

AIND Planning

Research Review

This short review relates three major advancements in the Planning domain, from 1971 to 1998. They are presented in chronological order and when they emerged they were all considered as top developments of AI applied to planning problems.

1. STRIPS

So we will start with the **Stanford Research Institute Problem Solver**, or **STRIPS**, developed by Richard Fikes and Nils Nilsson in **1971** [1].

STRIPS was first created as an automated planner whose goal was to be able to prove that a final state is true if it is the result of a succession of logical operations derived from an initial state, itself true .

To achieve this, Richard Fikes and Nilsson Nilsson had to develop a formal language that can be mathematically proven. This language, also named STRIPS, is the true legacy of this project [2], it's the base of modern "action languages" used for expressing automated planning problem instances.

STRIPS makes the assumption that any condition not expressed in the initial state is considered as False, which is limiting the scope of solvable problems as many real life problems deals with partially known initial states.

This led to the development of languages able to overcome those limitations.

2. ADL

Action Description Language (ADL) is such an advancement of STRIPS.

Edwin Pednault proposed this language in **1987** [3], initially for robots' actions planning.

The improvement over STRIPS is to allow the effects of an operator to be conditional.

This allow ADL to define an initial state as an ensemble of conditions and from this, derive a chain of actions that can lead to the intended goal.

Contrary to STRIPS, ADL is thus suited for open world problems, unknown initial states are irrelevant as long as they are not listed as needed conditions.

3. PDDL

Planning Domain Definition Language (PDDL) was originally developed by Drew McDermot and its colleagues in 1998 [4] as a problem-specification language for the first International Planning Competition [5].

Their idea was to create a common language based on principles introduced by STRIPS and ADL that would give them the possibility to compare and reuse approaches and systems developed by participants of the competitions. The end goal was to foster innovations and exchanges in the AI field of planning.

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PDDL has been designed to be a more flexible language than existing application driven languages, a trade-off that have been paying as the language has been widely used and improved over the years.

References

[1] Richard E. Fikes, Nils J. Nilsson (Winter 1971). ["STRIPS: A New Approach to the Application of Theorem Proving to Problem Solving"](#)

[2] en.wikipedia.org/wiki/STRIPS

[3] en.wikipedia.org/wiki/Action_description_language

[4] McDermott, Drew; Ghallab, Malik; Howe, Adele; Knoblock, Craig; Ram, Ashwin; Veloso, Manuela; Weld, Daniel; Wilkins, David (1998). ["PDDL---The Planning Domain Definition Language"](#)

[5] The 1st International Planning Competition, 1998. ipc98.icaps-conference.org