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Research Review : A History of AI Planning

In this research report, we give a short summary of several important historical development for planning which is one of the major field of AI.

STRIPS: Stanford Research Institute Problem Solver

STRIPS, developed by Nikes and Nilsson in 1971, was the first major planning system that was used. It was first designed as the planning component of the software for the Shakey robot project at SRI (Stanford Research Institute).

STRIPS was modeled on previous state space search system called GPS (General Problem Solver) that used means-end analysis. The representational language used by STRIPS planner has much bigger impact on field of AI than its algorithms and is the base for the most of languages used to describe planning problems.

GRAPHPLAN

In 1995, Avrim Blum and Merrick Furst developed the algorithm Graphplan, the algorithm divides the searches for the plans into 2 phases: graph expansion and solution extraction. The graph expansion phase extends a planning graph forward in time until it has achieved a necessary condition for plan existence. In contrast, the solution extraction phase performs a backward chaining in the graph looking for a plan that solves the problem. If this algorithm couldn't find any solutions, it would expand the planning graph further and repeat these cycle.

Satplan (Planning as Satisfiability)

Satplan transforms the planning problem in to a Boolean satisfiability problem (classical propositional SAT). Then the problem can be solved by establishing satisfiability conditions using Davis-Putnam-Logemann-Loveland algorithm or WalkSAT. It can only find plans of fixed maximal length, and a Planning Domain Definition Language problem description has to be translated to a suitable form to apply Satplan.

References:

STRIPS: https://en.wikipedia.org/wiki/STRIPS
GRAPHPLAN: https://en.wikipedia.org/wiki/Graphplan
SATPLAN: https://en.wikipedia.org/wiki/Satplan