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Improving Student Programming Skills in Introductory Computer and Data Science Courses Using Generative AI

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Abstract : Generative Artificial Intelligence (AI) has significantly expanded its applicability with the incorporation of Large Language Models (LLMs) and become a technology with promise to automate some areas that were very difficult to automate before. The paper describes the introduction of generative Artificial Intelligence into Introductory Computer and Data Science courses and analysis of effect of such introduction. The generative Artificial Intelligence is incorporated in the educational process two-fold: For the instructors, we create templates of prompts for generation of tasks, and grading of the students work, including feedback on the submitted assignments. For the students, we introduce them to basic prompt engineering, which in turn will be used for generation of test cases based on description of the problems, generating code snippets for the single block complexity programming, and partitioning into such blocks of an average size complexity programming. The above-mentioned classes are run using Large Language Models, and feedback from instructors and students and courses' outcomes are collected. The analysis shows statistically significant positive effect and preference of both stakeholders.

Keywords : introductory computer and data science education, generative AI, large language models, application of LLMS to computer and data science education
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