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THE USE OF ARTIFICIAL INTELLIGENCE IN HEALTH CARE. PROBLEMS OF IDENTIFICATION OF PATIENTS' CONDITIONS IN THE PROCESSES OF DETAILING THE DIAGNOSIS

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Annotation. The problems of using artificial intelligence in health care were discussed. The aim of the study. Assess the possibilities of using artificial intelligence in medicine right now. Most studies comparing the performance of AI and clinicians are not valid because the tests are not large enough or come from different sources. This difficulty could be overcome in the era of an open healthcare system. Indeed, open data and open methods are sure to attract a lot of attention as new research methods. It also highlights the idea that AI technologies can improve accuracy by incorporating additional data for self-updating, but automatically incorporating low-quality data can lead to inconsistent or inferior algorithm performance. The conclusion made is that the introduction of artificial intelligence into clinical practice is a promising field of development that is rapidly developing along with other modern fields of precision medicine. One of the fundamental issues remains the solution of ethical and financial issues related to the introduction of artificial intelligence.

Keywords. Artificial intelligence, state identification, high-quality survey data, deep learning.

Introduction

The need for artificial intelligence in health care is constantly growing as a result of the accumulation of data on patients, the problems of recognizing diagnoses, processing data, including images, the requirements for accurate assessment of patients' conditions, determining the risks of disease, predicting possible complications and determining optimal treatment [1, 9-12].

First of all, the acute problem in the earliest use of artificial intelligence is determined by the transformation of medicine into a broader social sphere that uses all forms of health data, including genomics, metadata, electronic medical records and biometrics, for timely round-the-clock diagnostics, as well as the creation of systemic biomedicine .

It is well known that health care is a multidimensional system created for the purpose of prevention, diagnosis, treatment, rehabilitation, and recreation of patients, health-related problems, or disorders in people. Accordingly, the more data we have about human health, the better we understand biomedical processes.

With this idea, modern technologies are developing at a tremendous speed. Today, humanity is working with a fantastic amount of data obtained since the integration of efficient technologies, such as next-generation sequencing (NGS) and genome-wide association studies (GWAS), to decode human genetics. NGS-based data provide information at previously inaccessible depths and take the experimental scenario to a whole new dimension. Instead of studying one "gene", it is now possible to study the entire "genome" of an organism in "genomics" studies within a given period of time. Similarly, instead of studying the expression or "transcription" of a single gene, we can now study the expression of all genes or the entire "transcriptome" of an organism. NGS technology has led to an increase in the volume of biomedical data,

It is estimated that the number of human genomes sequenced by 2025 could range from 100 million to 2 billion. Combining genomic and transcriptomic data with proteomic and metabolomic data can greatly expand our knowledge of the individual patient profile, an approach often referred to as "personalized, personalized, or precision medicine." As a result of the forecasts of the analytical agency Frost & Sullivan, it is assumed that in 2025 artificial intelligence systems will penetrate all areas of health care, up to the creation of digital assistants that will be able to answer most of the questions of patients and partially deal with their treatment independently.

But even now, elements of artificial intelligence are actively used in various areas of medicine, especially those related to the wide use of quantitative research methods, such as cardiovascular surgery, neurosurgery, etc. [1-6].

Current "gold standard" assessments of interoperability technical and non-technical skills are based on observation and expert judgment. Although these methods are widely used, there are many limitations related to the inherent subjectivity of these instruments, suboptimal inter-rater reliability, and limited reproducibility and scalability.

The use of AI, especially computer vision, offers a promising opportunity to automate, standardize and scale the evaluation of the effectiveness of surgical actions, primarily, including cardiothoracic surgery [3-5]. AI is also widely used in pathology [13,14]. Previous studies have documented the reliability of video-based surgical motion analysis for assessing laparoscopic performance in the operating room compared with the traditional, time-consuming approach. Despite the fact that there is a large amount of literature on AI in cardiovascular medicine, the future of these areas in clinical practice is still open. In particular, although promising roles have been postulated in providing automated image interpretation, automatic data extraction and quality control, and clinical risk prediction, however.

The aim of the study

Assess the possibilities of using artificial intelligence in medicine right now.

The results obtained

The obvious advantages of artificial intelligence, which include continuous operation of machines without fatigue and memory loss, the ability to improve communication and information sharing, facilitating research during data collection and analysis, as well as mathematical calculations, are accompanied by concerns about the breakdown of critical AI components and due them with cyber security issues. But the development and implementation of these technologies needs to demonstrate real results in different clinical settings.Scientific generalizations regarding the use of AI in health care are controversial. Several machine learning (ML) technologies are available around the world, which provide an initial set of materials for subsequent problem solving and assist in the diagnostic process. The resulting benefits include early disease detection; more consistent analysis of medical data; and increasing access to health care, especially for underserved populations. A variety of MN-based technologies have been identified for a number of diseases—certain cancers, diabetic retinopathy, Alzheimer's disease, heart disease, and COVID-19—with most technologies relying on imaging data such as X-rays or magnetic resonance imaging.

At the same time, these advances can empower healthcare professionals and improve patient care, but they also have certain limitations. For example, AI technologies can improve accuracy by incorporating additional data for self-updating, but automatically incorporating low-quality data can result in inconsistent or inferior algorithm performance.

To a certain extent, pitting artificial intelligence against doctors, although well represented in the scientific literature, is probably not the best way to solve the issue of comparing effectiveness. Most studies comparing the performance of AI and clinicians are not valid because the tests are not large enough or come from different sources. This difficulty could be overcome in the era of an open healthcare system. Indeed, open data and open methods are sure to attract a lot of attention as new research methods. However, the transition to an open healthcare system can be difficult for healthcare companies that develop software as a core business.

Currently, some studies approach the interaction of doctors and algorithms as a combination of human and artificial intelligence. It is possible to compare diagnoses while monitoring the pathological process. But this is practically impossible in emergency medicine, besides, it is extremely difficult to determine the thresholds for decision-making.

The greatest difficulties are caused by the impossibility of correctly identifying the degree of detail of the diagnosis in specific clinical cases. With a small detailing of the pathological process, the effectiveness of AI can be sufficient, but each new step can be catastrophic.

It should be emphasized that finding the optimal architecture and configuration for a neural network is not the gateway to success, as the network needs to be trained before the solution found can be used. Network training means finding such connection coefficients for interneuron connections, which allow to prove the accuracy of work not lower than the required minimum. The values of the coefficients are found as a result of the educational process. This is done by sending data samples—similar to those that would be analyzed in a real-world situation—to the input of the network, with coupling factors adjusted to minimize signal processing errors.

Unfortunately, deep learning and reinforcement learning models provide little insight into the relative importance of model inputs in determining output.

Self-attention mechanisms and probabilistic graphical models provide a visual representation of the model's activity, but do not allow for detailed analysis. Therefore, AI should now be used to enhance the decision-making process of a specialist, not to replace it. A surgeon can make one mistake after another, but a faulty model can harm hundreds or thousands of patients worldwide in a short period of time.

AI models must learn*on high-quality data*, results should be carefully interpreted by well-trained clinicians, and their performance should be compared directly with traditional scoring systems in prospective clinical trials to confirm observations from retrospective studies [16].

Since the diagnosis and treatment of emergency conditions affect the strategy of action in patients of all ages, future studies should first test the application of artificial intelligence in such cases in the field of medicine.

Studies reporting the use of AI in clinical practice are limited by retrospective designs and sample sizes. Such designs potentially include variance characteristics, spectral shifts, and other confounders. In other words, models are developed in accordance with a certain set of data. Practically, they are not repeated in other data sets. Thus, today there is no final solution regarding the practical use of AI.

Conclusion

The implementation of artificial intelligence in clinical practice is a promising field of development that is rapidly developing along with other modern fields of precision medicine. One of the fundamental issues remains the solution of ethical and financial issues related to the use of artificial intelligence.

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