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THE ROLE OF THE PRINCIPLE OF OPERATION OF A NEURAL NETWORK IN SOCIETY

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Annotation. *This article analyzes the working principle of neural networks and their role in society. Neural networks, as a key component of artificial intelligence and machine learning technologies, are revolutionizing many fields. The working principle of the network is based on the human brain, capable of learning, classifying, and making decisions based on data. It is effectively used in production optimization, medical diagnostics, creating personal assistants, and automation systems. The article also discusses the economic and social impact of neural networks on society, ethical issues, and future development prospects.*

Key words: *Neural networks, artificial intelligence, machine learning technologies, revolutionary changes, human brain activity, data mining, classification, optimization, medical diagnostics, personal assistants, automation systems, social impacts, ethical issues, and future development prospects are also discussed.*

Аннотация. *В статье анализируется принцип работы нейронных сетей и их роль в обществе. Нейронные сети, как ключевой компонент технологий искусственного интеллекта и машинного обучения, производят революцию во многих областях. Принцип работы сети основан на человеческом мозге, способном обучаться, классифицировать и принимать решения на основе данных. Он эффективно используется в оптимизации производства, медицинской диагностике, создании персональных помощников и систем автоматизации. В статье также обсуждается экономическое и социальное влияние нейронных сетей на общество, этические вопросы и перспективы будущего развития.*

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Ключевые слова: *Нейронные сети, искусственный интеллект, технологии машинного обучения, революционные изменения, активность человеческого мозга, интеллектуальный анализ данных, классификация, оптимизация, медицинская диагностика, персональные помощники, системы автоматизации, социальные последствия, этические вопросы и перспективы будущего развития.*

Neural networks, as one of the key technologies of artificial intelligence and machine learning, are bringing about major changes in the fields of science and technology. These networks are based on modeling the human brain and are used in many practical areas. Neural networks have found their place in various areas of society with their high efficiency and ability to process complex information. This article analyzes the principle of operation of a neural network and its role in society. In particular, the impact of this technology in the economic, social, cultural and scientific fields, as well as its importance for the overall development of society, will be considered.

Principle of operation of a neural network. The principle of operation of a neural network is based on modeling the human brain. In the human brain, neurons are interconnected and process information by receiving and sending signals from each other. Thus, an artificial neural network works in a similar way: input data (input) passes through neurons and is converted into output (output). Each neuron has its own weight and activation function, which determines how it processes the data.

The main components of a neural network are:

Input layers: Data enters the network and is processed by the neurons in the network.

Hidden layers: Data from the input layers is learned and processed by the hidden layers.

Output layers: The final layer produces the output of the network. This can be a category or class in a classification problem.

Neural networks learn using various algorithms, such as gradient descent or other optimization methods, in which the network updates its weights. During the

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training process, the network tries to minimize the error between the inputs and outputs.

Role and impact in society. The role of neural networks in society has led to changes in many areas. Their impact is most noticeable in the following areas:

Economic development. Neural networks and artificial intelligence technologies are making great revolutions in the economic sphere. The role of neural networks in automation, optimization of production processes and increasing efficiency is incomparable. For example, in the production and logistics sectors, neural networks are used to optimize automatic control systems, demand forecasting and inventory processes. This, in turn, helps to reduce production costs, increase competitiveness and ensure economic growth.

Also, in the banking sector, neural networks are used to detect fraud, assess credit history, and provide customer service. They help make quick and accurate decisions and are of great importance in making services more efficient.

Healthcare. In the healthcare sector, neural networks are creating new opportunities for analyzing, diagnosing, and treating medical images. When working with X-ray, MRI, and other medical images, neural networks help to identify pathologies with high accuracy. For example, in the field of oncology, neural networks have made it possible to detect cancer cells and diagnose diseases at an early stage.

The learning and analysis capabilities of neural networks are also helping to create new drugs and treatments in medical research. They are being used in genomic studies, the detection of genetic diseases, and the development of personalized medical treatment approaches.

Education and Science. In the field of education, neural networks allow for the creation of individual learning systems for students. For example, they can be used to develop customized educational materials based on students' interests, learning styles, and reading speed. At the same time, neural networks are of great help in scientific research and data analysis. In fields such as biology, physics, and

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mathematics, neural networks help in processing large data sets and making new scientific discoveries.

Application in everyday life Neural networks are also widely used in our daily lives. For example, personal assistants using artificial intelligence (Siri, Google Assistant, etc.) can provide users with accurate and fast assistance. In social networks, neural networks are used to describe advertising and content, which allows users to be shown personalized advertisements.

In addition, automatic systems in car control are also being developed using neural networks. New autonomous cars use neural networks to ensure safety and effectively manage traffic.

Social and ethical implications. Neural networks are raising social and ethical issues in society, especially in the information and media industries. Neural networks will be used to classify data, detect malicious content, and filter out fake information. However, these technologies can also be used for illegal purposes, such as manipulation through deepfake technologies.

In addition, the widespread use of machine learning and artificial intelligence systems will increase automation in the workplace, which may lead to the disappearance of certain professions. To prevent such situations and to adapt people to new professions, it is necessary to pay attention to the education system and vocational guidance.

The principle of operation of neural networks and their role in society are of great importance. It is helping to increase efficiency in economic sectors, create innovations in healthcare, individualize education, make new discoveries in science, and make everyday life easier. However, it is also necessary to take into account the social and ethical implications of these technologies. Therefore, along with the development and application of neural networks, it is important to take the necessary measures to achieve fair and sustainable development in society.

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