Welcome to the First International Workshop on Automation of Software Test (AST’06)!

It has been our privilege to organize this workshop at the 28th International Conference on Software Engineering (ICSE’06). This unique workshop serves as a bridge to bring together researchers and practitioners on software test automation from around the world. As widely recognized, software testing is indispensable for all software development, but labor intensive and expensive. In software development practice, testing can account for over half of the total development efforts. It is imperative to reduce the cost and improve the effectiveness of software testing by automating the testing process, which contains many testing related activities using various techniques and methods. Automation is the trend of software testing. In the past decades, a great amount of research effort has been made on the automation of test case generation, test oracles and so on. Many software test tools have also been made available on the market in the past few years. However, the current practice of software test automation is mostly based on recording manual testing activities and replaying recorded test scripts for regression testing. Bridging the gap between theory and practice will not only significantly improve the current-state of software production, but also foster innovative research in the area. As the theories of software testing become more mature, a larger scale automation of the testing process becomes feasible. Therefore, it is timely and important for the development of software testing methodologies into a scientific discipline as a part of software engineering. The workshop aims at providing researchers and practitioners a forum for exchanging ideas, experiences, understanding of the problems, visions for the future, and promising solutions to the problems. The workshop also serves as a platform for researchers and developers of testing tools to work together to identify the problems in the theory and practice of software test automation and to set an agenda and lay the foundation for future development.

A good number of papers were submitted to the workshop. They were authored by a total of 90 academic researchers and industrial experts from 15 different countries around the world. The submitted papers cover a wide range of topics in the area of software test automation. The AST’06 Programme Committee selected 18 papers for publication based on a rigorous review process. These papers represent the ideas, practices and experiences of the researchers from around the world and truly reflect the international theme of AST workshop.

The workshop include the following five sessions. Each session focuses on one specific topic.

Session one includes four papers on model-based automatic testing. Chen, Qiu, and Li present a method to generate tests from UML activity diagrams to satisfy certain coverage criteria. Vieira et al. describe an ongoing research on test case generation from UML diagrams based on an idea of combining data and graph coverage of UML models. Pfaller et al. present a method for combining testing coverage and system requirements. They discuss the issue of various levels of model abstractions in the context of embedded systems. Lund and Stolen use sequence diagrams with advance features such as negation and assertion not only for automatic test case generation but also for automatic checking of test results.

Session two has three papers of test generation based on program input domains. Liu and Tan address the issues of statistical input validation for input control. Ji et al. propose an approach to the generation of test cases that enables monitoring program execution time more precisely in test. Shan and Zhu propose a data mutation method to the generation of a large number of structurally complicated test data from a few seed test cases. The method has been applied to a modeling tool and proven effective.

Session three includes three papers on component and integration testing. Abdurazik and Offutt propose a solution to integration testing based on class coupling for testing orders. The paper by Gallagher and Offutt presents a tool for automated testing of inter-operating OO classes. The tool operates directly on an object-oriented software specification to produce a data flow graph and executable test cases that adequately cover the graph according to classical graph coverage criteria. Yuan and Xie describe a framework for automatic generation of integration tests based on call-sequence constraints inferred from dynamic executions.

Session four addresses economical issues of test automation with four papers. Cai et al. propose and validate their solution to test automation under cost constraints. Offutt et al. present the results of an empirical study on the affordability of class level mutation testing using MuJava tool. Ramlber and Woflmaier present their study of economical issues in testing automation and discuss how to balance between automated testing and manual testing to achieve an optimal test cost. Artho et al. focus on the scalability issue and extend unit testing framework for large scale tests.

The last session of the workshop, session five, is devoted to test tools and environments. It includes four papers. Yang, Li and Weiss survey and compare a set of coverage-based testing tools aiming at providing guidelines to the selection of coverage tools. Okika et al. describe a prototype TTCN-3 test harness for legacy software systems. Sauve et al. present a tool to create and execute client-readable acceptance tests in an acceptance-test driven software development process. Delamaro et al. describe a strategy for coverage-based testing of mobile devices on both emulators and the real mobile devices and report a test environment that supports the strategy.

The success of the workshop is the result of the collaboration among many people. We wish to thank all those who have contributed to this success. The Programme Committee members and reviewers provided excellent support in promptly and thoroughly reviewing the manuscripts. Avaya Labs’ sponsorship provided financial support. Local organizer in Shanghai, China, provided helps on organizations. We are most grateful to Frances Paulisch, the ICSE’06 workshops Chair, for his efforts in providing instructions, guideline as well as useful information.

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