

Research Review

The first major AI-like planning system is STRIPS that is introduced in [1].

STRIPS is a new problem solver that try to find the "path" to solve CSPs by "separating entirely the processes of theorem proving from those of searching through a space of world models"[1].

To summarize, the problem space for STRIPS is defined by three entities[1]:

- An initial world model, which is a set of wffs describing the present state of the world.
- A set of operators, including a description of their effects and their precondition wff schemata.
- A goal condition stated as a wff.

Then the problem is solved when STRIPS produces a world model that satisfies the goal wff.

The author also mentions the STRIPS' advantages and problems with it. It uses a GPS like a strategy of getting the difference between the current state model and the goal and pick the operators that reduce the difference. By finding such an operator, STRIPS start solving the sub-problems based on that operator. The hierarchy of goal, subgoals, and models generated by the search process is represented by a search tree. Each node of the search tree has the form (< world model >, < goal list >), and represents the problem of trying to achieve the sub-goals on the goal list (in order) from the indicated world model[1]. However, the author points out that an intelligent system should be able to solve problems that are harder than the current model, this is also a research topic nowadays.

Another interesting paper is [2], from the same lab. In this paper, the author states that the planning procedure is not linear. Therefore there exists some planning problems (and they are really simple for humans) are not solvable with linear planning program like STRIPS. Overall, the paper "deals with a deceptively simple idea: a plan may have the structure of a partial ordering"[2]. Though the STRIPS-like system is proved to be imperfect, both discoveries are kind of milestone of the planning research.

The third paper is more like a general review of the state-of-art AI technique at 1995, and it introduces the reader at what the authors perceive to be the most important theoretical and practical issues associated with the design and construction of intelligent agents. It is not introducing new algorithms but gives me a brief primer on computer AI agent theory from 3 perspectives[3]:

- Agent Theory
- Agent Architectures
- Agent Languages

This paper has reviewed the main concepts and issues associated with the theory and practice of intelligent agents[3]. It gathers ideas within the mainstream AI community and points future possible works in the related field.

[1] Fikes, Richard E., and Nils J. Nilsson. "STRIPS: A new approach to the application of theorem proving to problem-solving." *Artificial Intelligence* 2.3-4 (1971): 189-208.

[2] Sacerdoti, Earl D. The nonlinear nature of plans. No. SRI-TN-101. STANFORD RESEARCH INST MENLO PARK CA, 1975.

[3] Wooldridge, Michael, and Nicholas R. Jennings. "Intelligent agents: Theory and practice." *The knowledge engineering review* 10.2 (1995): 115-152.