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Udacity - AI Nanodegree

Planning Search Review

Review on the evolution of Planning Search Algorithms

"During the past several years, AI planning has made major steps forward in terms of the size and difficulty of problems that can be solved." [1]. Planning has made significant progress since its inception in the 1970s, in terms both of the efficiency and sophistication of its algorithms and representations and its potential for application to real problems, as an example logistics and the supply chain industries.

The first main algorithm was STRIPS, was presented in 1971 by Richard Fikes and Nils Nilsson creating a standard language to deal with these type of problems so until today the planning problems are basically composed by the quadruple <P,O,I,G> where P are the propositional variables, O are the operators, I is the initial state and G is the goal. This study opened the field for more enhanced algorithms as GRAPHPLAN.

GRAPHPLAN, presented by Avrim Blum and Merrick Furst in 1995, always returns a shortest possible partial-order plan, or states that no valid plan exists. [3]. After GRAPHPLAN and SATPlan, an area called Neoclassical Planning, that differs from the classical planning that every node of the search space can be viewed as a set of several partial plans [4], has appeared with contributions considering time as a variable and currently are responsible for controlling space vehicles and robots movements.

The challenge in the research field is to discover universal algorithms that can show strong performance on a wider range of problems than any of the current algorithms, probably without much of domain expertise [3]. Quite possibly, new techniques will emerge that dominate existing methods, so this are is on the of the most evolving as the real problems are getting more complex.

Nowadays there are specialized conferences such as the International Conference on AI Planning Systems, the International Workshop on Planning and Scheduling for Space and the European Conference on Planning [2].

References

[1] RINTANEN, Jussi; HOFFMANN, Jörg. An overview of recent algorithms for AI planning. **KI**, v. 15, n. 2, p. 5-11, 2001.

[2] RUSSELL, Stuart J.; NORVIG, Peter. **Artificial intelligence: a modern approach**. Malaysia; Pearson Education Limited,, 2016.

[3] BLUM, Avrim L.; FURST, Merrick L. Fast planning through planning graph analysis. **Artificial intelligence**, v. 90, n. 1-2, p. 281-300, 1997.

[4] M. Ghallab, D. Nau, and P. Traverso Automated Planning: Theory and Practice Morgan Kaufmann Publishers May 2004