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On Predicting Learning Styles in Conversational Intelligent Tutoring Systems using Fuzzy Decision Trees

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Abstract

Intelligent Tutoring Systems personalise learning for students with different backgrounds, abilities, behaviours and knowledge. One way to personalise learning is through consideration of individual differences in preferred learning style. OSCAR is the name of a Conversational Intelligent Tutoring System that models a person's learning style using natural language dialogue during tutoring in order to dynamically predict, and personalise, their tutoring session. Prediction of learning style is undertaken by capturing independent behaviour variables during the tutoring conversation with the highest value variable determining the student's learning style. A weakness of this approach is that it does not take into consideration the interactions between behaviour variables and, due to the uncertainty inherently present in modelling learning styles, small differences in behaviour can lead to incorrect predictions. Consequently, the learner is presented with tutoring material not suited to their learning style. This paper proposes a new method that uses fuzzy decision trees to build a series of fuzzy predictive models combining these variables for all dimensions of the Felder Silverman Learning Styles model. Results using live data show the fuzzy models have increased the predictive accuracy of OSCAR-CITS across four learning style dimensions and facilitated the discovery of some interesting relationships amongst behaviour variables.

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