

PECULIARITIES OF USING ARTIFICIAL INTELLIGENCE IN MECHANICAL ENGINEERING

The person has a very close connection with technology. In general, any aspect of life is impossible without the use of various technologies. The machine building sector is one of the most competitive of all industrial sectors.

In today's world, we are witnessing rapid development with changes in the global field of mechanical engineering, driven by technological innovations, new business processes, operating rules and requirements in various engineering sectors. Digitalization, new complex products, and the growing demand for highly skilled personnel are potential opportunities for machine building companies, but also serve as obstacles to growth. Innovative processes, predictive maintenance, and innovative service models are increasingly being used in the machine building industry. The use of advanced digital technologies in mechanical engineering has become a necessity to prevent the risk of losing relevance in the modern industrial market. The global industrial market is evolving due to technological innovations in mechanical engineering and progress in process management [4, c.5].

Today, we can already observe certain successes of artificial intelligence (AI) in solving complex problems in both purely scientific fields and in the fields of technology, business, economics, finance, medical diagnostics, and other fields related to intellectual activity [2].

AI in mechanical engineering is used for:

1. Increasing productivity. AI can automate many tasks, such as design, prototyping, testing, and production. This can lead to significant reductions of time and costs.
2. Improving quality. AI can help identify and eliminate defects in the early stages of design and production. This can result in better product quality and fewer errors.
3. Risk reduction. AI can help in predicting and preventing accidents and other hazardous situations. This can make the work environment safer for people.
4. Opening new opportunities. AI can help in developing new products and services that were previously impossible. This can give companies a competitive advantage.

Also, with the introduction of AI in the machine building industry, we can expect a sharp increase in labor productivity, changes in the structure and volume of production costs.

Among the most common applications of AI in mechanical engineering are:

1. Design. AI is used for automated design of parts, assemblies, and machines. This can help to create more optimal and efficient designs.
2. Prototyping. AI is used to create virtual prototypes that can be tested and improved before physical prototypes are made. This can save time and money.

3. Testing. AI is used to automated testing of products to ensure compliance with safety and quality standards. This can help in identifying and eliminating defects at early stages.

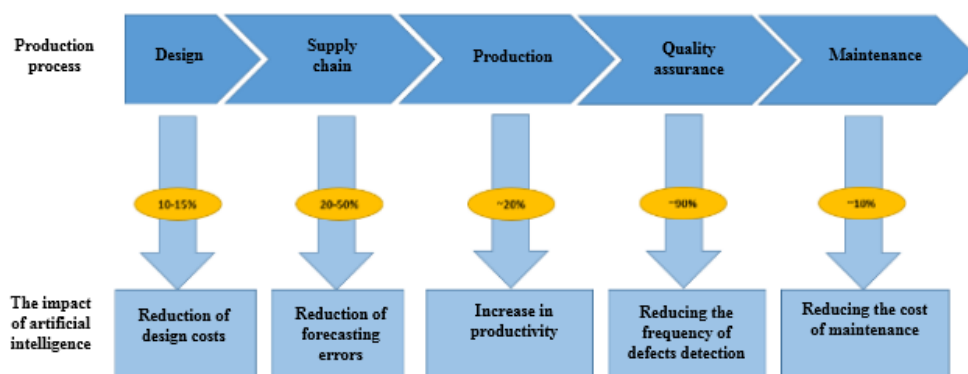
4. Production. AI is used for automated control of robots and other equipment. This can lead to more accurate and efficient production.

5. Maintenance. AI is used to predict and prevent breakdowns. This can help to reduce downtime and repair costs.

Artificial intelligence will define the next decade of mechanical engineering and continue to increase its influence on software used in the industry. Software vendors are developing AI systems to advise engineers on material selection and compliance with established codes and standards. Meanwhile, automation software allows AI to perform tasks such as reviewing change orders, managing material estimates, and finding opportunities to standardize parts across multiple products.

AI in engineering is increasingly being used to support the entire production chain, providing a detailed quantitative assessment of current market data and enabling effective strategic decision-making (Picture 1).

Besides, AI is used in autonomous systems. These include vehicles and drones, as well as robots that manage parts in factories and warehouses (they may someday replace conveyor belts) [3].



Picture 1. Using artificial intelligence to improve production processes

The enumerated positive economic outcomes, in turn, give rise to serious problems, namely:

1. There is a need to employ laid-off personnel with professional knowledge and special skills.

2. More efforts are needed to recruit workers with new professions and specialties specific to the operation of robotic equipment.

However, when it comes to the economic consequences of implementing AI in Ukraine's mechanical engineering sector, there are several issues that deserve attention:

1. There is a war going on and all resources are being spent on defense. It is important to prioritize the production of ammunition, missiles, unmanned aerial vehicle (UAV), unmanned ground vehicles (UGV), firearms, and military technology.

2. Emigration abroad is more than 5 million people. The most productive part of the population serves in the army, and a large number of specialists and future specialists have perished.

3. Some enterprises, including the infrastructure of the machine-building industry, especially in the occupied territories, have been looted and destroyed. And

this process continues every day. Almost 40% of Ukraine's economy has been destroyed. Thanks to the help of other countries with finance, equipment and weapons, Ukraine is able to resist the aggressor. However, this cannot continue indefinitely. It is very difficult for our country to resist such a powerful aggressor, the Russian Federation, which has enormous economic and human resources.

The war-related circumstances have a particular impact on the solution of these problems related to improving the efficiency of economic outcomes.

It is expected that the use of AI in mechanical engineering will continue to grow in the coming years. AI can help to create more intelligent and autonomous machines that can learn and adapt independently. This could lead to a revolution in mechanical engineering and other industrial sectors.

It is important to note that AI is not a replacement for human labor. AI can help people in performing tasks more efficiently, but it cannot fully replace human intelligence and creativity [1].

Thus, the main tasks at the moment are:

1. Training of highly qualified specialists capable of solving complex tasks and problems in the field of automation in mechanical engineering and creating intelligent mechanical systems using artificial intelligence and robotics. This involves developing the latest and using existing scientific methods, technologies, devices and systems in research institutions and at leading enterprises of the industry, transformation of the labor market through interaction with employers and other stakeholders.

2. Reconstruction and revitalization of the mechanical engineering industry, followed by the implementation of AI.

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