УДК 004.8:004.4

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WHY ARTIFICIAL INTELLIGENCE CANNOT FULLY REPLACE HUMANS IN IT: LIMITATIONS AND PROSPECTS

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Анотація:

У роботі досліджено роль штучного інтелекту в сучасній IT-індустрії та проаналізовано основні обмеження, які перешкоджають повній заміні людських фахівців системами ШІ. Розглянуто технічні, когнітивні, етичні та організаційні проблеми впровадження штучного інтелекту. У дослідженні наголошується, що найбільш ефективною моделлю майбутнього IT є співпраця між людиною та інтелектуальними системами, а не повна автоматизація.

Ключові слова: штучний інтелект, IT-індустрія, автоматизація, генеративний ШІ, співпраця людини та ШІ, розробка програмного забезпечення, обмеження ШІ.

Abstract:

The paper examines the role of artificial intelligence in the modern IT industry and analyses the main limitations preventing AI from fully replacing human specialists. Technical, cognitive, ethical, and organizational challenges of AI implementation are considered. The study emphasizes that the most effective model for the future of IT is collaboration between humans and intelligent systems rather than full automation.

Keywords: artificial intelligence, IT industry, automation, generative AI, human-AI collaboration, software development, AI limitations.

Introduction

The rapid development of artificial intelligence technologies has significantly transformed the modern IT industry. Tools such as ChatGPT, GitHub Copilot, Gemini, and CodeWhisperer are actively used for code generation, automated testing, analytics, and optimization of development processes [1]. As a result, discussions about the possible replacement of human specialists by intelligent systems have become increasingly relevant.

Despite the impressive capabilities of generative AI, modern intelligent systems still possess several fundamental limitations. Artificial intelligence operates on the basis of statistical analysis and pattern recognition rather than conscious understanding [2]. Consequently, AI cannot independently establish project goals, fully understand business requirements, or assume responsibility for decision-making.

AI Capabilities and Limitations in IT

Today, artificial intelligence is widely applied in software development, testing, DevOps, cybersecurity, analytics, and technical documentation [3]. AI systems can generate code fragments, automate repetitive tasks, analyze large datasets, detect anomalies, and accelerate engineering processes. This significantly increases productivity and reduces the time required for routine operations.

However, the effectiveness of AI in IT remains limited by several important factors. One of the key problems is the dependence on training data quality. Models may generate incorrect or misleading information, including non-existent functions, inaccurate algorithms, or insecure code solutions [4]. In addition, AI lacks intuition, emotional intelligence, and the ability to think critically in unpredictable situations.

Another major limitation concerns understanding context and communication within teams. Human specialists are capable of adapting to changing requirements, negotiating with clients, resolving conflicts, and making strategic decisions under uncertainty. Artificial intelligence cannot fully reproduce these social and cognitive functions [5].

Ethical and legal challenges also remain significant. AI systems cannot bear responsibility for errors, security breaches, or the consequences of their decisions. Furthermore, algorithmic bias, insufficient transparency, and privacy risks complicate the large-scale autonomous use of intelligent systems in critical IT environments [6].

Human-AI Collaboration Prospects

Current research demonstrates that the most effective approach is not the replacement of humans by AI but cooperation between them. The "Human-in-the-Loop" model allows intelligent systems to automate repetitive processes while humans retain control, supervision, and strategic decision-making functions [7].

The integration of AI technologies is also transforming the structure of IT professions. New roles such as AI Engineer, Prompt Engineer, AI Auditor, and Human-AI Supervisor are emerging. At the same time, the importance of critical thinking, creativity, communication skills, and ethical competence continues to increase.

Artificial intelligence should therefore be considered a tool for enhancing human capabilities rather than a complete substitute for professional specialists. The future development of the IT industry depends on the effective synergy between human expertise and intelligent technologies.

Conclusions

Artificial intelligence significantly transforms the IT sector and improves the efficiency of many engineering processes. Nevertheless, due to technical, cognitive, ethical, and organizational limitations, AI cannot fully replace humans in the near future. Human specialists remain essential for strategic thinking, communication, responsibility, creativity, and decision-making in complex situations. Therefore, the future of IT lies in the productive collaboration between humans and intelligent systems rather than in full automation.

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