AI Planning Historical Development Research Review

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.

Research on AI planning had concentrated on the so-called non-linear or partial-order planning algorithms(see for example {McAllester and Rosenblitt, 1991]) untill the introduction of the Graphplan algorithm in 1995 by Blum and Furst [1997]. This algorithem had two characteristics that separated it from earlier ones.

The success of Graphplan led the research community to look at techniques outside the traditional AI planning toolbox. Soonafter the intoduction of Graphplan Kautz and Selman demonstrated that a general purpose satisfiabilty algorithems specifically designed for AI planning.

The Constraint based model of classical planning allows plan search in several alternative ways. The main approaches have been backward chaining, as in the Graphplan algorithem, and general constraint sloving, as exemplified by the satifiability planning approach.The latter algorithems often need far less search than backward chaining, but there is a cost to pay tha amount of computation per search tree node is often much higer than in backward chaining planner.

Distance heuristcs have recently caught the attention of the research community. The techniques compute approximate distances between states, which helps in operator selection. The heuristics give a very good estimate of the distance, and plan search even with a plan forward or backward chaining algorithem can be very efficient. The heuristics planners have been most successful in finding non-optimal solutions to computationally easy planning problems, and the situation may be different when optimal solutions are needed and in connection with computationally more difficult problems (that are NP-hard or PSPACE-hard) that inherently require search.

Conclusions

Number of techniques that have proved to be useful for AI planning. Many of the developments in the research area are orthogonal to each other, and different succesful planneers have addressed different aspects in plan search.

Research on algorithems for conditional and probabilistic planning has also accelerated during the last decade.This research area has close connections to problem addresses in other areas in computer science.

References

http://www.cs.toronto.edu/~sheila/2542/w06/readings/RintanenHoffmann01.pdf