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Features and Adaptation of Hybrid Information Technologies in Contemporary Literary Criticism under Complex and Dynamics Conditions: Navigating Turbulence, Uncertainty and Systemic Risks within SHIVA-philology

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Abstract. The article explores the specifics, features and directions of adapting hybrid information technologies to modern literary studies in conditions of turbulence, uncertainty and systemic risks. The potential of SHIVA-philology is substantiated as an integrative model that combines traditional literary interpretation with artificial intelligence, machine learning, natural language processing, big data analysis, knowledge graphs and generative technologies. The principles of hybridization and adaptive application of intelligent technologies for multi-level analysis of a literary text are determined. The prospects for the formation of intellectual platforms that ensure scalability, clarity and sustainability of modern literary studies are shown.

Keywords: modern linguistics, computational linguistics, contemporary literary studies, hybrid information technologies, artificial intelligence, machine learning, natural language processing, digital humanities, text mining, big data analytics, knowledge graphs, semantic analysis, literary text, digital transformation, uncertainty, systemic risks.

INTRODUCTION.

Modern literary studies are undergoing a profound methodological transformation [1], driven by the digitalization of the humanities [2], the rapid development of artificial intelligence, machine learning technologies, natural language processing [3], big data [4], and intelligent information systems [5]. In the context of the formation of Digital Humanities, literary analysis goes beyond the boundaries of exclusively traditional interpretive methods and gradually

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integrates computational, semantic, cognitive, and analytical technologies [6]. As a result, a new direction of research is being formed, focused on the synthesis of humanities knowledge and intelligent digital tools [7], capable of working with large-scale literary corpora [8], complex cultural relationships, and multidimensional text structures.

Of particular relevance is the specifics of the adaptation of hybrid information technologies – complex intelligent systems [9], combining methods of artificial intelligence, machine learning, neural network models, semantic analysis, expert systems, graph knowledge models and big data analytics [10]. It is the hybridization of technologies that allows us to take into account both the quantitative patterns of literary data and the qualitative nature of the literary text, cultural context and authorial interpretation [11].

The modern research environment is characterized by the transition from traditional models of uncertainty (VUCA and BANI) to the more complex paradigm SHIVA, which reflects the state of high systemic turbulence, hybridity of processes, intense variability of the information environment, variability of interpretations and growing risks of digital interaction. For literary studies, this means the need to adapt research methods to digital corpora, multimodal data, generative language models and new forms of literary communication that are constantly changing.

In the context of SHIVA-philology, the literary text is considered not only as an object of interpretation, but also as a dynamic intellectual information system that interacts with cultural, historical, cognitive and digital contexts. This requires the formation of hybrid models of analysis that are able to combine the expert knowledge of the philologist, artificial intelligence algorithms and methods of intelligent data processing.

The purpose of the article = to investigate the specifics, features and mechanisms of adaptation of hybrid information technologies in modern literary studies, to determine their functional capabilities, advantages and limitations in conditions of dynamic turbulence, uncertainty and systemic risks, as well as to substantiate the conceptual provisions of modern SHIVA-philology as a new stage of the digital evolution of literary studies.

MAIN PART.

Modern literary studies are gradually moving beyond the classical humanitarian methodology, forming a new research

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space focused on the integration of digital technologies, artificial intelligence, big data analysis and intelligent information technologies. In this context, SHIVA-philology can be considered as an interdisciplinary concept of literary research that combines traditional literary studies, digital humanities, cognitive linguistics, machine learning, natural language processing and intellectual knowledge analysis. Its important feature is the consideration of a literary work not as a static object, but as a dynamic system of meanings and knowledge, included in a complex network of linguistic, cultural, historical, social and digital relationships. Accordingly, literary analysis acquires a multidimensional character, combining quantitative computational procedures with qualitative humanitarian interpretation. Instead of a predominantly linear analysis of a single text, there is an opportunity to study literary corpora, networks of characters and plot relationships, conceptual structures of works, emotional dynamics of narrative, intertextual connections and broader literary and cultural ecosystems. It is this methodological transformation that creates the basis for adapting hybrid information technologies to the tasks of modern literary studies.

Hybrid information technologies in this context are the integration of several classes of intellectual tools that function in an interdependent research system. They can combine methods of artificial intelligence and machine learning, natural language processing technologies, Text Mining, Big Data Analytics, Knowledge Mining, Semantic Analytics, graph knowledge bases, intelligent search, expert systems, generative language models and Retrieval-Augmented Generation technologies. However, the specificity of their application in literary studies is determined by the fact that the literary text has fundamental semantic ambiguity, metaphoricity, symbolism, intertextuality and cultural and historical conditioning. The same image, concept or linguistic element can acquire different meanings depending on the era, genre, author's concept, cultural context and reader's reception. Therefore, automated algorithmic analysis cannot be considered as a full-fledged replacement for literary interpretation. A more productive model is the intellectual interaction model, in which computing technologies provide processing, comparison and structuring of large data sets, and the researcher carries out their substantive, cultural and theoretical-literary interpretation.

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Adaptation of such technologies to a literary text requires their intellectual adjustment taking into account the specifics of various literary objects. It involves a consistent combination of several levels of analysis: lexical-grammatical and syntactic structuring of the text, automatic selection of entities and characteristics of the text, semantic and thematic analysis, identification of conceptual and intertextual connections, as well as cognitive-cultural interpretation. At the initial stages, morphological analysis, lemmatization, syntactic parsing and entity extraction can be used; at the subsequent stages, thematic modeling, semantic representations, embeddings and contextual language models can be used. A more complex level is associated with the reconstruction of artistic concepts, the analysis of character and plot interactions, emotional dynamics, the image system and the cultural and historical context. In this, the specific configuration of technologies must adapt to the genre, style and historical and cultural features of the material, since the methods of analyzing poetry, prose, drama, modernist and postmodern literature or digital and multimodal works cannot be found to be completely identical.

A special role in such a system is played by hybrid intellectual models that combine several analytical mechanisms. Neural network semantic analysis can be combined with graph modeling of characters and plot interactions, cognitive maps of artistic concepts, ontologies of literary knowledge, intellectual analysis of narratives and modeling of emotional dynamics. Graph representations allow formalizing connections between authors, works, characters, plots, concepts, historical events and cultural phenomena, while ontological models provide structuring and interconnection of concepts of literary knowledge. Generative models, in turn, can be used to search and compare semantic structures, reconstruct contexts and form research hypotheses. Hybridization of these approaches allows simultaneously taking into account the linguistic, semantic, plot, conceptual and cultural levels of a literary work and thus significantly expands the possibilities of analyzing large literary corpora.

The need for such hybridization is especially growing in the conditions of the modern SHIVA environment, which is characterized by high dynamics of information processes, uncertainty, nonlinearity and growth of systemic risks.

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Modern digital culture produces huge arrays of texts, electronic and interactive works, multimodal content and materials created using generative artificial intelligence. As a result, the literary scholar is simultaneously faced with information overload, ambiguity of the origin of individual texts, the spread of synthetic content, the mixing of authorial and machine-generated material, rapid change of cultural contexts and the risks of algorithmic interpretation. In these conditions, hybrid technologies must perform not only an analytical, but also an adaptive and verification function. Intellectual filtering of information, checking sources, assessing the reliability of data, semantic verification and expert control allow to reduce the risks of misinterpretation. Of particular importance are adaptive mechanisms that ensure the updating of models and knowledge bases as the literary and digital space changes.

The integration of hybrid technologies with digital humanities tools forms fundamentally new possibilities for literary analytics. Processing large corpora allows you to study thousands of works, identify the dynamics of themes and artistic concepts, establish intertextual and cultural connections, analyze the development of literary trends and the peculiarities of the reception of works. As a result, quantitative analysis may not be an alternative to traditional literary studies, but its additional analytical level, which ensures scalability, reproducibility and empirical validity of the study. The integration of large language models with digital corpora, knowledge graphs and ontologies of literary knowledge has a special perspective. In this, an important condition remains the preservation of the expert role of the researcher, since generative systems are able to reproduce factual and interpretative errors. Therefore, the most promising is the human-in-the-loop model, in which artificial intelligence performs the functions of intellectual search, analysis and support for the formation of hypotheses, and the final scientific interpretation remains with the specialist.

The promising development of SHIVA-philology is thus associated with the transition from individual digital tools to complex hybrid intellectual platforms for literary analysis. They can be based on digital corpora, intellectual libraries of knowledge, graph and ontological models, multimodal analytical tools, agent models of literary ecosystems, technologies of understandable artificial intelligence and generative systems integrated with the

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sources being verified. Of particular interest is the creation of original digital models of literary works and literary ecosystems, which allow us to explore not only the internal structure of the text, but also its connections with authors, other works, cultural events and changing contexts. Such an architecture can ensure the adaptability of literary analysis to new genres, digital formats, and a rapidly changing information environment.

As a result, hybrid information technologies within SHIVA-philology should be considered not simply as a set of modern digital tools, but as a new integrative model of organizing literary research. Its specificity is determined by the combination of computational analysis, semantic modeling, knowledge structuring, adaptive mechanisms and expert humanitarian interpretation. It is this interaction that allows you to simultaneously work with the scale of large literary data and preserve the complexity, contextuality and ambiguity of artistic meaning. In conditions of turbulence, uncertainty and systemic risks, this model creates the prerequisites for the formation of a more stable, adaptive, understandable and intellectually enhanced literary studies, in which artificial intelligence does not replace the researcher, but expands his analytical and interpretative capabilities.

CONCLUSIONS.

The conducted research shows that modern literary studies is entering the stage of formation of a new digital research paradigm = SHIVA-philology, in which literary analysis is carried out in the form of integration of humanitarian methods and intellectual information technologies. Such transformation is due to the need to work with large-scale digital literary corpora, multidimensional cultural contexts and a dynamically changing information environment.

It has been established that hybrid information technologies have a pronounced specificity in relation to literary studies, as they combine methods of artificial intelligence, machine learning, natural language processing, semantic modeling, expert systems and knowledge management technologies. Their adaptation allows to simultaneously take into account the quantitative characteristics of text data and the qualitative nature of artistic interpretation, while maintaining the leading role of literary expertise.

It is determined that the functioning of hybrid intelligent systems in conditions of dynamic turbulence,

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uncertainty and systemic risks requires adaptive analysis models capable of working with heterogeneous, multimodal and literary data that are constantly updated. The most important condition for effectiveness is the combination of automated analytics with expert verification of results, which ensures interpretative reliability and scientific reliability of research.

It is substantiated that the prospects for the development of SHIVA-philology are associated with the creation of hybrid intelligent information platforms of a new generation that integrate Knowledge-Based technologies, large language models, semantic knowledge graphs, cognitive models and Explainable AI. Their use forms the basis of an intellectually adaptive digital methodology of literary studies, focused on the sustainable development of the humanities in the conditions of digital transformation of modern society.

References:

- [1] Goncharenko S. (2025). Methodological bases of innovative information systems in the field of computer linguistics. Trends, Issues, and Challenges in Modern Science : Proceedings of the 2nd International Scientific Conference (Cambridge, United Kingdom, 5 September 2025). – Lulu Press, Inc., 2025. – P. 100-103. URL: <https://er.knutd.edu.ua/handle/123456789/31071>
- [2] De Luca, E. W., Fallucchi, F., Ghattas, B., & Spielhaus, R. (2024). The digital transformation processes for supporting digital humanities researchers in text analysis. Journal of Documentation, 80(2), 378-391. <https://doi.org/10.1108/JD-07-2022-0143>
- [3] Zhang, Z., Song, W., & Liu, P. (2024). Making and interpreting: Digital humanities as embodied action. Humanities and Social Sciences Communications, 11, Article 13. <https://doi.org/10.1057/s41599-023-02548-3>
- [4] Zubiaga, A. (2024). Natural language processing in the era of large language models. Frontiers in Artificial Intelligence, 6, Article 1343587. <https://doi.org/10.3389/frai.2023.1343587>
- [5] Goncharenko S. (2025). Intelligent information technologies for innovative management of advanced philology projects. Innovations and New Directions in Scientific Research : Proceedings of the 2nd International Scientific Conference (Manchester, United Kingdom, 20 September 2025). – Lulu Press, Inc., 2025. – P. 176-179. URL: <https://er.knutd.edu.ua/handle/123456789/31648>
- [6] Smits, T., & Wevers, M. (2023). A multimodal turn in Digital Humanities: Using contrastive machine learning models to explore, enrich, and analyze digital visual historical collections. Digital Scholarship in the Humanities, 38(3), 1267-1280. <https://doi.org/10.1093/llc/fqad008>
- [7] Belém, C. G., Kelly, M., Steyvers, M., Singh, S., & Smyth, P. (2024). Perceptions of linguistic uncertainty by language models and humans. In Proceedings of the 2024 Conference on Empirical Methods in Natural Language Processing (pp. 8467-8502). Association for Computational Linguistics. <https://doi.org/10.18653/v1/2024.emnlp-main.483>
- [8] Baayen, R. H. (2024). The wompom. Corpus Linguistics and Linguistic Theory, 20(3), 615-648. <https://doi.org/10.1515/cllt-2024-0053>
- [9] Hrashchenko, I. S., Krasniuk, M. T., & Krasniuk, S. O. (2019). Hibrydno-stsenarne zastosuvannia intelektualnykh, oriientovanykh na znannia

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tekhnolohii, yak vazhlyvyi antykryzovyi instrument lohistychnykh kompanii v Ukraini [Hybrid-scenario application of intellectual, knowledge-oriented technologies as an important anti-crisis tool of logistics companies in Ukraine]. Vcheni zapysky Tavriiskoho Natsionalnoho Universytetu imeni VI Vernadskoho. Serii: Ekonomika i upravlinnia-Scientific notes of Tavri National University named after VI Vernadskyi. Series: Economics and management, 30(69), 121-129.

- [10] Краснюк М.Т. (2014). Гібридизація інтелектуальних методів аналізу бізнесових даних (режим виявлення аномалій) як складовий інструмент корпоративного аудиту. Стан і перспективи розвитку обліково інформаційної системи в Україні: матеріали III Міжнар. наук.-практ. конф. (м. Тернопіль, 10-11 жовт. 2014 р.). Тернопіль: THEU, 2014. С. 211-212.
- [11] Ait Amine, M., Hmida, M., & Mansouri, K. (2023). Literature Review on Hybrid Evolutionary Approaches for Feature Selection. *Algorithms*, 16(3), 167. <https://doi.org/10.3390/a16030167>