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ARTIFICIAL INTELLIGENCE MODELS

Abstract. The article discusses the directions in the modeling of artificial intelligence. The emergence of other models that are usually known under the term "neural networks" (NN), the differences between these models in the structure of individual neurons, in the topology of connections between them and in learning algorithms. The most well-known now variants of neural networks with back propagation of errors, Hopfield networks, stochastic neural networks are considered.

The main promising directions in the study of artificial intelligence are analyzed. The first is to bring artificial intelligence systems closer to the principles of human thinking. The second is the creation of artificial intelligence, which is the integration of already created artificial intelligence systems into a single system capable of solving the problems of mankind.

Keywords: Neural networks, artificial intelligence, neurocomputers, industrial automation, thinking, algorithmic support, software, intelligence, modeling.

INTRODUCTION

Artificial intelligence, artificial intelligence systems, intelligent systems, intelligent systems are often written and spoken about. Much of what yesterday was called general and special terms is today called intellectual. Almost any information or technical object created, or rather, put on the market, is declared an intellectual system. In fact, this is partly a broad scientific and practical awareness of intelligence as one of the important characteristics of the world around us.

Approximately in the 70s of the last century - the beginning of the phase of the computer revolution, a conceptual breakthrough was made in a new field of informatics and computer technology, called artificial intelligence. During these years, a new concept was adopted, which stated that the effectiveness of a program in solving a problem depends on the knowledge that it possesses, and not only on the formalisms and inference methods that it uses.

The most significant work in the field of artificial intelligence is the development of powerful computer systems or expert systems, i.e. knowledge-based systems. Such problem-solving programs with the representation and application of factual and heuristic knowledge, the joint work of experts and knowledge engineers, system developers and inference allow us to move to new information technologies, to a new programming technology.

Currently, there is a rapid development of intelligent systems, intelligent concepts and technologies. Disciplines related to artificial intelligence systems appeared in connection with the trends of the educational process in the areas of practical activity related to solving problems of interpretation, diagnostics, monitoring, forecasting, planning, design, training, management for poorly formalized problems and noisy data (knowledge) with limited resources. The modern approach to solving such problems is based on artificial intelligence methods.

LITERATURE ANALYSIS AND METHODS

Currently, there is a fairly extensive literature on artificial intelligence systems and programs in the "demo version", that is, with a relatively small knowledge base. But for a real subject area, the entire arsenal of tools and methods accumulated over the past 40 years is required.

Despite all attempts to give a precise definition of the concept of "artificial intelligence" (AI), a strict definition still does not exist, and even with the emergence of new scientific ideas, it changes. Let us define at least the boundaries of this concept. I. Rich defines artificial intelligence as a field of study aimed at creating computers that perform functions that a person currently performs better [1].

Such functions that are manifested in a person include perception, analysis, reasoning, the use of knowledge, action planning, logical conclusion, etc. J. Allen gives a very close definition of artificial intelligence: “Artificial intelligence is the science of creating machines that solve problems that people can solve... » [2].

Here, the focus of artificial intelligence is on those tasks that are successfully solved by humans and poorly by computers. These two definitions compare the capabilities of man and machines. Back in 1950, A. Turing's empirical test was proposed to determine the level of intelligence of machines. In accordance with the test, the expert could enter into a dialogue either with a computer or with a person. Turing considered the behavior of a computer to be intelligent if the computer participated in the dialogue, and the expert was not able to determine with whom he was talking. Later, they began to believe that machine intelligence differs from human intelligence and, probably, an attempt to liken it to natural intelligence is erroneous. The importance of the Turing test is obvious for evaluating the quality of modern artificial intelligence programs, but it distracted scientific forces from solving the main task of artificial intelligence - developing a general theory of machine intelligence, and using this theory to develop intelligent systems that solve practical problems.

The well-known British specialist A. Andrew paid special attention to biological and biophysical problems and models of artificial intelligence; D. Hofstadter pointed out the close connection of artificial intelligence with fundamental mathematics, painting and classical music; T. Munakata's book recently published in New York presents neural networks and genetic algorithms,

which are usually considered in the mainstream of artificial intelligence only as auxiliary technical means.

Back in the 1200s, there were attempts to create an artificial man and his mind. Inventor Raymond Lully designed a machine consisting of circles marked with letters and painted in different colors, which symbolized various concepts, elements of the elements, subjects and objects of knowledge. Their diverse combination led with the help of logical operations to the conclusion of "knowledge formulas".

In the 40s of the 20th century, with the advent of electronic computers, artificial intelligence gained a second birth.

Artificial intelligence research has two goals:

• clarification of the essence of natural intelligence (human intelligence);

• use of machine intelligence to transform new knowledge and to solve intellectual problems.

In the late 1950s, the first neural networks and neurocomputers began to be developed and created by American scientists W. McCulloch, W. Pitts, F. Rosenblatt, which still represent the neurocomputer direction of artificial intelligence systems.

RESULTS AND DISCUSSION

Work in the field of artificial intelligence began with the birth of neurocybernetics. Since the human brain consists of many nerve cells - neurons, the researchers tried to build intelligent machines, imitating the behavior of a group of neurons.

Therefore, any thinking device must necessarily be made in the image and likeness of the human brain, reproduce its structure, its principle of operation. Thus, neurocybernetics is engaged in hardware modeling of the structure of the brain and its activity.

In 1943, W. McColack and W. Pitts proposed a model of a formal logical neuron that could be in two stable states. D. Hebb in 1949 developed a simple rule that allows you to change the weights of connections between neurons in order to train them. In 1951, M. Minsky and D. Edmonds developed a neurocomputer that contained 40 neurons.

The term "artificial intelligence" was proposed at a seminar at Dartsmouth College (USA) in 1956. The first work on artificial intelligence was carried out at the Massachusetts Institute of Technology under the leadership of M. Minsky and J. McCarthy, at Carnegie Mellon University under the leadership of G. Simon and A. Newell. They are considered the "fathers" of artificial intelligence.

A. Newell and G. Simon, after analyzing the solution methods, began to synthesize general methods for finding solutions, developing the following program - the "Universal Problem Solver" or GPS (General Problem Solver). It was developed to simulate the process of solving problems by a person and was based on the ideas of heuristic search. GPS was based on a maze search model. According to this approach, the solution of an intellectual problem was carried