Towards a quality object-oriented system: metrics-guided models and methods

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Abstract
The objective of our three on-going projects is to help software developers to achieve high-quality object-oriented software systems using metrics-guided models and methods. The first project aims to develop cost-effective models that automatically recommend potentially fault-prone/important modules in an object-oriented system. The second project aims to identify a subset of object-oriented metrics that are of practical value to software development. The third project aims to develop a framework to support that an object-oriented system evolves towards high-quality software.

1. Recommending fault-prone/important modules

Cost-effective model
- Input: source code
- Output: module ranking
- Method:
  - Unsupervised/semi-supervised/active learning
  - Causality diagram
  - Performance: efficient & effective

2. Meta-analyzing object-oriented metrics

Benchmark study
- Base-line values
- Classification performance
- Ranking performance
- Thresholds

3. Supporting software evolution

A framework integrating testing, analysis, and measurement
- Metric-guided test case generation
- Test-info-driven fault localization
- Software trustability measurement

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