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THE ROLE OF ARTIFICIAL INTELLIGENCE, MACHINE LEARNING AND NEURON NETWORKS IN THE SPHERE OF SOCIO-ECONOMIC SCIENCES AND INFORMATION TECHNOLOGIES

It has become a daily occurrence for us that new words begin to join our familiar vocabulary. We have often heard such terms as artificial intelligence, machine learning, neural networks, deep learning. Someone knew these words from the beginning of their inception, and someone met them only yesterday. All of these tools were primarily created to automate processes and perform similar tasks, but they should not be confused. So, undoubtedly, they need to be sorted out.

Machine learning is a term used to describe an algorithm that allows a machine to generate a certain result based on input data and is used in the creation of artificial intelligence. Machine learning allows you to make the most accurate predictions and calculations through the use of neural networks and other learning methods. Machine learning is based on three main elements: data, algorithm, signs (see Fig. 1).
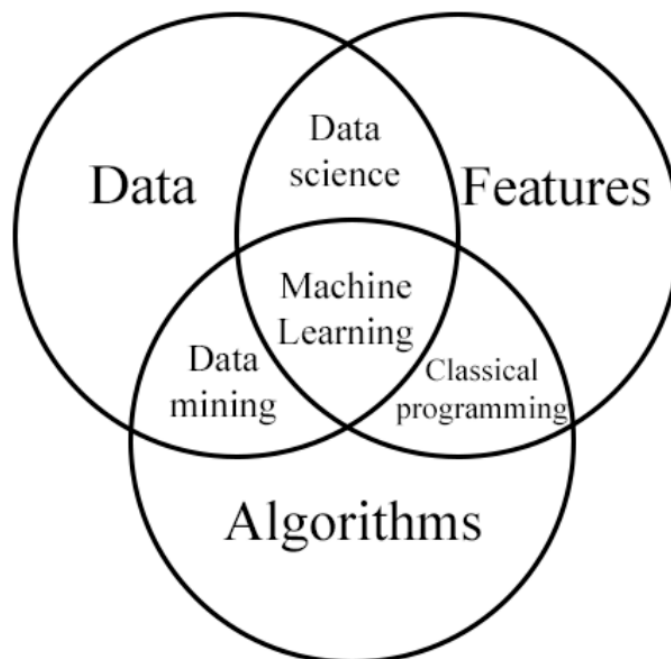

Fig. 1 – The fundamental foundation of machine learning

Data is literally any information that we can provide for the system to work with. An algorithm is a system of sequential operations to solve certain problems. Signs are those characteristics according to which we compare the final result. The main types of machine learning are classical learning, neural networks, and deep learning. Today, neural networks and deep learning have become more widespread due to their complex algorithms and capabilities.

A neural network is a term used to describe a program capable of storing, analyzing and reproducing information. As we noted earlier, neural networks are a type of machine learning. At a basic level, a neural network has four main components: inputs, weights, bias or threshold, and output. The approximate formula by which the optimal calculation is made in neural networks is given below:

$$\sum_{i=1}^{m} w_i x_i + bias = w_1 x_1 + w_2 x_2 + w_3 x_3 + \cdots + bias$$

Artificial intelligence is a term used to describe machines designed to imitate human intelligence artificially. Such devices are capable of streamlining, optimizing and performing actions that have a better result. These devices are based on laws in the field of mathematics, computer science, physics, psychology, etc. In general, there are several categories of artificial intelligence, which are divided by the ability to perform more complex and massive tasks, starting from simple calculations and ending with the solution of cognitive problems inherent in the human brain and modeling of highly complex systems. Currently, artificial intelligence is used in various industries – from engineering and finance to healthcare. Artificial intelligence is fairly well used, despite the fact that it has arisen quite recently. Tesla is using AI to drive autonomy across vehicles and robots, LinkedIn is using it to match job applicants, Facebook is using AI to detect content that may violate community norms, smart search and Google algorithms are also examples of AI applications. Many chatbots with artificial intelligence help people solve minor problems related to calculations, finding information, making decisions, etc.

It can be concluded that, by now, artificial intelligence, which was provoked by the idea of achieving a human level of intelligence with the help of machines,

machine learning, which started as a scientific pursuit to search for artificial intelligence, and neural networks, which were only a learning hypothesis, have become so widespread, that they can not but affect people's lives. All these methods of automating routine, heavy or massive work help to optimize and increase the efficiency of people's work in various areas of life.

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THE ROLE OF SUPER-RESOLUTION ABILITY IN THE SPHERE OF INFORMATION TECHNOLOGIES

Super resolution is an image processing technology that allows you to increase the resolution of an image, restoring lost details. Super resolution refers to the process of producing a high spatial resolution image from one or more low resolution images. High-resolution images provide more detailed information to enable more accurate image analysis. Many fields require high resolution imaging, such as medical or satellite sensing, telescope imaging, pattern recognition, video surveillance, etc.

The super resolution method includes three main tasks: upsampling the image, increasing the maximum spatial frequency, and eliminating defects that occur during image capture, such as blur and noise. In essence, through the resolution process, you can get closer to reproducing the missing high frequency components and minimize aliasing, blurring, and noise. Over the course of the study of super