

Sparkle: Towards Automated Algorithm Configuration for Everyone

Koen van der Blom¹, Chuan Luo², Holger H. Hoos^{1,3}

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**Universiteit
Leiden**
The Netherlands

¹Leiden University

²Microsoft Research Asia

³University of British Columbia

Sparkle

- Make meta-algorithmics more accessible
- Selection
- Configuration
- Best practices

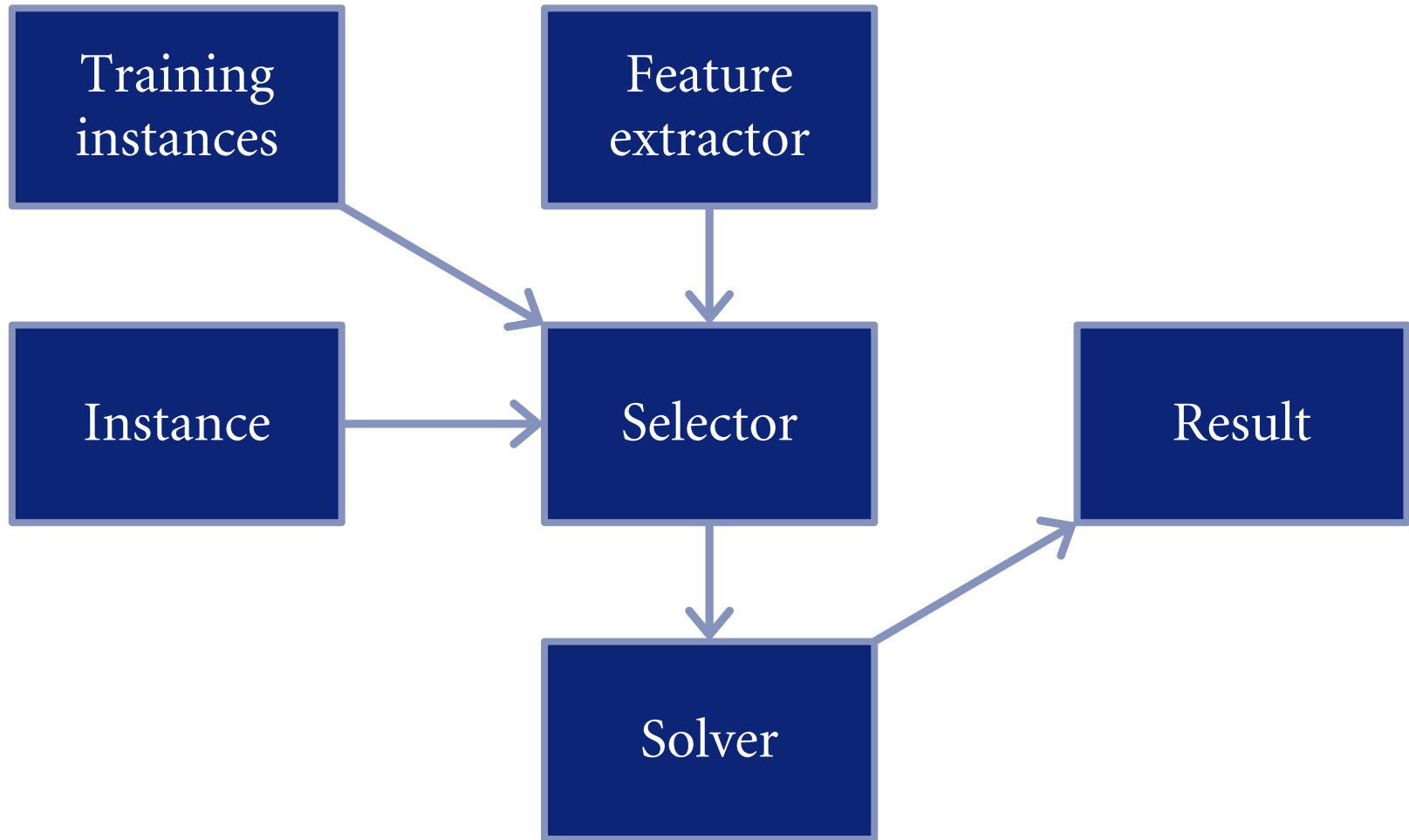
Algorithmic problem solving

- Problem, e.g. SAT



- Is my solver the best?
 - Or, for which instances is it?

Algorithm selection



Algorithm selection

- Surely, it can be simpler?



- But where do the solver and selector come from?

Sparkle is not (entirely) magical

- Someone has to set it up
 - Simple commands!
 - `add_solver`
 - `add_feature_extractor`
 - ...
- Who?
 - Solver developers
 - Competition organisers
 - Scientists
 - Or anyone

Report

- Instance set
- Selector, e.g. AutoFolio [Lindauer et al 2015]
- Settings, e.g. cut-off time
- Solvers, and their contributions
- Ingredients to write a paper!

Cooperative competition

- Traditional competitions
 - Measure overall performance
 - Winner takes it all
- Marginal contribution [Xu et al 2012]
 - Measure contribution
 - Shared credit
 - How valuable is this solver to the selector

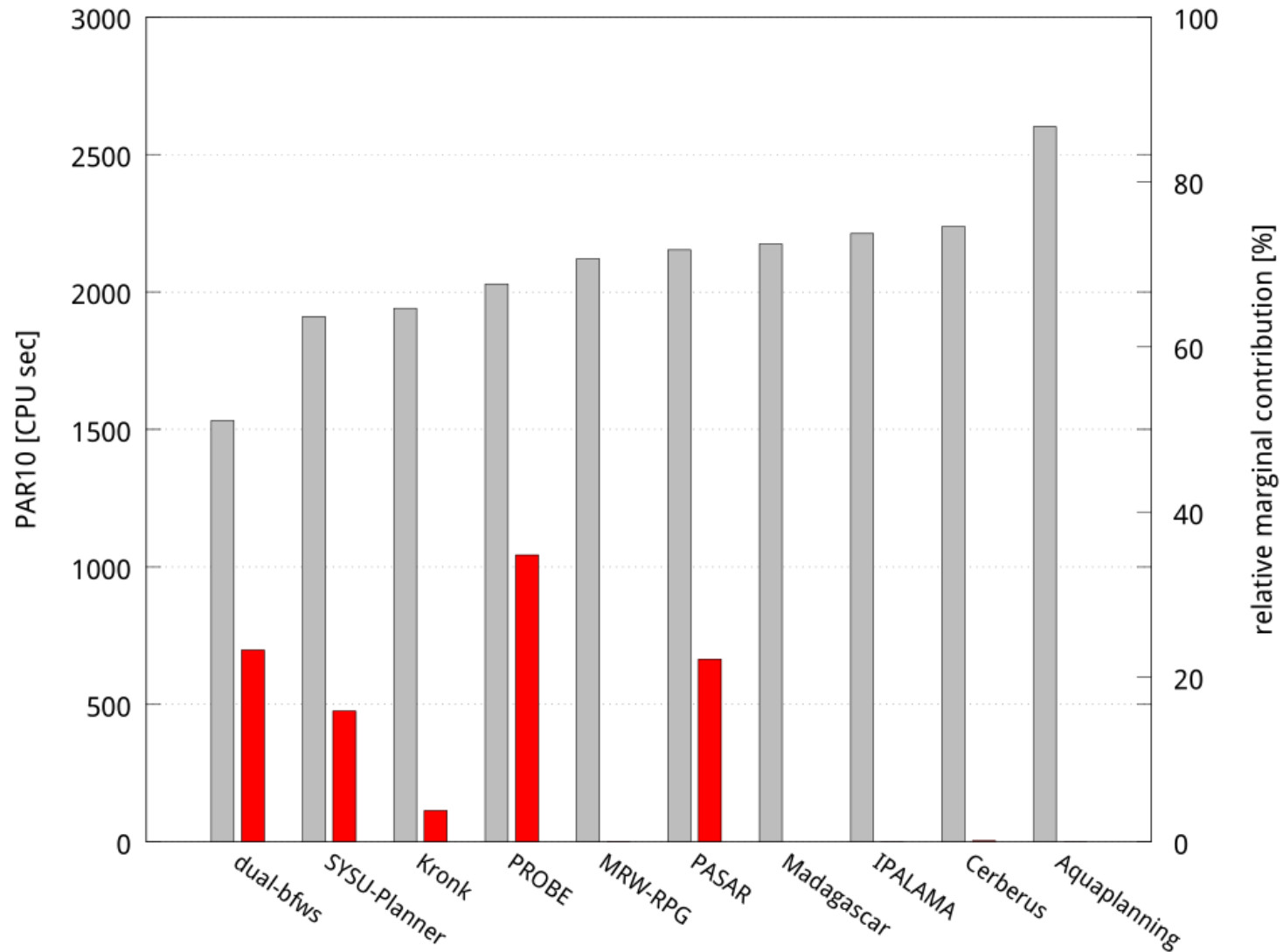
Successful applications

- Sparkle SAT Challenge [Luo, Hoos 2018]
- Sparkle Planning Challenge [Luo, Vallati, Hoos 2019]

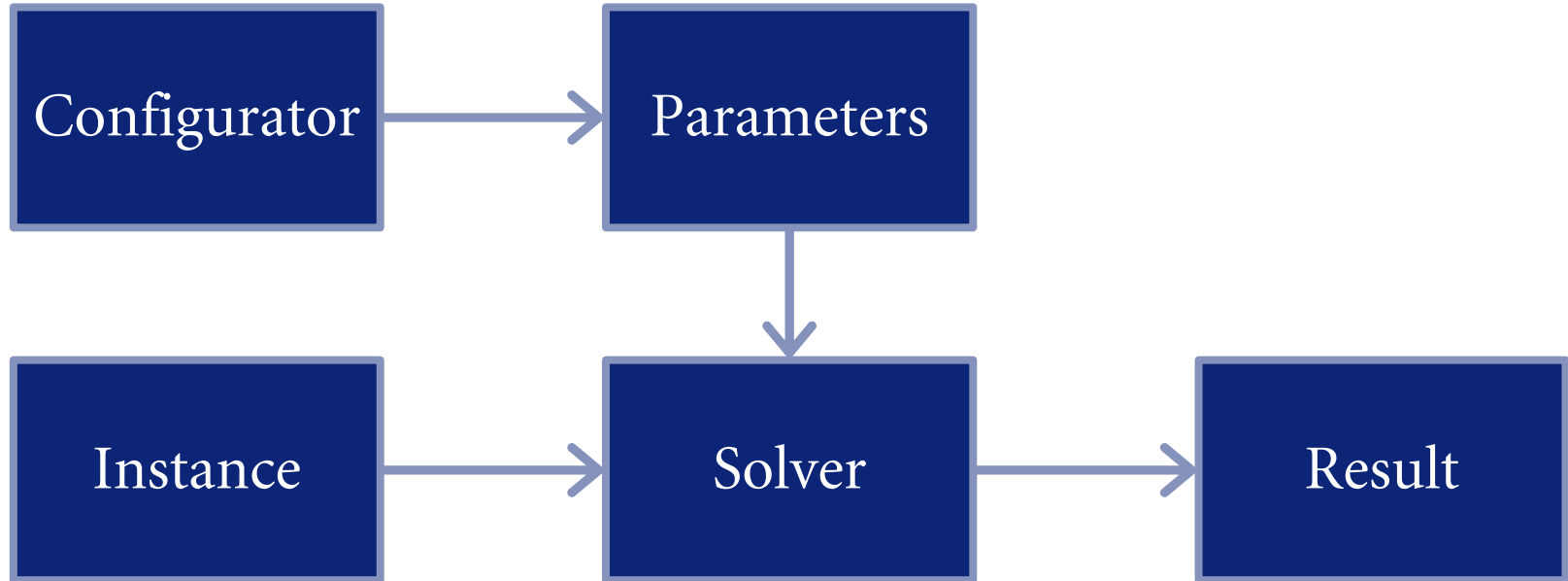
Solver	New rank	Standalone rank	(relative) marginal contribution
PROBE	1	4	34.77%
dual-bfws	2	1	23.25%
PASAR	3	6	22.13%

Table from [Luo, Vallati, Hoos 2019]

Sparkle planning challenge

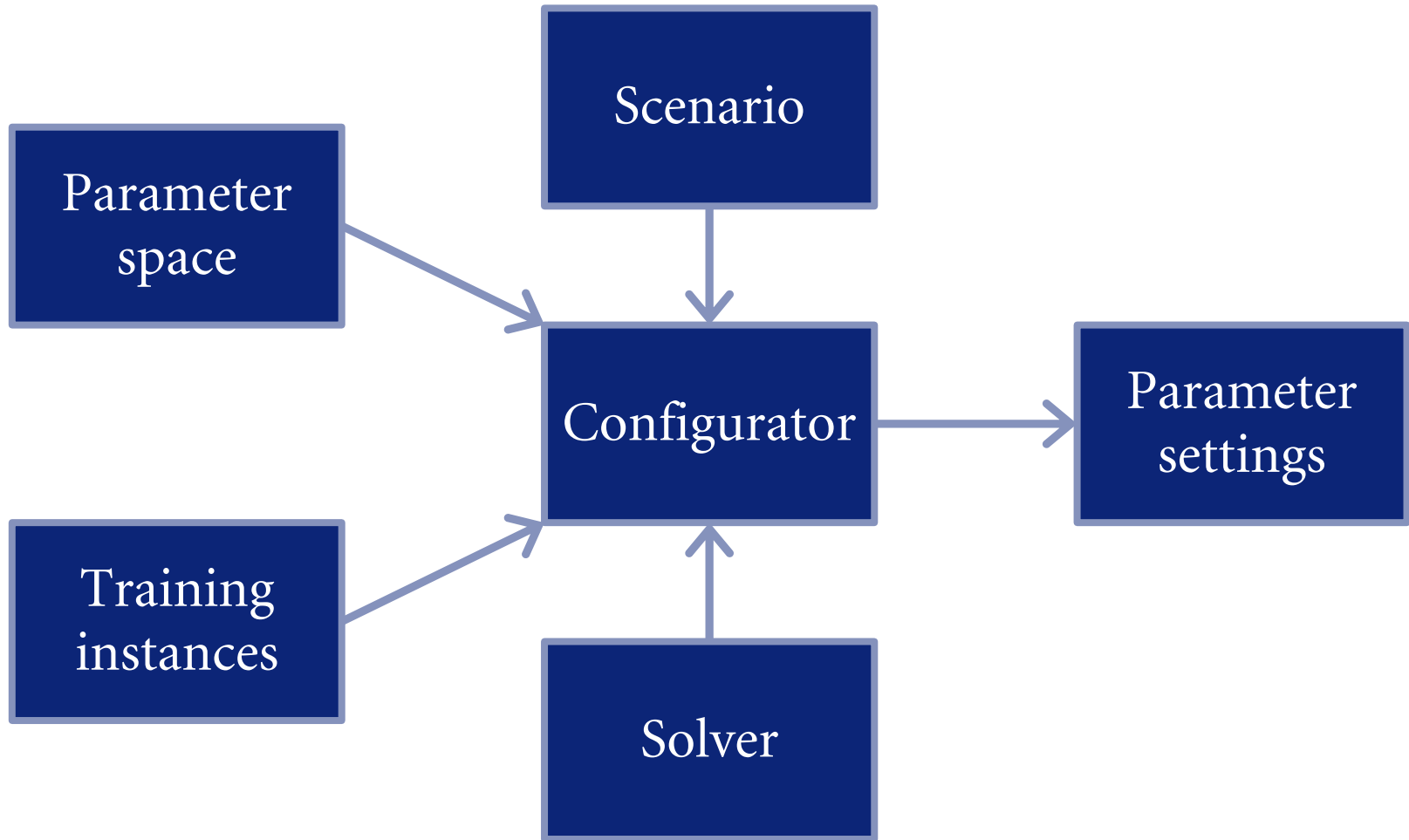


Algorithm configuration



- What are the best settings for my solver?

Algorithm configuration



Algorithm configuration

- Surely, it can be simpler...?



- Okay, but someone needs to set it up

Configuration in Sparkle

- Setup with simple commands
 - `compute_features`
 - `configure_solver`
- Fair comparison between solvers
- Credit: Sparkle reports which tools were used

What is next?

- Can we simplify things further?
- Can we ‘learn’ the parameter space?
 - Generate based on a few examples?
- Best practices, pitfalls [Eggenesperger et al 2019]

Take home

- Algorithm configuration should be easily accessible to everyone
- Low barrier to applying best practices and avoiding pitfalls
- Credit where credit is due
 - Solvers
 - Configurators
 - Selectors

k.van.der.blom@liacs.leidenuniv.nl