Means-ends Analysis

Frequenty featured in engineering textbooks when discussing design methods, Means-ends Analysis (MEA) is a technique of control for search. In AI, goal-based problem solving requires a framework for finding a sequence of actions that contribute to achieving said goal. MEA effectively introduced the idea of treating problem-solving as search. The MEA technique suggests that, given a current state and a goal state, search is should be limited to actions which reduce the difference between the two states. Allen Newll and Herbert Simon formally introduced the strategy as a computer program General Problem Solver (GPS) in 1961. Newell, Simon (1995)

Stanford Research Institute Problem Solver

Otherwise known as STRIPS, the Stanford Research Institute Problem Solver was originally an automated planner designed with the goal of finding what series of operators could take one from an initial state in a space of models to a given goal Fikes, Nilsson (1971). The name STRIPS would later be used, as it is here, to refer to the formal language required by the robotic planner as input Fikes, Nilsson (1971)

STRIPS firsts, aside from coping with uncertainty, include introducing a representation of language quite close to that of classical planning Russell, Norvig (2003). As such, STRIPS operators include operator names with a list of preconditions, an add list, and a delete list, with all elements being propositional expressions, precondition conjunctions of positive literals, and add/delete conjunctions of positive or negative literals Kohavi (2017). Though it was primarily used for research in the area of robotics, it has proven itself to be a framework for solving complex planning problems upon which additional artificial intelligence research has been built Russell, Norvig (2003).

Non-Linear Planning

Planners such as STRIPS operate in a sequential, ordered fashion such that no two (or more) events occur simultaneously. NOAH was a planner developed by Sacerdoti in 1975 that was the first planner to introduce non-linear planning Kohavi (2017). It utilized procedural nets that would initially start from the same point, but would branch out and rejoin based on locations of preconditions and operations along the path. Further work has been done in this area to address issues with backtracking, error-handling, and so forth.

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