Strategies to Configure a Portfolio

Isabel Cenamor
<icenamor@inf.uc3m.es>

Universidad Carlos III de Madrid

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1. Motivation

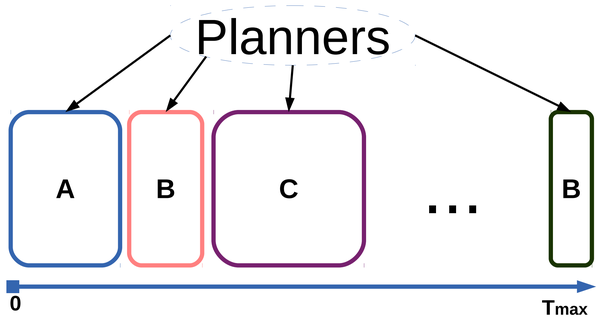
★ Different planning algorithms have been created in the planning community. However, none of them dominates in all cases (domains and/or problems). There is a global winner in each track, but this winner is not the best planner for all problems or in all domains.

★ Previous reason motivates the idea of selecting different algorithms or planners. This combination requires the selection of the best planner in each problem.

★ The most extended solution is the static combination, where the same configuration is used for all tasks. We propose a particular combination of planners for every single problem.

2. Portfolio

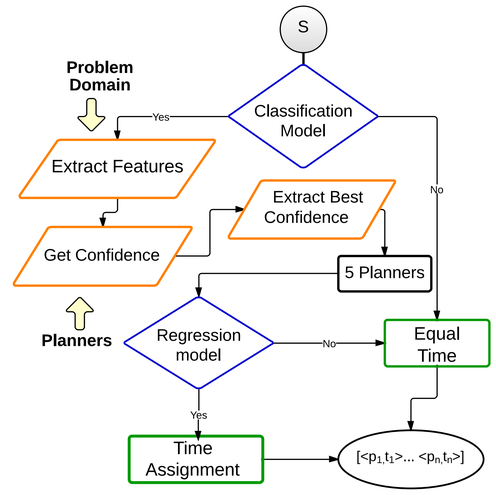
Given a set of base planners, $\{pl_1, \ldots, pl_n\}$, and a maximum execution time, T, a planning portfolio can be considered as a sequence of m pairs $< pl_1, t_1 >, \ldots, < pl_m, t_m >$, where $pl_i \in \{pl_1, \ldots, pl_n\}$ and $\sum_{j=1}^{m} t_j \leq T_{max}$.



There are two types:

1. **Static**: Same Configuration **FDSS** [Helmert, 2006]
2. **Dynamic**:
   (a) Different Configuration per domain **PbP** [Gerevini et al., 2009]
   (b) Different Configuration per problem [Cenamor et al., 2013]

3. Method



4. Portfolio Configuration

Learning Configurations

★ Number of learning domains and problems

★ Feature set

★ Pre-selection of Planners with Pareto Efficiency

	Planners	Domains	Problems	Features
C47	27	14	280	47
C96	13	25	790	96
C35	13	25	790	35

Planners Submitted to the Competitions

- *IBaCoP*: Pareto + Equal Time (ET)
- *IBaCoP*: Classification Model + ET (C35)

Satisficing | Agile | Multicore

- *LIBaCoP*: Classification Model + ET (C35)
- *LIBaCoP*: Classification Model + Regression Model

Learning

5. Results

- General: Base planners from the other competitions
- Pareto: planners selected by Pareto

	General		Pareto			LAMA-2011
	ET	C47	ETP	C96	C35	
barman	20	20	20	20	20	20
elevators	20	20	20	20	20	20
floortile	8	8	9	7	**11**	6
nomystery	15	**17**	16	**17**	**17**	10
openstacks	20	20	20	20	20	20
parcprinter	20	20	20	20	20	20
parking	12	**20**	14	17	19	**20**
pegsol	20	20	20	20	20	20
scanalyzer	18	18	17	17	18	**20**
sokoban	17	**19**	18	18	**19**	**19**
tibybot	16	19	17	17	18	19
transport	**20**	19	**20**	19	**20**	16
visitall	20	20	20	20	20	20
woodworking	20	20	20	20	20	20
Total	246	260	251	252	**262**	250

6. A Future Direction

- Study the utility of the portfolios as function of the available time
- Include the execution information to take decisions in run-time
- Study the constraints that might change the performance of the planners