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Leveraging hybrid machine learning for big data challenges in contemporary literary studies

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Introduction. The humanities are currently undergoing a profound transformation, driven by intense digitalization and the growing role of big data analysis [1] in both practical and scientific tasks. Literary studies, linguistics, history, cultural studies, sociology, and philosophy increasingly work with data sets that are comparable in volume and complexity to data in natural and technical disciplines. Digital text corpora, electronic archives, databases of oral and written heritage, multimedia collections, and social media resources form data streams that cannot be processed using traditional methods alone [2]. Classical humanities approaches based on critical analysis, hermeneutic interpretation, and philological reading remain valuable, but their capabilities are insufficient to work with gigantic volumes of digital sources. In this situation, machine learning technologies [3], [4] play a leading role, providing automation of information processing, detection of hidden structures and patterns that are beyond the power of a person during manual analysis [5], [6].

Hybrid and ensemble machine learning strategies are gaining particular importance. Their difference lies in the integration of different methods, which allows combining the advantages of several algorithms and neutralizing their limitations. Hybrid systems combine statistical models with deep learning algorithms and natural language processing methods, creating multi-level analytics for humanitarian data. Ensemble approaches (begging, boosting, stacking, etc.) combine the results of several models, ensuring high stability and accuracy of results.

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Main Part. Modern literary studies is in a phase of intensive transformations caused by the processes of digitalization of the humanities and the rapid increase in the volume of information. The formation and accumulation of large data sets in philological and literary studies opens up qualitatively new horizons for the analysis of texts, their interpretation and systematization. Traditional approaches to philology, based on hermeneutics, historical-cultural and comparative-typological methods, are becoming insufficient for working with huge corpora of works, multimedia sources and multilayered cultural artifacts. In these conditions, the importance of the use of hybrid machine learning technologies [7], which combine the potential of statistical methods, neural network models [8], knowledge-based & data-driven analysis and analytics [9] and artificial intelligence algorithms [10], is growing. Such synthetic integration allows solving research that is impossible within the framework of one single method. In the field of literary studies, the use of hybrid models contributes to a more accurate automated classification of genres, the identification of latent intertextual interactions, the construction of semantic maps of works, as well as the reconstruction of ideological and cultural contexts hidden in texts.

At the same time, big data changes the very research paradigm of literary studies: the scientist gets the opportunity to go beyond the narrow sample and work with global arrays of works of different eras, traditions and genres, which opens the way to identifying universal patterns of the literary process. The use of hybrid machine learning not only expands the research tools of the humanities, but also contributes to the formation of a new research methodology that combines quantitative data processing methods with qualitative interpretative strategies.

Thus, modern literary studies acquires an interdisciplinary character, where digital philology, computational linguistics, artificial intelligence and literary theory interact in a cybernetic way synergistically [11]. Hybrid machine learning in the context of big data forms the basis of a new scientific epistemology that combines traditional humanitarian practices and innovative methods of analysis.

Conclusions.

1. Hybrid machine learning in literary studies is one of

the most promising areas of digital humanities research, as it provides work with large and heterogeneous arrays of texts.

2. The integration of big data processing methods radically updates the methodology of literary analysis, allowing texts to be studied comprehensively - from formal structures to deep semantic layers.

3. The use of hybrid models opens up opportunities for the study of intertextual interactions, genre transformations and cultural universals, which significantly expands the potential of interdisciplinary research.

4. In the context of the digital transformation of science, hybrid machine learning contributes to the creation of a synthetic approach that combines hermeneutic, comparative-historical and semantic methods with artificial intelligence algorithms.

5. In the future, the integration of such technologies will lead not only to an increase in the accuracy of analysis and the depth of interpretation, but also to the emergence of intelligent scientific support systems capable of automatically detecting hidden structures, formulating research hypotheses, and proposing new trajectories of interpretation.

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