

THE ROLE OF ARTIFICIAL INTELLIGENCE IN MODERN SOFTWARE DEVELOPMENT LIFE CYCLES

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Анотація

Публікація досліджує вплив інструментів штучного інтелекту (ШІ) на процеси розробки програмного забезпечення. Розглядається, як нейронні мережі допомагають у написанні коду, автоматизації тестування та виявленні помилок. Основна увага приділена сервісам на базі LLM, що дозволяють підвищити продуктивність розробників та скоротити час виходу продукту на ринок.

Ключові слова: штучний інтелект, розробка ПЗ, генеративний код, автоматизація, LLM.

Abstract

This paper investigates the impact of Artificial Intelligence (AI) tools on software development processes. It examines how neural networks assist in code generation, test automation, and bug detection. Special focus is placed on LLM-based services that enhance developer productivity and reduce time-to-market for software products.

Key words: artificial intelligence, software development, generative code, automation, LLM.

Introduction

The landscape of software engineering is undergoing a massive transformation due to the rapid advancement of Artificial Intelligence. Traditional coding, which relies heavily on manual labour and syntax memorization, is being augmented by intelligent assistants. Tools like GitHub Copilot and ChatGPT have shifted the focus from writing boilerplate code to high-level system design. This paper explores how AI integration affects the efficiency and quality of modern software development life cycles.

Research results

One of the most significant changes in the development process is the implementation of AI-driven coding assistants. These tools utilize Large Language Models (LLMs) to predict and suggest the next lines of code based on the context of the project. [1] According to recent surveys, developers using AI assistants can complete tasks up to 55% faster than those working without them. [2] This efficiency is particularly visible in repetitive tasks, such as writing unit tests or documentation, allowing engineers to focus on complex architectural problems.

Another crucial area is automated debugging and security analysis. AI models can scan thousands of lines of code in seconds to identify potential vulnerabilities or logical flaws that might be missed by human eyes. [3] Unlike traditional static analysis tools, AI understands the intent behind the code, providing more relevant suggestions for optimization. This proactive approach significantly reduces the technical debt and improves the overall stability of the application.

Furthermore, AI is revolutionizing the testing phase. Machine learning algorithms can now generate diverse test cases, simulate user behaviour, and even perform visual regression testing with high precision. [4] This ensures that software remains functional across various platforms and devices without requiring extensive manual QA resources. The integration of AI into DevOps pipelines (often called AIOps) further streamlines deployment and monitoring processes.

Conclusion

Artificial intelligence is no longer a futuristic concept but a fundamental tool in the software developer's toolkit. By automating routine tasks, enhancing code quality, and accelerating the testing phase, AI allows for faster and more reliable software production. While it does not replace the need for human creativity and critical thinking, it serves as a powerful co-pilot that redefines the boundaries of technical possibilities. As these technologies continue to mature, the synergy between human intelligence and AI will become the standard for the industry.

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