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Weighted Lars for quantitative stream reasoning. (English) [Zbl 07368426]

Summary: We extend LARS, which is a recent stream reasoning framework based on ASP, to weighted LARS (wLARS), where formulae are interpreted as algebraic expressions over semirings. This adds the ability to express quantitative measures of many different natures and to approach respective reasoning problems such as probabilistic reasoning, preferential reasoning and quantitative queries in a uniform manner. Notably, well-known quantitative ASP extensions can be formalized using wLARS, thus lifting them to the streaming setting. We identify a relevant wLARS fragment that is equivalent to weighted automata, which consequently gives us a rule-based language for expressing behaviors of such automata. Furthermore, we analyze evaluating wLARS formulae, showing that brave preferential reasoning is PSPACE resp. $\Sigma^p_2$-complete in relevant settings.

For the entire collection see [Zbl 1456.68006].

MSC:
68T27 Logic in artificial intelligence
03D05 Automata and formal grammars in connection with logical questions
68N17 Logic programming
68Q17 Computational difficulty of problems (lower bounds, completeness, difficulty of approximation, etc.)

Full Text: DOI