

Planning Domain Definition language (PDDL) emerged as a primary mechanism for modelling planning problems. The benefit of the language is the usability for any type of domain. This was first developed by Drew Mc Dermott and his colleagues in 1998. The approach is to define the problem in two parts. The first is the domain description and the second was problem description.

The domain description contained...

- requirements
- object hierarchy
- constant objects
- predicates
- actions
- parameters
- Pre-conditions and effects

The problem description contained...

- Objects
- initial conditions
- goal-states

This allowed for having a common representation of problems across domains. Several variants emerged from this basic definition and the current version 3.1 simplified the representation using BNF notation making it very simple to follow.

There are two beautiful variants that have emerged from PDDL alone. These are..

Probabilistic PDDL (PPDDL)

Multi-Agent PDDL(MA-PDDL)

PPDDL extended PDDL with *probabilistic effects* which are discrete probability distributions over possible effects of an action, *reward fluents* for increasing or decreasing the reward of a plan, *goal rewards* for rewarding a state trajectory and *goal-achieved fluents*. These changes helped in Markov decision process where there can be uncertainty in state-transitions.

MA-PDDL is an extension of PDDL 3.1 that allows planning by multiple agents. This language allows for the possibility of different agents doing different actions. It also allows for different agents to have different goals. The common theme is that all agents can access every fluent state and observe partially executed action by any agent. This language has greatly benefitted real world planning since earlier definitions did not account for the agents which must play a role in the planning process

References:

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