

Preface

The content of the book includes high quality contributions to APCASE 2014, the second Asia-Pacific Conference on the Computer Aided System Engineering, February 10–12, 2014 in South Kuta, Bali, Indonesia. APCASE 2014 was organized by the University of Technology, Sydney (Australia), Binus University of Technology (Indonesia), Warsaw University of Technology (Poland) and the University of Applied Sciences in Hagenberg (Austria). The aim of APCASE series of conferences is to provide a highly prestigious venue for academics, system engineering and applied science researchers as well as practitioners in the Asia-Pacific region.

The proposed volume includes an excellent choice of extended versions of papers presented at the APCASE 2014 conference. The book is made of four main parts that cover data-oriented engineering science research in a wide range of applications:

- Computational Models and Knowledge Discovery
- Communications, Networks, and Cloud Computing
- Computer-Based Systems
- Data-Oriented and Software-Intensive Systems

The first part presents recent advances in computational models and knowledge discovery. This part also covers heuristic computational models and model-driven system design. These approaches are highly applicable for problems which cannot be easily solved by deterministic methods, due to the dimensionality, complexity or specificity issues. The issues discussed in this part of the book include: Boolean reasoning and fast Boolean computation, data ontologies, description logic, accelerated and simulation-based optimization techniques, implicit solution spaces and dynamic solution space reduction, neural network methods, iterative back projection methods, identification and classification, location of objects and events, symbolic regression and search strategies for grammatical optimization. The second part discusses most recent advances in communication and networks. In this part, innovative computational models of data transmission, as well as, practices and

implementation issues related to sensor network software infrastructure; reliability in multistage interconnection networks; authentication, authorization and the task workflow in the cloud infrastructure. The third part presents most recent developments, challenges and practical applications related to computer-aided system optimization and design principles. A range of application fields and case studies is presented, including: tracking moving targets and image processing; control, data fusion and monitoring of biosignals; electronic manufacturing, multi-core processors and smart grid technologies. The fourth and the final part presents an overview of the most recent advances in the domain of data-oriented and software-intensive systems. Such areas as: intelligent warehousing, simulation of supply-chain logistic, steganographic image processing, augmented reality solutions, e-commerce applications, financial markets and Internet banking systems are covered.

The organization of the book allows highlighting the tremendous and steadily growing role of data-oriented and software intensive systems in almost all domains of human activity. Additionally, such organization enables authors to provide a comprehensive review of new challenges these systems are facing when dealing with increasingly more complex solutions for solving data explorations.

This book offers excellent examples of the intelligent ubiquitous computation, as well as recent advances in systems engineering and informatics. The content represents state-of-the-art foundations for researchers in the domain of modern computation, computer science, system engineering and networking, with many examples that are set in the industrial application context.

The readers will greatly benefit from acquiring knowledge of the advanced methods and applications in computational intelligence on what and how various engineering problems and challenges can be approached and resolved in several domains. They will learn various methods and techniques that could be applied in order to solve these problems. One of the most important benefits that potential readers will gain is not only good understanding of what the major challenges are but also the most practical and efficient solutions to address them.

There are very few books that currently could offer similar content, depth and practicality of the methodologies and techniques contained in the book. Additionally, the publication offers a very convenient entry for researchers and engineers who intend to work in the discussed research domains.

The book is mainly targeted at scientists, engineers and IT specialists in the fields of computational intelligence, telecommunication, control engineering, artificial intelligence, signal processing, software engineering, electrical engineering, mechanics, robotics, soft computing and many others who have interests and needs to understand the theory and practical applications of computational intelligence and heuristic methodologies. Many students at various educational levels (undergraduate, graduate and postgraduate) could benefit from this book, as it offers a

consistent material as well as a well-researched bibliography. From this perspective, the book can be used as a textbook in any course in the field of computational intelligence, computer system engineering, telecommunications, software engineering and IT.

Warsaw, October 2014
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