

The integration of these diverse technological tools creates a comprehensive ecosystem for English language learning that addresses multiple skill areas — reading, writing, listening, and speaking — while accommodating the varied circumstances and constraints that Ukrainian students currently face.

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Hybrid artificial intelligence for philology research amid instability or crisis

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Abstract. *This article examines the importance of hybrid artificial intelligence (HAI) in philological research during periods of crisis and instability. Hybrid AI, which integrates neural networks, machine-learning methods, expert rules and linguistic models, provides advanced tools for large-scale text analysis, linguistic modelling and automated interpretation of complex language structures. HAI enhances computational linguistics, lexicography, literary studies and intelligent translation by improving semantic detection, stylistic analysis, authorship attribution and culturally sensitive translation. It also supports digital humanities through text reconstruction, corpus studies and manuscript deciphering. Overall, hybrid AI expands analytical possibilities, increases research accuracy and ensures continuity and adaptability of philological studies under crisis conditions, strengthening the resilience and innovation potential of the humanities.*

Keywords: *philology, research and development, artificial intelligence, hybrid AI.*

Introduction.

In times of large-scale social, political and economic upheaval, when the scientific and educational infrastructure is destabilized, research processes face numerous limitations. Access to information resources is reduced, communication between

scientists is complicated, and the volume of data that needs to be processed is rapidly increasing [1-3]. This especially affects philological disciplines that are based on the meticulous study of texts, linguistic phenomena and cultural contexts. In such conditions, it is artificial intelligence (AI) that becomes a key tool for the modernization of scientific developments [4], including in the humanitarian field.

Artificial intelligence technologies — machine learning algorithms, automated language processing tools, generative models, intelligent corpus systems and modern translation platforms — make it possible to significantly expand the analytical resource of a philologist [5]. Thanks to them, it becomes possible to conduct a comprehensive study of large sets of texts, build models of the development of language structures, identify hidden semantic dependencies, analyze stylistic properties, and form new interpretive approaches to literary materials. In critical situations, the importance of AI increases many times over. It ensures the stability of research processes, supports remote interaction between scientists, compensates for the lack of traditional resources, and allows working with digital archives, information repositories, and text corpora. The use of AI stimulates the emergence of interdisciplinary methodologies, within which philological science is combined with computational linguistics, cognitive approaches, and digital technologies. As a result, artificial intelligence not only optimizes the processes of text analysis, but also makes philological research more flexible, resilient, and innovatively oriented even in conditions of general instability.

The Main Part.

Hybrid artificial intelligence (HAI), which combines neural network technologies, machine learning algorithms, expert rules and linguistic models [6], is gradually becoming a key tool in modern philological analysis. Unlike traditional systems based on a single data processing method, hybrid AI platforms are able to combine the strengths of different approaches, which makes them especially effective in the study of complex language structures, multi-layered texts and culturally rich contexts.

One of the most important areas of application of HAI is the complex processing of large-scale text arrays. Hybrid systems allow you to simultaneously use the potential of neural networks to search for hidden patterns and analytical linguistic rules to refine, filter and structure the results. This makes it possible to perform detailed morphological, semantic, syntactic and discursive analysis, significantly accelerating research that previously required a large expenditure of resources and time.

HAI makes a significant contribution to the development of computational linguistics and lexicographic work. Intelligent hybrid models are able to detect new semantic connections, form updated dictionary entries, record the appearance of neologisms and track the dynamics of changes in word usage. By combining neural network methods with formal rules, the analysis of metaphorical constructions, phraseological units, complex periphrases and multi-valued expressions becomes much more accurate and deeper.

An important direction is the use of HAI in literary studies. Such systems allow classifying literary texts according to a number of parameters - style, genre, artistic manner, era of creation; determining individual features of the author's letter; identifying emotional and rhetorical structures of works. Integration of AI with philological theories contributes to the automation of stylometric studies, the study of disputed authorship and quantitative analysis of literary trends.

Hybrid AI also provides significant advantages in intelligent translation systems, where it is necessary to take into account not only grammar, but also cultural nuances, pragmatic features and hidden contextual meanings. Combining neural network models with linguistic rules provides a more accurate, stylistically verified and contextually correct translation, which is especially important when working with artistic, scientific and specialized texts.

HAI is also actively used in digital humanities. Hybrid algorithms help to decipher ancient manuscripts, reconstruct lost text fragments, analyze folklore records, compare materials from different eras and cultures. Such technologies expand the capabilities of historical and philological research and make them more accurate and informative.

In addition, hybrid AI solutions are used for the automated creation of educational, teaching-methodological and research materials: summaries, annotations, test tasks, semantic schemes and structured reviews. This helps teachers and researchers optimize the preparation of educational resources and accelerate the implementation of analytical tasks.

Thus, hybrid artificial intelligence becomes an integration platform that combines different approaches to language and text analysis. Its application significantly expands the research horizons of philology, improves the quality of analytical results, and contributes to the development of innovative methods in the humanities.

Conclusions.

The introduction of artificial intelligence into scientific and research projects of a philological profile in times of crisis is not just expedient, but vitally necessary. AI minimizes dependence on traditional sources, expands the researcher's capabilities in the study of linguistic and literary processes, accelerates the processing of large text volumes and contributes to obtaining operational, reasoned conclusions. Intelligent algorithms allow us to more accurately trace linguistic trends, analyze the structural characteristics of texts, model semantic connections and support such areas as translation studies, stylometric studies and corpus linguistics. In difficult periods, the need for fast, flexible and reliable research tools increases [7-9], and AI fully meets these criteria. It strengthens the resilience of philological science to external risks, contributes to the digital transformation of the humanitarian sphere and opens the way to new scientific concepts at the border of disciplines. Thanks to this, philology retains its potential for development, ensures high quality academic results, and adapts to the complex challenges of modernity.

Thus, artificial intelligence becomes a determining factor that allows supporting scientific research, increasing its productivity, expanding methodological horizons, and ensuring the viability of the humanities in times of crisis.

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