

Planning Research Review

Investigations in state-space search, control theory and practical requirements of robotics, scheduling and other domains give rise to AI planning. This brief research review highlights three major developments in AI planning and search.

Stanford Research Institute Problem Solver (STRIPS)

In 1971, Richard Fikes and Nils Nilsson developed an automated planner called STRIPS. STRIPS is the first major planning system and was designed as the planning component of the software for the Shakey robot project.

The influence of STRIPS on AI is far more in terms of its representation language than its algorithmic approach. STRIPS representation language is very close to “classical” planning language. STRIPS introduced notions like actions having preconditions and post conditions which has been an inspiration for latter planning languages.

Planning Domain Definition Language (PDDL) and Heuristic Forward Search Planner (HSP)

The biennial planning competition which started in 1998 gave rise to the PDDL family of domain languages. PDDL (Ghallab et al. 1998) was introduced as a computer-parsable, standardized syntax for planning problems. The usage of a common language encourages a greater reuse of research and aids faster progress.

After the 1998 competition emphasis to plan optimality began to give way to a willingness to trade off optimality for speed. The heuristic forward search planner HSP (Bonet et al. 1997) emerged as an exciting future planning technology as it was able to find acceptable (a plan can be considered acceptable if it is no longer than, say, 10 percent of a competitive plan) plans quickly. HSP led to an intense period of research activity into heuristic forward search.

Graphplan

Graphplan (Blum and Furst, 1995) created great interest as its approach to planning was new at that time (1990's). It constructs and searches a compact reachability analysis of the problem state space. Due to its compactness of representation along with the informative nature of data that can be accumulated both during construction and search, it outperformed other contemporary planning search strategies. The success of Graphplan led to development of a number of extensions and modified implementations.

References:

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2. Richard E. Fikes, Nils J. Nilsson (Winter 1971). "STRIPS: A New Approach to the Application of Theorem Proving to Problem Solving".
3. Long, D., & Fox, M. (2002). Progress in AI planning research and applications. *UPGRADE: The European Journal for the Informatics Professional*, 3(5), 10-25.