INNOVATION PARTNERSHIPS
UNIVERSITY OF MICHIGAN

Co-Advisor: Learning Programming Strategies in Context

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OVERVIEW

Co-Advisor is an AI-powered assistant for Visual Studio Code that builds students' strategic debugging skills through expert, step-by-step coaching.

- Analyzes code and errors, then guides users with tailored problem-solving strategies and real-time feedback.
- Helps learners not just fix bugs, but develop lasting skills and confidence in tackling future coding challenges.
- Addresses the global need for scalable, effective skill-building in programming education and software team onboarding.

BACKGROUND

Mastering programming goes beyond writing correct syntax; it requires learning how to systematically diagnose and solve complex errors. Most students and new developers depend on trial-and-error or quick fixes, rarely building the strategic mindset of experienced engineers—leading to slower learning and costly productivity gaps.

Traditional AI code tools offer instant answers but lack true mentorship. There is a growing demand for solutions that teach the “how” of problem-solving, helping learners and organizations close the skills gap in debugging and accelerate onboarding.

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INNOVATION

Unlike other code assistants that simply propose fixes, Co-Advisor uses AI to analyze code, error outputs, and developer actions in real time.

At each challenging stage, Co-Advisor prompts the learner with the next best strategic step (e.g., hypothesis testing, isolating issues, interpreting error messages), monitors their attempts, and provides immediate, targeted feedback. If a learner makes a misstep, Co-Advisor explains both the mistake and the rationale for the best approach—thus bridging the gap between surface-level fixes and deep, transferable problem-solving skills.

Novel aspects vs. prior solutions:

- **Context awareness**: Guides are personalized to the learner's specific code, error context, and behavior.
- **Strategic mentorship**: Emphasizes critical thinking and decision making, not just "right answers."
- **Real-time, actionable feedback**: Users learn by doing, supported by explanations at every step.
- **Data-driven improvement**: Interaction logs can be leveraged (with privacy in mind) to further refine and personalize approaches.

By integrating strategic debugging expertise into the everyday coding environment and making the “tacit” knowledge of experienced engineers accessible to all, Co-Advisor unlocks both better learning outcomes and measurable productivity gains for teams.