

транспортування, що в свою чергу підвищить продуктивність та якість технологічного процесу в елеваторному комплексі.

Література

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UDC 004

OPPORTUNITIES OF ARTIFICIAL INTELLIGENCE FOR THE DEVELOPMENT OF INDUSTRIAL AUTOMATION

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Research on artificial neural networks is related to the fact that the way the human brain processes information is fundamentally different from the methods used by conventional digital computers. The brain is an extremely complex, non-linear, parallel computer. Scientists have proven that the brain consists of a huge number of structural components - nerve cells, also called neurons. A neuron creates connections with other neurons, the number of which can range from 10 to

100,000 at its conjugation points. Signals propagated through the neural network control the activity of the brain for a short interval, and also cause long-term changes in the state of the neurons themselves and their connections.

The human brain has the ability to organize the work of neurons so that they can perform specific tasks (such as pattern recognition, processing of sensory signals, motor functions) many times faster than the fastest modern computers can allow. Ordinary vision is an example of such an information processing task. The functions of the visual system include the creation of a representation of the surrounding world in a form that provides the ability to interact with this world. More specifically, the brain sequentially performs a series of recognition tasks (for example, recognizing a familiar face in an unfamiliar environment). It takes him about 100-200 milliseconds to do this, while performing similar tasks of even less complexity on a computer can take several days.

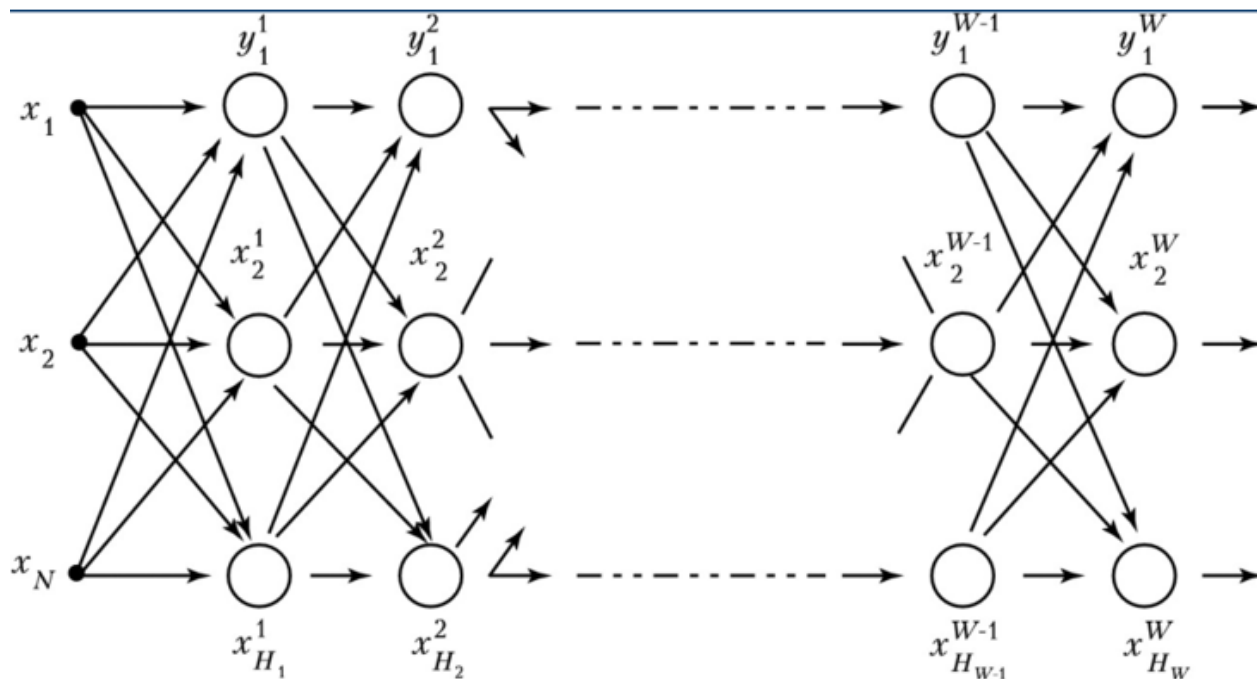


Fig. 1. Graph of a multilayer neural network with serial connections

The brain and digital computer perform completely different tasks and have different properties. The typical human brain has 1000 times more neurons than the gates in the processor of a typical high-end computer. In accordance with Moore's Law, and given the fact that according to some calculations, the number of neurons

in the brain should double approximately every 2-4 million years, it can be predicted that the number of logical elements in the processor will equal the number of neurons in the brain by about 2020 year. Of course, these predictions say little; furthermore, this difference in the number of elements is negligible compared to the difference in switching speed and degree of parallelism. Computer microcircuits are capable of executing a single instruction in less than a nanosecond, while neurons are millions of times slower. But the brain makes up for this deficiency a hundredfold, since all its neurons act simultaneously, whereas most modern computers have only one processor (but with several cores) or a small number of processors. Thus, even though the computer has an advantage of more than a million times in physical switching speed, the brain appears to perform all its actions about 100,000 times faster than it.

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MODEL OF THE AUTOMATED SYSTEM OF DETAILS SORTING

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Relevance of Project. Conveyor sorting systems are material handling technologies designed to increase the efficiency and accuracy of manufacturing and shipping operations. Industry professionals use them to separate products from in-feed conveyor lines and direct them to shipping, palletizing, packaging, and other processing stations. They are suitable for use with a wide range of items, varying in size and weight and material.

Project's objective. The research aims to increase the productivity and efficiency of controlling the continuous flow of products through a production line by using the automated sorting system. Such a system is to minimize errors, time, and the use of multiple conveyors in a productive factory.

Project's purpose. Compared to manual or conventional sorting methods, sorting conveyor systems offer numerous advantages to industrial shipping facilities, including:

- **Greater shipping accuracy:** The use of smart conveyor systems reduces the risk of products being directed to the wrong shipping lane and, consequently, sent to the wrong customer.
- **Higher productivity:** Using conveyor sorting systems decreases the amount of time employees spend in processing products and increases the number of products that can be processed within a single shift.
- **Lower production costs:** The higher productivity achieved by using conveyors for sorting operations translates to lower production costs since