Guest Editorial

Automated Verification of Critical Systems

This issue contains selected and revised papers from the AVoCS (Automated Verification of Critical Systems) workshop held April 2–3, 2003 in Southampton.

The event attracted a large audience and the proceedings (published as technical report DSSE-TR-2003-2 of the University of Southampton) containing 24 regular contributions from 10 countries as well as two invited talks and a model checking competition. After the event, the programme committee selected the most promising and mature contributions and invited the authors to submit a revised and extended version of their paper to this special issue of Formal Aspects of Computing. This resulted in 9 submissions out of which 7 were accepted after several rounds of careful refereeing.

The articles in this special issue explore several important aspects relevant to the automated verification of critical systems. The articles are grouped according to the following themes:

Refinement

Bill Roscoe investigates what kind of properties can be expressed as CSP refinement checks, and which can be verified using the FDR model checking tool. The article by Michael Huth employs a game-theoretic approach to refinement to prove completeness of refinement. Stefano Cattani and Marta Kwiatowska present an operational and denotational semantics along with refinement relations for a real-time extension of CSP.

Model Checking

The article by Gethin Norman, David Parker, Marta Kwiatkowska, Sandeep Shukla, and Rajesh Gupta presents an application of probabilistic model checking to the performance analysis of dynamic power management systems. Bram De Wachter, Alexandre Genon, Thierry Massart and Cédric Meuter develop the programming language dSL for distributed industrial control applications, along with a mapping to Promela for model checking in Spin. In their article by Elsa Gunter and Doron Peled develop the idea of combining deductive verification, model checking and testing into a single framework to overcome deficiencies of the individual methods on their own.

Techniques for Analysis and Verification

The article by Roberto Bagnara, Pat M. Hill and E. Zaffanella describes new techniques for dealing with not necessarily closed convex polyhedra, which lie at the heart of several analysis and verification methods.

I would like to thank all the reviewers for their efforts and meticulous work, ensuring the quality of this special issue. I am very grateful to Dr. D.J. Cooke for his extensive support, making this special issue possible. I would also like to thank the authors for carefully taking the constructive comments of the reviewers into account, ensuring a quick turnaround. Finally, many thanks to all the participants of the workshop and to all the local organisers, especially Stefan Gruner and Stephane Lo Presti, making AVoCS'03 a fruitful and enjoyable event.

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