DEPARTMENT OF INFORMATICS

TECHNISCHE UNIVERSITÄT MÜNCHEN

Bachelor's Thesis in Informatics

Empirical Evaluation of Test Suite Reduction

Adrian Regenfuß

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Empirische Evaluation von Test-Suiten Reduktion

Author:	Adrian Regenfuß
Supervisor:	Supervisor
Advisor:	Advisor
Submission Date:	Submission date

I confirm that this bachelor's thesis in informatics is my own work and I have documented all sources and material used.

Munich, Submission date Adrian Regenfuß

Acknowledgments

Abstract

As a response to ever-growing test suites with long runtimes, several different approaches have been developed to reduce the time for test suite execution to give useful results. One of these approaches is test suite reduction: selecting a sample of tests that maximizes coverage on the tested source code. This paper attempts to replicate the findings in [Cru+19], which borrows techniques from big data to handle very large test suites. We use independently generated testing data from open source projects, and find that TODO.

Contents

1 Introduction

3 pages

To prevent the introduction (or re-introduction) of bugs, software developers often test their software after making changes to it. This is known as regression testing, and takes up a significant portion of development cost. However, the resulting test suites can grow quite significantly in size and execution time, which hinders development speed and increases costs.

This work attempts to determine how different test suite reduction strategies compare to each other in terms of time performance, fault detection loss and magnitude of reduction.

2 Terms and Definitions

$\frac{1}{2}$ a page

3 Related Work

5 pages

3.1 Handling Large Test Suites

3.1.1 Test Case Selection

3.1.2 Test Case Priorization

3.1.3 Test Suite Reduction

3.2 Algorithms for Reduction

3.2.1 Greedy Selection

Needs coverage information

3.2.2 Clustering

3.2.3 Searching

3.2.4 Hybrids

4 Approach

8 pages

4.1 Replicating "Scalable Approaches for Test Suite Reduction"

1 page

4.2 Algorithms Used

7 pages

4.2.1 FAST

4 pages

FAST++

FAST-all

FAST-CS

FAST-pw

4.2.2 Adaptive Random Testing

2 pages

ART-D

ART-F

4.2.3 Greedy Algorithm

$\frac{1}{2}$ a page

4.2.4 Random Selection

$\frac{1}{2}$ a page
New method, after [Kha+18] (p. 17)

5 Evaluation

17 pages

5.1 Research Questions

Research Question 1: Does the Relative Effectiveness of the Different Algorithms Replicate the Results in [Cru+19]?

Research Question 1.1: Does Their Relative Effectiveness in TSR Replicate the Findings in [Cru+19]?

Research Question 1.2: Does Their Relative Effectiveness in FDL Replicate the Findings in [Cru+19]?

Research Question 2: Does the Relative Runtime Performance of the Different Algorithms Replicate the Results in [Cru+19]?

Research Question 3: How Much Better Than Random Selection are Specialized Algorithms?

(Possibly) Research Question 4: Do the Results in [Cru+19] Replicate with the Original Test Data?

5.2 Study Setup

5.3 Study Objects

5.3.1 Selecting Projects

Medium-Sized Java Projects
assertj-core, commons-lang, commons-math, commons-collections, jopt-simple, jsoup

5.3.2 Generating Coverage Information

Only Line Coverage
Using Teamscale Jacoco Agent

5.3.3 Collecting Fault Coverage Information

Using Pitest

5.3.4 Combining Tests Suites

5.4 Results

Research Question 1.1

Research Question 1.2

Research Question 2

Research Question 3

(Possibly) Research Question 4

5.4.1 Running Time

5.5 Discussion

5.5.1 Comparison to "Scalable Approaches to Test Suite Reduction"

5.6 Threats to Validity

5.6.1 Conclusion Validity

5.6.2 Internal Validity

5.6.3 Construct Validity

5.6.4 External Validity

6 Future Work

1 page

7 Summary

2 pages

List of Figures

List of Tables

Bibliography

[Cru+19] E. Cruciani, B. Miranda, R. Verdecchia, and A. Bertolino. "Scalable approaches for test suite reduction." In: *2019 IEEE/ACM 41st International Conference on Software Engineering (ICSE)*. IEEE. 2019, pp. 419–429.

[Kha+18] S. U. R. Khan, S. P. Lee, N. Javaid, and W. Abdul. "A systematic review on test suite reduction: Approaches, experiment's quality evaluation, an d guidelines." In: *IEEE Access* 6 (2018), pp. 11816–11841.