

Planning Historical Development

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Artificial Intelligence (AI) planning algorithm was design to serve the purpose of robotics, scheduling and other domains. The following content is mainly focusing on showing some major algorithm that has profound impact on AI planning algorithm.

Stanford Research Institute Problem Solver(STRIP)

STRIP is the very first planning system designed by Fikes and Nilsson in 1971 [1] primarily for the Shakey robot project at SRI [2]. The representation language that used by STRIP has a significant impact on AI study than its algorithm. The 'classical' language we now using is close to STRIP format. Such language allows a state transfers into another state using simple operator and the principle built up the foundation for many complex problems solving in AI research.

The action Description Language, ADL [2], improved its suitability in real world problems by relaxing some of the TRIPS rules and Nebel investigated to compile ADL into STRIPS [2].

WARPLAN

In early 1970s [2], linear planning was generally implemented in AI problem solving. This approach considers the order of actions sequentially. Sooner, someone found out such algorithm has limitations solving simple problems such as the Sussman anomaly [2] due to its incompleteness.

Interleaving of actions must be allowed in a complete planner in a single sequence. WARPLAN, first introduced by Waldinger in 1975, was consider the solution for this flaw. It has large effect on avoiding conflict between subgoals.

It is also the first language planner that written in programming language. Although it only has 100 lines of code, the implementation reveals great potential in problem simplification.

Partial-Order Planning

The desire of detecting subgoal conflicts [3] and avoiding interference to achieved conditions materialized partial-order planning.

It is a planning approach deferent from STRIP and PDDL, that trying to leave the problem as open as possible. It only constraints the actions that needs to be taken, but does not specify the order of actions.

In 1977, Tate first introduced such system, also called task networks, in NOAH planner [2]. Then, in the next 20 years, partial-order planning was one of the most popular topic in research. There was TWEAK, a planner that simply allow proofs of completeness and flexibility in various planning problems, but completed the partial-order planner with straightforward description [4]. Such improvement led to wide range of implementation but in 1990s, the heat in this era cooled down.

References

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