

UZBEK LITERATURE UNDER THE MICROSCOPE OF NEURAL NETWORKS: FROM STYLISTIC ANALYSIS TO THEMATIC MODELING

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Abstract: Recent advancements in artificial intelligence and natural language processing have opened new horizons in the study of literary texts. This article explores the potential application of neural network technologies to the analysis of Uzbek literature, particularly from the perspectives of stylistic analysis and thematic modeling. The use of machine learning algorithms offers a fresh approach to examining the structure, language, emotional tone, and semantic content of works by Uzbek authors. The article discusses specific examples in which neural networks identify stylistic features, recurring motifs, and hidden thematic clusters. The aim of the study is to demonstrate how digital technologies can enhance traditional philological research methods and provide new opportunities for teaching and studying Uzbek literature in higher education institutions.

Keywords: Uzbek literature, neural networks, stylistic analysis, thematic modeling, digital philology, artificial intelligence, literary studies, pedagogical education.

In the context of the rapid advancement of artificial intelligence technologies, the humanities—including literary studies—are faced with the need to rethink traditional approaches to text analysis. Uzbek literature, as a significant part of Central Asia's cultural heritage, has increasingly become a focus within the field of digital philology. The application of neural network models to literary works not only accelerates the analytical process but also reveals textual features that are difficult to capture using classical methods.

Particularly relevant is the study of stylistic traits and thematic structures embedded in the works of Uzbek authors from various periods—ranging from 20th-century classics to contemporary writers.

Modern deep learning algorithms, including transformer-based models (such as BERT, GPT, and RoBERTa), possess the capability to recognize complex linguistic dependencies, emotional markers, and lexico-semantic patterns across large text corpora. This creates the foundation for objective and scalable literary analysis, enabling the identification of hidden structures, recurring themes, emotional tones, and stylistic shifts. Within the framework of Uzbek literature, this can assist in systematizing a rich and diverse body of works, proposing new classifications, and uncovering patterns that may have previously escaped scholarly attention.

Moreover, such an approach holds significant pedagogical value: teaching students at pedagogical universities to analyze literary texts using digital tools fosters critical thinking, interdisciplinary competence, and digital literacy. This is particularly important in light of ongoing educational reforms in Uzbekistan aimed at integrating modern technologies into higher education. Thus, the adoption of neural network methods in literary analysis represents not only a scientific breakthrough but also a valuable educational asset, paving the way for a new paradigm in philological education.

The analysis of Uzbek literature through neural network technologies involves two key directions: stylistic analysis and thematic modeling. Stylistic analysis with the help of artificial intelligence enables the identification of authorial traits, speech patterns, rhythmic structures, and lexical preferences that may have eluded traditional literary scholarship. For example, clustering algorithms can group literary works based on stylistic characteristics such as the density of epithets, frequency of specific syntactic constructions, or the degree of emotional coloring. This is especially relevant for analyzing authors who wrote during transitional periods—such as Erkin Vokhidov, Shukur

Kholmiraev, or Utkir Khoshimov—whose works merge traditional and modernist elements.

Thematic modeling, in turn, refers to the automated identification of dominant themes, motifs, and semantic fields based on the analysis of large volumes of text. Methods such as LDA (Latent Dirichlet Allocation) or BERTopic make it possible to detect recurring topics—such as love, national identity, collectivism, the struggle against internal and external enemies, and social justice—through the statistical distribution of words in texts. Applying these models to Uzbek prose and poetry enables researchers to trace the evolution of literary themes from the Soviet period to the post-Soviet era, as well as to observe differences in thematic preferences depending on region, gender, and age group.

Another area of interest is sentiment analysis, which helps assess the emotional tone of a work. Sentiment analysis models allow for the quantification of the prevalence of positive, neutral, or negative emotions in literary texts. For instance, novels about labor life from the 1970s typically reflect neutral-to-positive sentiments, whereas contemporary prose more often displays irony, sarcasm, and anxiety—mirroring societal change and the reevaluation of values.

Furthermore, neural networks can be used to detect intertextual links—such as allusions, quotations, and stylistic parallels between authors and literary eras. This is especially important in the study of post-Soviet Uzbek literature, which exhibits active borrowing of forms and motifs from world literature, including through translated works. For example, in the writings of Abdulla Oripov, one can trace the influence of Eastern poetics combined with modernist forms from Western traditions.

The application of such methods requires the creation of a digital corpus of Uzbek literature, which, in turn, promotes the digitization of humanities data in Uzbekistan. Currently, such corpora are limited in scope and require significant expansion, standardization, and annotation. Nevertheless, there are already

ongoing initiatives to digitize the works of both classical and contemporary Uzbek authors and convert them into machine-readable formats for further analysis.

Thus, neural network technologies not only create opportunities for a more accurate and comprehensive study of Uzbek literature, but also contribute to the development of new teaching methods, the stimulation of student research activity, and the integration of the humanities into the digital educational ecosystem.

The integration of neural network technologies into the analysis of Uzbek literature represents a crucial step toward incorporating digital tools into the humanities. These technologies expand the boundaries of traditional literary scholarship and offer new interpretive methods capable of addressing both microstructural (lexical and syntactic) and macrostructural (thematic, intertextual, and stylistic) levels of analysis. Thanks to the capabilities of machine learning and natural language processing, researchers gain powerful tools for conducting deeper and more objective studies of both classical and contemporary Uzbek literary texts.

The educational potential of these methods is of particular importance. The use of thematic modeling, stylistic classification, and sentiment analysis can form the basis of innovative pedagogical practices in teacher training institutions, where future educators not only learn traditional methods of literary analysis but also acquire skills in working with digital tools and interpreting data using artificial intelligence. This aligns with global educational trends aimed at fostering digital literacy, critical thinking, and interdisciplinary analytical skills among students.

In the context of Uzbekistan, where reforms in the digitalization of education and scientific research are actively underway, such approaches are especially relevant. The creation and development of a digital corpus of Uzbek literature, the integration of neural network platforms into research and teaching

practices, as well as interdisciplinary collaboration between philologists, programmers, and educators, have the potential to give a powerful impetus to the advancement of the humanities. In the long term, this will not only improve the quality of academic research but also contribute to the formation of a new culture of scholarly thinking—one that is open to innovation and technological progress.

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