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Flexible Strategy Use in Soar's Tic-Tac-Toe

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Abstract

Modeling cognitive processes is one of the major tasks of cognitive science. This work presents a model of a study described in Flexible Strategy Use in Young Childrens Tic-Tac-Toe (Crowley & Siegler, 1993) in which the authors made an attempt to characterize decision-making in a conflict-of-interests-like environment. In the experiments, kindergarten/primary school children and an algorithm-based opponent played a series of games in Tic-Tac-Toe. The outcomes seemed to indicate the existence of a hierarchy of rules that is constructed with experience. Although already tested algorithmically, the simulation detailed in the paper was applicable to a narrow class of problems only. The model shown in this work was built using a cognitive architecture, i.e. computer-based structure mimicking the general functioning of the human mind. Concretely, we used a rule-based system Soar that operates in mental rules paradigm and in most part replicated the results of the mentioned study.