Research Review

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Development 1 : STRIPS

This new approach to the application of theorem proving in problem solving were developed by Richard Fikes and Nils Nilsson. This model attempts to find a sequence of operators in a space of world models to transform the initial world model into a model in which the goal state exists.

The STRIPS formulation assumes that there exists a set of applicable operators which transform the world model into others. The problem for STRIPS is defined by the initial model, the set of available operators and their effects on models, and the goal statement. A problem is said to be solved when STRIPS produces a world model that satisfies the goal statement.

Development 2 : Planning Graphs

Avrium Blum and Merrick Furst developed a new approach to planning in STRIPS-like domains. It involved constructing and analyzing Planning Graphs.

The Planning Graph encodes useful constraints explicitly, thereby reducing the search overhead in the future. And, it can be constructed in polynomial time and has polynomial size. Planning Graphs are not only based on domain information, but also the goals and initial conditions of the problem and an explicit notion of time.

Planning Graphs have similar features to dynamic programming. The Graph Plan algorithm uses a planning graph to guide its search for a plan. The algorithm guarantees that the shortest plan will be found like BFS.

Development 3 : Heuristic Search Planner

HSP is based on the idea of heuristic search. The main issue is that often the relaxed problem heuristic computation is NP-hard.

The HSP algorithm instead estimates the optimal value of the relaxed problem. The algorithm transforms the problem into a heuristic search by extracting heuristics from the STRIPS encodings.