Research Review

A overview of a couple of techniques from the bibliographical and historical notes at the end of Artificial Intelligence: A Modern Approach chapter 10 is presented below.

STRIPS (Stanford Research Institute Problem Solver)

STRIPS is an automated planner developed by Richard Fikes and Nils Nilsson in 1971 at SRI International. This language is the base for most of the languages for expressing automated planning problem instances in use today.

STRIPS consists of goals and actions, where goals describe some desired state of the world to we want to reach, and actions are defined in terms of preconditions and effects. An action may only execute if all of its preconditions are met, and each action changes the state of the world in some way.

Graphplan

Graphplan is an algorithm for automated planning developed by Avrim Blum and Merrick Furst in 1995. It takes as input a planning problem expressed in STRIPS and produces, if one is possible, a sequence of operations for reaching a goal state.

The planning graph has actions and facts as nodes and two kinds of edges: from a fact to the actions for which it is a condition and from an action to the facts it makes true or false. Lists of incompatible facts that cannot be true at the same time and incompatible actions that cannot be executed together are also maintained. The algorithm then iteratively extends the planning graph, proving that there are no solutions of length l-1 before looking for plans of length l by backward chaining: supposing the goals are true, Graphplan looks for the actions and previous states from which the goals can be reached, pruning as many of them as possible thanks to incompatibility information.

Satplan

Satplan (better known as Planning as Satisfiability) is a method for automated planning. It converts the planning problem instance into an instance of the Boolean satisfiability problem, which is then solved using a method for establishing satisfiability. Given a problem instance in planning, with a given initial state, a given set of actions, a goal, and a horizon length, a formula is generated so that the formula is satisfiable if and only if there is a plan with the given horizon length.

References
- https://en.wikipedia.org/wiki/STRIPS
- http://alumni.media.mit.edu/~jorkin/gdc2006_orkin_jeff_fear.pdf
- https://en.wikipedia.org/wiki/Graphplan
- https://en.wikipedia.org/wiki/Satplan