

CURRENT PROBLEMS AND POTENTIAL OF MECHATRONICS DEVELOPMENT IN THE MODERN WORLD

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Mechatronics is a field where knowledge about the creation and development of technical systems combining mechanical elements, electronics, software and automation is integrated [1].

The current concepts in mechatronics that are widely used for describing technical areas of application are: *robotics*, one of the key areas in mechatronics is the creation and programming of robots capable of performing a variety of tasks in various fields such as industry, medicine, service and others; *integrated systems*, modern mechatronic systems are becoming more compact and versatile, which significantly increases the productivity and efficiency of technical devices.; *artificial intelligence and machine learning*, the application of artificial intelligence and machine learning methods in mechatronics allows you to create systems with self-learning algorithms, which makes them more adaptive and flexible.

Among the prospects for the development of various concepts in mechatronics can be mentioned the following:

1. Nanotechnology in mechatronics: The introduction of nanotechnology will make it possible to create more compact and energy-efficient mechatronic devices, opening up new opportunities for innovation.
2. Internet of Things (IoT): The fusion of mechatronics with the Internet of Things network contributes to the development of smart devices capable of autonomously interacting with each other, which is extremely important for the development of smart cities and industrial enterprises.

Concepts in the field of mechatronics continue to evolve, and their development is aimed at improving the efficiency, accuracy and functionality of technical systems. One of the important areas of research is the development of more flexible and adaptive mechatronic systems that can quickly adapt to changing environmental conditions.

The integration of the latest technologies, such as artificial intelligence, the Internet of Things, nanotechnology and robotics, allows to create unique technical solutions capable of solving complex problems in various fields of application. The development of mechatronics is also aimed at reducing the cost of production and maintenance of systems, increasing reliability and safety, as well as improving the user experience [1].

Thanks to the constant improvement of the methods of designing, modeling and controlling mechatronic systems, today we see more and more innovative and promising developments that become the basis for the future development of technology and technology. It is important to maintain active interaction between scientists, engineers and specialists in various fields in order to advance the boundaries of knowledge and create unique technical solutions that can change the world for the better.

Mechatronics is a key area in modern technology, covering a wide range of applications, ranging from industrial robots and autonomous vehicles, to medical devices and home robots. The prospects for the development of mechatronics are associated with the constant improvement of the technical characteristics of systems, as well as the creation of innovative solutions to increase efficiency and ease of use.

An important aspect of modern mechatronics is also the consideration of environmental aspects and sustainable development. The development of energy-efficient mechatronic systems capable of reducing resource consumption and reducing environmental impact is becoming an increasingly urgent task.

Given the rapid development of technologies and breakthroughs in the field of artificial intelligence, we can expect further expansion of the capabilities of mechatronic systems and their applications in various industries. It is important to continue research and innovation in the field of mechatronics in order to ensure the progressive development of technology and society as a whole.

References

1. Мехатроника и робототехника как перспективные научные направления. [Electronic resource] – Mode of access: https://atf.ru/articles/materialy_dlya_tipovykh_uzlov_treniya/mekhatronika-i-robototekhnika-kak-perspektivnye-nauchnye-napravleniya/. – Date of access: 24.03.2024.