SMTQuery: Analysing SMT-LIB String Benchmarks

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Example: $aaaX = aaY$ adding length constraint: $|X| > |Y|$

SMT-LIB

- formalize into SMT-LIB files:

```
(declare-fun X () String)
(declare-fun Y () String)
(assert (> (X Y) )
(assert (= (str.++ “aaa“ X)(str.++ “aa“ Y)))
(check-sat)
(get-model)
```

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Instance	Z3Seq Result	Time	CVC5 Result	Time
pisa-006.smt2	TimeOut	20.0321	NotSatisfied	0.9634

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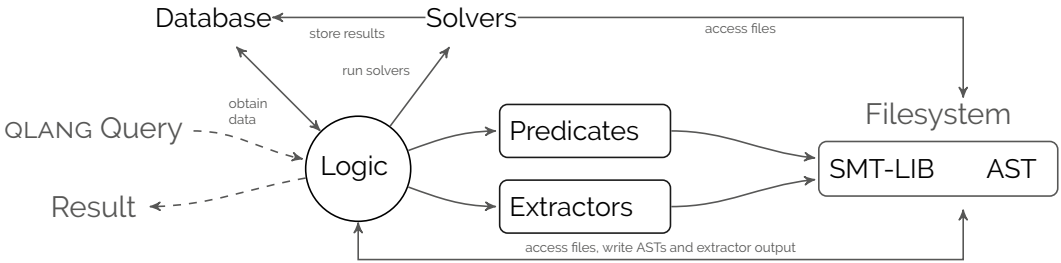
	Z3Str3	Z3Seq	CVC5	CVC4	Ostrich	Z3Noodler	Z3Alpha
SAT	4331	3469	5113	4739	60	4416	4331
UNSAT	8709	8538	8924	8736	5248	8223	8709
Unknown	215	0	0	0	0	0	214
Timeout	1119	2367	337	899	9066	1735	1120
Crash	0	0	0	0	0	0	0
Time w/o Timeout	16874.5	13493.6	14037.3	14498.4	93911.1	12269.7	17003.4
Total Time	39399	61067.7	20807.8	32562.9	277627	47240.9	39542.7

Architecture



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⇒ train a random forest machine learning model that determines which solver is best suited

	Instance Count	CVC5	Random Forest	Improvement
All Data	114,468	92.38%	93.79%	1.14
CVC5 > 85% omitted	9,067	66.98%	77.59%	10.61
CVC5 > 80% omitted	6,401	55.91%	74.01%	18.1

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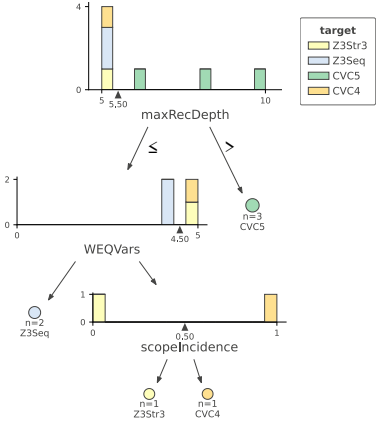

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  - SQL-like interaction with the tool
  - easily expandable with new predicates
  - extraction of files, features and graphics
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Thank You!