

Important historical developments in the field of AI planning and search

Planning is the process of computing several steps of a problem-solving procedure before executing any of them. [1] This problem can be solved by search. The main difference between search and planning is the representation of states. In search, states are represented as a single entity. In planning, states have structured representations which are used by the planning algorithm. In this research review, I will talk about three major developments in the field of AI planning research.

Development 1: STRIPS (1971)

In 1971, Richard Fikes and Nils Nilsson at Stanford Research Institute developed a new approach to the application of theorem proving in problem solving. This new automated planning technique called the Stanford Research Institute Problem Solver (**STRIPS**). [2] The model attempts to find a sequence of operators in a space of world models to transform the initial world model into a model in which the goal state exists. It 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.

Development 2: Planning Graphs (1997)

In 1997, Avrium Blum and Merrick Furst at Carnegie Mellon developed a new approach to plan in **STRIPS-like** domains [3]. It involved constructing and analyzing a brand new object called a Planning Graph. They developed a routine called GraphPlan which obtains the solution to the planning problem using a Planning Graph construct.

Development 3: Heuristic Search Planner (HSP) (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 iteratively by generating states by the actions whose preconditions held in the previous state set [4].

Reference:

1. Anon, (2017). [online] Available at: <http://www.cs.nott.ac.uk/~psznza/G52PAS/lecture9.pdf> [Accessed 26 Sep. 2017].
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4. Anon, (2017). [online] Available at: <https://bonetblai.github.io/reports/aips98-competition.pdf> [Accessed 26 Sep. 2017].