Metrics: A Unified Library for Experimenting Solvers

Thibault Falque¹, Romain Wallon², Hugues Wattez²
Séminaire au CRIL – 17 et 24 septembre 2020

¹ Exakis Nelite
² CRIL, Univ Artois & CNRS
Example

Let us consider a campaign in which we would like to compare the two solvers *Sat4j* and *Glucose*. These solvers are our experimentwares. Suppose that we want to compare them on two inputs: a sudoku instance `sudoku.cnf` and a pigeonhole problem `pigeonhole.cnf`. The input-set we consider is composed of these two instances. The experiments of this campaign are thus:

- the execution of *Sat4j* on `sudoku.cnf`,
- the execution of *Sat4j* on `pigeonhole.cnf`,
- the execution of *Glucose* on `sudoku.cnf`, and
- the execution of *Glucose* on `pigeonhole.cnf`. 
extraCt dAta of exPeriments from softwarE Logs
name: My Awesome Campaign

date: 2020/09/17

setup:
  os: Linux CentOS 7 (x86_64)
  cpu: Intel XEON X5550
  ram: 32GB
  timeout: 1200
  memout: 16384

You must specify name, timeout and memout
You may manually list the experiment-wares used for your experiments

experiment-wares:
  - my-awesome-solver
  - ...

You may also let scalpel retrieve them, if you do not need to collect additional data
A first approach for listing the benchmarks is to list them in the YAML input-set:

```yaml
input-set:
  name: My Input Set
  family: -3
  input-name: -1
  type: file-list
  path-list:
    - /path/to/my/benchmarks/of/family-a/sat/toto.cnf
    - ...
    - /path/to/my/benchmarks/of/family-n/unsat/titi.cnf
```
You may also retrieve the benchmarks from a file hierarchy containing these benchmarks

```
input-set:
  name: My Input Set
  family: -2
  input-name: -1
  type: hierarchy
  extensions:
    - .cnf.xz
    - .cnf.bz2
    - .cnf
  path-list:
    - /path/to/my/benchmarks
```
You may also let `scalpel` retrieve the inputs, if you do not need to collect additional data.
scalpel may parse a wide variety of source files to retrieve experimental data, such as CSV files

```yaml
source:
  path: /path/to/my/file.csv
```
scalpel may parse a wide variety of source files to retrieve experimental data, such as "evaluation" files

source:
  format: evaluation
  path: /path/to/my/file.txt
scalpel may parse a wide variety of source files to retrieve experimental data, even log files!

source:

    format: deep-dir
    path: /path/to/root/directory/of/xp
    hierarchy-depth: 2
    experiment-ware: 1

An example of hierarchy described by the configuration above is following

- xp
  - my-solver-a
    - output-on-instance-1
      - ...
      - ...
      - ...
  - ...
  - ...
  - ...
scalpel may parse a wide variety of source files to retrieve experimental data, even log files!

**source:**

- **format:** flat-dir
- **path:** /path/to/root/directory/of/xp

An example of hierarchy described by the configuration above is following

- xp
  - output-of-solver-a-on-instance-1
  - ...
  - output-of-solver-b-on-instance-n
If scalpel does not allow to parse your files, you may implement your own parser, and tell scalpel to use it.

```yaml
source:
  path: /path/to/my/very/specific/file
  parser: my.own.parser
```
If your data (especially, from a CSV file) do not follow scalpel’s naming convention, you may map the names of your file to the identifiers recognized by scalpel.

```yaml
data:
  mapping:
    experiment_ware:
      - solver
      - configuration
    cpu_time:
      - solver time
  input:
    - benchmark
```
You can describe how to extract data from log files as follows:

data:
  raw-data:
    - log-data: memory
      file: mysolver.log
      regex: "c Memory usage: (\d+) Mo"
      group: 1
    - log-data: cpu_time
      file: mysolver.log
      pattern: "c CPU time: {real} seconds"

A log file could have the following form:

c This is an example of log file from my awesome solver
c
c Memory usage: 3000 Mo
c CPU time: 12.34 seconds
If your solver has produced files using common formats, scalpel can parse them without having to describe them

```yaml
data:
  data-files:
    - output.json
    - output.csv
```
Previously...

With metrics-scalpel, it is possible to extract data:

- from CSV files
- from evaluation files
- from solver log files
Since last week...

We took your remarks into account, and have implemented some new features:

- Boolean values are supported as simplified patterns (true and false, case insensitive)
- Extraction of the name of the solver and input from the name of the file being parsed
- Parsing of (multiple) custom CSV files, with header or not

We are currently working on other new features:

- Parsing of multiple files having the same name but different extensions (almost done)
- Extraction of multiple data on the same line (almost done)
- Exploration of file hierarchy with arbitrary depth
Today...

Let us talk about figures!
Automated tool for exploiting Experimental results

- Static Plot: matplotlib library
- Dynamic Plot: Plotly library
Demonstration

Because demonstration is better than words!
Install metrics with pip

$ pip install crillab-metrics
Install metrics with pip

$ pip install crillab-metrics

Download the source code from GitHub

https://github.com/crillab/metrics/
Metrics: A Unified Library for Experimenting Solvers

Thibault Falque\textsuperscript{1}, Romain Wallon\textsuperscript{2}, Hugues Wattez\textsuperscript{2}
Séminaire au CRIL – 17 et 24 septembre 2020

\textsuperscript{1} Exakis Nelite
\textsuperscript{2} CRIL, Univ Artois & CNRS