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Preface

Fundamentals of Software Engineering (extended versions of selected papers of FSEN 2015)



This special issue contains the extended versions of the selected papers presented at the sixth IPM International Conference on Fundamentals of Software Engineering (FSEN), Tehran, Iran, April 22–24, 2015. This event, FSEN 2015, was organized by the School of Computer Science at the Institute for Studies in Fundamental Sciences (IPM) in Iran, in cooperation with the ACM SIGSOFT and IFIP WG2.2.

FSEN attracts submissions concerning all aspects of formal methods in software engineering, in particular those related to advancing the application of formal methods in the software industry and promoting their integration with practical engineering techniques. For FSEN 2015, we received 62 submissions from 22 countries out of which we have accepted 14 regular papers for publication in the conference proceedings and presentation at the conference. From these papers, we have invited and accepted the following 5 papers published in this special issue.

The first article entitled ‘Choreography Realizability Enforcement through the Automatic Synthesis of Distributed Coordination Delegates’ by Marco Autili, Paola Inverardi, and Massimo Tivoli, focuses on the composition of distributed services by means of a choreography that specifies the external interaction of the services. The problem addressed in this work is automatic synthesis of distributed coordination delegates that control the service interactions. The synthesis process should respect the realizability of the specified choreography. The authors show the correctness of their approach and illustrate their formalization on an explanatory example.

The second article entitled ‘Architecture-Level Configuration of Industrial Control Systems: Foundations for an Efficient Approach’ by Razieh Behjati and Shiva Nejati, extends their previous work on configuring embedded system. The earlier work suggested a methodology that enables instantiation of a reference architecture model for a particular industrial control system. The extension proposes a backtrack-free configuration mechanism by presenting an algorithm that computes an ordering over configuration parameters to find a consistent configuration without backtracking. The authors analyse the proposed mechanisms by showing formal properties such as termination, soundness and completeness, and efficiency of their presented algorithm. The third article entitled ‘Centralized Coordination vs. Partially-Distributed Coordination with Reo and Constraint Automata’ by Sung-Shik Jongmans and Farhad Arbab, provides a performance comparison between various compilation approaches for Reo, which is a language designed to implement concurrency protocols among threads. The authors compare the time performance of different compilation approaches. The authors claim that their approach can be applied, not only to Reo, but to any language whose semantics can be defined in terms of constraint automata.

The fourth article entitled ‘A Study of Mutable Checkpointing and Related Algorithms’ by Astrid Kiehn and Deepanker Aggarwal, focuses on the specification and verification of mutable checkpointing algorithms. To this end, the authors introduce a formal framework to specify the operational semantics of mutable checkpointing. This allows constructive consistency proofs that can be used for automatic verification of mutable checkpointing algorithms.

The last article entitled ‘A Theory of Integrating Tamper Evidence with Stabilization’ by Reza Hajisheykhi, Ali Ebnehasir and Sandeep Kulkarni, considers the problem of system stabilisation, and introduces two notions of stabilisation: tamper-evident and flexible tamper evident stabilisation. The authors compare the notion of tamper-evident stabilisation with existing notions of stabilisation and active stabilisation, and present verification approaches for the two proposed notions of stabilisation. The complexity of verification approaches is presented, and it is explained how these stabilisation concepts can be applied. We would like to thank the authors and the reviewers of all the papers. We also thank the editorial team

of the journal, specially the Editor-in-Chief, Jan A. Bergstra, and the Editorial Assistant, Bas van Vlijmen, for their constant help and support.

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