Computer Science
Seminar

Automatic Modeling of Procedural Knowledge and Feedback Generation in Tutoring System for Computer Science

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Abstract: This research takes place in the larger context of the study of one-on-one tutoring, a form of instruction that has been shown to be very effective. We conducted a study of human tutoring in the domain of Computer Science data structures, to understand which features and strategies of human tutoring are important for learning. We developed an Intelligent Tutoring System, iList, that helps students learn linked lists. One of the main advancements in iList is the presence of a Procedural Knowledge Model automatically extracted from student data. This model allows iList to provide effective reactive and proactive procedural feedback while a student is solving a problem. We tested five different versions of iList, differing in the level of feedback they can provide, in multiple classrooms, with a total of more than 200 students. The evaluation study showed that iList is effective in helping students learn; students liked working with the system; and the feedback generated by the most sophisticated versions of the system is helpful in keeping the students on the right path.

Davide Fossati (http://www.fossati.us) received his Ph.D. in Computer Science at the University of Illinois at Chicago in summer 2009. He also holds an M.Sc. degree in Computer Engineering from the Politecnico di Milano, Italy (2004), and an M.Sc. in Computer Science from the University of Illinois at Chicago (2003). His research focuses on applications of Artificial Intelligence in education, such as Intelligent Tutoring Systems, and computational models and tools to support formative assessment in Computer Science education.

Friday, November 20, 2009, 3:00 pm
Mathematics and Science Center: W301

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