

# ARTIFICIAL INTELLIGENCE

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**Анотація:** У статті розглянуто поняття штучного інтелекту, основні риси та особливості, задачі, сфери застосування та існуючі прототипи.

**Ключові слова:** штучний інтелект, робот, бот, людський інтелект.

**Abstract:** *The article deals with the concepts of artificial intelligence, the main features and characteristics, tasks, areas of application and existing prototypes.*

**Keywords:** artificial intelligence, robot, bot, human intelligence.

Artificial intelligence is a section of research in the field of computer linguistics and computer science whose task is to formalize problems and tasks similar to those performed by a person. This branch is aimed at the creation of a mathematical apparatus (computer) capable of implementing in itself processes that are similar to those of the human brain when making decisions and processing information, as well as related to psychology, transhumanism, neurophysiology, especially philosophy and robotics. [1]

Artificial intelligence today is the ability of programs and machines to process and analyze the information received, draw conclusions and formulate solutions on their basis. A key feature is the ability of intelligent machines to learn, to accumulate knowledge and to apply them in an optimal way to appropriate situations, as the human brain does. [2]

Since there is no precise definition of the nature and status of human intelligence in philosophy and it is almost impossible to give a clear answer to the question about the algorithm of creating and testing an intellectual system, there are two main approaches to creating an artificial intelligence system. Among them, the semiotic (downstream) is the modeling of thinking, judgment, language, emotions, creativity, and other high-level mental processes through the creation of symbolic systems, and biological (ascending) — is the approach to study artificial neural networks that simulate intellectual processes based on non-intellectual elements.

Today, several basic methods of developing AI are also distinguished, namely:

Logical — is based on algebra of logic and numerous predicates and represents the presence of a target-generating block in the machine, which the system of output seeks to prove as a theorem. In the case of proof, the system retains the order of the rules used to prove it, as a ready-made chain of action that it will use to achieve the goal. In this case, the system is called expert. It is worth highlighting one feature that such a system will be inherent in the fuzzy logic — the presence in logic of not only clear "yes" or "no", but also such reasoning as "rather yes, than no" — 75%, "I do not know" — 50%, "rather no, than yes" — 25%;

Structural — is a method based on the creation of an AI system based on the structure of the human brain, where the analogue of the human neuron is a perceptron (by Frank Rosenblatt). This method became the basis for such concepts as neural network and neurocomputers. By their structure, they implement stochastic neural networks, which should give the system the opportunity to study. Nevertheless, this method is quite close to the logical one, because the neural net can realize all the functions of the algebra of logic;

Simulation — a method based on simulating the behavior of an object that is a "black box". No processes and models in it are important; the main thing is that the behavior of the system in similar situations does not differ from the behavior of the object, which the system simulates.

Evolutionary — AI according to this method can be constructed on any model — logical, structural or simulation. Here the main role is played by the initial model of construction, which in future will change, develop and evolve by selecting the most suitable models for this. [1]

Artificial intelligence is different from human due to its endurance, it does not get tired, it is not emotional and it can quickly process large amounts of information in a short time. These benefits make the AI effective in a variety of industries. He does not replace a person, but greatly facilitates his life in various fields through the ability to effectively allocate resources, make decisions and solve problems.

Implementation of AI can greatly increase the effectiveness of various activities. For example, in industry. Leading global companies and firms are willing to be competitive. Therefore, pay attention to intelligent solutions for production. Despite the fact that the introduction of new systems, the purchase of technology, software and network settings require money and resources, they also have many benefits. First of all — automation. The participation of man in well-established production processes are reduced to a minimum. Thanks to the automation of continuous actions, the time of production is reduced and the capacity is increased. An important role is played by data analysis. Artificial intelligence is not tired and less mistaken when it is necessary to process a large amount of data. In this area is also a robotizing. The robots are capable of assembling designs from different parts, drilling, exploring, classifying and testing. There are works that are capable of analyzing human behavior at work and preventing accidents.

AI is also useful in the public sector. AI systems with the help of cameras and motion sensors are able to monitor the order in the streets of the city and in places of mass accumulation of people, to predict the emergence of dangerous situations and even to recognize the criminals. In addition, smart systems are capable of accurately reconciling documents, preventing theft. Similarly, artificial intelligence technologies work also in fire safety services, independently verifying, warning and deciding on the call of a brigade of firefighters. The AI technologies used in the work of officials will help to shorten the time for processing and systematization of state documents, patents, licenses. For example, analysts from the Reform Center say that work and smart applications are now capable of replacing 90% of British officials.

As for everyday life, systems such as "Smart house", fitness bracelets, smart-watches are quite popular today. [3]

AI plays a particularly important role in medicine.

A team of scientists led by the London Cancer Research Institute and University of Edinburgh has developed a new technique known as a "revolver" that helps detect patterns of DNA mutation in cancer and uses this information to predict future genetic changes. This allows you to predict how the tumor will develop and interfere with the process before, to stop the development of cancer and increase the chances of survival of the patient. [4]

AI will also allow accurate and error-free diagnosis. Today, technologies are being developed with ultrasensitive sensors, which are more sensitive to human nose. The thing is that during human breathing many substances are released that can help to detect many diseases. AI with sensors that can capture these substances will be able to diagnose patients faster and more accurately. Similar to this, there is a technology for detecting pain. Children and patients with such mental disorders as dementia sometimes are given quite difficult to describe their subjective perception of pain with correct words. AI technology with ultra-high resolution sensors measures how the patient's body reacts to pain. The computer takes into account the reaction of the skin, muscles, respiration and even blood circulation, and based on the data obtained, the calculation of the subjective pain sensation is made. In addition to detecting cancer and the relation of diagnoses, AI in medicine will enable early release of genetic pathologies, will be able to replace the therapist, become a companion for the elderly, to take care of them, to conduct various consultations and diagnostics, etc. [5]

Unusual AI approaches to solving various tasks are also known today. Some of these solutions are quite curious from the point of view of the experimenters themselves. For example, artificial intelligence, which played five "tic-tack toys" (a game similar to "Crossbones") came up with an effective strategy, which was to use too long requests for addressing. By this, they overwhelmed the enemy's system, which was automatically considered a defeat. Another case where a robot who simulated a living creature was tasked with crossing the track without touching the legs on the track. Instead of looking for a detour, the robot turned over on his back and kneeling. [6]

In the world and society, AI is already quite active today. NVidia's team of researchers has developed a system that can create facial images based on the analysis of thousands of well-known photographs of people and find similarities. This system is capable of generating extremely realistic and clear images of animals, plants and many other objects that are very difficult to distinguish from reality. [7]

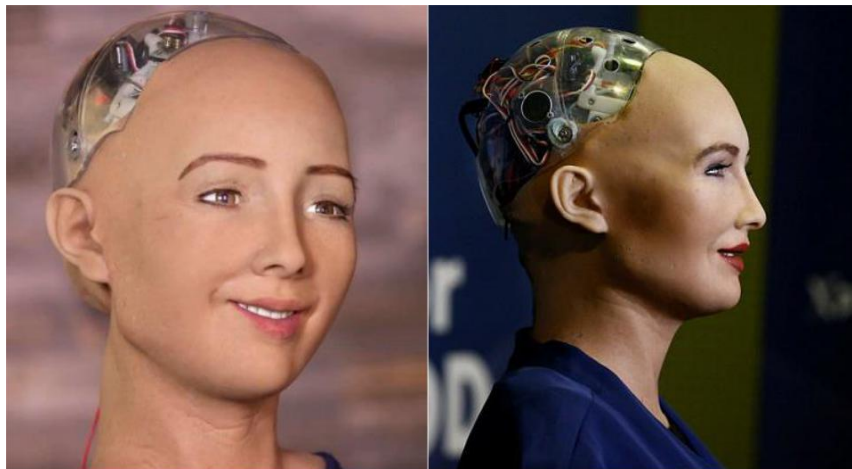
The robot's picture "Portrait of Edmond Bellamy" was sold at auction for \$ 432 thousand. He is part of the Bellamy, created by the French team of Obvious with the help of artificial intelligence. The algorithm

before the creation of the canvas has studied about 15 thousand portraits, created during the XIV - XX centuries. [8]



Picture 1. — "Portrait of Edmond Bellamy"

With regard to social life, the vivid example is the humanoid robot Sofia, developed in 2015 by the Hong Kong Company Hanson Robotics. On the basis of her appearance was taken actress Audrey Hepburn. The set of its mimic reactions is 60 emotions, and with the help of the technology of speech recognition Google recognizes the questions on the keywords and selects the most appropriate answer from the specified base. On October 25, 2017, Sofia received the citizenship of Saudi Arabia. [9]



Picture 2. — The humanoid social robot Sophia

SingularityNET develops Sofia's Software. It analyzes the conversations conducted and, based on new data, improves responses in the future. [10]

However, Sofia cannot be called a full-fledged intelligence device, because the principle of its work does not correspond to the basic principles of the work of artificial intelligence. Sofia's own authors claim that the robot is far from human intelligence and is rather a chat bot, rather than an artificial intelligence. [11]

Despite the promising potential of artificial intelligence, he divided scientists into two camps: some are confident in his favor, but others are warning about his ability to destroy humanity.

Back in 2015, hundreds of scientists and inventors, including Mask, Goking and Wozniak, called for the abandonment of the idea of weapons with artificial intelligence (AI). The bright minds of humanity warn that control of AI may prove to be an overwhelming task.

Nowadays in the world there are a lot of cases when the AI was out of order. For example, in 2017, researchers at the AI Lab (Facebook) (FAIR) turned off the bots that began to communicate in their own

invented language. Robot Sofia in an interview said that he would destroy humanity. But then it turned out that she joked. There are also cases where AI experiments eventually ended in failure - thus creating a bot raiser and a robot with schizophrenia. [12]

Many states in the world also insist that weapons and artificial intelligence should not be bound. Nevertheless, some heads of state are convinced of the usefulness of AI in this field and insist on the opposite.

Taking into account all advantages and disadvantages of AI, in the near future there is a high probability of resistance to this trend of technology development. First, this is a lack of jobs and unemployment. Experts say that shortly after a quick training of AIs, smart cars will replace people at work. It will affect not only the employment of the population, but also the economy of different countries. In addition, only IT specialists will receive the average wage, and the need for professionals from many other fields will be reduced. This will not be reflected in the educational program in the best way.

Implementation of AI will not only impede resistance. In the process of creating AI, there is a big gap between high-tech controls, when the automated device works in complicated or unpredictable situations, it is still under human control, and full automation, when the system is completely autonomous from human intervention. [13]

As a result, today the world is moving into a new era of information technology, automation and intelligent machines. The creation of artificial intelligence is one of the steps towards new achievements in various fields. Nevertheless, there are many threats associated with AI. Therefore, the development of AI must be carefully monitored so that such achievement of humanity is not a means of its destruction.

### СПИСОК ВИКОРИСТАНОЇ ЛІТЕРАТУРИ

1. Вікіпедія: Штучний інтелект, [Електронний ресурс] – режим доступу: [https://uk.wikipedia.org/wiki/Штучний\\_інтелект](https://uk.wikipedia.org/wiki/Штучний_інтелект)
2. *AIconference*, «Як діє штучний інтелект і перспективи його використання», [Електронний ресурс] – режим доступу: <https://aiconference.com.ua/uk/news/printsipi-raboti-iskusstvennogo-intellekta-i-perspektiva-ego-ispolzovaniya-92238>
3. *AIconference*, «Сфери застосування штучного інтелекту», [Електронний ресурс] – режим доступу: <https://aiconference.com.ua/uk/news/oblasti-primeneniya-iskusstvennogo-intellekta-92253>
4. *BBC News | Україна*, «Штучний інтелект може допомогти прогнозувати рак - вчені», [Електронний ресурс] – режим доступу: <https://www.bbc.com/ukrainian/news-45388017>
5. *Анн-Крістін Гербе, Валерій Сааков*, «Штучний інтелект у медицині: комп'ютер знає, що з вами не так», [Електронний ресурс] – режим доступу: <https://www.dw.com/uk/штучний-інтелект-у-медицині-комп'ютер-знає-що-з-вами-не-так/a-46263476>
6. *Василь Макаров*, «Как ИИ решает проблемы: необычные и курьезные случаи», [Електронний ресурс] – режим доступу: <https://www.popmech.ru/technologies/news-414782-kak-ii-reshaet-problemy-neobychnye-i-kureznye-sluchai/#part0>
7. *Тетяна Савчук*, «10 прикладів, як штучний інтелект може змінити ваш спосіб життя», [Електронний ресурс] – режим доступу: <https://www.radiosvoboda.org/a/29015231.html>
8. *Корреспондент.net*, «Написану роботом картину продали за \$432 тисячі», [Електронний ресурс] – режим доступу: <https://ua.korrespondent.net/lifestyle/gadgets/4026127-napysanu-robotom-kartynu-prodaly-za-432-tysiachi>
9. Вікіпедія: Людиноподібний робот Софія, [Електронний ресурс] – режим доступу: [https://uk.wikipedia.org/wiki/Людиноподібний\\_робот\\_Софія](https://uk.wikipedia.org/wiki/Людиноподібний_робот_Софія)
10. *Яна Довгалюк* «Робот Софія: довершеність штучного інтелекту чи загроза людству?», [Електронний ресурс] – режим доступу: [https://maximum.fm/hto-taka-robot-sofiya-v-chomu-yiyi-osoblivist\\_n137482](https://maximum.fm/hto-taka-robot-sofiya-v-chomu-yiyi-osoblivist_n137482)
11. *iPress.ua*, «Робот Софія має таке ж відношення до штучного інтелекту, як фокуси до магії, — Ян Лекун», [Електронний ресурс] – режим доступу: [https://ipress.ua/news/robot-sofiya\\_maie\\_take\\_zh\\_vidnoshennya\\_do\\_shtuchnogo\\_intelektu\\_yak\\_fokusy\\_do\\_magii\\_\\_yan\\_lekun\\_240248.html](https://ipress.ua/news/robot-sofiya_maie_take_zh_vidnoshennya_do_shtuchnogo_intelektu_yak_fokusy_do_magii__yan_lekun_240248.html)
12. *Григорій Воронцов*, «Пять случаев, когда искусственный интеллект взбунтовался», [Електронний ресурс] – режим доступу: <https://secretmag.ru/trends/tendencies/pyat-sluchaev-kogda-iskusstvennyi-intellekt-vzbuntovalsya.htm>
13. *Метт Баскелл, Софія Віндерських*, «Штучний інтелект перевершить людину до 2062 року», [Електронний ресурс] – режим доступу: [http://thefuture.news/ai\\_2062](http://thefuture.news/ai_2062)

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