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# Science of Computer Programming

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## Preface

### Special section on Software Verification and Testing



We are delighted to present this special section containing extended versions of selected papers from the Software Verification and Testing (SVT 2013) track at the 28th ACM Symposium on Applied Computing (ACM SAC 2013), which took place in March 2013 in Coimbra, Portugal. The SVT track aims to bring together academic researchers and industry R&D expertise to discuss new results in formal verification and testing, as well as development of technologies to improve the usability of formal methods in software engineering. The SVT track's topics of interest include:

- tools and techniques for verification of large scale software systems,
- real world applications and case studies applying software verification,
- static and run-time analysis,
- abstract interpretation,
- model checking,
- theorem proving,
- refinement and correct by construction development,
- model-based testing,
- verification-based testing,
- run-time verification,
- symbolic execution and partial evaluation,
- analysis methods for dependable systems,
- software certification and proof carrying code.

There were 34 papers submitted to SVT 2013, from which the program committee selected 8 papers for presentation and publication in the proceedings of ACM SAC 2013. From these 8 papers, we invited the authors of 4 selected papers to submit to this special section. After several rigorous rounds of reviewing processes, in which each paper was reviewed by at least three experts, the following 3 papers made it to this special section:

- Gustavo Carvalho and his co-authors propose a methodology for generating test-cases from controlled natural language requirements. In this methodology the requirements are translated into the SCR intermediate format and subsequently T-Vec tool is used to generate test-cases from SCR specifications. They apply their techniques to academic examples as well as industrial examples from the avionics- and the automotive domain. They perform a mutation-based strength analysis to compare the proposed methodology with a random testing approach.
- Mike Papadakis, Marcio Delamaro, and Yves Le Traon deal with a well-known difficult problem in mutation-based testing, namely detecting equivalent mutants and mitigating their effect in mutation-based testing. They perform an empirical study of the classification technique, which can be used as a heuristic for detecting equivalent mutants. The results of their empirical study suggest that for low-quality test suites, classification can be effective in identifying equivalent mutants to some extent, but for high-quality test-suites the technique is not very effective. They also compare two different classification strategies and suggest that for a classification method, a higher recall value plays a more important role than a higher precision value.
- Liqian Chen, Xueguang Wu, and Ji Wang combine shape analysis and numerical abstractions in an abstract interpretation framework for list-manipulation programs.

We would like to thank all the people who have made this special section possible: the authors for extending and submitting their high-quality papers to the special section and for their efforts to incorporate all the comments during the reviewing processes; the program committee members of SVT 2013 and anonymous reviewers of the special section for

their great work to ensure the quality of each accepted paper, and also the editor-in-chief and the editorial assistants of Science of Computer Programming for their help and support during this intensive process.

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