Mopsa at the Software Verification Competition

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SV-Comp
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Mopsa

Overview of Mopsa

Modular **O**pen **P**latform for **S**tatic **A**nalysis [1]

`gitlab.com/mopsa/mopsa-analyzer`

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Contributors (2018–2023)

- Antoine Miné
- Abdelraouf Ouadjaout
- Raphaël Monat
- David Delmas
- Guillaume Bau
- Milla Valnet
- Matthieu Journault

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Based on abstract interpretation

Only proves programs correct

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	bitarray	5,700	4.6m	94.6%

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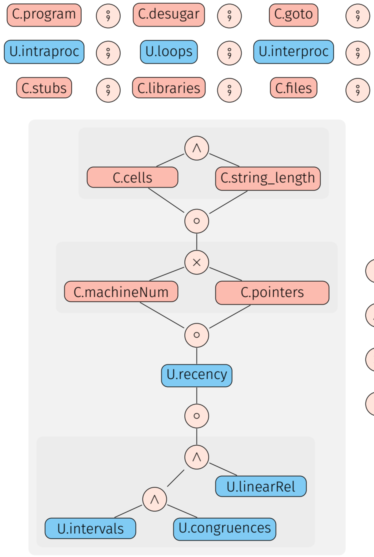
[4]Monat, Ouadjaout, and Miné. “A Multilanguage Static Analysis of Python Programs with Native C Extensions”. SAS 2021

Example configuration in Mopsa



⨾ Sequence

∧ Reduced product

× Cartesian product

∘ Composition

Mopsa at SV-Comp

Adapting Mopsa to SV-Comp’s Framework

Our approach

1. Analyze the target program with Mopsa

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  $\implies$ We could at least add slicing
- New analyses restart from scratch

Portfolio of analyses used

Increasingly precise analyses

1. Intervals, small structs initialized

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21220 tasks in total, 12636 correctness tasks

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Mopsa validates 54% of correct tasks (61% for overall winner, UAutomizer).

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Results in the *SoftwareSystems* category

Verifier	Bubaak	CPAchecker	Goblint	Mopsa	Symbiotic	Ultimate
Proved correct	291	**1,651**	1,256	1,610	942	1,423
Proved incorrect	143	59	0	0	84	2
CPU Time (s)	2,000,000	730,000	800,000	580,000	**400,000**	1,400,000
Rank	2	6	10	3	**1**	7

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  - Difficulties with interprecodural encoding[5]?

[5] Saan. Witness Generation for Data-flow Analysis. 2020

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- Targeting falsification tasks: synergy with symbolic execution, or backward analysis

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Questions

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