Parallel portfolio report

Sparkle

30th July 2021

1 Introduction

Sparkle [2] is a multi-agent problem-solving platform based on Programming by Optimisation (PbO) [1], and would provide a number of effective algorithm optimisation techniques (such as automated algorithm configuration, portfolio-based algorithm selection, etc.) to accelerate the existing solvers.

This experimental report is automatically generated by *Sparkle*. This report presents experimental results of *Sparkle* parallel portfolio containing 3 solver(s).

2 Experimental Preliminaries

This section presents the experimental preliminaries, including the list of solvers in the portfolio, the list of instance sets and information about the experimental setup.

2.1 Solvers

There are 3 solver(s) included in *Sparkle*, as listed below.
1. **CSCCSat**
2. **PbO-CCSAT-Generic**
3. **MiniSAT**

2.2 Instance Set(s)

There are 1 instance set(s) included in *Sparkle*, as listed below.

1. **PTN**, number of instances: 12

2.3 Experimental Setup

The experimental setup is described below.

Performance computation: *Sparkle* runs the portfolio one time on each instance. The cutoff time for the computation run is set to 300 seconds. The outcome of the computation is listed below. The scores of the outcomes are calculated according to PAR10, this means that for each instance the solver which solved the instance is scored its runtime and the remaining solvers are scored the runtime times ten. If however the portfolio reaches the cutofftime, which means that no solvers solved the instance, all solvers are scored the cutofftime times ten.

1. Solver **PbO-CCSAT-Generic**, was the best solver on **3** instance(s)

2. Solver **CSCCSat**, was the best solver on **4** instance(s)

3. **5** instance(s) remained unsolved

In the table below the computed PAR10 scores of all solvers have been listed aswell as the portfolio itself.

Portfolio results

Portfolio nickname	PAR10	#Timeouts	#Cancelled	#Best solver
test3	15156.91	5	0	7

Solver results

Solver	PAR10	#Timeouts	#Cancelled	#Best solver
CSCCSat	24038.83	5	3	4
PbO-CCSAT-Generic	27118.08	5	4	3
MiniSAT	36000.0	5	7	0

2.4   Scatter Plot Analysis

Figure 1 shows the empirical comparison between the actual parallel portfolio in *Sparkle* and the single best solver (*SBS*).
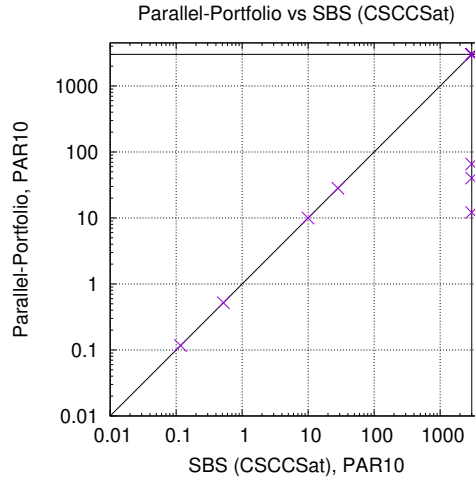

Figure 1: Empirical comparison between the actual parallel portfolio in *Sparkle* and the *SBS*.

References

[1] Holger H. Hoos. Programming by optimization. *Communications of the ACM*, 55(2):70–80, 2012.

[2] Holger H. Hoos. Sparkle: A pbo-based multi-agent problem-solving platform. Technical report, Department of Computer Science, University of British Columbia, 2015.