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ORIGINAL

# Language Transformations Under the Influence of Artificial Intelligence: Linguistic Trends and Development Prospects

## Transformaciones lingüísticas bajo la influencia de la inteligencia artificial: Tendencias lingüísticas y perspectivas de desarrollo

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## ABSTRACT

**Introduction:** the article is devoted to the analysis of the linguistic features of the application of artificial intelligence (AI) on the material of the English and Ukrainian languages. The research material included texts created or processed using AI (in particular, ChatGPT, Google Translate, Grammarly), as well as the results of surveys of these technologies' users. The aim of the work is to determine the impact of AI on language structure, stylistics, interlingual adaptation and communication.
**Method:** the study used methods of content analysis, comparative analysis, and expert evaluation.
**Results:** the main results showed that the English language is more adapted for the work of AI, which is manifested in higher accuracy of grammatical and stylistic corrections. The Ukrainian language demonstrates significant challenges for AI, in particular in the reproduction of dialects, stylistic nuances and complex syntactic constructions. AI facilitates interlingual communication, but sometimes leads to the loss of cultural and linguistic features. There are risks of standardizing language norms, which may negatively affect the preservation of unique linguistic feature
**Conclusions:** the results show that there if the need to improve AI algorithms to better adapt to the peculiarities of different languages. The completion of this task presupposes involving linguists to ensure linguistic diversity.

**Keywords:** Ukrainian Language; Language Mentality; Communicative And Pragmatic Paradigm; New Trends; Automated Text Processing; Cross-Linguistic Adaptation; Cultural Identity; Dialects; English; Linguistic Analysis.

## RESUMEN

**Introducción:** el artículo está dedicado al análisis de las características lingüísticas de la aplicación de la inteligencia artificial (IA) en el material de las lenguas inglesa y ucraniana. El material de investigación incluía textos creados o procesados mediante IA (en particular, ChatGPT, Google Translate, Grammarly), así como los resultados de encuestas realizadas a los usuarios de estas tecnologías. El objetivo del trabajo es determinar el impacto de la IA en la estructura del lenguaje, la estilística, la adaptación interlingüística y la comunicación.
**Método:** en el estudio se utilizaron métodos de análisis de contenido, análisis comparativo y evaluación por expertos.
**Resultados:** los principales resultados mostraron que la lengua inglesa está más adaptada para el trabajo de

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la IA, lo que se manifiesta en una mayor precisión de las correcciones gramaticales y estilísticas. La lengua ucraniana presenta importantes dificultades para la IA, sobre todo en la reproducción de dialectos, matices estilísticos y construcciones sintácticas complejas. La IA facilita la comunicación interlingüe, pero a veces lleva a la pérdida de rasgos culturales y lingüísticos. Existe el riesgo de estandarizar las normas lingüísticas, lo que puede afectar negativamente a la conservación de rasgos lingüísticos únicos
**Conclusiones:** los resultados muestran que es necesario mejorar los algoritmos de IA para que se adapten mejor a las peculiaridades de las distintas lenguas, tarea en la que es imprescindible la participación de lingüistas para garantizar la diversidad lingüística.

**Palabras clave**: Lengua Ucraniana; Mentalidad Lingüística; Paradigma Comunicativo y Pragmático; Nuevas Tendencias; Procesamiento Automatizado de Textos; Adaptación Interlingüística; Identidad Cultural; Dialectos; Inglés; Análisis Lingüístico.

## INTRODUCTION

Today, the existence of great progress in the field of information technology and digital developments can be observed at every step. The process of digital transformation has become an indispensable part of modern society development and significantly affects various aspects of our lives, including scientific research, the creative process and education. Due to the leap in the development of technologies, in particular, automated information processing, new questions arise every year for researchers in various fields. The sphere of purely linguistic research focused on the stylistic aspects of language,[1] cognitive linguistics[2] and linguoculturology[3] is expanding and becoming interdisciplinary.

Recent advances in technology, particularly artificial intelligence (AI), have led to improvements in automatic translation, text analysis, speech recognition, and text generation models that more closely mimic natural language. These advances have expanded the possibilities for cross-cultural communication in education and media. However, they also raise questions about the impact on the nature of language and the ethical standards for its use.[4]

Research into the impact of AI algorithms and technologies on language in the modern world is relevant for several reasons. First of all, they allow understanding how the structure of language and its functional purpose are changing. Such research helps to identify potential threats to the preservation of linguistic diversity and cultural identity, which in turn contributes to the creation of recommendations for maintaining language standards and improving the effectiveness of language technologies. Consideration of this issue makes it possible to understand how new technologies not only affect aspects of speech in a technical sense, but also the cultural context of modern society.

The aim of the proposed study is to identify the linguistic features of AI on the material of the English and Ukrainian languages, as well as to identify the main trends of its influence on the development of language as a whole.

The conducted analysis of recent publications on the topic of the work made it possible to identify the main areas of research in the field of AI and its impact on language in general, communication in particular, and education. One of the central themes is the transformation of decision-making processes under the influence of AI, which is highlighted in the work of Agrawal et al.[5] which considers how innovations in this field change approaches to information analysis and processing. Russell and Norvig[6] outline fundamental aspects of AI that remain relevant even decades after the publication of their work.

The study of Arcenal et al.[7] considers a comparative analysis of texts created using AI and by users of the Reddit platform, illustrating the ability of AI to imitate human language. Binz and Schulz[8] approach this issue through the prism of cognitive psychology, revealing the principles of GPT-3. Some works focus on the impact of AI on the educational environment, in particular on aspects such as reducing user autonomy and increasing security.[9] Crompton and Burke,[10] as well as King[11] assess the state of development of artificial intelligence in the field of higher education, paying attention to its potential and challenges. Gao et al.[12] investigate the extent to which scientific abstracts created by AI are able to mislead experts, which indicates a high level of imitation of human text. Dans[13] and Patty[14] raise the issue of critical thinking, which, according to the authors, can be degraded by the excessive use of AI in educational and professional processes. Similarly, De Schryver and Joffe[15] analyze the ability of AI to replace traditional lexicography functions. Markus and Kirner-Ludwig[16] investigate the impact of AI on English dialectology, in particular in the creation of online dictionaries.

Jakesch et al.[17] consider the problems of human perception of texts created by AI, revealing the weaknesses of cognitive processes. The important role in the interaction between human and artificial intelligence is emphasized by Jarrahi et al.,[18] who introduce the concept of “hybrid intelligence”.

Since the beginning of the 2000s, significant achievements have been observed in the development of

intelligent systems, which are increasingly effective in their work. The spread of technologies in the field of education has become common practice among users and has contributed to improving the convenience and effectiveness of learning in general. Current algorithms manage to improve the educational process by analyzing information materials in text or oral form and formulating general conclusions to facilitate interaction and assimilation of educational material. Thus, Mieczkowski et al.[19] Mizumoto and Eguchi,[20] Else[21] focus on the effectiveness of using language models for automatic essay scoring and their impact on the educational process. Farrokhnia et al.[22] conduct a SWOT analysis of ChatGPT, highlighting its advantages and disadvantages for educational practice.

Zavalniuk et al.[1] analyze the stylistic features of lexical-syntactic repetitions in the system of figures of speech, indicating the importance of preserving language norms in the context of automation. Sabzalieva and Valentini[23] offer a quick guide to implementing AI in higher education, focusing on practical aspects. Theocharopoulos et al.[24] investigate the possibilities of detecting fake scientific abstracts created with the help of AI. Xu et al.[25] demonstrate the potential of AI as a powerful paradigm for scientific research. Stanko[26] studies the application of AI in creative writing, including the fan fiction genre.

Overall, the literature shows that key areas of research are the impact of AI on education, in particular its ability to automate assessment and support learning processes,[9,20,27,28] the transformation of language models in linguistics,[16,29] as well as the ethical aspects of the use of AI in science and society.[12, 24] However, this list lacks studies devoted specifically to the study of linguistic features of texts produced by AI, which emphasizes the relevance of our work.

## METHOD

The conducted study of linguistic features and the impact of artificial intelligence on language development was based on the use of a comprehensive methodology, which included several stages. The first one implied formation of a theoretical basis for the study and an assessment of the current state of the problem through a review of scientific publications, monographs, articles and electronic resources. The next stage content analysis of texts created using AI made it possible to investigate compliance with language norms, as well as identify grammatical and lexical errors in the English and Ukrainian languages. Comparative analysis at the third stage made it possible to compare different approaches to natural language processing by artificial intelligence, in particular, to compare specific aspects of the Ukrainian language with other languages, which made it possible to identify unique features and outline the necessary aspects of improving AI algorithms.

Finally, surveys and interviews conducted among users and linguistic experts (a total of 50 students and teachers) helped to collect data on the experience of using AI and its impact on the Ukrainian language.

## RESULTS

The linguistic features of AI in English cover several key aspects that determine its functioning. English is characterized by a relatively simple morphology, as it has a minimal number of cases, genders and endings, which facilitates the processing of texts by AI, allowing the model to work more efficiently, using words in many contexts without significant changes.

AI considerably influences the development of the Ukrainian language and opens new prospects for automation of language interaction, text analysis, and generation of language data. Meanwhile, its use is accompanied by several linguistic features that are important for the Ukrainian language space. Main among them are the adaptation of algorithms of natural language processing to the peculiarities of Ukrainian grammar, syntax, and morphology.

A few specific examples can illustrate the points made above. AI tools experience difficulties with the inflectional system of the Ukrainian language, especially the case forms of words. For example, the word *"рука"* ("hand") can take such forms as *"руці"* ("to the hand"), *"рукою"* ("with the hand"), and *"руку"* ("the hand"), and systems that are not well adapted may interpret these forms as different words, which causes translation errors. In the sentence *"Дівча дала книжку брату"* ("The girl gave the book to her brother"), it may think that *"брату"* ("to her brother") is a genitive case instead of dative because of poor context processing. Yet another point of Ukrainian syntax is its free word order. For example, the sentences *"На столі лежить книга"* ("There is a book lying on the table") and *"Книга лежить на столі"* ("The book is lying on the table") do not differ in meaning but express quite different structures - a factor that sometimes may be painful for AI. In complex constructions like *"Чоловік, який приніс листа, чекає у коридорі"* ("The man who brought the letter is waiting in the corridor"), models sometimes can't correctly identify the main and subordinate parts of the sentence.

Dialects and regional features of Ukrainian also affect the quality of text processing. For example, the Western Ukrainian word *"ґазда"* ("landlord" or "head of the household") may not be recognized or could be misunderstood. The phrase *"Маю свій хіснєк"* ("I have my own use/benefit") would not be comprehended by the system if such words are absent from the training corpus.

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Moreover, neologisms and borrowings, like *"підписник"* ("subscriber") or *"лайкнути"* ("to like"), are not included in any standardized dictionary and hence may be misprocessed by AI. In texts with a lot of Anglicisms, such as *"брейнштorм"* ("brainstorm") or *"фідбек"* ("feedback"), AI is unable to introduce these words into Ukrainian grammar or stylistics.

Besides, there is an issue of shortage or sometimes even lack of Ukrainian text corpora. For example, till quite recently versions of Google Translate used to mistranslate such set phrases as *"сидіти вдома"* ("to stay at home"), replacing them with *"сидіти у будинку"* ("to sit in the building"). The similar problems appear during text generation by AI, that can mix the stylistic nuances - particularly, it might not distinguish between formal *"Ви"* ("You") and informal *"ви"* ("you").

Other essential moment is stylistics of the text. For example, in technical texts, one might have something like *"Система опрацьовує дані"* ("The system processes data"), but after AI changes the word *"опрацьовує"* with *"обробляє"*, one may lose this nuance. For example, a task entitled "Write an informal letter to a friend" would come out totally opposite in too official words and expressions produced by the algorithm.

The results of content analysis of Ukrainian texts generated by AI are presented in the following table 1.

**Table 1**. Results of Content Analysis of AI-Generated Texts

| Error Type | Description | Frequency of Occurrence (%) |
|---|---|---|
| Grammatical Errors | Incorrect use of cases, numbers, or gender | 35 % |
| Lexical Errors | Improper word choice or mismatch of meaning to context | 25 % |
| Stylistic Inconsistencies | Use of formal vocabulary in informal texts or vice versa. | 20 % |
| Word Agreement Errors | Incorrect agreement of adjectives and nouns | 15 % |
| Translation Errors | Inaccuracies in automatic translation due to literal interpretation of words or phrases. | 5 % |

From the table, we can come to the conclusion that the effective work of AI in the Ukrainian linguistic environment is possible by adapting algorithms considering grammatical, lexical, and stylistic peculiarities and developing qualitative data corpora.

We present the results of a survey of users on the impact of AI on the development of language in general and Ukrainian in particular. The survey was conducted among students and teachers of philological specialties at Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University. The study took place in September-October 2024. The sample size was 48 participants. Respondents were asked about their opinions regarding the influence of AI on the development of language in general and Ukrainian in particular. The survey provided several predefined response options, allowing participants to choose from the following aspects of AI's impact: the spread of new words, the spread of borrowings, changes in stylistic norms, and changes in grammatical usage. The results were processed by calculating the percentage of responses for each option and are presented in figure 1.

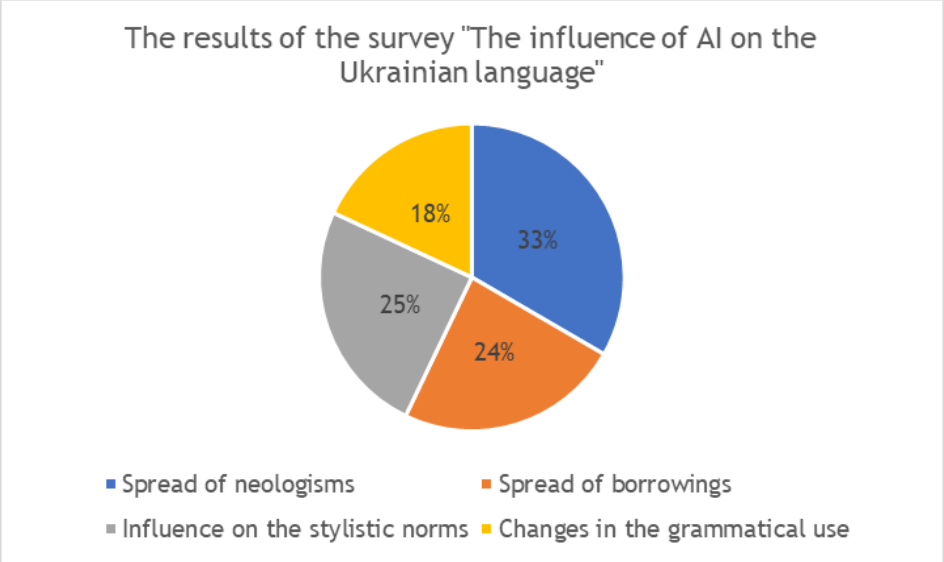


**Figure 1.** The results of the conducted survey

As can be seen from the data presented in the diagram, the main share of respondents (33 %) indicated the spread of new words as the main impact of AI. The second most significant impact is the spread of borrowings,

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which accounts for 24 % of the total number of responses. The impact of AI on stylistic norms received a score of 25 %, demonstrating that respondents noted changes in the stylistic aspects of texts. The smallest share, 18 %, is inherent for changes in grammatical usage, which indicates less but noticeable attention to grammar problems in texts created by AI.

Now, let's turn to the analysis of the second aspect of our study the impact of AI on the Ukrainian language. First of all, it should be pointed out that artificial intelligence popularizes the Ukrainian language, its use in the digital space, and supports linguistic research. Moreover, the Ukrainian language becomes much more accessible with the help of Google Translate or ChatGPT, within the global information space, and this fact contributes to its popularization and growing status. Fast, correct information in Ukrainian, due to translation automation facilities, makes it possible actually to use this language while localizing software, interfaces, and mobile applications for Ukrainian audience.

AI also contributes much to the preservation of linguistic diversity. For example, algorithmic analysis of dialects improves the understanding of their peculiarities and inclusion of this knowledge in educational materials. Simultaneously, technologies such as speech recognition and synthesis expand the opportunities for inclusivity, for instance, for people with visual or hearing impairments.

On the other hand, AI has a probably negative effect. The frequency of using automated translators can lead to the simplification of the Ukrainian language, creating texts with errors. For example, some AI models sometimes incorrectly put words in a sentence: *"Ці книги були знайдено на полиці"* instead of *"Ці книги були знайдені на полиці"*. Such errors may reinforce incorrect language patterns in users, especially among the youth.

Moreover, the intensive use of AI contributes to the penetration of Anglicisms into the Ukrainian language. For instance, in professional and youth environments, words like *"апдейт"* (update), *"лонч"* (launch), and *"фідбек"* (feedback) are becoming widespread, often replacing Ukrainian equivalents such as *"оновлення"*, *"запуск"*, and *"зворотній зв'язок"*. This undoubtedly leads to the displacement of original terms and the disruption of linguistic authenticity.

Ignoring regional peculiarities is another issue. AI models focused on literary norms often fail to account for dialectal forms. For example, the western Ukrainian word *"файний"* (nice) or the above-mentioned Hutsul term *"ґазда"* (head of the household) may not be recognized by AI, limiting their use in the digital environment.

Another problem is users' dependence on AI. Continuous use of tools for text correction or message generation can reduce linguistic literacy and critical thinking. For example, if users rely solely on autocorrection, they may stop carefully reviewing their texts, which would lead to the reinforcement of errors.

Thus, artificial intelligence opens up new opportunities for the development of the Ukrainian language, but at the same time creates risks associated with its standardization, simplification, and anglicization. For the effective use of AI, it is necessary to develop the adaptation of algorithms to the specifics of the Ukrainian language, improve the quality of language corpora and raise users' awareness of the correct use of these technologies.

In general, the linguistic features of artificial intelligence in the Ukrainian language are determined by its rich grammatical structure, stylistic differences, problems of adaptation to dialects, and the impact of borrowings. Further development of AI in the Ukrainian language environment will contribute to strengthening the status of the language and its integration into the global digital space.

## DISCUSSION

The flexibility of the English syntax makes a number of variants immediately available; for instance, inversion, passive form or contraction. That is why the formal text would need, say, passive-voice construction like "The report was completed" whereas the same utterance in informal text is rendered as: "We finished the report". Meanwhile, the English language is filled with a huge amount of ambiguous words, for example: "run", which can mean "to run", "to control", or "to work" (about a device), depending on the context. This kind of meaning is something Artificial Intelligence needs to consider when it is analyzing texts and may turn out to be quite a challenge.

A certain challenge in the work of AI is the phraseology that the English language is rich in, for example: "kick the bucket", which means "to die". Artificial intelligence generally recognizes these expressions and interprets them correctly. Besides, the English language is constantly influenced by globalization, integrating new borrowings like "selfie", "podcast", "cryptocurrency". AI must be ready to work with such words, which often appear in the field of technology.

The contextuality of the English language demands that AI get tuned to various styles-formal or informal. For instance, one can find such phrases as "The data indicate significant growth" in some scientific text, while in the everyday colloquium, one can often get such expressions like "Sounds good!" with abbreviations or slang. Many words in the English language have cultural connotations, such as "keeping up with the Joneses", which means the desire to keep up with neighbors in material things. AI has to consider such niceties if it is to perform

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appropriate text analysis.

Modern English is fast developing under the influence of the Internet. New words like “LOL”, “vlog” or “cringe” quickly enter everyday use, and AI must correctly recognize them in different contexts. Besides, there are different regional variants of English, such as British, American, Australian, etc., which have their own vocabulary and pronunciation. For instance, the word “boot” means “luggage boot in a car” in British English, but “shoe” in American. Such differences make the variants unique and demand adaptation by AI to each of them.

Thus, the English language creates for AI both favorable conditions due to its structural simplicity and certain challenges associated with its ambiguity, cultural specificity, and rapid changes in vocabulary. In this respect, constant improvement is needed to meet the modern communicative contexts while working with the English language.

The Ukrainian language is inflectional, meaning the process of recognition and generation of texts is highly complicated in view of the variability of cases, numbers, genders, and endings. For instance, creating models that consider the correct agreement of numerals with nouns or the correct formation of word combinations is quite a challenging task for AI.

Another important feature is the necessity to consider stylistic and lexical features of the Ukrainian language, which depend on the context. AI has to differentiate between formal, informal, dialectal, or professional vocabulary, which becomes critically important for contextual analysis or translation. For example, Ukrainian dialects and regional features can create difficulties for AI systems to understand and process text if AI algorithms are not sufficiently trained on such data.

Another feature is the problem of borrowings and neologisms, which actively come into the Ukrainian language space under the influence of globalization and technologies. AI can record, analyze, and adapt borrowings, but all these processes should happen within the framework of language norms and not lead to excessive Anglicization of the Ukrainian language. Another important factor is that, in general, the development of the Ukrainian language models often faces the problem of an insufficient number of high-quality data corpora, which restricts the quality and functionality of AI algorithms, raising questions about the role of rich and diverse language bases in training systems.

The results of the study confirm the significant potential of AI in the field of language technologies, but also reveal a number of challenges related to its adaptation to the English and Ukrainian languages. Our study generally supports the results of other researchers in the context of English communication, confirming the broader trends observed in previous studies.[7,10,30] However, it also provides new insights specifically concerning the Ukrainian language, where the impact of AI presents unique aspects that have not been explored in earlier works. English, as one of the most widely spoken languages in the world, already has a powerful corpus of data, which contributes to the accuracy of text processing. At the same time, the study showed that AI has difficulties in interpreting cultural features, idioms and regional language variants. This aspect requires further research, since the influence of cultural context on the perception of texts is critically important in many areas, such as translation, content generation and education.

The grammatical structure of the Ukrainian language, variability of word inflection, and richness of dialects create unique challenges for AI. Although modern language models show partial success in understanding the Ukrainian language, the results indicate low accuracy in syntactic analysis, agreement of grammatical forms, and semantic context understanding. Part of these are the result of few high-quality data corpora being available to train AI on and not sufficiently focusing on the regional language variety.[29]

Special attention should be given to the ethical aspects of AI use for language technologies, especially the risk of standardizing a language at the expense of its cultural and dialectal diversity. The effectiveness of AI should be weighed against the preservation of linguistic identity, which is a key challenge that calls for an interdisciplinary approach.[12] Overall, these findings in the study signal a way to increasingly adaptive language models, taking into consideration not only grammatical features but also socio-cultural context.

## CONCLUSIONS

The investigation into artificial intelligence’s effect on language development has proven the importance of adjusting new technologies to the linguistic peculiarities of both the English and Ukrainian languages. For the English language, which structurally is relatively simple, AI shows high text processing rates, especially with respect to word ambiguity, phraseology, and contextual changes. Cultural subtexts and regional variants, plus new lexical units entering the active turnover under the powerful influence of globalization processes, cause specific difficulties in dealing with such vocabulary; there, the problem is also special because the Ukrainian language has unique features such as an inflectional system and case variability that support free word order. Though AI is gradually becoming tuned to these features, difficulties in the correct coordination of word forms and analysis of syntactic constructions, taking into consideration regional dialects, indicate an area for development of these algorithms. Much attention, however, needs to be paid to the issues which relate to

the saving of the linguistic identity amidst globalization, avoiding excessive Anglicization, creation of the rich data corpora for the language models training.

Thus, the research confirmed the great potential of AI for the development of language technologies, underlining at the same time the importance of an ethical approach to their implementation. The results of this work can become the basis for further interdisciplinary studies aimed at the improvement of language models, support for linguistic diversity, and preservation of cultural identity in conditions of digital transformation.

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## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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