

Historical development of AI planning and search.

In the history of AI planning and search, there are many important researches. If we need choose three of them, i'll choose PDDL, Partial-Order planning, GRAPHPLAN.

PDDL is fundamental representation language of AI planning and search. Partial-Order planning is important because it dominate research about 20 years. GRAPHPLAN is base of various recent algorithms.

Most of this report based on Artificial Intelligence A Modern Approach(3rd edition)¹.

PDDL : Problem Domain Description Language².

Computer-parsable, standardized syntax for representing planning problems. It has been used as the standard language for the International Planning Competition since 1998. Most recent version is PDDL 3.0³.

The Planning Domain Definition Language (PDDL) is an attempt to standardize Artificial Intelligence (AI) planning languages⁴.

Partial-Order planning

Pioneer is NOAH planner⁵ and NONLIN⁶. The ideas underlying partial-order planning is detection of conflicts⁷ and protection of achieved conditions from interference⁸.

Dominate the about 20 years of research up to early 90s.

Partial-order planning is an approach to automated planning that leaves decisions about the ordering of actions as open as possible. It contrasts with total-order planning, which produces an exact ordering of actions. Given a problem in which some sequence of actions is required in order to achieve a goal, a partial-order plan specifies all actions that need to be taken, but specifies an ordering of the actions only where necessary⁹.

GRAPHPLAN¹⁰

Graphplan is an algorithm for automated planning developed by Avrim Blum and Merrick Furst in 1995. Graphplan takes as input a planning problem expressed in STRIPS and produces, if one is possible, a sequence of operations for reaching a goal state.

The name graphplan is due to the use of a novel planning graph, to reduce the amount of search needed to find the solution from straightforward exploration of the state space graph.¹¹

¹ Stuart Russell and Peter Norvig. 2009.

² Challab et al., 1998

³ Gerevini and Long, 2005

⁴ https://en.wikipedia.org/wiki/Planning_Domain_Definition_Language

⁵ Sacerdoti, 1975, 1977

⁶ Tate, 1975b, 1977

⁷ Tate, 1975a

⁸ Sussman, 1975

⁹ https://en.wikipedia.org/wiki/Partial-order_planning

¹⁰ Avrim Blum and Merrick Furst, 1995, 1997

¹¹ <https://en.wikipedia.org/wiki/Graphplan>