

**EDITORIAL**

# Introduction to the special issue on search-based software engineering (NasBASE 2015)

It is our pleasure to introduce to the reader this special issue based on extended papers from the 1st North American Search Based Software Engineering Symposium (NasBASE 2015). The NasBASE symposium was conceived as a vehicle to bring together the rapidly growing North American Search Based Software Engineering (SBSE) community in a welcoming forum for discussion and dissemination, and to sustain the recent flourishing of interest in this field of research and practice.

A total of 16 papers were submitted to the symposium. Each paper was subjected to at least three reviews, and finally nine were accepted for publication and presentation at the symposium. From these nine papers, four were chosen and the authors invited to extend their paper for submission to this special issue. These four invited papers were extended by their authors and then subjected to the rigorous JSEP reviewing process, undergoing several further rounds of review and revision. Finally, the three papers described below successfully completed the review process and are contained in this special issue.

In “An Empirical Investigation of Single-Objective and Multi-objective Evolutionary Algorithms for Developer’s Assignment to Bugs” by Md. Mainur Rahman, Muhammad Rezaul Karim, Guenther Ruhe, Vahid Garousi, and Thomas Zimmermann, the authors model the problem of developer assignment to bugs as a single objective (to minimize bug fix time) and as a bi-objective (minimize bug fix time and cost) combinatorial optimization problem. Two models of developer assignment are considered where in the first model a single developer is assigned per bug (single developer model), whereas in the second model, a single developer is assigned for each competency area of a bug (individual competency model). The performance of the proposed approaches was evaluated for 2040 bugs in 19 open-source milestone projects from the Eclipse platform. The results and analysis demonstrate that the bi-objective model is far better than the single developer model, with an average bug fix time reduction of 39.7% across all projects.

In “Error Leakage and Wasted Time: Sensitivity and Effort Analysis of a Requirements Consistency Checking Process” by Jane Hayes, Bram Adams, Yann-Gaël Guéhéneuc, Giuliano Antoniol, Wenbin Li, and Mirek Truszczyński, the authors model and study a process for

checking the consistency of temporal requirements and assess error leakage and wasted time. They perform an analysis of the input factors of the proposed model to determine the effect that sources of uncertainty may have on the final accuracy of the consistency checking process. The results show that an analyst’s effort varies depending on the precision and recall of the subprocesses, and that the number and capability of analysts affect their effort.

In “Search-Based Model Transformations” by Martin Fleck, Javier Troya, and Manuel Wimmer, the authors address the problem of model optimization through transformation. Current approaches based on rule orchestration suffer from the limitations that the optimization objectives are hidden in the transformation rules, and that manually finding a good sequence of rules to apply in a particular scenario is a very challenging task. In this paper, the transformation orchestration problem is formulated as an optimization problem, which enables it to be addressed by search-based exploration of the transformation space driven by explicitly stated transformation objectives. The authors embody these ideas in a framework and test it on a number of typical model-based software engineering problems, thus demonstrating it to be usable by non-SBSE experts as well as capable of producing feasible solutions that are easy to comprehend.

We hope that readers will enjoy reading these papers and find that they make a useful contribution to their knowledge and understanding. There are many people we would like to thank: the authors who submitted papers to this special issue and the reviewers who did an excellent job of helping to bring these papers to such a high level, the editorial board of the *Journal of Software: Evolution and Process* and especially its editor, Gerardo Canfora, who provided his expertise in a very timely fashion throughout the process.

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