Developments in Search and Planning AI
Research Review

The historical important developments in search and planning AI discussed in this review are:

- STRIPS
- GraphPlan
- HSP

STRIPS

STRIPS (Standford Research Institute Problem Solver) is a major planning system, developed by Nilson and Fikes in 1971 at SRI International a planning component of a software used in a robot named Shakley.

The main elements of STRIPS are objects, states, and set of actions. Actions include preconditions (state of the world required to perform an action) and effects or post-conditions (state after the action is executed). In so-described world one can introduce a problem set with its initial state and a goal state. STRIPS starts with the initial state and by executing different actions it tries to find the goal state.

GraphPlan

Avrium Blum and Merrick Furst created GraphPlan in 1995 - a new algorithm used in planning expressed in STRIPS. GraphPlan is a routine that obtains a solution by using object called Planning Graph. A Planning Graph consists of levels that consist of states and actions. A Planning Graph can be is like a 'flow o truth-values through the graph'. In the first step Graphplan constructs Planning Graph, which encodes useful constrains in the explicit way. Then it uses the Planning Graph to can estimate how many steps it takes from the initial state to the goal. Graphplan is polynomial approximation of exponential problem, therefore the amount of search is significantly reduced.

HSP

Heuristic Search Planner (HSP) was developed in 1998 and it is based on the idea of using a heuristic function in the search algorithm. The heuristic estimates the optimal value of relaxed problem. HSP works in the similar way by automatically extracting heuristics from a STRIP problem and transforming it into heuristic search. HSP performs forward search from the initial state to the goal. The distance between those states is given by heuristic function.

References:
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