.[12] In this regard, AI has the potential to recognize basic elements such as character names, place names, and institutions. This potential is an important element that highlights the potential of algorithms in text analysis.

The latest developments in the automation of translation of philological texts are associated with innovations in artificial intelligence tools. AI translates texts while preserving their context and style. Tools for automating the translation of philological texts greatly facilitate translation and enable cross-cultural analysis and interpretation of literary works. AI, namely (NLP) and deep learning models, are able to convey the stylistic features of the source text (emotions, rhythm, idioms and the necessary vocabulary). For philological analysis, the stylistic context is crucial.

AI tools can identify cultural elements and rhetorical devices that are distinctive to the original text. Thus, AI can interpret cultural references, historical allusions and contextual elements table 2.

Table 2. Analysis of the selected literature sources related to the topic

Authors	Title	Type of research	Methods	Results
Hrachova et al.[13]	Analysing the Impact of Artificial Intelligence on the Development of Contemporary Philology: The Use of Automated Tools in Linguistic Research	Theoretical research	Analysis of automated tools for linguistics	Study shows the importance of AI in modern philological research
Strashko et al.[14]	Linguistic Analysis of Texts in Philological Research: The Use of Salesforce Einstein Artificial Intelligence	An empirical study	Using Salesforce Einstein for text analytics	Study demonstrates the effectiveness of Salesforce Einstein in linguistic analyses
Katerynchuk et al.[15]	The Use of Artificial Intelligence Models in the Automated Knowledge Assessment System	A case study	AI-based modelling for knowledge assessment	Study shows high efficiency of AI models in automated knowledge assessment
Markus et al.[16]	A philologist's perspective on Artificial Intelligence-a case study in English Dialect Dictionary Online 4.0	Case study	Analysing lexicographic data	How artificial intelligence can contribute to the development of dialect dictionaries
Carpitella et al.[17]	Artificial Intelligence Enriching Contributions from Multiple Perspectives in Ancient Text Analysis	Research article	Methods of intelligent and fuzzy systems	Using AI for in-depth analysis of ancient texts |
Van Heerden et al.[18]	AI as author-bridging the gap between machine learning and literary theory	Theoretical research	Comparison of literary theories and machine learning algorithms	Analysing the possibility of AI as an author who bridges the gap between technology and literary theory
Jones[19]	Experiential Literature? Comparing the Work of AI and Human Authors	A comparative study	Analysing literary texts created by humans and AI	Differences in writing styles and content of the texts were identified

Heflin[20]	AI-generated literature and the vectorized Word	Dissertation	Lexical and structural analysis of texts	Exploring word vectorization in AI-generated literature
Da[21]	The computational case against computational literary studies	A critical study	Consideration of methodological issues	A critique of the limitations of computer-based literature research
Chun et al.[22]	What the Rise of AI Means for Narrative Studies	Theoretical article	An overview of technological influences on literary studies	The advantages and limitations of using AI in narrative studies
Barron[23]	AI and Literature	Book	Overview and analysis of the cultural context	The impact of AI on literary practices and popular culture is described
Bajohr[24]	Algorithmic Empathy: On Two Paradigms of Digital Generative Literature and the Need for a Critique of AI Works	A critical study	Reviewing digital literature	A study of two approaches to generating AI literature and the need for their critical reflection
Lévy[25]	Calculer la sémantique avec le langue IEML	Theoretical article	Semantic analysis using IEML	New opportunities for calculating values using AI
Chagué et al.[26]	Chaînes d'acquisition, de traitement et de publication du texte	Dissertation	Word processing processes	The chains of text processing and publishing in the digital environment are investigated
Carré et al.[27]	Les Humanités Numériques, quelles définitions?	Theoretical research	Analysing the digital humanities	Defining and explaining digital humanities from the perspective of information sciences
Miras et al.[28]	Apports d'un outil d'intelligence artificielle à l'enseignement-apprentissage des langues	Conference report	Using AI in education	The benefits of using AI for language learning are shown
Larsonneur[29]	Intelligence artificielle ET/OU diversité linguistique	Article.	Analysing language diversity	Challenges and paradoxes in applying AI to language processing are discussed
Jouitteau[30]	Guide de survie des langues minorisées à l'heure de l'intelligence artificielle	Article.	Research on language communities	Recommendations for the preservation of minority languages in the AI era
Soh et al.[31]	Analyse de la vitalité des langues camerounaises à l'aide de techniques d'intelligence artificielle	Article.	Using AI to analyse languages	Viability of Cameroonian languages assessed with the help of AI
Schurster et al.[32]	Traduction and paratraduction en tant que stratégies de résistance	Article.	Translation and paraphrase analysis	Translation as a way to resist objectification in the context of AI is considered
Silvério Costa et al.[33]	Transcrição manual e automática de textos históricos manuscritos	Conference report	Using text recognition software	Comparison of manual and automatic recognition of historical texts
Emilio[34]	Perspectivas dos bolsistas e voluntários sobre o processo de tradução	Article.	Evaluation of translation experience	The experience of volunteers in the translation process was studied
Leal[35]	Tradução, conceituação sistematizada, tecnologia, filosofia	Dissertation	Systematizing concepts in translation	The interaction of technology, translation and philosophy is highlighted
Khasawneh[36]	The Potential of AI in Facilitating Cross-Cultural Communication Through Translation	Article.	Analysing AI potential in intercultural communication	AI shows great potential in facilitating intercultural communication through translation
Elkins[37]	In search of a translator: using AI to assess what's lost in translation	Article.	Estimating translation losses using AI	The disadvantages and losses that arise during AI translation are investigated

AI is actively used in modern philological research. They significantly increase the efficiency and accuracy of text analysis. The proposed work summarizes key studies that show the effectiveness of AI, particularly Salesforce Einstein, for philological analysis, for automated knowledge assessment, for the development of a dialect dictionary, and for the in-depth study of ancient texts.

The results of the study demonstrated the potential of AI and Salesforce Einstein. The specified tools allow the identification of stylistic differences and variations of content in philological texts, which was previously impossible without a human translator.

The study emphasizes the role of AI for the development of dialect dictionaries. Such vectorization of

vocabulary with AI is appropriate for the creation of complex dictionaries with regional speech models. These capabilities are valuable for the study of language variations.

The main limitation of AI in philological analysis is that the machine is not yet able to convey the cultural and emotional context of the source texts. The semantics of philological texts are endowed with hidden meanings, historical references and metaphorical layers, emotional tones (irony, sarcasm, subtle expression of the mood of the characters), which are not yet accurately captured by algorithms. The presented literature review outlined the advantages and limitations of using artificial intelligence in philological research.

AI simplifies the translation of literary analysis, but at the same time may not preserve the cultural and emotional depth that a human translator conveys.

Translation has always been associated with humans, now with AI as well, and this issue raises ethical issues. AI, with its inability to convey emotional content, does not yet meet traditional concepts of authorship. Hence the question of legal ownership. Who owns the rights to the algorithm developer, the user, or the company that owns the AI?

The results of this work demonstrate the importance of integrating AI into philological research. We stand in solidarity with the authors of the relevant works and emphasize the potential of AI for the efficiency of analysing philological texts. However, ethical and moral issues remain open.

DISCUSSION

AI is actively involved in philological research and machine translation. This allows processing large volumes of philological texts. But AI has its limitations that affect the quality of translation. This is especially true for literary works. To optimize machine translation, permanent and extensive machine learning is necessary.[38]

Critics note that AI is not effective enough in recognizing cultural contexts and subtle meanings inherent in literary texts. This is especially true for the translation of poetry or epigraphs, where metaphors, linguistic nuances and cultural references are more often used. Experts argue that AI, due to its technical limitations, is unable to adequately convey the full range of meanings inherent in the original text, which can lead to a distortion of its original meaning.[39] This shortcoming of AI is explained by the fact that artificial intelligence, no matter how necessary it is, is unable to recognize and understand the subtleties that are introduced by the cultural aspect of the text being translated. As a result, certain meanings known only to a certain cultural or linguistic community may be lost. The importance of such aspects is emphasized when it comes to translating unique literary works, where the meaning of images and expressions often goes beyond the literal meaning of the words.[40]

While AI tools can be valuable for automating linguistic research, their application in literary translation calls for careful consideration. The challenge of maintaining cultural context and preserving subtle semantic nuances requires a balance between technological advancements and human interpretation.[41] Although AI offers efficient solutions for quick translation and text analysis, it struggles to accurately reproduce the cultural contexts crucial for philological studies. Some scholars point out that AI's ability to account for the cultural specifics of a text is limited, particularly when translating works that focus on local customs, historical events, and personal anecdotes.[42] This can lead to difficulties in accurate translation and distortions of meaning that reflect the AI's unfamiliarity with the cultural environment from which the text originates.[43]

For example, Yu notes that mastering the cultural context is a key aspect of accurate translation.[44] A cultural referent can be either universal or specific to a particular culture and can also belong to a common field between cultures.[45] The lack of understanding of such realities leads to inaccurate translation, which can not only distort the text but also cause negative reactions from the reader. Indeed, as noted in studies, "ignoring cultural references" can significantly limit translation options, making it difficult to achieve language-to-language correspondence.[46]

Examples of literary works that use specific cultural elements highlight this problem. For example, Natalie Sarouth's novel Tropisms relies on complex tropical structures, where words become containers for meaning hidden from the surface meaning. For a machine to recognize this hidden meaning is not an easy task, as the subtleties and shades of the text laid down by the author may be lost, as artificial intelligence is unable to consider cultural associations and connotations that are unique to a particular community.[47]

Another problem that arises during automatic translation is the loss of the author's style and tone. For example, Jean de Lafontaine endowed his fables with personality, emotions, and deep metaphors. In automatic translation, these subtleties of style, such as the use of metaphors to convey deeper meanings, can be simplified to formless structures.[48] The loss of cultural and emotional nuances in such a translation turns fables into simple stories without La Fontaine's characteristic style. As a result, it can lead to the harmonization of culture, losing the nuances inherent in certain regions.[49]

Automatic translation of metaphorical and poetic texts, especially those containing cultural features, often results in a literal translation that fails to capture the deeper meaning intended by the author.[50] Metaphors are often based on unique social and cultural experiences, and their accurate translation into other languages

without loss of meaning is extremely difficult. Such difficulties underline the need for a balanced approach to automating the translation of literary texts, where a constant balance between technological capabilities and cultural accuracy is required.[51]

The problem of untranslatability of literary works, especially those containing a rich cultural context, remains one of the main obstacles to automated translation. Often, expressions or images have specific cultural connotations that are difficult to convey in another language due to the lack of equivalents. As noted by Yurko, the uniqueness of the cultural experience reflected in the literature makes automatic translation less accurate and of lower quality, which can negatively affect the author's reputation and the perception of his or her work.[52]

This situation also raises ethical issues, about intellectual property and copyright. The use of automated translators for literary texts, without adequate supervision by a human translator, can lead to simplification or misinterpretation of the text. This, in turn, endangers cultural heritage and opens the way to plagiarism, which can cause irreparable damage to the quality of a literary work.

Inconsistencies in translation are often also explained by a lack of understanding of cultural references and the specifics of the author's style. As some researchers point out, for languages with a smaller digital presence, especially for lesser-known languages, automatic translation faces a shortage of databases. This limitation significantly affects the quality of translation, as the system cannot reproduce the cultural and linguistic differences of the original work.[53,54,55,56] This leads to translations that no longer reflect the uniqueness of the cultural heritage inherent in the original but instead reduce it to general and superficial elements.

Now, only human translation adapts the text to the context and situation. Human consciousness overcomes the limitations of automated systems. But thanks to the integration of AI tools in collaboration with a person, it helps to achieve optimal translation quality, preserving the cultural and stylistic features of the text. A human translator has linguistic skills, understands cultural differences, and can subtly adapt the text to the target audience, taking into account complex cultural and linguistic aspects.

Currently, the question of the quality and correctness of AI translation remains open. In this context, the quality of AI algorithms should be ensured, which, yet have not been trained to read potential cultural or social images and sometimes misinterpret texts.

In this context, the cooperation of machine translation technologies with human guidance will allow achieving the best results in philological research. Such a symbiosis will ensure the preservation of the originality of the text and the support of the cultural richness of the literary heritage.

CONCLUSIONS

AI for translating philological texts is promising for research in the field of linguistics and intercultural communication. Advanced natural language processing (NLP) models, such as (transformational models, translation platforms) have great potential in processing large volumes of texts. This potential is especially useful for technical, scientific and business texts, where clarity and accuracy of terminology are required. For such purposes, automatic translation is indeed a reliable tool that saves time and resources. However, for translating fiction or literary literature, filled with metaphors, cultural references and the style of authors, artificial intelligence faces difficulties. AI models are not yet able to convey the cultural sensitivity and stylistic flexibility that a human translator can convey. Thus, there is a need for AI to cooperate with humans.

Human-AI collaboration is poised to provide a more efficient translation process. AI automates the main steps (initial translation, text structure analysis), while the translator can focus on post-editing and adapting the text for a specific industry. Such a symbiosis is useful in areas that require a large number of translations in a short time, such as news or social networks. Automatic translation quickly covers a large audience, and a person, in turn, improves the final result, making it more natural and understandable. The integration of artificial intelligence also has great advantages for research purposes. AI algorithms collect and analyze large volumes of language data. Such potential is very effective for sociolinguistic studies that study the linguistic features of certain regions, groups or professions. The latest technologies help with translation and text classification. They are especially necessary for information search and topic identification. Therefore, translation automation creates conditions for a more complete and versatile understanding of the linguistic picture of the world.

Future research prospects can focus on the scientific interest in integrating artificial intelligence into translation. This may open prospects for the development of new methods for analyzing machine translation. Semantic theory as a powerful tool for linguistic research and semantic models can accurately describe linguistic phenomena and solve problems such as ambiguity through context analysis. Therefore, further scientific research in this area may lead to the creation of AI tools that will more effectively convey the diversity of languages and provide more accurate interpretation of philological texts.

Further development in the field of machine translation directly depends on the symbiosis and cooperation between artificial intelligence and humans, where each uses their strengths.

Thus, AI will help with fast translation and text processing, while humans will ensure high quality and cultural relevance of the translation.

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FINANCING

The authors did not receive financing for the development of this research.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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