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Frontiers in Artificial Intelligence and Applications

NEW TRENDS IN INTELLIGENT SOFTWARE METHODOLOGIES, TOOLS AND TECHNIQUES

Proceedings of the 23rd International Conference on New Trends in Intelligent Software Methodologies, Tools and Techniques (SoMeT_24)

Edited by
Hamido Fujita
Hector Perez-Meana
Andres Hernandez-Matamoros

IOS Press

NEW TRENDS IN INTELLIGENT SOFTWARE METHODOLOGIES, TOOLS AND TECHNIQUES

Applied intelligence, integrated with software, is an essential enabler for science and the new economy, creating new markets and new directions for a more reliable, flexible and robust society and empowering the exploration of our world in ever more depth. The available software, however, often falls short of expectations, with current methodologies, tools, and techniques still neither robust enough nor sufficiently reliable to adequately serve a constantly changing and evolving market.

This proceedings presents 40 papers delivered at SoMeT 24, the 23rd edition of the International Conference on New Trends in Intelligent Software Methodology Tools, and Techniques, held on 24 and 25 September 2024 in Cancun, Mexico. The conference explored new trends and theories, illuminating the direction of developments by discussing issues ranging from research practices to techniques and methodologies and proposing and reporting on the solutions needed for global world business, and this book aims to capture the essence of a new state-of-the-art in software science and its supporting technologies, and to identify the challenges that such technologies will have to master. The 40 papers included here were carefully selected following a thorough review process on the basis of technical soundness, relevance, originality, significance, and clarity, whereby each paper was reviewed by three or four reviewers.

The book brings together the work of scholars from the international research community, and will be of interest to all those working in the field of intelligent software methodology, tools, and techniques.

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Edited by

Hamido Fujita

Malaysia-Japan International Institute of Technology (MJIIT), Universiti Teknologi Malaysia, Kuala Lumpur, Malaysia

Hector Perez Meana

National Polytechnic Institute, Mexico City, Mexico

and

Andres Hernandez-Matamoros

Meiji University, Tokyo, Japan

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Preface

Applied intelligence, integrated with software, is an 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 neither robust enough nor 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 that are not fully automated.

This book explores new trends and theories which illuminate the direction of developments in this field which we believe will lead to a transformation in the role of software and science integration in tomorrow's global information society. By discussing issues ranging from research practices to techniques and methodologies and proposing and reporting on the 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 technologies, and to identify the challenges that such technologies will have to master. It contains extensively reviewed papers presented at the 23rd edition of the International Conference on New Trends in Intelligent Software Methodology Tools, and Techniques, (SoMeT_24) held in Cancun, Mexico, with the collaboration of University of Instituto Politécnico Nacional, Mexico, from 24 to 25 September 2024, https://atenea.esimecu.ipn.mx/
SoMeT_24 is celebrating its 23rd edition,[1] and the 2024 event was supported by the i-SOMET Incorporated Association, (www.i-somet.org) established by Prof. Hamido Fujita.

This edition of the conference brought together researchers and practitioners to share their original research results and practical development experience in software science and related new technologies. It forms part of the conference and the SoMeT series, providing an opportunity for the exchange of ideas and experiences in the field of software technology, opening up new avenues for software development, methodologies, tools, and techniques, particularly with regard to intelligent software, by applying artificial intelligence techniques in software development, and tackling human interaction in the development process for better high-level interface. The emphasis has been placed on human-centric software methodologies, end-user development techniques, and emotional reasoning, for an optimally harmonized performance between

[1] Previous related events are: SoMeT_02 (the Sorbonne, Paris, 2002); SoMeT_03 (Stockholm, Sweden, 2003); SoMeT_04 (Leipzig, Germany, 2004); SoMeT_05 (Tokyo, Japan, 2005); SoMeT_06 (Quebec, Canada, 2006); SoMeT_07 (Rome, Italy, 2007); SoMeT_08 (Sharjah, UAE, 2008); SoMeT_09 (Prague, Czech Republic, 2009); SoMeT_10 (Yokohama, Japan, 2010), and SoMeT_11 (Saint Petersburg, Russia), SoMeT_12 (Genoa, Italy), SoMeT_13 (Budapest, Hungary), SoMeT_14 (Langkawi, Malaysia), SoMeT_15 (Naples, Italy), SoMeT_16 (Larnakes, Cyprus), SoMeT_17 (Kitakyushu, Japan), SoMeT_18 (Granada, Spain), SoMeT_19 (Sarawak, Malaysia), SoMeT_20 (Kitakyushu, Japan), SoMeT_2021 (Cancun, Mexico), SoMeT_22 (Kitakyushu, Japan), SoMeT_2023 (Naples, Italy)

the design tool and the user. The word “intelligent” in SOMET emphasizes the need for the consideration of artificial intelligence issues in software design for systems application, for example. in disaster recovery and other systems supporting civil protection.

A major goal of this publication was to assemble the work of scholars from the international research community which 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 so as to adapt it to the user’s mental state, and tools and techniques related to this aspect form part of the contributions to this book. Other subjects raised at the conference were intelligent software design in software ontology, and conceptual software design in the practice of human-centric information system application.

The book also investigates other theories and practices in software science, including emerging technologies from their computational foundations in terms of models, methodologies, and tools. This is essential both 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 papers, refereed by the reviewing committee listed, the members of which carefully selected revised articles of the highest quality for publication. Referees from the program committee first carefully reviewed all the submissions received, and 40 papers were selected on the basis of technical soundness, relevance, originality, significance, and clarity. These were then revised on the basis of the review reports before being selected by the SoMeT_24 international reviewing committee, with each paper being reviewed by three or four reviewers.

This book is the result of a collective effort from many industrial partners and colleagues throughout the world. We would like to express our gratitude for the support provided by the University of Instituto Politécnico Nacional, Mexico and to all those authors who contributed their invaluable support to this work. Most especially, we wish to thank the program committee, reviewing committee and all those who participated in the rigorous reviewing process and the lively discussion and evaluation meetings which led to the selection of the papers which appear in this book. Last, but not least, we would also like to thank the Microsoft Conference Management Tool team for their expert guidance on the use of the Microsoft CMT System as a conference-support tool during all the phases of SoMeT_24.

The Editors

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Hamido Fujita	Malaysia-Japan International Institute of Technology(MJIIT), Universiti Teknologi Malaysia, Kuala Lumpur, Malaysia e-mail : fujitahamido@utm.my, hfujita@i-somet.org
Hector Perez Meana	National Polytechnic Institute (IPN), Mexico City, Mexico e-mail : hmperezm@ipn.mx

Program Chairs

Andres Hernandez-Matamoros, Meiji University, Tokyo, Japan
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e-mail: caaann@gmail.com

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