Charalambidis, Angelos; Rondogiannis, Panos; Troumpoukis, Antonis
A logical characterization of the preferred models of logic programs with ordered disjunction. (English) Zbl 07454773

Summary: Logic programs with ordered disjunction (LPODs) extend classical logic programs with the capability of expressing alternatives with decreasing degrees of preference in the heads of program rules. Despite the fact that the operational meaning of ordered disjunction is clear, there exists an important open issue regarding its semantics. In particular, there does not exist a purely model-theoretic approach for determining the most preferred models of an LPOD. At present, the selection of the most preferred models is performed using a technique that is not based exclusively on the models of the program and in certain cases produces counterintuitive results. We provide a novel, model-theoretic semantics for LPODs, which uses an additional truth value in order to identify the most preferred models of a program. We demonstrate that the proposed approach overcomes the shortcomings of the traditional semantics of LPODs. Moreover, the new approach can be used to define the semantics of a natural class of logic programs that can have both ordered and classical disjunctions in the heads of clauses. This allows programs that can express not only strict levels of preferences but also alternatives that are equally preferred.

MSC:
68N17 Logic programming

Keywords:
ordered disjunction; answer sets; logic of here-and-there; preferences

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References:


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