Research review

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Strips

Strips is the name of the method we defined our world in in our plane planer. Stripes is the part where we defined the initial state, the goal state and the actions.

Strips stands for “STanford Research Institute Problem Solver” and was developed by Richard Fikes and Nils Nilsson at Stanford Research Institute in 1971.

Strips *is based on* Green (another problem solver), but Green suffered from the “frame problem” (which is says specifying only changed conditions does not entail all other conditions are unchanged).

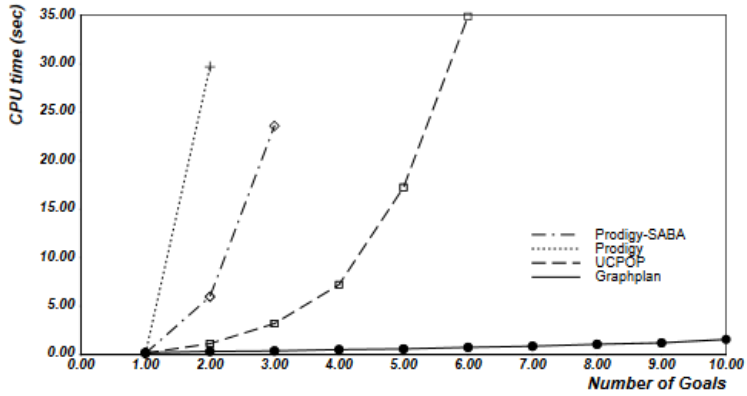
Stripes was designed in such it wasn’t bound in the search algorithm unlike other problem solvers at the time.

Planning Graphs

Avrium Blum and Merrick Furst from Carnegie Mellon created in 1997 the GraphPlan routine, it is used for generating a heuristic score from a Strips state in a Stripes world without any additional coding then the GraphPlan algorithm and the stipes world.

The GraphPlan can be used with any search algorithm, and will never underestimate the remaining cost, and will therefore always find the shortest path. The GraphPlan can’t say if goal is reachable but can check if a goal is unreachable.

The graph plan is fast compared to other domain independent heuristic functions as shown in the graph:



Source: https://www.cs.cmu.edu/~avrim/Papers/graphplan.pdf

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The GraphPlan is not a state-space graph, but a flow of networks though the reachable states. The different actions in a layer in the network can be “mutual excluded” if cant be reach from the same state, in that way the algorithms knows with actions can be added in the next layer. The heuristic can be calculated when the graph is leveling off.

Heuristic Search Planner (HSP)

HSP estimates a cost to the goal by relaxing the problem. When HSP is going to find the cost, it expands the graph, but ignores all negative effects, and find a cost according to the new state, and how many goals are satisfied. It continues to expand the graph until the cost function levels of.

The main issue with this approve is it is NP hard and is not a fast heuristic compared to other planning heuristics but use to find a pretty good solution in the end.

Sources

https://towardsdatascience.com/ai-planning-historical-developments-edcd9f24c991

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https://bonetblai.github.io/reports/aips98-competition.pdf