

Meta-level search strategies

This proposes a usage of a portfolio of different algorithms that complements each others weaknesses to achieve the best results. The argument of the strategy is if one algorithm is weak at solving a certain kind of problem, there will exist another algorithm that can still perform better. Meta-level search strategy identifies three methods that different algorithms can be utilized.

- Selection: Evaluate the properties of the problem initially and select the best algorithm from a portfolio
- Sequential Composition: Continue with a selected algorithm and if it fails to return a result within a specified threshold, stop and continue with another algorithm. Switching algorithms like this will help to mitigate weaknesses affecting one algorithm.
- Parallel Composition: For fastest results all algorithms can be executed parallelly until one finishes and returns a result. However the major downside of this is it can be very resource intensive.

Algorithm Portfolio Design: Theory vs. Practice. Carla P. Gomes. Rome Laboratory. Rome Lab, NY

Horvitz, E. and Klein, A. (1995) Reasoning, metareasoning, and mathematical truth: studies of theorem proving under limited resources. Proc. of the Eleventh Conference on Uncertainty in Artificial Intelligence (UAI-95), August 1995.

WARPLAN

WARPLAN is considered to be the first planner to be programmed in a logic programming language called Prolog. Published in 1974 it utilizes a technique called goal regression planning to reorder an ordered set of actions to avoid conflicts between sub actions. The most notable achievement was its simplicity, WARPLAN was able to achieve this just by 100 lines of code which was considerably a fraction of the size of other planners of that time.

<http://aima.cs.berkeley.edu/2nd-ed/newchap11.pdf>

<http://www.cs.huji.ac.il/~naomil/maria/warplan.pl>

Planning as satisfiability and the SATPLAN

Satplan focus on satisfiability rather than deduction. The reserches argue that this more closely represents the modern approaches of constraint satisfaction. This is more flexible when needed to start with different constraints on plans. SATPLAN was proposed by Kautz Selman in 1992.

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