

UDC 82.09:004.8

EVOLUTIONARY TECHNOLOGIES IN MODERN LITERARY STUDIES UNDER DYNAMIC UNCERTAINTY, TURBULENCE, AND SYSTEMIC RISKS (WITHIN THE SHIVA FRAMEWORK)

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Abstract. *The article considers the possibilities of using evolutionary technologies in modern literary studies in the conditions of the SHIVA and WARMI worlds. The potential of genetic algorithms, genetic programming and other evolutionary methods for the analysis of literary texts is analyzed. The prospects of their integration with artificial intelligence technologies and digital humanities are substantiated.*

Keywords: *philology, literary studies, evolutionary technologies, digital humanities, evolutionary computing, artificial intelligence, genetic algorithms, SHIVA-world, WARMI-world, intellectual analysis of texts.*

Introduction.

Modern philological science as a whole operates in conditions of deep transformation of the global humanitarian space [1], which is characterized by high dynamics of uncertainty, non-linearity of the processes taking place, increased information turbulence, acceleration of cultural changes and growth of systemic risks. The formation of new communicative practices, rapid development of digital technologies [2], artificial intelligence, global information platforms and digital media = leads to constant complication of objects of philological research, expansion of sources of textual information and multiple increase in the volume of analyzed data. In such conditions, the modern external environment of philology increasingly corresponds to the characteristics of the concepts of SHIVA- and WARMI-world, which reflect the growing instability, fragmentation, unpredictability and multivariateness of the development of cultural and literary processes, which requires a qualitative update of research methodology and the introduction of intelligent digital technologies.

Therefore, modern literary studies are developing in conditions of radical transformation of the scientific, cultural and information environment: traditional methods of analyzing literary texts are gradually supplemented by digital technologies, intellectual analytics [3], artificial intelligence, Big Data, computational stylistics [4] and Digital Humanities [5]. At the same time, the complexity of research objects is increasing: the literary process is becoming a nonlinear, multidimensional system that functions in conditions of high uncertainty, constant variability, information overload and accelerated evolution of cultural practices.

The modern external environment of scientific research is increasingly described using the concepts of SHIVA (Split, Horrible, Inconceivable, Vicious, Arising) and WARMI (Wickedness, Anxiety, Randomness, Multipolarity, Incomprehensibility), which have replaced the earlier VUCA and BANI models; These concepts reflect the transition of humanity to a new phase of development, characterized by continuous crises, nonlinear processes, high turbulence, systemic risks and increasing complexity of scientific decision-making. Therefore, in such conditions, classical linear research algorithms are not effective enough [6], which requires the search for new intelligent technologies of analysis, analytics and further optimization.

One of the most promising directions is the use of evolutionary technologies - a set of methods based on the principles of natural evolution, self-organization, adaptation and collective search for optimal solutions [7]. Genetic algorithms, genetic programming, evolutionary strategies, differential evolution, memetic algorithms and other representatives of evolutionary computing = allow you to effectively solve complex multi-criteria problems [8], which are poorly amenable to traditional optimization methods.

For philology in general, and for modern literary studies in particular, the application of such evolutionary technologies opens up new research opportunities [9]: in particular, evolutionary methods are able to automatically detect hidden patterns of a literary text, optimize thematic modeling procedures, conduct intellectual clustering of literary works, attribution of authorship, reconstruct literary influences, investigate

the dynamics of the development of artistic trends, and build predictive models of the evolution of the literary process.

Therefore, taking into account the above, the current goal of this article is to study the possibilities of applying evolutionary technologies in modern literary studies in the conditions of the SHIVA and WARMI environments, as well as to determine the prospects for their integration with artificial intelligence technologies, intelligent data analysis, and digital humanities.

Main Part.

Evolutionary technologies as a new direction of digital transformation of literary studies.

Evolutionary technologies are a set of computational methods based on the principles of natural selection and adaptive search for solutions [10]. Unlike traditional algorithms, they form a set of alternative solutions, consistently improving them according to given efficiency criteria. For literary studies, this approach is especially relevant due to the ambiguity of the literary text, the complexity of interpretations and a large number of interdependent analysis parameters. Evolutionary algorithms allow building adaptive research models that automatically optimize the processes of classification, analysis and interpretation of literary works.

SHIVA and WARMI environment as a factor in the transformation of methods of literary analysis.

The digitization of the literary space, the emergence of new genres, multimodal texts and generative literature significantly complicate the objects of philological research. In the conditions of the SHIVA and WARMI world, the influence of uncertainty, nonlinearity, information turbulence and high variability of cultural processes is increasing. This necessitates the use of intelligent adaptive methods capable of quickly adjusting analysis models as new literary data accumulate and the research context changes.

Genetic algorithms in the study of literary texts.

Genetic algorithms are one of the most common tools of evolutionary computing. They allow you to automatically select the most informative features of the text, increase the accuracy of authorship attribution, optimize thematic modeling and study of stylistic features of literary works. In addition, these algorithms are used in the construction of semantic networks, literary graphs and the analysis of character interaction, ensuring increased efficiency of intellectual processing of large literary corpora.

Genetic programming and automatic construction of interpretation models.

Genetic programming is aimed at the evolution of the analysis algorithms themselves, and not only their parameters. This allows you to automatically form new models of classification of literary texts, improve methods of stylometric analysis and develop intelligent systems to support literary studies. This approach is of particular value when working with large-scale digital collections of texts, where traditional analysis methods are not effective enough.

Differential evolution and multi-criteria optimization of literary studies.

Modern literary studies assume simultaneous consideration of lexical, syntactic, semantic, genre and cultural characteristics of the text. Such tasks belong to the class of multi-criteria optimization. Differential evolution methods allow to effectively find optimal solutions in multidimensional spaces of features, ensuring improvement of the quality of intellectual analysis of literary data.

Memetic algorithms as a synthesis of artificial intelligence and expert knowledge.

Memetic algorithms combine global evolutionary search with expert evaluation of results [11]. In literary studies, this ensures the integration of automated analysis of literary texts with the professional interpretation of the researcher. The use of feedback between the intelligent system and the expert allows to significantly increase the reliability and quality of the obtained results.

Integration of evolutionary technologies with artificial intelligence.

A promising direction is the combination of evolutionary algorithms with artificial intelligence and natural language processing technologies [12]. Evolutionary optimization can be used to adjust the parameters of language models, select optimal

neural network architectures, and improve the efficiency of literary text analysis. Such a synthesis forms the basis of a new generation of intelligent literary studies that combine the capabilities of digital humanities, NLP, and artificial intelligence methods.

Prospects for the formation of Evolutionary Literary Analytics.

The development of digital humanities creates the prerequisites for the formation of a new scientific direction - Evolutionary Literary Analytics, which hybridly combines [13] evolutionary computing, intelligent data analysis, artificial intelligence, and literary expertise. Its methodological basis is the transition from static analysis of individual texts to modeling of the literary process as a complex adaptive system. The use of this approach opens up the possibilities of intellectual analysis of large literary corpora, identification of patterns of cultural evolution, forecasting the development of literary trends, and improving the research tools of modern philology in the conditions of SHIVA and WARMI reality.

Conclusions.

The modern conditions of the SHIVA and WARMI environments significantly change the requirements for the methodology of literary studies, making it necessary to transition from mainly traditional methods of analysis to intelligent adaptive technologies for processing complex humanitarian data.

It is shown that evolutionary technologies are an effective tool for solving multi-criteria problems of modern literary studies. Genetic algorithms, genetic programming, differential evolution and memetic algorithms ensure an increase in the quality of analysis of literary texts, optimization of thematic modeling, attribution of authorship, research of literary networks and intellectual interpretation of works.

The feasibility of integrating evolutionary computing with technologies of artificial intelligence, machine learning, natural language processing and digital humanities is substantiated. Such a synthesis forms a new direction of Evolutionary Literary Analytics, aimed at creating intelligent systems for analyzing and predicting the development of literary processes.

Prospects for further research are related to the development of specialized evolutionary models for the analysis of large literary corpora, the construction of digital models of the evolution of artistic trends, as well as the creation of intellectual platforms to support literary studies, capable of functioning effectively in conditions of high uncertainty, turbulence, and systemic risks of the modern scientific environment.

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Article sent: 19.07.2026

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