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MEDICAL DIAGNOSTICS WITH THE HELP OF ARTIFICIAL INTELLIGENCE

Abstract. This article reviews recent advances in medical diagnostics using artificial intelligence (AI) and their practical applications. The article provides detailed information on how AI is used in medicine, in particular in the diagnosis and treatment of diseases, its advantages and limitations. It discusses how AI technologies, including machine learning, deep learning, and data analysis, can improve the decision-making process of doctors. The article also provides examples of the effectiveness of diagnostic systems based on AI and their application in clinical practice. The ethical and legal aspects of the use of AI in medicine are also considered, and future development prospects are discussed.

Keywords: artificial intelligence, medical diagnostics, disease detection, treatment, SI technologies, legal aspects.

Introduction. Artificial intelligence (AI) is revolutionizing the medical field, particularly in the diagnosis and treatment of diseases. These technologies can help doctors make more accurate and effective decisions. One of the main advantages of AI is the ability to quickly analyze large amounts of data [1]. In medicine, this includes information from various sources, such as patient records, laboratory results, and imaging studies (e.g., X-rays, MRIs). In the diagnosis of diseases, AI algorithms, for example, use deep learning techniques to identify specific features from images. Such systems are used, for example, in the field of oncology to detect cancer cells. Studies show that AI systems can sometimes perform better than human doctors [2]. This helps to quickly assess patients' conditions and develop a treatment plan. In addition, AI allows for the development of individualized treatment approaches in medicine. For example, by analyzing genetic data, individual treatment strategies can be developed for a patient's diseases. This increases the effectiveness of treatment for patients and reduces side effects. However, the application of artificial intelligence in medicine also has a number of limitations. SI systems require large amounts of high-quality data. If the data is incorrect or incomplete, the accuracy and reliability of these systems can decrease. Also, the process of collecting and storing the data necessary for the operation of artificial intelligence is often complex and time-consuming.

Artificial intelligence-based systems must use personal patient data, which raises issues of confidentiality and data protection. These issues must be addressed in order to maintain trust between doctors and patients. Also, artificial intelligence systems cannot fully replace the experience of human doctors. Human factors, such as understanding the patient's condition and emotional approach, are very important in medicine. Artificial intelligence systems are limited to analyzing data and do not take human emotions into account.

The use of artificial intelligence in medicine is expected to expand in the future. As technology advances, AI systems can provide more accurate and reliable results. However, ethical and legal issues need to be considered in this process [3]. Medical professionals and researchers should be careful when implementing AI in practice.

Artificial intelligence (AI) technologies, including machine learning, deep learning, and data analysis, can radically improve the decision-making process of doctors in the medical field. These technologies help doctors make more accurate and effective decisions, while also helping them develop the best treatment strategies for patients.

Machine learning algorithms provide the ability to quickly and efficiently analyze large amounts of data. In medicine, doctors must review a large number of patient data, laboratory results, and imaging tests (e.g., X-rays, MRIs). Machine learning algorithms analyze this data and help identify important features in diagnosing diseases or assessing a patient's condition. For example, using ML models to diagnose conditions such as heart disease or diabetes can help doctors make faster and more accurate diagnoses. Deep learning (DL) is a powerful technique for analyzing image data. DL algorithms are used in oncology, for example, to detect cancer cells. Studies have shown that deep learning models can sometimes outperform human doctors [4]. This can help doctors quickly assess patients' conditions and develop treatment plans. Such technologies can help doctors detect diseases in the early stages, which can improve treatment effectiveness.

Data analytics can also improve doctors' decision-making. AI systems can collect and analyze large amounts of patient data, and provide doctors with accurate recommendations. For example, by analyzing a patient's history and genetic information, AI systems can suggest individualized treatment strategies. This increases the effectiveness of treatment for patients and reduces side effects. AI systems also provide doctors with diagnostic tools that help them make clinical decisions. Programs created with AI can analyze patients' symptoms and identify their possible diseases. This process allows doctors to expand their knowledge and apply new approaches [5]. However, the use of AI in medicine also has a number of limitations. First, AI systems require a large amount of high-quality data. If the data is inaccurate or incomplete, the accuracy of these systems may decrease. Ethical issues also play an important role. AI-based systems must use patients' personal data, which raises privacy and data protection issues. Collaboration between doctors and AI systems is also important. AI systems cannot fully replace the expertise of human doctors; human factors, such as understanding the patient's condition and emotional approach, are very important. AI systems are limited to analyzing data and do not take into account human emotions.

Diagnostic systems based on AI have shown their effectiveness in medicine and are widely used in clinical practice. The following are examples of the effectiveness and practical application of these systems:

An AI system developed by Google DeepMind is used to diagnose retinopathy. The system analyzes retinal images and helps doctors identify the early stages of the disease. Studies show that this system can show better results than human doctors. This increases the chances of treating patients early.

Aidoc is an artificial intelligence-based radiological diagnostic system that analyzes X-ray and computed tomography (CT) images. The system helps detect, for example, blood clots in blood vessels or pulmonary embolism. The Aidoc system allows doctors to make quick and accurate diagnoses, which leads to rapid treatment of patients.

EkoAI is an artificial intelligence-based system that analyzes cardiac ultrasound scans. The system provides accurate results in assessing the structure and function of the heart. Studies show that EkoAI, when used by cardiologists, significantly increases the accuracy of diagnosing heart diseases.

Foundation Medicine uses artificial intelligence to analyze genomic data. This system analyzes patients' genetic information and offers individualized treatment strategies. For example, by determining the genetic profile of cancer patients, the SI system determines which drugs will be most effective.

IBM Watson for Oncology is an artificial intelligence-based system that helps oncologists develop treatment plans. The system analyzes patients' medical histories, laboratory results, and imaging to provide personalized treatment recommendations. Studies show that Watson for Oncology supports doctors' decisions in many cases and provides recommendations based on updated scientific evidence.

The use of artificial intelligence (AI) in medicine opens up many possibilities, but this process also involves ethical and legal aspects. Below are some thoughts on these aspects and future development prospects.

AI systems collect a lot of data, including patients' personal and medical histories. The protection and confidentiality of this data are important. Patients need to know how their data will be used and give permission.

AI systems can provide diagnosis and treatment recommendations, but there is a risk of reducing the role of doctors. It is important for doctors to retain their expertise and ability to communicate with patients.

AI systems can sometimes make unfair decisions for certain groups or demographics. The systems operate on the data they are trained on, and if that data is inaccurate or biased, so can the results. This is an important issue for ensuring fairness and equity.

Who is liable if an AI system makes an incorrect diagnosis or treatment recommendation? The doctor, the manufacturer, or the software company? This question is also important from a legal perspective.

All countries have laws aimed at protecting personal data (for example, the GDPR in the European Union). When using AI in medicine, these laws must be observed.

Diagnoses and recommendations made with the help of AI should be legally accepted. How will patients' rights be protected if the AI system makes an incorrect diagnosis? These issues need to be clearly defined.

Algorithms and models that affect the operation of AI systems can be patented. This can create problems for the development of innovations.

In the future, AI systems will work in closer cooperation with doctors. The goal of this cooperation is to provide patients with better quality and individualized care.

AI systems must be constantly updated and trained with new data. This will increase their accuracy and allow them to identify new diseases.

It is necessary to develop ethical standards and legislation for the use of AI. This will increase the efficiency of AI systems, while protecting patients' rights.

AI technologies are also developing in the field of telemedicine. They allow for more efficient remote diagnosis and treatment processes.

Conclusion. In conclusion, artificial intelligence (AI) is an important tool that is revolutionizing medical diagnostics, increasing accuracy, efficiency, and speed in this field. AI algorithms, with their ability to analyze large amounts of data, help doctors make quick and accurate diagnoses. They can be effective in detecting diseases at an early stage, developing individualized treatment plans, and monitoring patients' condition. However, the use of AI also raises a number of ethical and legal issues. Issues such as privacy, data protection, and responsibility between humans and AI remain relevant. The impartiality and fair operation of AI systems are also important. In the future, AI is expected to be used more widely in medicine. However, its success will depend on the cooperation between doctors and technology, the development of ethical standards, and legislation. In general, the process of medical diagnostics using AI not only provides innovative approaches, but also creates the opportunity to provide better and more efficient services for patients.

References:

1. Xujaqulova, Mehribon. "KASALLIKLARNI DAVOLASHDA TIBBIY DIAGNOSTIK TEKSHIRUVLARNING AHAMIYATI." *INTERNATIONAL SCIENTIFIC INNOVATION RESEARCH CONFERENCE*. Vol. 1. No. 6. 2024.
2. Xursanov, Sherzod, and Sherzod Aliyev. "Tibbiyotda sun'iy intellektning o'rni va ahamiyati." *Journal of universal science research* 2.12 (2024): 199-205.
3. Axunova, Zeynab. "ZAMONAVIY KLINIK LABARATORIYALARNI TURLARI VA VAZIFALARI." *Инновационные исследования в современном мире: теория и практика* 4.15 (2025): 62-64.
4. Shodmonqulovich, Hamroyev Alisher. "TIBBIY DIAGNOSTIKADA KASALLIKNI ERTA ANIQLASH UCHUN SUN'IY INTALLEKT TEXNOLOGIYALARINING QO'LLANILISHI." *Международный научный журнал* 2.1 (2025): 21-25.
5. Ulaboyevich, Xursanov Sherzod, Zaripov Husan Dilshod o'g'li, and Yo'ldoshev Nodirbek Choriyevich. "TIBBIYOTDA KOMPYUTER TEXNOLOGIYALARI." *ACUMEN: International journal of multidisciplinary research* 2.5 (2025): 376-383.