ARTIFICIAL INTELLIGENCE IN MEDICINE

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Annotation: the article analyzes the influence of artificial intelligence and its introduction into medicine. We study the history of the emergence of artificial intelligence from the beginning of the experiments of the 50s. Describes the developed products from popular companies. Such as: Ada, Sense.ly, QTrobot, IBM Watson. The article shows how these products help doctors and patients in difficult situations, what actions the program produces when used. With the help of such products, the time and technical costs of obtaining results are reduced.

Keywords: artificial intelligence, medicine, healthcare, neural network.

Artificial intelligence begins its revival since the appearance of the first electronic computers in the 40 y. With the advent of computers, prerequisites began to appear about the possibility of creating artificial intelligence. Questions have arisen about whether it is possible to make a machine that will have the same intellectual capabilities as a human (or much superior). Scientists in the 1950s experimented with building equipment that would mimic the human brain. Such attempts were unsuccessful, since there was a complete inadequacy of software and hardware.

In 1956, a seminar was held on the development of logical problems and ways to automate their solution. It was the first time the term artificial intelligence was introduced. After the seminar, artificial intelligence was recognized as a separate branch of science.

25 years later, Barr and Feigenbaum propose a more precise definition of artificial intelligence, which states that Artificial Intelligence (AI)- it is a field of computer science that deals with the development of intelligent computer systems: language understanding, learning, reasoning ability, problem solving, etc. Bar and Feigenbaum highlight the key points of artificial intelligence that creators should come to in the course of working on AI [1, 2,4].

From the very beginning, the artificial intelligence industry was divided into 2 parts: cybernetics and neurocybernetics. The main idea of neurocybernetics is to confirm the uniqueness of the human brain, which can think. Therefore, an AI device should be like a brain. Neurocybernetics began to study in detail the hardware modeling of structures similar to the structure of the human brain. They took it upon themselves to create and integrate a system of elements similar to neurons. Such systems have come to be called neural networks.

Cybernetics took the side of rejecting the idea of all re-copying of human thought processes. It didn't matter to them how the "thinking" device was arranged. The main thing is that the device and the person react to these questions in the same way.

How everything happens inside the machine, cybernetics were not interested. That is why they received the name “black box” cybernetics. In the mid 70 s. instead of

finding a unique thinking algorithm, the idea of modeling exact knowledge was born. This was a hugely important breakthrough in artificial intelligence. The new approach was to represent knowledge. Created by MYCIN and DENDRAL, they are classic expert systems for medicine and chemistry.

In the mid-80 s. commercialization of artificial intelligence begins. The annual monetary contribution to this area is growing, expert systems are being created, and all-round interest is increasing. Developers from various companies (Microsoft, Apple, Google, etc.) are working on the creation of products using artificial intelligence for the healthcare sector. At the moment, artificial intelligence is being used in the field of drug development, medical imaging, genome research, and disease diagnostics. Created devices can be trained. They can also independently analyze the huge volumes of information received, make a conclusion and make a decision, which saves time, money and maximizes the effect in serving patients.

In order to correctly identify the cause of the disease and issue competent treatment, it is necessary to study the data about the patient: look at the medical history, tests, pictures, etc. Sometimes the most experienced doctors cannot make a confident diagnosis due to the fact that they do not see the full picture of the disease. According to analytic data from Google, one in ten patients suffers from a misdiagnosis. Many have resorted to the theory that AI will help solve this problem. Some UK hospitals are already using Deepmind Health's development. It processes all the information about the patient, all his symptoms and issues a list of recommendations to the attending physician, who, as a result, makes an accurate, final diagnosis [5,6].

There are systems that can give their results not to the doctor, but immediately to the patient. One such system is Ada. She advises the patient, gives advice, suggests which doctor should be consulted and offers a remote consultation with a specialist. For people who have recently undergone a long period of treatment or have chronic diseases, the Sense.ly program was invented. The system issues a notification about the time of taking medications, the need for observation by a doctor, structures data on the patient's condition and sends statistics to the attending physician. At the moment, there are genetic analysis systems that reveal the patient's tendency to various diseases, help to understand the root cause of the disease and indicate what effect can be expected from a particular drug.

Scientists have learned how to use artificial intelligence to create medicines. Finding the right chemical formula for them takes a lot of time. As a result, the desired result is not always obtained. Even a lot of tests, tests and analyzes are not always able to give one hundred percent guarantee that a medicine will work. Therefore, they resort to artificial intelligence, which in turn creates the correct chemical formulas of drugs.

Sometimes people with cancer have only the last hope for treatment. The supercomputer IBM Watson was created in 2011. At the moment, its Watson for Oncology module is applicable for the diagnosis and treatment of cancer [2,4].

The main mission of the supercomputer is to find the necessary information in the database and give it to the user. In the case of Watson for Oncology, this database includes more than 600 thousand medical reports and diagnoses, as well as two million pages of texts from medical journals and clinical trials in the field of oncology.

The neural network can offer several treatment options, the doctor will have to

choose the best one. The doctor can add information about the patient as needed, and the computer at this moment will look for a new course of treatment in accordance with the entered information and after a short period of time will give an updated diagnosis.

In 2016, AI identified a rare form of leukemia in a 60-year-old patient who was initially misdiagnosed. To do this, the system studied 20 million scientific articles on cancer in ten minutes. One of the well-established type of artificial intelligence in medicine is QTrobot: a robot for treating children with autism spectrum disorders. Such patients can hardly contact with others: they can hardly perceive other people's emotions and with difficulty express their own. The older a person becomes, the more difficult it is for him, because there is an exacerbation of the problem. Therefore, if you do not pay enough attention to this disease at an early age, it will subsequently be difficult to cope with it.

QTrobot is intended for children aged four years and older. Communication with the patient occurs using words, gestures and various facial expressions. Such a robot helps a child eventually learn to recognize the mood of others, and can teach him how to communicate. According to the conducted experience in 2018, it turned out that children with autism pay more attention to the robot than to the doctor. On average, they stared at him twice as long. While the robot is not yet on sale, it is undergoing various tests in medical institutions [3,6].

The use of AI in medicine will help make the diagnosis of diseases more accurate, and will be able to effectively predict and prevent diseases. AI will help save more sick patients, improve the efficiency of healthcare facilities, and make the work of doctors easier.

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