Historical Developments in the field of AI planning and search

In this review, I will go over three planning systems in chronological order of their introduction: STRIPS, WARPLAN and TWEAK.

STRIPS

STRIPS (Fikes and Nilsson, 1971) is described as a problem-solving program developed at the Stanford Research Institute. It is considered to be the first major automatic-planning system (Russel and Norvig, 2009). Variants of the STRIPS language have been used by subsequent planning systems.

Linear planners such as STRIPS were proven to present certain limitations. STRIPS for instance had problems with goal interactions and could not handle conflicting subgoals.

WARPLAN

WARPLAN (Warren, 1974) is a non-hierarchical linear planner like STRIPS. But unlike STRIPS, it avoided conflicting subgoals by using goal regression planning. WARPLAN is well-known for having been written with a relatively small number of lines of code (about 100) which was made possible with the use of Prolog, a logic programming language first created for artificial intelligence applications.

TWEAK

To tackle conflict detection and achieve conditions that are interference-free, partial-order planning came to be. TWEAK (Chapman, 1987) is a non-hierarchical partial-order planner that is both provably correct and complete. It was the first partial-order planner to be formalized. TWEAK introduced a number of important concepts such as constraint posting and modal truth criterion.

Bibliography

Fikes and Nilsson, STRIPS: A New Approach to the Application of Theorem Proving to Problem Solving, IJCAI, 1971
Russel and Norvig, Artificial Intelligence: A Modern Approach (3rd Edition), Pearson, 2009
Warren, Warplan: A System for Generating Plans, Edinburgh University, 1974
Chapman, Planning for Conjunctive Goals, Artificial Intelligence 32(3): 333-377, 1987