INFLUENCE OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES IN MEDICINE ON DIAGNOSTIC PROCESSES

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Abstract: The article examines modern approaches to integrating artificial intelligence (AI) technologies into diagnostic processes in the healthcare sector. Special attention is given to the use of AI in medical image processing, analysis of laboratory data, and clinical decision support systems. It is shown that AI contributes to early disease detection, personalization of medical care, and reduction of physicians' workload. The article also analyzes technological, legal, and ethical barriers to the implementation of AI in clinical practice.

Keywords: artificial intelligence, medical diagnostics, medical imaging, clinical decision-making, electronic medical records, healthcare information systems, data security, automation, medical informatics, algorithms.

Annotatsiya: Maqolada sog‘liqni saqlash sohasida diagnostika jarayonlariga sun’iy intellekt (SI) texnologiyalarini integratsiya qilishning zamonaviy yondashuvlari ko‘rib chiqiladi. Tibbiy tasvirlarni qayta ishlash, laboratoriya ma’lumotlarini tahlil qilish hamda klinik qarorlarni qo‘llab-quvvatlash tizimlarida SI’dan foydalanishga alohida e’tibor qaratilgan. SI kasalliklarni erta aniqlash, tibbiy xizmatlarni individuallashtirish va shifokorlar yuklamasini kamaytirishga xizmat qilishi ko‘rsatib berilgan. Shuningdek, maqolada SI’ni klinik amaliyotga joriy etishdagi texnologik, huquqiy va etik to‘siqlar tahlil qilingan.

Kalit so‘zlar: sun’iy intellekt, tibbiy diagnostika, tibbiy tasvirlash, klinik qarorlar, elektron tibbiy yozuvlar, sog‘liqni saqlash axborot tizimlari, ma’lumotlar xavfsizligi, avtomatlashtirish, tibbiy informatika, algoritmlar.

Аннотация: В статье рассматриваются современные подходы к интеграции технологий искусственного интеллекта (ИИ) в диагностические процессы в сфере здравоохранения. Особое внимание уделено

использованию ИИ в области обработки медицинских изображений, анализа лабораторных данных, а также в системах поддержки клинических решений. Показано, что ИИ способствует раннему выявлению заболеваний, персонализации медицинской помощи и снижению нагрузки на врачей. Также в статье анализируются технологические, правовые и этические барьеры внедрения ИИ в клиническую практику.

Ключевые слова:
искусственный интеллект, медицинская диагностика, медицинская визуализация, клинические решения, электронные медицинские записи, информационные системы здравоохранения, безопасность данных, автоматизация, медицинская информатика, алгоритмы.

Introduction

In recent years, artificial intelligence technologies have been actively used globally in almost all sectors, especially in medicine. Artificial intelligence (AI) makes it 7 diagnosis, and provide an individual approach. This, in particular, plays an important role in the early detection of cancer, cardiovascular diseases, diabetes, and other chronic diseases.

This article reviews the impact of artificial intelligence technologies on diagnostic processes, existing AI systems, their operating algorithms, advantages, and current issues**.**

Main part

Understanding artificial intelligence and its role in medicine

Artificial intelligence is a set of algorithms and systems that imitate human mental activity. In medicine, AI is widely used in the following areas:

diagnostics based on images (for example, X-ray, MRI, CT);

analysis of laboratory tests;

studying electronic medical records and providing recommendations;

providing initial advice through medical chatbots.

One of the most successful applications of artificial intelligence is imaging diagnostics.

For example:

The LYNA (Lymph Node Assistant) algorithm developed by Google Health has high accuracy in detecting breast cancer metastasis..

The IBM Watson for Oncology system recommends the most appropriate treatment methods for oncology patients.

Advantages:

24/7 availability;

reduction of human error;

rapid analysis of large amounts of data;

personalized medical approach.

Limitations and problems

The problem of ensuring the confidentiality of information;

The unexplained decision-making of the SI model (black box effect);

Low trust of medical workers in SI technologies;

The lack of SI specialists in our country.

Result:

In the healthcare system of Uzbekistan, artificial intelligence technologies are mainly used in the areas of automating diagnostic processes, managing electronic medical databases, and developing telemedicine services. In particular, AI algorithms in the analysis of medical images are greatly helping doctors in the early detection of diseases. Also, through electronic health care platforms, patient information is stored centrally, creating the opportunity to provide fast and efficient services.

There are a number of problems in the process of introducing SI technologies into the healthcare system of Uzbekistan. One of the biggest challenges is the lack of infrastructure and the lack of equal access to high-quality Internet access, which is necessary for the implementation of modern technologies. In addition, the lack of

qualified personnel is also an important issue. It is necessary to strengthen cooperation between medical personnel and IT specialists, as well as conduct regular training on new technologies. Lack of financing is preventing the large-scale implementation of these projects.

IBM Watson Health

Description: IBM Watson Health is a medical platform powered by artificial intelligence and big data analytics that helps support clinical decisions, diagnose diseases, and develop treatment plans.Asosiy imkoniyatlari:
Analysis of large amounts of medical data.
Supporting clinical decisions.
Develop a treatment plan.

News: Using the IBM Health Guardian platform, it is possible to analyze many types of data (text, audio, video), which serves as an effective tool for early detection and prevention of diseases. arXiv **Google DeepMind Health**

Description: Google DeepMind Health is a project focused on the application of artificial intelligence in the field of medicine, which helps in the analysis of medical images, diagnosis and treatment of diseases.

Main features:
Analysis of medical images.
Identifying diseases.
Help with treatment.

News: Using the MedGemma model, the possibility of joint analysis of medical images and texts has been created, which provides high efficiency in identifying diseases. medgemma.org

PathAI

Description: PathAI is a platform focused on applying artificial intelligence in the field of pathology, helping to analyze tissue samples and diagnose diseases.
Key capabilities:
Analyze tissue samples.

Diagnose diseases.

Assist in treatment.

News: AISight platform enables digital pathology workflow management and AI-powered analytics. pathai.com

“Current Opportunities and Prospects”

The government of Uzbekistan is paying great attention to the modernization of the healthcare system as part of its digital transformation programs. A number of projects are being implemented to introduce e-health platforms, telemedicine services, and artificial intelligence-based diagnostic systems. In addition, through the study of the experience of foreign countries and cooperation, a new impetus is being given to the development of information and communication technologies in our country. In the near future, the widespread use of information and communication technologies in medicine is expected to play an important role in providing high-quality and timely medical services to patients.

Conclusion

The introduction of artificial intelligence technologies in medicine is significantly increasing the quality of diagnostics. However, in order to fully exploit its potential, it is necessary to provide the necessary infrastructure, train specialists, and ensure data security. In the future, the possibility of developing individual diagnostics and treatment methods with the help of AI technologies will further expand.

Literature

1. Topol E. "Deep Medicine: How Artificial Intelligence Can Make Healthcare Human Again." Basic Books, 2019.
2. Esteva A, et al. "Dermatologist-level classification of skin cancer with deep neural networks." Nature, 2017.
3. Rajpurkar P, et al. "CheXNet: Radiologist-Level Pneumonia Detection on Chest X-Rays with Deep Learning." arXiv preprint, 2017.
4. IBM Watson Health. (2023). https://www.ibm.com/watson-health

5. Miotto R, et al. "Deep learning for healthcare: review, opportunities and challenges." Briefings in Bioinformatics, 2018.
6. Kadyrov I.A. "Digital technologies in medicine." Tashkent Medical Academy Publishing House, 2022.
7. WHO. "Ethics and governance of AI for health." World Health Organization, 2021.
8. Lee J. et al. "Machine Learning and AI in Healthcare: Big Data for Improved Health Outcomes." IEEE, 2020.