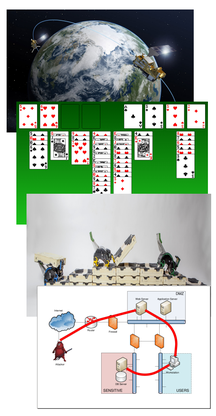
Understandable features and **explainable techniques** learn state-of-the-art **portfolio selectors.**

Motivation



? SymBA*

Sympl-1

...

No single planner is good on all tasks. Which planner should we use for a given task?

Portfolios

P := set of planning algorithms
T := timelimit

Offline Portfolios:

Offline portfolios learn an order and the time limits for every planner.

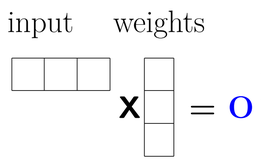
Online portfolios:

$f : \mathit{Task} \mapsto P$

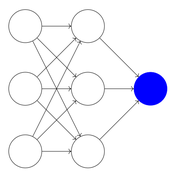
Online portfolios learn to choose a single planner for a given task.

Machine Learning

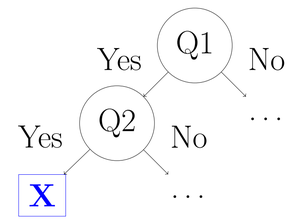
Linear Regression



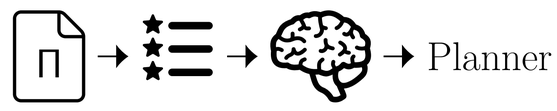
Multi-Layer Perceptron



DecisionTree



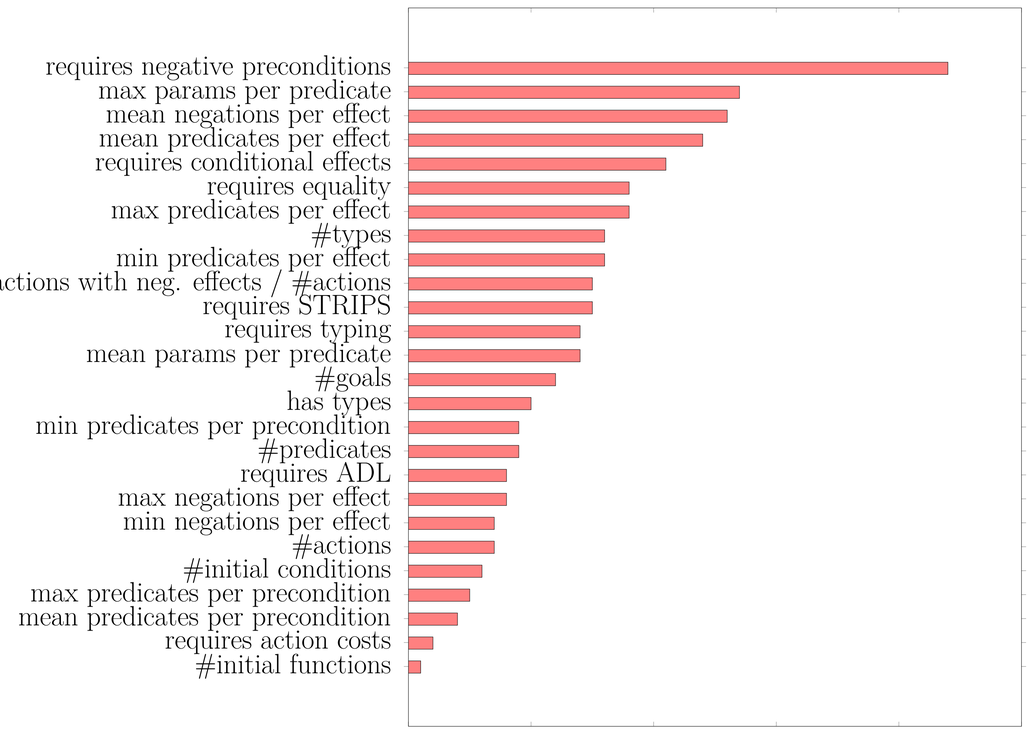
Training

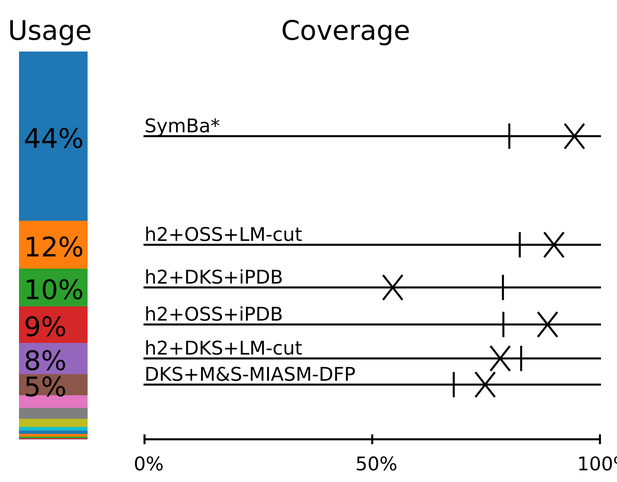


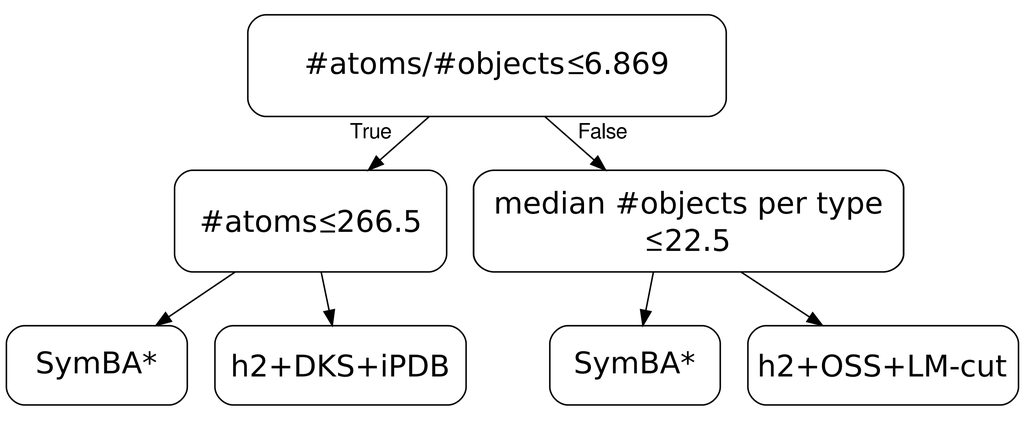
- data set of Ferber et al. (2019)
  - tasks, runtimes
- extract properties
- labels: time, logtime, coverage
- 10 fold cross-validation

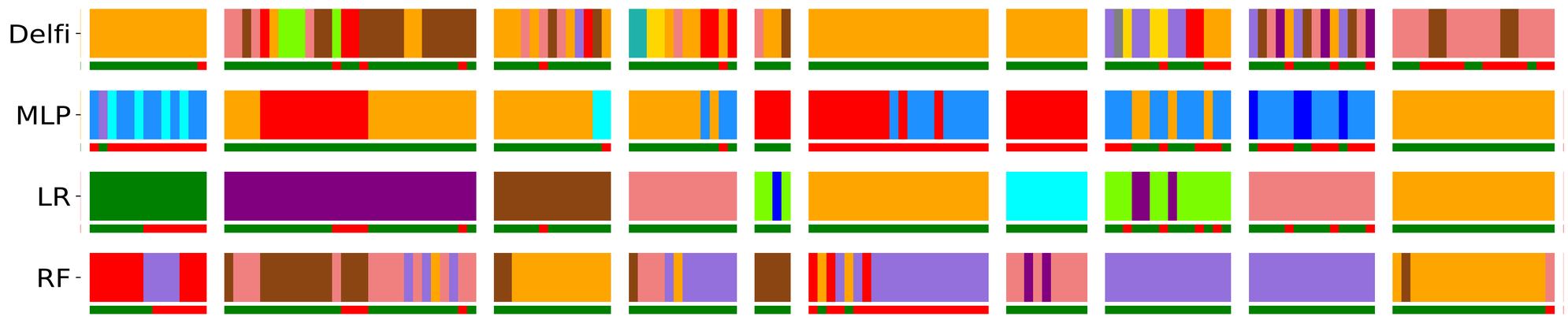
We either train a decision tree that tells use the planner to use, or we train a model per planner and select the most promising planner.

		Linear Regression					MLP		Rnd. Forest
		0.0	0.1	1.0	2.0	5.0	3	5	50
Fawcett	binary	78.6	77.2	82.1	82.4	80.9	**87.1**	78.2	**84.8**
	logtime	79.3	79.0	81.5	81.7	83.6	82.2	82.2	84.1
	time	78.6	81.8	80.5	80.4	80.3	82.2	**85.3**	81.8
Fpddl	binary	**87.7**	74.3	72.7	74.3	71.4	81.0	81.5	77.5
	logtime	82.5	84.0	78.5	77.7	80.3	78.2	79.7	82.0
	time	86.5	**86.5**	**86.5**	**86.6**	**86.6**	80.2	81.9	78.8
Pddl	binary	81.4	75.7	72.6	74.1	71.4	78.1	79.8	80.2
	logtime	82.1	79.7	80.4	79.8	77.8	79.5	78.0	82.8
	time	81.6	82.0	81.2	79.0	78.7	77.8	78.4	79.7
Union	binary	74.8	81.0	79.4	82.4	80.9	84.7	78.3	82.1
	logtime	75.6	80.0	80.7	81.8	83.4	82.2	82.2	84.7
	time	74.8	77.3	75.7	76.1	77.1	84.3	83.6	84.0
	average	80.3	79.9	79.3	79.7	79.4	81.5	80.8	84.9









Ferber, P.; Mai, T.; Huo, S.; Chen, J.; and Katz, M. 2019. Ipc: A benchmark data set for learning with graph- structured data. In *In Proceedings of the ICML-2019 Workshop on Learning and Reasoning with Graph-Structured Representations.*

Explainable Planner Selection

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