Forensics and Feedback at Scale for Digital Assignments

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Artificial intelligence (AI) based tools have very rapidly altered how students approach digital assignments. The widespread adoption and use of AI presents a complex duality. While these tools offer significant gains in efficiency and productivity, they also introduce worrisome new challenges to academic integrity, learning outcomes, and traditional assessment design (Dastagir et al., 2024).

The education in programming and software development has become a critical test case for navigating this new landscape. Studies show that AI can solve the vast majority of university-level programming assignments partially or entirely (Denny et al., 2024), leading to concerns about over-reliance and the potential for diminished problem-solving skills among students. The freshly emerging evidence suggests a troubling trade-off where students complete tasks faster but show performance declines in AI-free environments and may fail to develop deep conceptual understanding. This growing dependency complicates academic oversight, with one study noting a significant increase in stylistically anomalous and suspicious code submissions following the popularization of ChatGPT (Hellas et al., 2024).

In this context, we believe that automated version control forensics and feedback mechanisms represent a promising path forward. Using programmatic access to educational platforms such as GitHub Classroom, instructors can extract both quantitative and qualitative insights into student work (França et al., 2021; Nolan & Stoudt, 2018). Analyzing the entire version control history, rather than just the final submission, allows for a more holistic evaluation of a student's engagement and learning process.

The talk outlines the emerging challenges posed by AI in digital learning environments and motivates the need for scalable, automated approaches to analyze student contributions. Such systems can not only help protect academic integrity, but also generate timely, personalized feedback that supports skill development in an AI-integrated world (Wermelinger et al., 2023).

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