Important developments in the field of AI planning and search

In this paper I will give a brief overview of three important historical developments in the field of AI planning and search. First starting with the STRIPS system. Afterwards I will have a look at Graphplan and finally discuss Heuristics Search Planning.

STRIPS

STRIPS (Stanford Research Institute Problem Solver) was introduced in 1971 by Fikes and Nilsson in the field of planning as a subfield of AI in these days. STRIPS was an important contribution because it introduced the Strips Assumption which is a way to avoid the complexity of the frame problem. STRIPS also defined a simple syntax of action schemas. (Long & Fox, 2002)

STRIPS represent a world model as an arbitrary collection of first-order predicate calculus formulas and is designed to work with models consisting of large numbers of formulas. (Fikes & Nilsson, 1971)

Graphplan

Graphplan came out in the early 1990s and excited a great deal of interest because it constitutes an approach to planning that was completely new in this time. It constructs and searches a compact reachability analysis of the problem state space. Both the compactness of the representation and the rich information in the data during construction and search leads to a performance that outperformed all known contemporary planning search strategies in this time. Graphplan uses two main steps for searching a for a plan. First is the construction of the data structure called the plan graph. With this it can determine what is achievable with performing actions from the initial state. The second part is searching backwards from the goal to get a subset that represents the actions that can achieve the goal. (Long & Fox, 2002)

Heuristics Search Planning

In 1998 the heuristic search planning shows that it is competitive with planners like Graphplan. They transform planning problems into problems of heuristic search by automatically extracting heuristics from STRIPS encodings. This means they can extract heuristics from the representations in comparison to specialized problem solvers which are applicable only for the specific problem. (Bonet & Geffner, 2001)

Conclusion

STRIPS was a big step for AI and for the planning and search domain in 1971. After this there where different improvements and a lot of new ideas. Graphplan in the early 1990s follows new approaches and therefor was very successful. Because of its success there was a lot of interest in in the planning problem which leads to the exploration of other new ideas like heuristic search planning. We can say, that each of these ideas opens the way for further development and the progresses we make today in AI.

References

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