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Stages of development of artificial intelligence

Abstract: The article describes the history of the development of artificial intelligence research and the division of the process of improvement of such a phenomenon as artificial intelligence into certain stages.

Keywords: artificial intelligence, computer technology, cybernetics, Twitter, IBM

The history of the development of research in the field of artificial intelligence and the process of improvement of such a phenomenon as artificial intelligence is easier to understand by dividing it into certain stages. The division into stages is very conditional, some researchers distinguish a large number of relatively separated periods, others - smaller, the boundaries of these periods sometimes do not coincide with each other, and the names are different. For a deeper study of the issue, one can refer to the works of experts in the field of history of informatics and cybernetics. Consider the main steps in a general sense. The first (initial) stage of the development of artificial intelligence systems can be recognized as the period of the 50s of the 20th century, when the level of computer technology development increased. The emergence of computers created the necessary hardware for the development of informatics and cybernetics as a science. If informatics is the science of methods and processes of collecting, storing, processing, transmitting, analyzing and evaluating information using computer technology, then cybernetics is the science of optimal management of complex dynamic systems. Cybernetics studies the general principles of control and communication underlying the operation of systems of various nature (natural or technological). As mentioned above, the foundations for the development of neural networks have been created by this time. In the 50s of the 20th century, expert systems were also created that describe the algorithm of actions for choosing a solution based on certain conditions, machine learning appeared a little later, as a result of which information systems were able to independently formulate rules and find solutions. Dependency analysis using data from initial sets and without human pre-construction of the list of possible solutions. The term "artificial intelligence" was first coined by the American computer scientist John McCarthy in 1956 at a scientific seminar on the subject at Dartmouth University used. In the 60s of the 20th century, operations of

search, sorting and summarization of information were added to EHM capabilities, which made it possible to automate certain human activities. This second phase is often referred to as the "Golden Years" (1956-1974), and researchers begin to predict the emergence of human-like intelligent machines in less than 20 years. The next - the third stage (70s of the 20th century) - the understanding of the importance of informal knowledge, in which mathematical methods were not previously used for the synthesis of problem-solving algorithms. . This knowledge includes information worked by specialists in various fields of activity (doctors, chemists, etc.), that is, people with expert knowledge. Based on such knowledge, expert systems were created. The name of this phase found in the literature - "The First AI Winter" (The First AI Winter, 1974-1980) - indicates the high expectations and financial problems that were not realized after the interest of investors decreased significantly. The very limited power of computers at that time (lack of memory, in the Fourth Stage, in the 80s of the 20th century, through the spread of expert systems that justify these decisions, offer solutions with the ability to learn and communicate with humans in natural language) there was a leap in the development of technologies. This revived the interest in artificial intelligence (Boom, 1980-1987). The increased development of expert systems, the emergence of automated processing centers created due to the need to solve new problems due to the complexity of communication systems, resources ensuring information security, protection against unauthorized access, when it is necessary to perform a search, the analysis of information in networks has led to large investments in the development of appropriate programs and software-hardware systems. With the advent of tools for training multi-layer neural networks, interest in neural networks has returned. The growth of interest in neural networks is due to David Rumelhart, a research psychologist from California and then from Stanford University. Together with James McClelland and a group of colleagues, he developed a model of parallel distributed information processing. In the book "Parallel distributed data processing: study of the microstructure of perception"53, reflecting the results of the work of the research group, it is emphasized that parallelism is a universal property of any intellectual system. A single neuron in the human brain does not do its job alone in processing information, neural networks solve everything not sequentially, but simultaneously and simultaneously. The smarter the system, the larger and more complex the network of interconnected elements. Such a system does not work according to a given algorithm, although individual "native" algorithms can be successful. Speaking about the time of the fourth stage, experts emphasize the formation of the entire industry of artificial intelligence. The fifth stage is the second

winter of artificial intelligence (Second AI winter, 1987-1993), which was caused by the excessive enthusiasm of the business community for artificial intelligence, which led to another disillusionment and natural decline in the subject. financing. Some of the companies that invested in the creation of specialized equipment went bankrupt. Professional systems became more expensive to maintain, while personal computers made by Apple and IBM became more and more powerful. Interest in the products of companies producing expert systems for business has decreased. Despite the fact that the fifth stage is marked by the decline of business interest in artificial intelligence, it is during this period that a corresponding scientific field is emerging. Since the late 1980s, some researchers have begun to demand a new approach to artificial intelligence based on "embodied" robotics, because they believe that in order to show true intelligence, a machine must not only perceive information, but also move and communicate physically. the outside world. This revived the fields of cybernetics, which had been unclaimed for several decades. The sixth stage corresponds to the years 1993-2011. Research and development in the field of artificial intelligence began to be used in various fields: the Deep Blue supercomputer beats a man in chess (1997), the DARPA Grand Challenge autonomous autorobots are held (since 2004), "Intelligent agents" (Intelligent Agents), robotics its use in production and everyday life is expanding. The seventh stage began in the second decade of the 21st century and continues to this day. This is due to the beginning of the technological transition and the entry into the period of the Fourth Industrial Revolution, which will change the principles of production, production processes, the service sector and the basis of communication in society. Since around 2011, a new stage of development of artificial intelligence as a field of research and practical development has begun, many startups have appeared, which present themselves as developers of artificial intelligence, and which are supported by large corporations such as Google they buy, Twitter, IBM and others. Intelligent technologies are moving beyond the confines of research laboratories and manufacturing plants and becoming a part of everyday life.

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