



Introduction to the special issue on program comprehension

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The Research Track of the 28th IEEE/ACM International Conference on Program Comprehension (ICPC 2020) provided a quality forum for researchers and practitioners from academia, industry, and government to present and discuss new results, negative results, and replications in program-comprehension research. The Research Track welcomed submissions on any program comprehension research and accepted 32 papers out of 84 submissions.

For this special issue, we invited authors of five high-quality papers presented in the Research Track of ICPC 2020 to submit an extension of their papers. The program co-chairs selected the top five papers with the highest ratings from the reviewers. Each of these papers received all positive ratings. Eventually, four extensions were submitted by their authors. Three experts reviewed each submission to guarantee the quality and sufficient novelty of the extensions. Some reviewers of the extensions had reviewed the original ICPC papers. Finally, we accepted the following three papers:

- The paper entitled *Quick remedy commits and their impact on mining software repositories*, authored by *Fengcai Wen, Csaba Nagy, Michele Lanza, and Gabriele Bavota*, presents a study investigating “quick remedy commits” performed by developers to implement changes omitted in previous commits. Through a manual analysis of 500 quick remedy commits, the authors defined a taxonomy of the types of changes that developers tend to omit. The authors showed that consideration of quick remedy commits accounts for some noisy data points when performing commit mining.

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- The paper entitled *Software testing and Android applications: a large-scale empirical study*, authored by *Fabiano Pecorelli, Gemma Catolino, Filomena Ferrucci, Andrea De Lucia*, and *Fabio Palomba*, presents a large-scale empirical study targeting 1,693 open-source Android apps and assessing the extent to which these apps are actually tested, how well-designed are their tests, etc. The authors showed that Android apps are poorly tested and that their tests have low design quality, effectiveness, and ability to find defects.
- The paper entitled *A unified multi-task learning model for AST-level and token-level code completion*, authored by *Fang Liu, Ge Li, Bolin Wei, Xin Xia, Zhiyi Fu*, and *Zhi Jin*, proposes an approach to code completion based on neural networks. It overcomes the limitations of previous approaches by combining AST-level and token-level code completion. Hence, it can take into account token probability but also syntactic structure and semantic relationships. The authors showed that this novel approach is more effective than previous ones through experiments.

We would like to thank the authors of these papers. We also thank the reviewers who helped authors improve their papers. Finally, we would like to thank the editorial board of the Springer Empirical Software Engineering Journal, who provided the opportunity for this special issue and greatly assisted the editing process.

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