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Cognitive Technologies: Brief Summary

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Abstract:

The article analyzes the development of cognitive technologies. Software in cognitology: applications for analysis of texts and other materials, search, machine learning, classification, hypothesis generation, navigation (guidance), as well as knowledge platforms for the development of intelligent programs are considered. Also, information on artificial intelligence, mechanical engineering and robotics, cloud technologies, and virtual reality was analyzed.

Keywords: Cognitive technologies, artificial intelligence, modeling, mechanical engineering and robotics, cloud technologies, virtual reality, digital technologies, the third industrial revolution.

In recent years, interest in the study of cognitive processes has been growing. Until the beginning of the 50s of the 20th century, issues related to the theory of knowledge were considered in works on philosophy and logic. In the early 1950s, the mechanisms of learning were studied by psychologists. The first studies were devoted to studying the mechanisms of perception. Currently, more complex cognitive mechanisms are being studied, for example: the decision-making mechanism, learning, memory, etc. Based on the data of psychological and neurophysiological studies of the mechanisms of knowledge, the natural approach to the study of the phenomenon of knowledge was called cognitology. Nowadays, cognitology is becoming an important object of research necessary to solve one of the strategic tasks of civilization, the purpose of which is to develop methods of managing a conscious person and creating humane robots.

Cognitive technologies are understood as a wide range of technologies for rationalizing and forming intelligent systems for the development and activation of knowledge, experience, communication and decisions. Cognitive technologies develop and implement the principles of organization and operation of natural and artificial intelligent systems. They are a complex of mathematical methods, algorithms and computer technologies that create intelligent software-hardware systems, can determine natural language and form, dynamically study systems, formulate hypotheses, evaluate and solve other issues. The essence of cognitive technologies is to find out how a person receives and processes the received information, what forms (cognitive schemes) he can create. Cognitive

technologies differ from awareness because awareness occurs in a new information environment. It is not only people, nature, technology, books, but also computers and networks (social and computer). The most promising directions of development of these technologies are as follows:

- cognitive drugs designed to develop human abilities, including intelligence, memory; - cognitive assistants – flexible support systems in different situations (access control, autopilot); - virtual interfaces in the form of "brain - computer" - intuitive, accessible to everyone for controlling computer systems.

According to the estimates of the Institute of Development Studies (IDS), in the coming years, the world market of cognitive technologies will grow by an average of 55% annually and will reach $ 31.3 billion in the 20s of the 21st century. In addition, more than 40% of the market is occupied by software: applications for the analysis of texts and other materials, search, machine learning, classification, hypothesis generation, navigation (guidance), as well as knowledge platforms for the development of intelligent programs. About 20 percent of global purchases of cognitive systems are in the banking sector. In banks, these systems are used to detect fraud, analyze and automate threats, as well as provide recommendations. The second and third places in purchasing are sales, where cognitive systems provide the work of automated agents of customer service, sales and healthcare, where they are used in diagnostic and treatment systems.

Cognitive modeling is designed to systematize, analyze and make management decisions in complex and uncertain situations (geopolitical, domestic, military, etc.), in the absence of quantitative or statistical information about the processes taking place in such situations. Cognitive modeling helps to better understand the problem situation, identify contradictions and qualitatively analyze the system. The emergence of the cognitive approach is related to the complexity of analysis and decision-making in fields such as economics, sociology, and ecology. In such systems, the number of factors that must be taken into account when making a decision is measured by dozens. The factors themselves are in a complex interaction. Often there is no specific methodology for determining measurement factors, and the amount of data is insufficient or qualitative in nature.

Due to the characteristics of such systems, they are called weakly structured. One of the definitions of widely used cognitive modeling is the following definition - it is a method of analysis capable of determining the strength and direction of the influence of factors in making the management object a target, taking into account the similarities and differences of the influence of various factors on the management object. Cognitive modeling helps to better understand the problem situation based on the qualitative analysis of the system. Allows you to identify problems and contradictions inherent in the system. The purpose of modeling is to formulate and clarify a hypothesis about the operation of the object under study, which is considered as a complex system consisting of separate but interrelated elements and subsystems. Cognitive analysis of the research object allows you:

- ✓ to see the general situation of the analyzed problem;
- ✓ to predict of system (situation) development direction;
- ✓ to determine the factors affecting the development of the situation;
- ✓ to develop of action strategy;
- ✓ to offer alternative solutions to the problem;
- ✓ to format of the decision-making process;
- ✓ to obtaining qualitative and quantitative descriptions of the situation under consideration;
- ✓ to increase the quality and validity of decisions.

In 2017, the digital revolution entered a decisive phase - every second population of the world was connected to the Internet. According to the McKinsey Global Institute (MGI), in the next 20 years

up to 50% of work operations in the world can be automated, and this process can be compared to the industrial revolution of the 18th and 19th centuries. The industrial revolution allowed individual countries to achieve incredible rates of economic growth, and for several decades they became the leaders of the global economy. Currently, during the globalization of the economy and the development of information and communication technologies, the economies of many countries are moving to a new digital form. The digital economy is changing the face and structure of the economy of countries and entire regions. The competition within the network is increasing, the markets are expanding, the competitiveness of the industries of some countries is increasing in the world markets. As a result, national economies are growing. The digital economy determines the growth prospects of the company, the industry and the national economy as a whole. The advent of digital players has already changed all sectors - tourism, telecommunications, printing, passenger transport. Digital transformation is one of the main factors of world economic growth. According to the calculations of the global institute McKinsey, in 2025, the growth of the gross domestic product in China can be achieved by 22% due to Internet technologies. And in the USA, the growth of the economy due to digital technologies is $1.6-2.2 trillion in 2025. can be equal. This is not due to the automation of economic predictions, but only related existing processes, but with the introduction of completely new comprehensive work - models and technologies. Among them - digital platforms, digital ecosystems, in-depth analyst big data groups, for example, 3D as Industry 4.0 technologies - printing, robotics, Internet of things. A Brief History of Industry the Fourth Industrial Revolution, known as the Industrial Revolution, first appeared in Western countries. In 2011, at one of the industrial exhibitions in Hanover (Germany), the German government spoke about the need for a wider use of information technology in production. A specially organized group of officials and experts developed a strategy to transform the country's manufacturing enterprises into "smart" enterprises. Other countries actively developing new technologies followed this idea. The fourth industrial revolution began to be used as a synonym for the term industry. The fourth industrial revolution in production is a new driver of economic growth, which is associated with the adoption of learning opportunities and values that did not exist before. The introduction of technologies in accordance with a comprehensive idea aimed at improving the world around us will help strengthen the global economy and improve the environmental condition of our planet. The main directions of production transformation are determined by three global technological trends: network integration, intellectualization and flexible automation. Experts have proposed the so-called cyber-physical systems, or the integration of automated machines and processing centers connected to the Internet into industrial processes (systems that integrate the physical world with the virtual world, CPS). The goal is to create systems that can independently change the machines when the need arises.

The industry radically changes not only the production process, but also the range of services related to the manufactured products. Cyber-physical systems of production fundamentally change the logic of traditional production. Each working object independently determines what work should be done for its production element. A completely new architecture of these industrial systems can be phased in through the digital modernization of existing production facilities.

Artificial intelligence, mechanical engineering and robotics. Industrial robots have long been used to perform complex tasks in large enterprises in various industries. But today's robots are becoming more independent, flexible and controllable than ever before. Over time, they begin to relate to each other and not only work next to a person, but also learn. In the future, such robots will cost less, but have more capabilities than those used in production today.

Integration system. A large number of information systems in use today are not fully integrated. The industry requires a rethinking of its relationship to these industries. Full integration of all business processes (commercial and industrial) is required. For this, it is important to establish close cooperation not only at different levels (departments) within the enterprise, but also between different partner enterprises in the production cycle.

Cloud technologies. Some companies are partially using cloud software in their work, but with the development of the industry, this technology is used to solve many problems. Over time, the quality of cloud storage technology will improve, the response time will be reduced to milliseconds, and in the future, the operation of production process control systems will also be based on cloud technologies.

Virtual reality. Virtual reality systems can be used for various purposes: for example, in the selection of parts in a warehouse or in the display of equipment repair and maintenance instructions on portable devices. Such systems have just begun to develop, but in the future they will be widely used to provide employees with up-to-date information, support real-time decision-making, and perform various tasks. For example, using virtual reality glasses, it will be possible to receive immediate repair instructions while inspecting a part of a faulty system. At the same time, we often come across the term "Cloud technologies", which is very common in the Digital Economy. When studying the concept and history of cloud technologies, the most important question that needs to be answered when considering the history of the emergence of this term is the definition of the term "cloud". It is still not possible to say exactly who used the term "cloud" for the first time, but according to some sources, the origin of the term can be associated with the tradition of using clouds in the drawings of computer communication infrastructure. In general, the term "cloud" is used as a synonym for the term "Internet", and in certain cases "cloud" can be understood as remote servers as well as network infrastructure or all. The concept of "cloud" is not a revolutionary concept, but an evolutionary concept that emerged from the ideas and technologies of the 50s of the 20th century, which tried to optimally download the power of the mainframe (educational institutions and corporations) in order to obtain high efficiency and profit. The pursuit of optimization has caused users to come up with the idea of remote access on a temporary basis, using all available resources and time for this. In the history of the concept of cloud computing, John McCarthy, an American expert in the field of artificial intelligence, in 1960, suggested that "computing capabilities may one day be open", that is, his proposal to provide computing capabilities to users as a service. Later, from the 70s to the 90s of the 20th century, the development of cloud technologies slowed down due to the imperfection of communication and network technologies. The next steps in the conceptualization of cloud computing are the emergence of Salesforce.com's CRM system (1999) offered as a subscription in the form of a website, and the beginning of Amazon.com (2002) offering services through a bookstore. The culmination of the development of cloud technologies is associated with the launch of the Amazon Web Service (AWS) platform in 2006.

The company modernized its data centers, using only 10% of its total capacity, like many computer infrastructures. Amazon played an important role in opening up the cloud computing market, thereby optimizing its resources and learning to take advantage of previously unused resources. In 2008, Microsoft Windows Azure and Google - Google App Engine introduced cloud platforms. Since 2008, the cloud computing market has been filled with leading companies (Amazon, Microsoft, Salesforce, Google, HP, Dell, AT&T, RackSpace) and organizations that provide cloud resources to solve specific problems (Engine Yard, gCloud3, OrangeScape), and at a rapid pace began to develop with. The launch of Google Apps in 2009 marks the next important step in the promotion and understanding of cloud computing. In 2009-2011, several important cases of cloud computing concepts were formed, in particular, a personal cloud computing model suitable for use in organizations was promoted, - Storage- as - a - Service (SaaS), Process-as-a-Service(PaaS) , various service models such as Information-as-a-service (IaaS) are beginning to emerge. Recently, researchers and academic institutions have shown serious interest in cloud computing.

In general, it is important to be careful when introducing this new and technological field, and in all cases, the expected probabilities should be predicted in advance. In our Uzbekistan, it will be appropriate to use the possibilities of the digital economy gradually and efficiently. Of course, as

time changes, so does the scope of people's thinking. This, in turn, creates the basis for the emergence of new sectors of the economy.

References

1. Kelly K. New Rules for the New Economy: 10 radical strategies for a connected world /K. Kelly. – New York: Viking, 1998.
2. Amrhein D., Quint S. Cloud computing for the enterprise: Part 1: Capturing the cloud.
3. British Computer Society, 2014: The Digital Economy.
4. Brynjolfsson E. and KahinB. (editors), Understanding the Digital Economy, The MIT Press, Cambridge, Massachusetts, and London, England, 2000, – 408p.
5. Organization for Economic Cooperation and Development (OECD), 2013: The Digital Economy.
6. Цветков В.Я., Соловьев И.В. Принципы когнитивного управления сложной организационно-технической системой // Государственный советник. – 2016. – № 1 (13). – С. 27-32.
7. Хакимов, Д. Р. (2022). Олий таълим тизимида янги иқтисодий механизмларни шакллантириш.
8. Хакимов, Д. Р. (2022). Ta'lim Sohasida Vaucher Tizimlarining Rivojlanishi. *Journal of new century innovations*, *18*(1), 75-82.
9. Khakimov, D. (2023). New educational models: university consortium, teleuniversity, virtual university (the Australia and usa experience). International Bulletin of Engineering and Technology, 3(5), 45-55.
10. Khakimov, D. R. (2024). Singapore's educational system (brief summary). World of Scientific news in Science, 2(1), 289-308.
11. Rakhmonaliyevich, K. D. (2023). Monetary policy and the financial crisis: methodology and lessons. Ethiopian International Journal of Multidisciplinary Research, 10(10), 150-158.
12. Rakhmonaliyevich, K. D. (2023). Yangi ta'lim modellari: universitetlar konsorsiumi, teleuniversitet, virtual universitet (Avstraliya va AQSH tajribasi). Journal of new century innovations, 28(2), 177-188.
13. Rakhmonaliyevich, K. D. (2023). Masofaviy va ochiq universitetlarni yangi texnologik asosda rivojlantirish (ispaniya va angliya tajribasi). World scientific research journal, 15(1), 104-113.
14. Khakimov, D. (2023). New educational models: university consortium, teleuniversity, virtual university (the Australia and USA experience). International Bulletin of Engineering and Technology, 3(5), 45-55.
15. Khakimov, D. R. (2023). Ways to improve the management of an educational institution in the conditions of the development of market relations. Publishing House "Baltija Publishing".
16. Rakhmonaliyevich, K. D. (2023). Universitetning yangi modeli: zamonaviy axborot texnologiyalarining ta'siri. Journal of innovations in scientific and educational research, 6(4), 983-991.