

Preface

Software is the essential enabler for science and the new economy. It creates new markets and new directions for a more reliable, flexible, and robust society. It empowers the exploration of our world in ever more depth. However, software often falls short of our expectations. Current software methodologies, tools, and techniques remain expensive and are not yet sufficiently reliable for a constantly changing and evolving market, and many promising approaches have proved to be no more than case-by-case oriented methods.

This book explores new trends and theories that illuminate the direction of developments in this field, developments that we believe will lead to a transformation of the role of software and science integration in tomorrow's global information society.

By discussing issues ranging from research practices, techniques, and methodologies, to proposing and reporting solutions needed for global world business, it offers an opportunity for the software science community to think about where we are today and where we are going.

The book aims to capture the essence of a new state of the art in software science and its supporting technology, and to identify the challenges that such a technology will have to master. It contains extensively reviewed papers presented at the 14th International Conference on New Trends in Intelligent Software Methodology, Tools, and Techniques (SoMeT 2015) held in Naples, Italy, with the collaboration of the University of Naples Federico II, during September 15–17, 2015 (<http://www.impianti.unina.it/somet2015/>). This round of SoMeT 2015 celebrated its 14th anniversary. The SoMeT¹ conference series is ranked as B+ rank among other high-ranking computer science conferences worldwide.

This conference brought together researchers and practitioners to share their original research results and practical development experience in software science and related new technologies.

This volume forms part of the conference and the SoMeT series by providing an opportunity for the exchange of ideas and experiences in the field of software technology; by opening up new avenues for software development, methodologies, tools, and techniques, especially with regard to intelligent software by applying artificial intelligence techniques in software development; and by tackling human interaction in the development process for a better high-level interface. The focus is on human-centric software methodologies, end-user development techniques, and emotional reasoning, for an optimally harmonized performance between the design tool and the user.

¹ Previous related events that contributed to this publication are: SoMeT_02 (the Sorbonne, Paris, 2002); SoMeT 2003 (Stockholm, Sweden, 2003); SoMeT 2004 (Leipzig, Germany, 2004); SoMeT 2005 (Tokyo, Japan, 2005); SoMeT 2006 (Quebec, Canada, 2006); SoMeT 2007 (Rome, Italy, 2007); SoMeT 2008 (Sharjah, UAE, 2008); SoMeT 2009 (Prague, Czech Republic, 2009); SoMeT 2010 (Yokohama, Japan, 2010), and SoMeT 2011 (Saint Petersburg, Russia), SoMeT 2012 (Genoa, Italy), SoMeT 2013 (Budapest, Hungary), and SoMeT 2014 (Langkawi, Malaysia).

The word “intelligent” in the name SoMeT emphasizes the need to apply artificial intelligence issues to software design for systems application, for example, in disaster recovery and other systems supporting social services through sustainable recovery planning.

A major goal of this conference was to assemble the work of scholars from the international research community to discuss and share research experiences of new software methodologies and techniques. One of the important issues addressed is the handling of cognitive issues in software development to adapt it to the user’s mental state. Tools and techniques related to this aspect form part of this book. Another subject raised at the conference was intelligent software design in software ontology and conceptual software design in the practice of human-centric information system applications.

The book also investigates other comparable theories and practices in software science, including emerging technologies, from their computational foundations in terms of models, methodologies, and tools. This is essential for a comprehensive overview of information systems and research projects, and to assess their practical impact on real-world software problems. This represents another milestone in mastering the new challenges of software and its promising technology, addressed by the SoMeT conferences, and provides the reader with new insights, inspiration, and concrete material to further the study of this new technology.

The book is a collection of carefully selected refereed papers by the reviewing committee and covering (but not limited to):

- Software engineering aspects of software security programs, diagnosis, and maintenance
- Static and dynamic analysis of software performance models
- Software security aspects and networking
- Agile software and lean methods
- Practical artifacts of software security, software validation and diagnosis
- Software optimization and formal methods
- Requirement engineering and requirement elicitation
- Software methodologies and related techniques
- Automatic software generation, re-coding and legacy systems
- Software quality and process assessment
- Intelligent software systems design and evolution
- Artificial intelligence techniques on software engineering, and requirement engineering
- End-user requirement engineering, programming environment for Web applications
- Ontology, cognitive models and philosophical aspects of software design
- Business-oriented software application models
- Emergency management informatics, software methods and application for supporting civil protection, first response and disaster recovery
- Model-driven development (DVD), code-centric to model-centric software engineering
- Cognitive software and human behavioral analysis in software design

All 48 papers selected and organized in this book have been carefully reviewed, on the basis of technical soundness, relevance, originality, significance, and clarity, by up to four reviewers. They were then revised before being selected by the SoMeT 2015 international reviewing committee. These papers are categorized into ten chapters and classified according to the paper's topic and its relevance to each chapter theme:

Chapter 1 “Embedded and Mobile Software Systems, Theory and Application”

Chapter 2 “Real-Time Systems”

Chapter 3 “Requirement Engineering, High-Assurance and Testing System”

Chapter 4 “Social Networks and Big Data”

Chapter 5 “Cloud Computing and the Semantic Web”

Chapter 6 “Artificial Intelligence Techniques and Intelligent System Design”

Chapter 7 “Software Development and Integration”

Chapter 8 “Security and Software Methodologies for Reliable Software Design”

Chapter 9 “New Software Techniques in Image Processing and Computer Graphics”

Chapter 10 “Software Applications Systems for Medical Health Care”

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