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Testing – Practice and Research Techniques

5th International Academic and Industrial Conference
TAIC PART 2010

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Proceedings



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Preface

A Message from the TAIC PART 2010 General Chair

TAIC PART is a unique event that strives to combine aspects of a conference, a workshop and a retreat. Its purpose is to bring together industrialists and academics in an environment that promotes fundamental collaboration on problems in software testing. Among the wide range of topics in computer science and software engineering, software testing is an ideal candidate for academic and industrial collaboration because advances in research can have such wide-ranging and far-reaching implications for industry. Conversely, the advances in computing and communications technology and the growth of the associated software engineering activity are producing new research challenges at an increasing rate.

The problems that arise in software testing are related to the problems that arise in many other areas of computing. As such, testing research combines a wide range of elements encompassing the theoretical work of program analysis and formal methods and the associated representations such as finite-state machines and dependence graphs. The inherent complexity of software testing has led to the involvement of heuristic methods. Software testing is also a human activity and has thus seen the involvement of psychology, sociology and even philosophy. This astonishing breadth and depth have made the problems of software testing appealing to academics for several decades.

Industrial activities are, of course, the fundamental source of the software testing problems to which research is directed. Software now controls safety-critical systems from chemical plants and national nuclear defence systems, through sophisticated fly-by-wire commercial aircraft, to the airbag and brake controllers in our motor cars. These problems have a strong technical aspect but they also have economic and social aspects. This explains the variety of disciplines that have contributed to software testing research. Industrialists are not only the source of research problems but they are also significant contributors to the solutions of these problems, particular in the development of tools and methods. Many of the industrial tools used in software testing today are based on research ideas and research prototypes.

The consequences of software failure can be severe, and so it is with these pressing concerns in mind that TAIC PART seeks to bring academics and industrialists together in a retreat setting, allowing for interaction, extended discussion and joint work that is not possible in the rushed schedule of a conventional conference format. The organizers have aimed to ensure that there is a productive mix of academic and industrial involvement in this rather special event. We are delighted that we have been able to secure industrial sponsorship for the event, ensuring the committed participation of the industrial community. We would like to thank our TAIC PART sponsors: CREST and LDRA.

A Message from the TAIC PART 2010 Programme Chairs

This volume contains the proceedings of Testing: Academic and Industrial Conference–Practice and Research Techniques (TAIC PART 2010), held during September 3–5 in Cumberland Lodge, Windsor, UK, the fifth conference in a series of highly successful events.

A special thank you is due to the Programme Committee, which worked hard to ensure that the event lived up to the standards of academic rigor, ensuring that the event engaged fully with the academic community. Putting together the programme was both enjoyable and challenging. The event received 40 paper submissions and we would like to thank everyone who submitted a paper. After a rigorous reviewing process in which each paper was reviewed by at least two reviews followed by Programme Committee discussions, 15 full papers and 7 abstracts were accepted. Three of the papers were from industry. The papers originate from 13 countries in North and South America, Europe and Asia.

A special thank you is due to the Programme Committee for the outstanding quality of their reviews, which were produced promptly to a short deadline. We believe that for the authors (irrespective of whether their papers were accepted) this is the most sincere and valuable reward for their hard work and expertise. TAIC PART seeks to encourage and facilitate high-quality reviewing, since it plays such a vital role in the development of this subject. In addition to the submitted papers, TAIC PART had three outstanding invited speakers, Wolfgang Grieskamp of Microsoft, USA, Sir Tony Hoare of Microsoft Research, UK and Bertrand Meyer of the Swiss Federal Institute of Technology, Switzerland, who we thank for their contributions and for attending the conference.

We are very grateful to the international community for their participation. A complex event like TAIC PART cannot be organized without the help of a committed team of organizers. We would therefore like to extend a very warm thanks to all the staff at the Cumberland Lodge. The event would not be nearly so appealing without their support, kindness and professionalism. We would also like to thank the staff at the Springer who have been very helpful in supporting us to collect and organize the material required to produce the proceedings. We are also very grateful to R.N. Horspool and A.J. Wellings, the editors of *Software: Practice and Experience* for agreeing to a special section of extended selected papers from TAIC PART. Finally, thanks also to Easychair, which makes the life of Programme Chairs so much easier.

June 2010

Gordon Fraser
Leonardo Bottaci

Keynote Speakers

Bertrand Meyer is Professor of Software Engineering at ETH Zurich (the Swiss Federal Institute of Technology), which he joined in 2001 and was chairman of the computer science department from 2004 to 2006. He remains Chief Architect of Eiffel Software, the company he founded in California in 1985. He is the author of a number of books translated into many languages, including “Object-Oriented Software Construction” (Jolt Award 1997), “Reusable Software”, “Introduction to the Theory of Programming Languages”, “Eiffel: The Language” and several others, as well as many articles and over 60 edited conference proceedings. He has led the design and implementation of numerous tools and libraries used in production applications, including the open-source EiffelStudio environment, and serves as consultant to industry and government agencies. He is the principal designer of the Eiffel language and method, and the editor of the Eiffel language standard, accepted by the International Standards Organization in 2006. His research interests range over object-oriented analysis, design and programming, concurrency (SCOOP model), object persistence, development environments, software project management, software verification, automatic testing, formal methods, programming language semantics, and educational issues. He is the recipient of the Dahl-Nygaard object technology award and, in 2007, of the ACM Software System Award.

Sir Charles Antony Richard Hoare (Tony Hoare or C.A.R. Hoare, born January 11, 1934) is a British computer scientist, probably best known for the development in 1960 of Quicksort (or Hoaresort), one of the world’s most widely used sorting algorithms, Hoare logic, the formal language Communicating Sequential Processes (CSP) used to specify the interactions between concurrent processes, structuring computer operating systems using the monitor concept, and the axiomatic specification of programming languages. He is now an Emeritus Professor at the Oxford University Computing Laboratory, and is also a senior researcher at Microsoft Research in Cambridge, England. He received the 1980 ACM Turing Award for “his fundamental contributions to the definition and design of programming languages”.

Wolfgang Grieskamp is a principal architect and researcher in the Protocol Engineering Team at Microsoft, Server Tools and Business, which aims to create tools and engineering methods that enable software engineers to build, test, and maintain interoperable products from Microsoft Technical Documentation. To achieve this goals they apply modeling, model-based testing, and other advanced technologies. Before joining Microsoft he worked for six years at Microsoft Research, developing MBT technology and the Spec Explorer family of MBT tools. Spec Explorer has moved together with him from Microsoft Research to Windows, where it is successfully productized and maintained.

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Table of Contents

Keynote Addresses

Automatic Testing and Fixing for Eiffel (Extended Abstract)	1
<i>Bertrand Meyer</i>	
Testing and Proving, Hand-in-Hand	5
<i>Sir Tony Hoare</i>	
Microsoft's Protocol Documentation Program: A Success Story for Model-Based Testing	7
<i>Wolfgang Grieskamp</i>	

Full Papers

Masking Boundary Value Coverage: Effectiveness and Efficiency	8
<i>P. Vijay Suman, Tukaram Muske, Prasad Bokil, Ulka Shrotri, and R. Venkatesh</i>	
Model-Checking Erlang - A Comparison between EtomCRL2 and McErlang	23
<i>Qiang Guo, John Derrick, Clara Benac Earle, and Lars-Åke Fredlund</i>	
Bad Pairs in Software Testing	39
<i>Daniel Hoffman, Chien-Hsing Chang, Gary Bazdell, Brett Stevens, and Kevin Yoo</i>	
Localizing Defects in Multithreaded Programs by Mining Dynamic Call Graphs	56
<i>Frank Eichinger, Victor Pankratius, Philipp W.L. Große, and Klemens Böhm</i>	
Filtering Test Models to Support Incremental Testing	72
<i>Antti Jääskeläinen</i>	
Does Testing Help to Reduce the Number of Potentially Faulty Statements in Debugging?	88
<i>Mihai Nica, Simona Nica, and Franz Wotawa</i>	
Linguistic Security Testing for Text Communication Protocols	104
<i>Ben W.Y. Kam and Thomas R. Dean</i>	

Tool Papers

An Open-Source Tool for Automated Generation of Black-Box xUnit Test Code and Its Industrial Evaluation	118
<i>Christian Wiederseiner, Shahnewaz Amin Jolly, Vahid Garousi, and Matt M. Eskandar</i>	
TeCReVis: A Tool for Test Coverage and Test Redundancy Visualization	129
<i>Negar Koochakzadeh and Vahid Garousi</i>	
A Fault Injection Tool for Testing Web Services Composition	137
<i>Fayçal Bessayah, Ana Cavalli, Willian Maja, Eliane Martins, and Andre Willik Valenti</i>	
Synthesis of On-Line Planning Tester for Non-deterministic EFSM Models	147
<i>Marko Kääramees, Jüri Vain, and Kullo Raiend</i>	
A Generic Approach to Run Mutation Analysis	155
<i>Siamak Haschemi and Stephan Weißleder</i>	

Challenge Paper

The Practical Assessment of Test Sets with Inductive Inference Techniques	165
<i>Neil Walkinshaw</i>	

Experience Reports

Mining API Popularity	173
<i>Yana Momchilova Mileva, Valentin Dallmeier, and Andreas Zeller</i>	
Automatic Discovery of Unspecified Behaviors in Automotive Control Software	181
<i>Muzammil Shahbaz and Robert Eschbach</i>	

Fast Abstracts

An Empirical Evaluation to Study Benefits of Visual versus Textual Test Coverage Information	189
<i>Vahid Garousi and Negar Koochakzadeh</i>	
A Multi-criteria Decision Making Framework for Real Time Model-Based Testing	194
<i>Mohammad Saeed Abou Trab, Bachar Alrouh, Steve Counsell, Rob M. Hierons, and George Ghinea</i>	

Improved Testing through Refactoring: Experience from the ProTest Project	198
<i>Huiqing Li and Simon Thompson</i>	
Towards Run-Time Monitoring of Web Services Conformance to Business-Level Agreements	203
<i>Konstantinos Bratanis, Dimitris Dranidis, and Anthony J.H. Simons</i>	
A New Approach for Software Testability	207
<i>Lydie du Bousquet</i>	
DOM Transactions for Testing JavaScript	211
<i>Phillip Heidegger, Annette Bieniusa, and Peter Thiemann</i>	
The GZoltar Project: A Graphical Debugger Interface	215
<i>André Riboira and Rui Abreu</i>	
Author Index	219