

# AIND-Planning project: research review

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## I. INTRODUCTION

Over the last half century, major developments in artificial intelligence planning have been made. We outline here three of them and their impact on the overall field.

## II. STRIPS

The problem solver called STRIPS (STanford Research Institute Problem Solver) [3] was introduced in the beginning of the 1970s. The solver uses propositional logic to tackle planning problems. It translate world actions, states and goals in logic statements and provide a systematic way to represent preconditions and effects of each action and, thus, is a great resource to solve planning problems with logic.

## III. PLANNING GRAPHS

Graphplan algorithm takes as input a problem expressed in STRIPS and finds a solution. Introduced in the late 1990s [1], it reduces the search space by exploring a novel state space planning graph.

The novelty comes in the fact that in graphplan's planning graph the nodes are actions are alternated facts and are organized in pairwise in different levels, being the first the initial state. The edges, on the other hand, provide ways to assess preconditions and effects.

## IV. HEURISTIC PLANNING SEARCH

An important development came in the beginning of the 2000s: heuristic planning search. While for puzzles and other gaming situations at the time the heuristic was normally give, in planning the heuristic must be automatically extracted when the problem is set up [2]. HSP (Heuristic Search Planner) is able to do it and therefore is domain-independent, i.e. the same code and cost function provided by the automatically heuristic extraction can be applied to all kinds of problems - they can be views as general problem solvers. Bonet and Geffner [2] introduced the heuristic of ignoring preconditions and extensions.

## REFERENCES

- [1] Blum, Avrim L., and Merrick L. Furst. "Fast planning through planning graph analysis." *Artificial intelligence* 90.1-2 (1997): 281-300.
- [2] Bonet, Blai, and Hector Geffner. "Planning as heuristic search." *Artificial Intelligence* 129.1-2 (2001): 5-33.
- [3] 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.