ARTIFICIAL INTELIGENCE ASSISTANT FOR LEARNING OF OBJECT-ORIENTED PROGRAMMING

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Generative AI is starting to reshape the way software is developed, bringing real boosts to productivity, accuracy, and even how people learn to code [1]. Tools that suggest code, catch errors as you type, or even handle testing automatically are making life easier for developers by cutting down on repetitive tasks. In addition, it becoming a great learning tool [2]. For students, AI can give targeted feedback and suggest cleaner, more efficient ways to write code.

Generative AI comes with its own set of challenges. One of the biggest is prompt engineering. A prompt is a special construction that works as an instruction for a GPT model. A clear, well-structured prompt can help guide the AI to deliver responses that match your expectations. A bad prompt can lead to vague or irrelevant answers, while a clear one can steer the AI toward useful, relevant help. It's especially important when the task involves teaching, tech support, or writing code, where the details really matter.

To explore how AI could help students learn to program, the AI assistant was developed focused on Object-Oriented Programming (OOP) [3]. It is built to work inside modern GPT-based tools using a system prompt approach. It was tested with ChatGPT, Gemini, and Grok. Also, it was deployed into the Azure cloud in the form of a separate application.

The assistant offers quick feedback, explains things in plain language, and walks students through examples and practice problems. The idea is to give students something more interactive than a textbook. As a result, this kind of support helps bridge the gap between learning concepts and actually applying them in code. In addition, the assistant may help with task decomposition, explanation, and resolution during practical work.

To sum it up, an AI-powered assistant can be a valuable asset in both software development and education. It helps with coding tasks and design and allows one to focus on creative problem-solving. On the education side, generative AI is also making a real impact by offering personalized learning and support.

References (translated):
1. Haindl P., Weinberger G. Does ChatGPT Help Novice Programmers Write Better Code? Results From Static Code Analysis – IEEE Access, Volume 12, 2024. – 114146 – 114156 pp. – ISSN 2169-3536
2. Chen L., Chen P., Lin Z. Artificial Intelligence in Education. – IEEE Access, Volume 8, 2020. – 75264 – 75278 pp. – ISSN 2169-3536
3. Свідоцтво про реєстрацію авторського права на твір № 133141 UA. Літературний письмовий твір навчального характеру «Генеративний промпт для створення асистента для вивчення дисципліни об`єктно-орієнтованого програмування на основі штучного інтелекту» / О. О. Решетнік, Є. К. Завальнюк, О. Н. Романюк, О. Л. Бобко (Україна) ; Державна організація «Український національний офіс інтелектуальної власності та інновацій». Дата реєстрації 5 лютого 2025 р.