

Chapter 1

Evaluation

To answer the research questions, we implemented the previously described grouped sampling algorithm. This chapter tries to answer several questions leading to the answers of the research questions.

Q_1 How can we create groups of configurations without violating constraints?

In the previous chapter two methods to create groupings of features are described, both relying on a SAT-Solver to create valid configurations. To determine which solution is superior, we test both variants on real world data sets and make a side-by-side comparison.

Q_2 Which group size is most effective for our data sets?

The results of the group sampling algorithm are dependent on the group size used during sampling. We determine an effective group size by varying the group and sample size of the group sampling algorithm.

1.1 Datasets

- Only Binary options
- Pre Sampled? Stefan, wie beschreib ich die daten hier? "already gathered all test data by leipzig university ?"

Apache

Berkley

PostgreSQL

JavaGC

1.1.1 Synthetic Data

1.2 Setup

- Random Sampling w/ Linear regression
- Group Sampling - determining fitting sizes
- Group sampling vs Random Sampling

1.2.1 Metrics

MAPE The mean absolute percentage error

$$M = \frac{1}{n} \sum_{t=1}^n \left| \frac{A_t - F_t}{A_t} \right|$$

where n is the number of tests, A_t is the actual value of test t and F_t is the forecast value of test t .

1.3 Results

1.3.1 Random sampling

Although true random sampling is hard to achieve in a sensible manner, it allows for a good baseline comparison of other sampling algorithms which may be domain specific. In our case, since all possible configurations of a given system are already known, we can perform true random sampling of configurations by randomly picking a configuration out of the known configurations. With this we can fit a linear regression and see, how effective a linear regression model is trained with randomly sampled data.

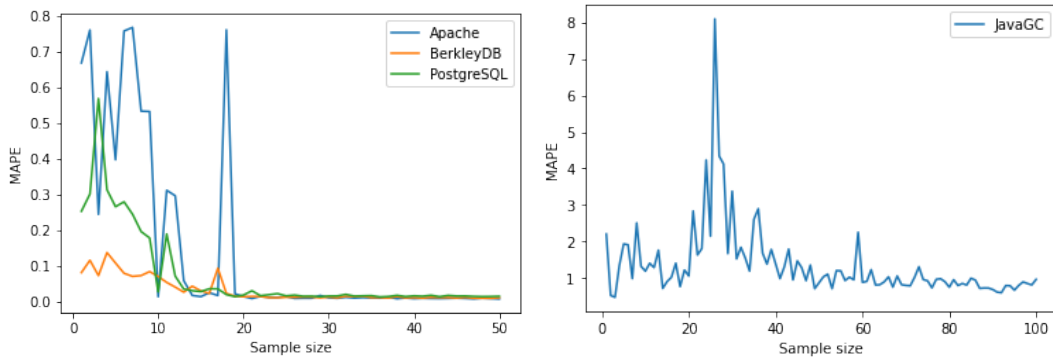


Figure 1.1: The MAPE value on the Apache, BerkeleyDB and PostgreSQL datasets in correlation to the sample size

With our real world examples we achieve

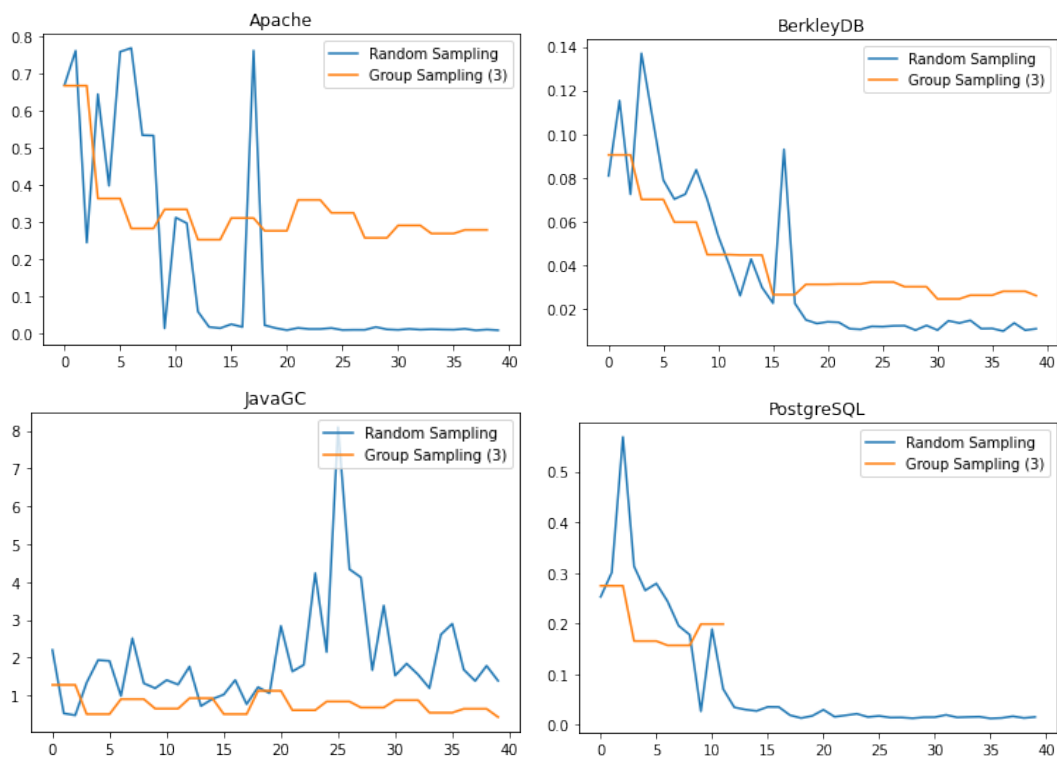


Figure 1.2: Group Sampling compared to random sampling with linear regression

1.3.2 Group Sampling

Large datasets

Feature interactions

1.4 Interpretation