Kowalski, Robert A.; **Sadri, Fariba**

Teleo-reactive abductive logic programs. (English) Zbl 1356.68033

Artikis, Alexander (ed.) et al., Logic programs, norms and action. Essays in honor of Marek J. Sergot on the occasion of his 60th birthday. Berlin: Springer (ISBN 978-3-642-29413-6/pbk). Lecture Notes in Computer Science 7360. Lecture Notes in Artificial Intelligence, 12-32 (2012).

Summary: Teleo-reactive (TR) programs are a variety of production systems with a destructively updated database that represents the current state of the environment. They combine proactive behaviour, which is goal-oriented, with reactive behaviour, which is sensitive to the changing environment. They can take advantage of situations in which the environment opportunistically solves the system's goals, recover gracefully when the environment destroys solutions of its goals, and abort durative actions when higher priority goals need more urgent attention.

In this paper, we present an abductive logic programming (ALP) representation of TR programs, following the example of our ALP representation of the logic-based production system language LPS. The operational semantics of the representation employs a destructively updated database, which represents the current state of the environment, and avoids the frame problem of explicitly reasoning about the persistence of facts that are not affected by the updates. The model-theoretic semantics of the representation is defined by associating a logic program with the TR program, the sequence of observations and actions, and the succession of database states. In the semantics, the task is to generate actions so that all of the program's goals are true in a minimal model of this associated logic program.

For the entire collection see [Zbl 1241.68007].

MSC:

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68P15 Database theory

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teleo-reactive programs; abductive logic programming; production systems; LPS

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