Scientific Programming

Special Issue on
Code Analysis and Software Mining in Scientific and Engineering Applications

CALL FOR PAPERS

Code analysis and software mining provide opportunities for system assessments and quality improvements of many current scientific and engineering applications. Modern development frameworks provide constructs which could be used in this analysis to better evaluate or verify software solutions. For example, a software engineer may extract information directly from the code or data, transform it into new models, and use it as input in other systems. This input may simplify the distribution of information, application verification checks, or the derivation of system or process overviews.

New tools and approaches proposed for code analysis and software mining should improve our understanding of large software systems and their dependability, alongside many other qualities. For instance, they may address mining application programming interface (API) dependencies, modeling control flow, or provide an overview of system concerns. They may also consider continuous integration, which brings opportunities for software repository mining and repository commit analysis involving other metainformation. Further research in this area would assist with test extraction and detecting duplicated tests and also improve software quality assurance in general.

This Special Issue aims to publish original research and review articles that explore state-of-the-art methods of code analysis and software mining in scientific or engineering applications. Contributions may consider static or dynamic code analysis of compiled or interpreted languages or use bytecode analysis. Approaches involving novel machine learning techniques or scientific analysis methods are also welcome, as are case studies looking beyond recommender systems, providing novel metrics and/or involving big data solutions which tackle fast processing or memory optimization. Research is expected to report new approaches and tools alongside production-level experience, and also consider impacts on development and sustainability or code management.

Potential topics include but are not limited to the following:

- Test automation, test coverage, verification, code checking, and quality assurance
- Development frameworks in the context of code analysis
- Code reviews based on code analysis
- Code clone and inconsistency analysis
- API contract or dependency mining
- Software project repository mining (Git, SVN, etc.)
- Analysis of code and development processes (Jira, Bugzilla, etc.)
- Control flow modeling and reconstruction
- Distributed system integration based on code tools
- Case studies, surveys, and novel tools and approaches in code analysis and software mining
- Model and documentation extraction based on code analysis

Authors can submit their manuscripts through the Manuscript Tracking System at https://mts.hindawi.com/submit/journals/sp/codas/.

Papers are published upon acceptance, regardless of the Special Issue publication date.

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