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Mostafavi, Behrooz; Barnes, Tiffany

Evolution of an intelligent deductive logic tutor using data-driven elements.

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Summary: Deductive logic is essential to a complete understanding of computer science concepts, and is thus fundamental to computer science education. Intelligent tutoring systems with individualized instruction have been shown to increase learning gains. We seek to improve the way deductive logic is taught in computer science by developing an intelligent, data-driven logic tutor. We have augmented Deep Thought, an existing computer-based logic tutor, by adding data-driven methods, specifically; intelligent problem selection based on the student's current proficiency, automatically generated on-demand hints, and determination of student problem solving strategies based on clustering previous students. As a result, student tutor completion (the amount of the tutor the students completed) steadily improved as data-driven methods were added to Deep Thought, allowing students to be exposed to more logic concepts. We also gained additional insights into the effects of different course work and teaching methods on tutor effectiveness.

Classification: U50 U70 E30

Keywords: deductive logic instruction; intelligent tutoring systems; data-driven methods
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