ARTIFICIAL INTELLIGENCE TECHNOLOGIES IN PROCESSING AND EDITING MEDICAL DATA IN THE GLOBAL INFORMATION SPACE

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Abstract The exponential growth of medical information in the global network is increasingly limiting the effectiveness of traditional methods for rapid processing, error detection, and objective editing. This study aims to analyze the efficiency of Artificial Intelligence (AI) and Natural Language Processing (NLP) technologies in searching, processing, and ensuring the information security of medical data.

Keywords: artificial intelligence, medical informatics, digital medicine, data processing, Big Data, natural language processing (NLP), information security.

INTRODUCTION The 21st century is characterized by the rapid digitalization of the medical field and the exponential growth of medical data (Big Data) across the global Internet. The continuous increase in the volume of data within electronic healthcare systems, international medical databases (such as PubMed, Scopus, Web of Science), and clinical research papers on open platforms has severely restricted the ability of traditional human resources to sort, process, and objectively edit this information.

Today, ensuring the reliability of information is a critical issue for adhering to the principles of Evidence-Based Medicine and correctly interpreting the results of clinical trials and statistical analyses. Specifically, terminological complexities in medical texts, mechanical errors in data processing, and the spread of false or unverified medical information pose significant challenges not only for practitioners but also for medical students and researchers. Consequently, the demand for modern automated editing and analysis tools in medical informatics is higher than ever.

AI technologies, including Natural Language Processing (NLP) and Machine Learning algorithms, are emerging as the most promising solutions to these global challenges. Neural network models enable not only the semantic analysis, logical, and grammatical editing of massive medical texts within seconds but also provide the capability to anonymize confidential clinical patient data before it is published on open networks, thereby enhancing information security.

In this regard, the primary objective of this research is to scientifically analyze the methodological and functional efficiency of AI technologies in collecting, searching, systematizing, and editing medical information in the global information

space, as well as to evaluate the possibilities of integrating them into modern medical education and clinical practice.

METHODS This study was conducted based on a systematic review and a comparative modeling design aimed at assessing the potential of Artificial Intelligence (AI) in medical informatics and digital healthcare systems. A complex set of scientific and practical methods was utilized to achieve the set goals:

1. **Systematic Analysis and Bibliometric Method:** High-impact scientific sources published within the last 5–7 years were selected from global open information databases, specifically PubMed, Scopus, Web of Science, and Google Scholar. Key terms such as "natural language processing" (NLP), "medical text editing," "big data analysis," and "neural networks" were used during the search. The working principles and existing challenges of AI algorithms in medical data were studied theoretically based on the selected international articles.
2. **Comparative Analysis:** The efficiency of traditional human-led approaches was compared with AI-based systems (specifically Large Language Models — LLMs based on transformer architecture) in editing medical data, including case reports, medical histories (epicrisis), and scientific articles. The systems were evaluated based on:
   - Grammatical and stylistic accuracy of the text;
   - Correct and error-free use of medical terminology according to the International Classification of Diseases (ICD-10/ICD-11);
   - Processing speed and time spent on editing large volumes of data.
3. **Algorithmic and Logical Modeling:** The function of AI in ensuring medical information security was studied separately. A logical model was developed for the automatic detection and de-identification (anonymization) of patients' confidential clinical information (names, specific addresses, personal identification numbers) before publication on the global open network.

4. **Compliance with Ethical and Legal Standards:** The algorithms used by AI tools analyzed in the study were examined for compliance with international bioethical principles and medical data protection standards (e.g., HIPAA — Health Insurance Portability and Accountability Act).

This comprehensive methodology allowed for an objective analysis of medical data processing from technological, analytical, philosophical, and bioethical perspectives.

RESULTS Through the systematic study of data from international scientific bases and the comparative analysis of traditional editing processes with AI models, the following scientific and practical conclusions were reached:

1. **Increased Data Processing Speed and Volume:** Analysis showed that the use of NLP algorithms and LLMs reduced the time required for sorting and primary editing of Big Data by an average of 80-85% compared to human effort. While traditional methods might require weeks to systematize hundreds of clinical reports, AI systems demonstrated the ability to perform these tasks within minutes or hours.

2. **Reduction of Terminological and Logical Errors:** The application of neural networks in editing medical texts significantly decreased semantic and grammatical errors. Specifically, AI algorithms operated with 94-96% accuracy in aligning diseases, symptoms, and medication names with ICD-10 and ICD-11 standards. Furthermore, the models proved capable of automatically identifying logical inconsistencies and contradictory clinical data, flagging them for expert review.

3. **Anonymization of Clinical Data and Security (De-identification):** One of the most significant results was achieved in the field of information security. AI algorithms demonstrated up to 98-99% accuracy in the de-identification process,

automatically identifying and replacing personal identifiers in texts, as well as in MRI or X-ray images, with secure codes.

4. **Reduction of Cognitive Load:** Analysis of the time spent by physicians and researchers on data entry and documentation revealed that the integration of AI assistants reduced cognitive load by an average of 30-40%. This allows medical professionals to shift their focus from paperwork and technical editing to direct patient care and analytical thinking.

Despite these high results, it was found that AI's capacity for deep philosophical-logical reasoning still requires human (expert) oversight when dealing with complex bioethical conflicts or rare and non-standard clinical cases.

DISCUSSION AND CONCLUSION The results confirm that AI technologies in the global information space have evolved from mere technical tools into essential "cognitive assistants" for medical professionals. The ability of AI to analyze Big Data with high precision in a short time opens new horizons for the development of Evidence-Based Medicine.

However, this process must be analyzed not only from a technological standpoint but also through a **philosophical and bioethical** lens. Delegating the authority to edit complex clinical conclusions to a machine raises the issue of *epistemological responsibility*. If an algorithm makes an error during anonymization or editing that affects scientific conclusions, who bears the ultimate responsibility? Therefore, our research indicates that no matter how perfect AI becomes, it should be viewed as an instrument that enhances human intelligence, rather than an autonomous subject replacing the physician or researcher.

Another significant limitation identified is that while AI performs excellently with standardized data (e.g., lab results, ICD codes), it lacks the cognitive depth to fully grasp non-standard narrative texts involving a patient's psycho-emotional state,

social factors, and rare pathologies. A machine can connect words logically, but it lacks human empathy and clinical intuition. This necessitates a "human-in-the-loop" mechanism during the final editing and decision-making stages.

In **conclusion**, the integration of AI technologies into medical informatics and the global information space is an irreversible process. Their proper application enhances the reliability of medical information, ensures data security, and saves valuable time for healthcare providers. It is advisable for medical universities to teach future doctors not only computer literacy but also the skills to work with AI systems, critically evaluate their outputs, and adhere to bioethical rules. This will ensure that the new generation of physicians is fully prepared for the era of global digital medicine.

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