

ARTIFICIAL INTELLIGENCE AS A SCIENCE

Artificial intelligence as a science has existed for over sixty years. To date, there is no single definition that adequately describes this scientific area. Among many points of view, it is dominated by three. According to the first, research in the field of artificial intelligence is fundamental research in which models and methods for solving problems that have been considered intellectual and previously not amenable to formalization and automation are developed. According to the second point of view, this direction is connected with new ideas for solving problems on a computer with the development of a fundamentally new programming technology with the transition to computers of new architecture. The third point of view, is based on the fact that as a result of research conducted in the field of artificial intelligence, many application systems have emerged that solve problems for which the previously created systems were unsuitable. According to the last interpretation, artificial intelligence is an experimental scientific discipline, while the main role of the experiment is to verify and refine artificial intelligence systems, which are hardware-software information systems.

There are also basic concepts in this field of science. One of the most important concepts of artificial intelligence is algorithm. At the same time, the technology of expert systems is the most important tool in solving global problems of traditional programming: the length and, therefore, the high cost of application development; high cost of maintenance of complex systems; the possibility of reuse programs, etc. In addition, the integration of expert systems technology and neural networks with traditional programming technology adds new qualities to commercial products, providing dynamic change of applications by the user, not the programmer, better graphical tools, user interface and interaction.

At present, there are two main approaches to the modeling of artificial intelligence: machine intelligence, consisting in the strict task of the result of functioning, and artificial intelligence, aimed at modeling the internal structure of the system. Modeling systems of the first group is achieved through the use of the laws of formal logic, set theory, graphs, semantic networks and other scientific advances in the field of discrete computing. The main results are the creation of expert systems, natural language parsing systems and the simplest control systems of the "stimulus-response" type. The systems of the second group are based on the mathematical interpretation of the activity of the nervous system led by the human brain and are implemented as neural-like networks based on a neural-like element -

an analogue of a neuron. Networks of the first group, such as back propagation networks, Hopfield networks, etc., are used for pattern recognition, speech analysis and synthesis, translation from one language to another, and prediction. This is caused by such network features as image restoration by its part, resistance to noise of the input signal, prediction of input changes and parallelism of calculations. Also, an important characteristic is the ability to function with the loss of some part the network. Networks of the second group are used as real-time control systems for uncomplicated objects. The peculiarities of this group are the appearance of some internal stimuli, the ability to learn and function in real time.

According to experts, in the near future, expert systems will play a leading role in all phases of design, development, production, distribution, sales, support and provision of services. Their technology, having received commercial distribution, will provide a revolutionary breakthrough in the integration of applications from ready-to-know-interacting modules.