TECHNICAL SCIENCES

ARTIFICIAL INTELLIGENCE IN AUTONOMOUS SYSTEMS: APPLICATIONS AND THE FUTURE

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Abstract

The work analyzes key technologies underlying autonomous systems, such as machine learning, big data processing, and sensor networks. Particular attention is paid to practical examples of the use of artificial intelligence (AI) in autonomous systems, and security, reliability, and ethics issues related to their implementation are discussed.

The article emphasizes the importance of further research and development in this area, since autonomous AI-controlled systems can significantly increase the efficiency and safety of processes, as well as open up new horizons in automation and independent work in a wide variety of industries.

Keywords: autonomous systems, artificial intelligence, management, ethics and security, prospects mathematics teacherand possibilities of using artificial intelligence.

The age of the digital revolution has opened new horizons for humanity. One of the most ambitious and, at the same time, controversial achievements of this time was autonomous systems with artificial intelligence (AI). These systems, endowed with the ability to learn and make decisions, transform our society, economy, and even the very nature of human existence. This manifesto aims to address and highlight the key aspects and challenges associated with autonomous systems and to suggest ways to implement them ethically and effectively in our society.

Prospects and opportunities

Autonomous systems with AI have tremendous potential to improve quality of life. They can streamline production processes, improve transport safety, improve medical diagnosis and treatment, and make our homes and cities smarter and more convenient. Such systems are capable of performing tasks with high accuracy and speed beyond human capabilities. For example, in the medical field, AI can analyze medical images in incredible detail, and in transport, it can reduce accidents thanks to autonomous driving systems. "Artificial intelligence is the study of how to create computers that can perform tasks that were ever thought possible only for human intelligence," wrote Russell, S., & Norvig, P. (2020). Artificial Intelligence: A Modern Approach. 4th ed. Pearson.

Ethics and responsibility

However, with great power comes great responsibility. One of the main issues facing society is the ethics of using autonomous systems. AI decision-making, especially in critical areas such as health or safety, requires careful oversight and transparency. How do we ensure that AI algorithms act fairly and do not introduce bias or discrimination? How to ensure that autonomous systems work in the interests of all mankind and not just a narrow circle of people or organizations? These issues require developers, governments, and citizens to work together to create effective norms and standards.

Economic and social consequences

Autonomous systems with AI can affect the labor market and the economy, as the replacement of human resources with robots leads to job cuts, which causes concern among the population. On the other hand, it also opens up new opportunities for job creation in the development, maintenance, and management of these systems. Therefore, it is very important to think over retraining and advanced training strategies for employees to minimize negative consequences and create conditions for economic growth.

"Autonomous robots are designed to operate independently, adapting to changing environments through complex decision-making processes and sensor-based perception, which allow them to perform tasks without human intervention," wrote Valavanis, K. P., & Vachtsevanos, G. J. [Autonomous Robots: Modeling, Planning, and Control. Wiley. 2015, interview]

Sustainable Development and Security.

The introduction of autonomous systems should take into account issues of sustainable development and safety. AI systems can become targets of cyberattacks or can be used for malicious purposes. Therefore, it is crucial to develop effective measures to ensure their safety and protection from abuse. Innovation must be coupled with robust data protection mechanisms and compliance with security standards. Many study authors emphasize the importance of the security of autonomous systems, which is a key aspect when discussing their prospects. Так Cao, Y., & Wang, X.wrote: "The security of autonomous systems is a critical factor for their successful operation and trust on the part of users; it is necessary to integrate risk assessment methods at all stages of design and operation." . ["Safety in Autonomous Systems: An Analytical Review." Systems Engineering, 22(4), p. 305-317, 2020].

Human interaction and cooperation

The introduction of autonomous systems should not be seen as a replacement for humans but as a way

to complement and improve human potential. These systems need to work in tandem with the individual, supporting and empowering us. Human-AI interactions must be based on trust and mutual respect, where technology serves as tools for the common good. Так в статье Valavanis, K. P., & Vachtsevanos, G. J. указано "Autonomous robots are designed to operate independently, adapting to changing environments through complex decision-making processes and sensor-based perception, which allow them to perform tasks without human intervention." [Autonomous Robots: Modeling, Planning, and Control. Wiley, 2015]

Conclusion

Autonomous systems with artificial intelligence represent not only a technological achievement but also a challenge that requires a conscious approach. We must strive to ensure that their introduction contributes to the creation of a fairer, safer, and more prosperous society. It is necessary to realize the responsibility when using AI, respect for human dignity, and the need for joint efforts to solve emerging problems. We are on the verge of a new era, and it depends on us how we will use this power for the benefit of all mankind.

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