# Domain Specific Approaches to Software Test Automation

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## ABSTRACT

In this paper, we describe the contributions to the workshop on domain specific approaches to software test automation. The workshop consists of six accepted papers and a keynote speech. The papers tackle a wide range of topics related to the testing of applications within specific domains including event driven software, synchronous safety critical software, web applications, wireless sensor networks, and mobile phone applications. Each of the papers describes the influence of the domain on the testing process.

## Categories and Subject Descriptors

D.2.5 [**Testing and Debugging**]: Testing Tools.

## General Terms

Languages, Verification.

## Keywords

Constraint logic programming, Data exchangeability, Domain specific test automation, Event driven systems, Exploratory testing, Feature testing, Model based testing, Multi-threaded debugging, Safety critical software, Test prioritization, Wireless sensor software.

## 1. INTRODUCTION

Recent years have witnessed the emergence of domain-specific languages in software development. These languages are tailored to the needs of the domain at hand, thus enabling higher level of abstraction than generic solutions based on standard languages such as UML or Java. These approaches utilize domain knowledge in a way that enables domain experts without programming skills to develop designs that can be converted to optimized implementations by efficient code generators. It is generally agreed that the use of domain-specific solutions can offer vast improvements in productivity.

The aim this workshop is to extend the scope of such domain-specific approaches towards automated software testing at system level. System testing is a context sensitive activity that is by nature more domain specific than program development. However, so far software test automation has failed in its ability to replace manual testing: most of the defects in an average

software project are still found manually. Moreover, there are severe test suite maintenance problems associated with test automation systems. Nevertheless, the level of automation in system testing is increasing. Current best practices, such as keyword-driven test frameworks, are considerably more domain-specific than more traditional data-driven ones. In addition, novel model-based solutions, automating not only the test execution but also the test generation, are proving successful in various domains.

However, there are several trade-offs involved concerning for instance the tools, processes, methods, and services. Generic approaches are supported by readily available tools and services while domain-specific solutions need customized design and transformation tools in order to be applicable. Development of generic but customizable tools and processes could be a significant factor in the trade off. Research may provide a resolution to the problem of expensive customization.

This workshop provides a forum for academia, industry, and the research and development community to share their work, exchange experiences and ideas, and discuss challenges and future research directions in the area of domain-specific software test automation. .

## 2. THE PAPERS

The papers in this workshop concentrate mostly on event driven architectures. This style of application poses a number of problems for testing, and the various domains explored in this workshop illustrate the diversity of approaches to cope with the many problems inherent in testing and debugging event driven systems.

The paper by Bryce and Memon [1] deals with test prioritization for event driven software. They introduce a prioritization criterion for test suites and study its effectiveness in an experimental setting.

The work of Seljimi and Parissis [6] discusses an extension of their test environment for software specified in a synchronous data flow language used in safety critical domains. They illustrate the use of Constraint Logic Programming in this domain.

Sato and Kosuga [5] give an account of a debugging environment for web applications. They deal with the complex problems of debugging in a multi-threaded event-driven domain, and the use of such a debugger to generate white-box tests.

Nguyen and Soffa [4] have focused on wireless sensor applications. They discuss a set of abstractions and structures for

describing these applications. These structures can be used for static analysis of applications in this domain and eventually for the generation of test cases.

The paper by Nascimento and Machado [3] does a comparison between model based testing and exploratory testing in the domain of feature testing for mobile phones. Their goal is to develop an effective methodology for testing in this domain.

The exception to this trend of studying event driven systems is the paper by Marchetti and Bertolino [2] which focuses on conformance testing of data with an emphasis on the interoperability and "exchangeability" of structured data in the health care domain.

## 3. REFERENCES

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