

Guest Editorial:

Special Section on IEEE International Conference on Software Quality, Reliability, and Security (QRS) 2020

The IEEE International Conference on Software Quality, Reliability, and Security celebrated its 20th anniversary in 2020. We received 156 submissions to the regular and short articles tracks. After the process of desk rejection, all remaining submissions were reviewed by three or more program committee members. Each submission was discussed online by the respective reviewers. Finally, the program chairs recommended six submissions of top quality out of the accepted articles to the IEEE TRANSACTIONS ON RELIABILITY for potential publication. We invited the authors of the six submissions to submit the corresponding revised versions that had addressed the reviewers' comments to the IEEE TRANSACTIONS ON RELIABILITY for further evaluation. We invited the original reviewers of these QRS submissions to review these revised articles using the standard of the journal for article acceptance. In addition, the abstracts of these six selected articles were published in the QRS 2020 conference proceedings.

The six articles we invited span the topics of both reliability and security in hardware and software with a new focus on AI-assisted techniques.

Grichi *et al.* studied multilanguage dependency in the article titled "On the impact of inter-language dependencies in multi-language systems." They proposed two approaches to analyze such dependencies and showed that more interlanguage dependencies lead to more bugs and security vulnerabilities in the benchmark suites they studied in their experiment.

In the article titled "Reliability evaluation of FPGA with common cause failure in multi-phase mission," Shao *et al.* studied the impact of common cause failure for field-programmable gate arrays with static random-access memory. They developed a condition for probabilistic model checking so that common cause failures can be considered in reliability analysis of phased-mission systems.

Landauer *et al.* presented a platform to generate testbeds based on model-driven engineering in the article "Have it your way: Generating customized log data sets with a model-driven simulation testbed." Their platform allows the modeling of system infrastructure, normal behavior, and attack scenarios, and initializes them with hyperparameters to allow flexible evaluation of intrusion detection systems.

Chen *et al.* in their article titled "Data evaluation and enhancement for quality improvement of machine learning" empirically

show that previous techniques that excelled in a learning task could be due to the data quality problem and show that there is a strong correlation between the quality of the datasets and the performance of a machine learning technique. They proposed a transfer-learning-based strategy for data quality enhancement, thereby allowing existing techniques to improve their performance.

The article "Simplified deep forest model based just-in-time defect prediction for Android mobile apps" authored by Zhao *et al.* presents a new method to predict just-in-time defects in commits of Android mobile apps. They proposed to use a cascade structure with ensemble forests for representation learning and classification, and incorporate the machine learning models. Their experimental results show that their proposed method is effective.

The technique RTPDroid is proposed by Zhang *et al.* in their article "RTPDroid: Detecting implicitly malicious behaviors under runtime permission model." The runtime permission model in Android is implicitly inferred by their proposed technique for the detection of malicious behaviors. Their experiment shows that there are many such malicious behaviors in the benchmarks they collected for the experiment.

The first three articles were published in the March 2021 issue; the fourth and fifth articles appear in this issue; and the last article will be included in the September 2021 issue.

Last but not the least, the guest editors would like to thank the authors for their excellent work and contribution to the QRS 2020 and this Special Issue. The guest editors would also like to thank the reviewers for reviewing the above six article and IEEE TRANSACTIONS ON RELIABILITY, in particular, Professor Eric Wong to host this Special Issue.

Yours faithfully,

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