Research Review

By Simon Müller

Goal

The goal of this review is to summaries three important historical developments in the field of AI planning and searching, highlight their relationship and their impact on AI. As suggested I used the book Artificial Intelligence by Norvig and Russel as reference (Russel & Norvig, 2016). Starting point is Chapter 10.6 Bibliographical and Historical Notes.

Planning Systems: from STRIPS over ADL to PDDL

The first major planning system STRIPS (Stanford Research Institute Problem Solver) was developed by (Fikes & Nilsson, STRIPS: A New Approach to the Application of Theorem Proving to Problem Solving, 1971) in 1971 in Stanford (Russel & Norvig, 2016). This system was developed as the planning component for the Shakey robot project at SRI. The goal of STRIPS can be described as follows (quote from (Fikes & Nilsson, STRIPS: A New Approach to the Application of Theorem Proving to Problem Solving, 1971)):

> *…STRIPS attempt to find a sequence of operators in a space of world models to transform a given initial world model into a model in which a given goal formula can be true*

The key influence of STRIPS on later planning system, as ADL or PDDL, was the used representation language that is close to the "classical" planning (Russel & Norvig, 2016) and not the algorithmic approach.

The Action Description Language (ADL) developed by (Pednault, 1986) as an extension of STRIPS. The STRIPS framework is designed for static world were ADL is able to model dynamic world. So, ADL could able to model more realistic problems than STRIPS ((Pednault, 1986) and (Fikes & Nilsson, STRIPS, a retrospective, 1993)).

The next major step in planning systems was the development of the Problem Domain Description Language by Ghallab et al. (Ghallab, Knoblock, Wilkins, & Weld, 1998). PDDL is a computer parseable standardized syntax for representing planning problems (Russel & Norvig, 2016). Beside this technical advantage of easier paring the rules, PDDL can be seen as a progress of STRIPS, as PDDL uses a simpler representation than STRIPS (and by relaxing some of STRIPS restrictions) that enables PDDL to solve more realistic problems (static versus dynamic). Compared to ADL, PDDL has a more easier representation and since version 3.0 PDDL includes plans constraints and preferences (Russel & Norvig, 2016). This easier representation of a problem lowers the entry hurdle for using PDDL and opened the door for faster progress in the field of AI.

Bibliography

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