

Research Review

In this one page review, some of the key developments in the field of AI planning and search are described. The 3 topics selected have been taken from the book *Artificial Intelligence: A Modern Approach* by Norvig and Russell, from the Bibliographical and Historical notes at the end of Chapter 10.

Stanford Research Institute Problem Solver (STRIPS)

Strips is an automated planner developed by Richard Fikes and Nils Nilsson in 1971 at SRI International. The same name was later used to refer to the formal language of the inputs to this planner. This language is the base for most of the languages for expressing automated planning problem instances in use today; such languages are commonly known as action languages. The STRIPS representation is used to determine the values of primitive features in a state based on the previous state and the action taken by the agent. The STRIPS representation is based on the idea that most things are not affected by a single action. It can be used for many AI domains, like navigating a Robot, or solving a Rubik's cube [1].

Planning Domain Definition Language (PDDL)

In the late 1990s, the yearly International Planning Competitions (IPL) began in order to encourage development of efficient planning search algorithms. A new language, PDDL (Planning Domain Definition Language) was designed in order to have a single unified syntax for representing planning problems for the competition. PDDL has improved over time to support many sophisticated features, such as variable types, action costs, action preferences, deadlines, etc. even though no planning software available today supports all these features of PDDL. The main inspiration for the PDDL language was the STRIPS language from the early 1970s, developed at SRI International. STRIPS (Stanford Research Institute (SRI) Problem Solver) was used to help Shakey the Robot solve various tasks. [2]

Graphplan

Graphplan is a general-purpose planner for STRIPS-style domains, based on ideas used in graph algorithms. Given a problem statement, Graphplan explicitly constructs and annotates a compact structure called a Planning Graph, in which a plan is a kind of "flow" of truth-values through the graph. This graph has the property that useful information for constraining search can quickly be propagated through the graph as it is being built. Graphplan then exploits this information in the search for a plan. Graphplan was created by Avrim Blum and Merrick Furst, with subsequent extensions and improvements made by many researchers at many different institutions around the world.

[1] <http://www.primaryobjects.com/2015/11/06/artificial-intelligence-planning-with-strips-a-gentle-introduction/> , [2] <http://csci431.artifice.cc/notes/pddl.html> [3] <https://www.cs.cmu.edu/~avrim/graphplan.html>