



# One-Shot Learning of Temporal Action Models with Constraint Programming

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**Abstract.** This work presents a constraint programming (CP) formulation for the learning of temporal planning action models. This paper focus on the extreme scenario where just a single partial observation of the execution of a temporal plan is available (i.e. one-shot). Our CP formulation models time-stamps for actions, causal link relationships (conditions and effects), threats and effect interferences that appear in planning. It also accommodates a different range of expressiveness, subsuming the PDDL2.1 temporal semantics. Our CP formulation is solver-independent, meaning that an arbitrary CSP solver can be used for its resolution and is not only valid for learning, but also for plan validation.

## 1 Introduction

Contributions:

1. Our CP formulation allows that an arbitrary CSP solver can be used for the plan validation. This validation capacity is beyond the functionality of VAL (the standard plan validation tool [?]) because we can address *plan validation* of a partial (or even an empty) action model with a partially observed plan trace (VAL requires a full plan and a full action model for plan validation).

## REFERENCES

- [1] Richard Howey, Derek Long, and Maria Fox, ‘VAL: Automatic plan validation, continuous effects and mixed initiative planning using PDDL’, in *Tools with Artificial Intelligence, 2004. ICTAI 2004. 16th IEEE International Conference on*, pp. 294–301. IEEE, (2004).

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