DEVELOPMENT OF MEDICINE BASED ON ARTIFICIAL INTELLIGENCE

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Annotation
The introduction of artificial intelligence technologies in medicine is one of the main trends in the world of healthcare. AI and neural networks can fundamentally change the entire world of medicine: transform the diagnostic system, promote the development of new drugs, improve the quality of medical services in general and reduce costs

Keywords Artificial intelligence, medicine, technology, diagnostics, forecasting, neural networks.

Introduction
One of the first definitions of AI was proposed back in the 1980s. Computing scientists Feigenbaum and Barr called artificial intelligence a field of computer science aimed at creating intelligent systems that have the capabilities inherent in the human mind. These include the ability to learn, language recognition, the ability to reason and solve various problems.
Today, AI refers to software tools with a set of algorithms and methods that can solve intellectual problems in the same way as a person would do. For example, artificial intelligence is capable of:
1. Predict various situations
2. Evaluate information and formulate a final assessment
3. Analyze data and look for hidden patterns
It should be noted that at the moment the computer does not have access to the simulation of complex processes of the human higher nervous system: creativity, emotions, etc. All of this may arise over time and with the advent of stronger artificial intelligence. However, computers have already learned how to solve the problems of the so-called "weak artificial intelligence". The machine can work according to the rules set by the person in advance.

In addition, there is an increasing number of projects in which computers not only work according to established algorithms, but also self-learn, improve and solve more complex problems.

How do neural networks work in the medical field?

Neural networks are actively used today in the development of intelligent systems, including in medicine, due to their ability to learn. The mechanism of operation of artificial neural networks repeats the principle of biological ones. In a digital version, a neural network is a graph with three or more layers of neurons that are interconnected.

In the learning process, input neurons receive data, process it on the inner layer of the neural network, and the results are output. If the result obtained during the training process does not suit the researchers, they change the weight of the connections and retrain the network. At the same time, the success of the process and the reliability of the results depend on the amount of input data - the more of them, the better.

Neural networks can be applied in medicine in many ways. For example, a patient makes a request "headache", "high temperature", "chills", and the neural network analyzes thousands or millions of other people's cards and, based on their diagnoses, can assume a disease in the person who made the request.

Naturally, the neural network cannot be 100% sure that the patient has, for example, the flu with these symptoms, but it assumes such a diagnosis in accordance with the conclusions of doctors on other medical records.

Today, many technologies for medicine have been developed based on neural networks, and some of them are already actively used in clinics around the world.

Predicting blood pressure drop with AI

In 2018, the results of research by several scientists were published, who developed an algorithm for predicting an abnormal pressure drop or hypotension during a surgical intervention.

The algorithm was developed using machine learning technologies in medicine. The researchers used an AI that analyzed data from more than 1,300 patients who had their blood pressure recorded during surgery. The total duration of the observation was almost 546 thousand minutes. With this data, artificial intelligence helped prepare an algorithm for predicting hypotension.

The algorithm was retested on a second dataset of 204 other patients. AI was able to correctly predict a sudden drop in blood pressure 84% of the time 15 minutes before the drop, 84% of the time 10 minutes before the drop, and 87% of the time 5 minutes before.

The researchers believe the algorithm can be used during surgeries to reduce the chance of complications.

Skin Cancer Recognition

Artificial intelligence in healthcare shows impressive results in solving the problem of early detection of skin cancer. The experiment was conducted in 2018 by scientists from the United States, France and Germany, who trained neural networks to identify images for the diagnosis of skin cancer. The machine was given more than 100,000 images of harmless moles and life-threatening melanomas, and later showed the same photos to professional dermatologists who tried to identify cancer from the images.

The machine coped with the task better than specialists. She correctly recognized malignant tumors in 95% of cases, while humans showed the result only in 86%.

AI in ultrasound examination of pregnant women

Already today, some British hospitals are using a new way to test the fetus for pathologies that are difficult or impossible to detect by other means. The system works on the basis of artificial intelligence, and it contains more than 350 thousand images of fruits with various deviations.

The system is called ScanNav and it is able to give the doctor a lot of useful information about fetal pathologies, based on the data available in the database for other patients. So far, ScanNav is in test mode and is used only in obstetrics, but in the future it may become much more widespread and will be especially useful for countries experiencing acute shortages in doctors.

Conclusion

In the future, the possibilities of AI are almost limitless. However, before considering the features of the use of technology in the healthcare sector, it is necessary to understand what AI is. Neural networks are actively used today in the development of intelligent systems, including in medicine, due to their ability to learn. The mechanism of operation of artificial neural networks repeats the principle of biological ones.

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