Research Review

Development of AI in Planning and Search

By
Kiran Niranjan

Development 1: STRIPS (1971)

Richard Fikes and Nils Nilsson at Stanford Research Institute developed a new approach to the application of theorem proving in problem solving this attempts to model the world as a set of first-order predicate formulas and is designed to work with models consisting of a large number of formulas

A problem consists of an initial state and a goal condition. STRIPS can then search all possible states, starting from the initial one, executing various actions, until it reaches the goal.

This included problem solver is to find a sequence of operators which transform the given initial problem into one that satisfies the goal conditions

Development 2: Planning Graphs (1997)

Avrium Blum and Merrick Furst at Carnegie Mellon developed a new approach to planing in STRIPS-like domains which invloved in constructing and analyzing a brand new object called a Planning Graph

Planning graphs operates as follows start a planning graph that only encodes the initial conditions. In Stage i, GraphPlan take the the planning graph from state i-1 and extends it one time step and then searches the extended planning graph for a valid plan of length i. If it finds a solution, then it halts, otherwise it continues to the next stage.

Development 3: Heuristic Search Planner (1998)

HSP is based on the idea of heuristic search. A heuristic search provides an estimate of the distance to the goal.
The HSP algorithm instead estimates the optimal value of the relaxed problem. The algorithm transforms the problem into a heuristic search by automatically extracting heuristics from the STRIPS encodings.

The algorithm works by generating states by the actions whose preconditions held in the previous state set. Each time an action is applied, a measure g is updated, which aims to estimate the number of steps involved in achieving a subgoal.