Advanced Topic Review Abstract (Search-Based Software Testing)

Type: Research-oriented
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Spring, 2017

Abstract:
Search-Based Software Testing (SBST) is an area under Search Based Software Engineering (SBSE) associated with Software Testing. Some Software Engineering problems can be reformulated as optimization problems which can be dealt with SBSE approach that uses Metaheuristic search techniques, for example – Genetic Algorithms. In SBST, these optimization search techniques can be used to solve Software Testing problems like test data generation, test-case prioritization, generating test suites etc.

It is widely believed that a huge portion of the budget is spent on Software Testing. Software Testing methodologies like functional testing, mutation testing, integration testing are still open challenges as they are expensive in the terms of both cost and time. Thus, automation of testing tasks like test data generation, Unit test suites generation would be very beneficial.

The specific aspects that the review would focus on are - overview of the state-of-the-art of SBST, application of SBST in automation of Test data generation, few examples of application of Genetic algorithms in Testing and debugging, overview of notable systems like EvoSuite which can be used to automatically generate Unit test suites.

The review will not only help us understand the concept of Search-based Software Testing but will help us understand the ways it can be applied to improve the Testing process and automate testing methodologies. The review would help us answer questions like: a) What algorithms can be used for automation of test suite generation; b) How can we improve efficiency of these algorithms to prove the quality of output they can provide; c) How can these techniques be applied to Object Oriented Programming.

References: