

Problem definition languages in AI planning

Automated planning and scheduling aka AI Planning is about implementation of action sequences for execution by intelligent agents, autonomous robots and others. Most prominent examples of application domains include scheduling and robotics.

Before we solve a planning problem by applying of an algorithm implemented by planners, we need to describe it in a way that can be consumed by a planner.

STRIPS

The first and most influential representation language has been introduced by STRIPS (Stanford Research Institute Problem Solver) planner [1] in 1971. It was designed as the planning component for the Shakey robot project [8].

The representation language of the planner was more important than its algorithmic approach [2].

Despite of its age, STRIPS is still a base for expressing of automated planning problems in use nowadays and inspire new developments of representation languages for planning problems.

Action Description Language (ADL)

ADL [3] is an example of action language [7] considered as an enhancement of STRIPS, in particular:

- It supports negative literals
- Unmentioned literals are unknown (open world principle)
- It allows disjunctions in goals

As a result, ADL is more expressive as STRIPS and allows to encode more realistic problems [2].

Planning Domain Definition Language (PDDL)

PDDL [5] is an attempt to standardize Artificial Intelligence planning languages. Its development has been inspired by STRIPS and ADL.

Since it first introduced in 1998, there have been 5 official versions. Each consequent version extended its predecessor with new features. It can be seen as an evolution rather than revolution of its capabilities. The latest version is 3.1 and can be found at [6].

PDDL is widely used in the industry for solving planning problems.

Conclusion

I think that PDDL as a standard will further evolve and become more expressive for encoding of real world planning problems.

It is also possible that PDDL will serve as a base for more advanced standards in the field of AI planning.

References

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