

This writeup will focus on STRIPS, GraphPlan and HSP (Heuristic Search Planner), which are 3 significant developments in the evolution of AI planning and search

STRIPS¹ (Stanford Research Institute Problem Solver), from Fikes and Nilsson in 1971, was the first major planning system and was designed to support the Shakey robot project as its' planning system. STRIPS' control structure was modeled after GPS², which was a state-space search system using means-ends analysis. STRIPS has been shown to be PSPACE-complete³. STRIPS' broader impact on AI planning and search is felt mainly through its representation language, which influenced "classical" language.

In the 80s and 90s, partial-order planning was viewed as the best way to handle planning problems with independent subproblems. However, in 1995 Blum and Furst came out with GraphPlan⁴, which takes as input a planning problem expressed in [STRIPS](#) and produces (if one is possible) a sequence of operations for reaching a goal state. GraphPlan was orders of magnitude faster than the partial-order planners of the time and, along with planners such as SATPlan and FF, moved the planning field forward considerably. GraphPlan improved the performance of planning systems, it clarified the representational and combinatorial issues, and helped in the development of useful metrics. However, there were concerns as to how far GraphPlan could scale.

In 1999, Bonet and Geffner introduced Heuristic Search Planner (HSP)^{5,6}, a forward search planner, which was the first approach to make state-space search practical for large planning problems. The state-space efforts at this time were largely a reaction to the perceived over-concentration on partial-order planning in the research community, and are associated with the introduction of the ignore-delete-list heuristic. Heuristic search planners like HSP transform planning problems into problems of heuristic search by automatically extracting heuristics from Strips encodings. HSP differs from specialized problem solvers in that it uses general declarative language for stating problems and a general mechanism for extracting heuristics from these representations. The most successful state to date is FF from Hoffman⁷ (2001).

¹ <http://ai.stanford.edu/~nilsson/OnlinePubs-Nils/PublishedPapers/strips.pdf>

² https://en.wikipedia.org/wiki/General_Problem_Solver

³ <http://www.sciencedirect.com/science/article/pii/0004370295000550>

⁴ <https://www.ics.uci.edu/~dechter/courses/ics-271/fall-06/project/a.blum97.pdf>

⁵ <https://bonetblai.github.io/reports/hsp2-aimag.pdf>

⁶ <http://www.cs.toronto.edu/~sheila/2542/s14/A1/bonetgeffner-heusearch-aij01.pdf>

⁷ <http://www.jair.org/media/855/live-855-1976-jair.pdf>