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ПРИМЕНЕНИЕ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА В УПРАВЛЕНИИ ЭЛЕКТРОННЫМИ МЕДИЦИНСКИМИ КАРТАМИ

Аннотация. *Стремительная цифровизация системы здравоохранения привела к широкому внедрению электронных медицинских карт (EHR). Хотя электронные медицинские карты повышают доступность и координацию информации о пациентах, они также создают значительные проблемы, связанные с объемом, качеством, безопасностью данных и удобством их использования в клинической практике. Искусственный интеллект (ИИ) предоставляет эффективные инструменты для решения этих проблем посредством автоматизированной обработки данных, прогнозной аналитики, выявления аномалий и интеллектуальной поддержки принятия клинических решений. В данной статье рассматриваются основные направления применения искусственного интеллекта в управлении*

электронными медицинскими картами, особое внимание уделяется поддержке принятия клинических решений, автоматизированному извлечению клинической информации и безопасности данных.

Ключевые слова: *искусственный интеллект, электронные медицинские карты, управление медицинскими данными, машинное обучение, поддержка принятия клинических решений, безопасность данных, цифровое здравоохранение.*

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ARTIFICIAL INTELLIGENCE APPLICATIONS IN ELECTRONIC HEALTH RECORDS MANAGEMENT

Abstract. *The rapid digitalization of healthcare has resulted in the widespread adoption of electronic health records (EHRs). While EHRs improve accessibility and coordination of patient information, they also create significant challenges related to data volume, quality, security, and clinical usability. Artificial intelligence (AI) offers powerful tools for addressing these challenges through automated data processing, predictive analytics, anomaly*

detection, and intelligent decision support. This article examines the main applications of AI in EHR management, focusing on clinical decision support, automated extraction of clinical information, and data security.

Keywords: *artificial intelligence, electronic health records, healthcare data management, machine learning, clinical decision support, data security, digital health.*

Introduction

Electronic health records have become the central component of modern healthcare information systems. They store comprehensive patient data, including medical history, laboratory results, imaging studies, prescriptions, and clinical notes. The volume and complexity of this data continue to grow as telemedicine platforms, wearable devices, and connected diagnostic equipment generate additional streams of information [1].

Traditional EHR systems often struggle with incomplete records, inconsistent data formats, and limited analytical capabilities. Healthcare professionals spend considerable time searching for relevant information, which can delay clinical decisions. At the same time, the sensitivity of medical data requires strict protection against unauthorized access and cyber threats.

Artificial intelligence, particularly machine learning and natural language processing, provides new opportunities to improve the management, analysis, and security of EHR data [2, 3]. AI systems can extract structured information from unstructured clinical notes, detect patterns that indicate potential risks, and support clinicians with evidence-based recommendations [4]. This article explores how AI technologies can enhance EHR management while highlighting the technical, ethical, and organizational issues that must be considered.

Materials and Methods

This article is a narrative review based on the analysis and synthesis of published scientific literature on the use of machine learning and artificial intelligence in healthcare, with a focus on the management of electronic health records.

Results

AI Applications in EHR-Based Clinical Decision Support

Clinical decision support is one of the most important areas in which artificial intelligence can provide practical value to electronic health record systems. Healthcare professionals must often analyze large amounts of patient information before making diagnostic or therapeutic decisions. AI-based systems can process this information rapidly and identify clinically relevant patterns that may not be immediately apparent to healthcare professionals [2].

Machine learning algorithms can analyze patient history, laboratory results, medications, vital signs, and other clinical parameters to estimate the probability of particular diseases or complications [5]. Predictive models can also help identify patients who may require closer monitoring or additional diagnostic procedures.

For example, AI-based predictive systems can analyze changes in vital signs and laboratory parameters to identify patients at increased risk of clinical deterioration. In chronic disease management, machine learning can be used to identify patterns associated with complications and support earlier intervention.

AI for Data Security and Privacy Protection

The protection of patient information is one of the most important requirements of modern healthcare information systems. EHRs contain highly sensitive information, including diagnoses, medications, laboratory results, personal information, and medical histories. Unauthorized access, data leakage, and cyberattacks can therefore have serious consequences.

Artificial intelligence can contribute to healthcare cybersecurity by continuously analyzing system activity and detecting unusual patterns.

Discussion

One of the most valuable applications of AI in EHR systems is the automatic extraction and structuring of clinical information. Natural language

processing algorithms can analyze free-text physician notes, discharge summaries, and radiology reports, converting them into structured data that can be more easily searched and analyzed [4]. This reduces documentation burden and improves the completeness of patient records.

Machine learning models also support clinical decision-making by identifying high-risk patients, predicting disease progression, and suggesting personalized treatment options based on historical data [2]. For example, predictive models trained on large EHR datasets can help detect early signs of sepsis, deterioration in chronic conditions, or potential adverse drug reactions.

Conclusion

Artificial intelligence has significant potential to improve the management of electronic health records by enhancing data quality, supporting clinical decisions, and strengthening security [6]. Through automated information extraction, predictive analytics, and intelligent monitoring, AI can help healthcare organizations handle growing volumes of medical data more effectively.

Successful implementation, however, requires careful attention to data quality, algorithmic fairness, system interoperability, and ethical standards. Collaboration between medical professionals, information technology specialists, and policymakers is essential to ensure that AI solutions deliver real clinical value while protecting patient privacy and safety. As digital health continues to develop, well-designed AI applications can play an important role in creating more efficient, reliable, and patient-centered healthcare information systems.

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