IBaCoP-2018 and IBaCoP2-2018

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Abstract

This manuscript describes the IBaCoP family of planning portfolios submitted to the International Planning Competition 2018. Our portfolios are improved versions of the planners submitted to the last IPC-2014. IBaCoP-2018 is configured following a Pareto efficiency approach for selecting planners and then giving the same execution time for the selected planners. IBaCoP2-2018 decides for each problem the sub-set of planners to use. This decision is based on predictive models trained with domain/problems from previous IPCs. Both 2018 portfolios compete in the sequential satisficing and agile tracks.

Introduction

IBaCoP and IBaCoP2 are planning portfolios, which are descried in detail in (Cenamor, de la Rosa, and Fernández 2014). We build these portfolios making a pre-selection of good candidate planners from the set of known or available planners. The pre-selection technique is based on a multi-criteria approximation taking into account the time of the first solution and the quality of the best solution, both observed running planners on the training domain and problems. Then, we do planner performance modeling, for predicting the behavior of planners as a function of planning task features. From the output of the predictions, we narrow the selection of planners to finally run the portfolio in a per-instance based configuration. As in 2014, IBaCoP is the portfolio resulting from the Pareto pre-selection of planners (static configuration), and IBaCoP2 is the portfolio following the whole process described before (dynamic configuration). In IPC-2014, IBaCoP2 was the winner of the satisficing track, while IBaCoP achieved a runner-up position in the multi-core track (Cenamor, de la Rosa, and Fernández 2014).

Version for IPC-2018 have being built following the same procedure. The remarkable modifications are: version (Cenamor, de la Rosa, and Fernández 2016; Cenamor 2017).

- Models were trained with additional features regarding landmarks and relaxed plans (de la Rosa, Cenamor, and Fernández 2017).
- Data from IPC-2014 was used as part of the training data
- New base planners were included as candidates

The Components of IBaCoP

We started the construction of the portfolio with all the planners from the sequential satisficing track in IPC-2011 plus Mercury, Jasper, BFS(f) and SIW. However, there are some planners that obtained similar results, and therefore do not contribute to diversity in the portfolio. The chosen planners were selected by using the Pareto efficiency (Censor 1977) technique described before. The final components for IBaCoP-2018 are:

- jasper (Xie, Müller, and Holte 2014)
- mercury (Katz and Hoffmann 2014)
- BFS(F) (Lipovetzky et al. 2014)
- SIW (Lipovetzky et al. 2014)
- FDSS-2 (Helmert et al. 2011)
- probe (Lipovetzky and Geffner 2011)
- yashp2-mt (Vidal 2011)
- lama-2011 (Richter, Westphal, and Helmert 2011)
- lamar (Olsen and Bryce 2011)
- arvand (Nakhost, Valenzano, and Xie 2011)

We trained a predictive model for a (yes/no) classification task using Rotation Forrest (Rodriguez, Kuncheva, and Alonso 2006). The model tries to encode whether a given planner will solve the planning task or not. IBaCoP2-2018 is the result of querying this model and selecting the five planners with the best "positive" prediction confidence.

Details for Sequential Agile and Satisficing Tracks

The IBaCoP-2018 in the sequential satisficing track assigns 257 seconds to each base planner. The IBaCoP-2018 agile planner assigns the time shown in Table 1. In addition in this track, if one or more candidate planners fail, the system runs lama-2011, lamar and arvand with the remaining time. In both tracks, IBaCoP2-2018 selects five planners recommended by the predictive model, and then assigns the same time per candidate.

Planner	Time
jasper	80
mercury	30
BFS(F)	45
SIW	45
FDSS-2	45
probe	45
yashsp2-mt	20

Table 1: IBaCoP-2018 Agile. The list with the planners and the time in seconds per candidate.

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