Preface

Nowadays IT enterprises, networking, and business processes are becoming extremely demanding due to the ever-increasing complexity of systems and real-life applications. Complex intelligent systems are calling for advanced decision support systems to deal with the huge amounts of information, manipulation of complex data as well as efficiency, scalability, and security issues to support modern businesses in an autonomous, intelligent and adaptive manner.

The book *Complex Intelligent Systems and Their Applications* brings a comprehensive view of the most recent advances in complex intelligent systems and their application to the resolution of real-life problems from networking, finance, engineering, production processes, IT enterprises, and business security. The selected chapters cover a broad spectrum of issues and applications in the field of complex intelligent systems and state-of-the-art results for theoretic and practical approaches in such systems.

Among the many features of *Complex Intelligent Systems* highlighted in the book, we could distinguish the following ones by chapter:

In Chap. 1, *Moser et al.* present an approach for integrating complex information systems in the ATM domain. The large-scale and the critical issues in integration of various complex information systems in the ATM domain are real challenges tackled in the chapter. The approach presents software engineering and intelligent solutions to the integration of complex information systems in the ATM domain. An industry case is used to evaluate the approach and its comparison to traditional system integration approaches in the ATM domain.

Chapter 2 by *Veres et al.* addresses the use of semantic technologies in alignment of IT with business strategy from a requirements engineering perspective. The proposed approach is shown to be very useful in IT business. Data models and semantics are explored to achieve the goals of the proposed approach by extending BSCP (Business Strategy, Context, and Process) framework. Seven–Eleven Japan is used as a case study to validate in practice the approach.

Goebel et al. in Chap. 3 use RFID-based inter-organizational system architecture for decision support in modern business environments such as supply chain event management. By using standardized formats for event and context data, the

approach supports the interoperability of information systems in different organizations and facilitates the integration of event-based applications into enterprise architectures. Both pull- and push-based architectures are analyzed regarding efficiency and reliability.

In Chap. 4, *Hussain and Dillon* report a decision-making approach for demand-driven production processes. With the ever increasing complexity of the production processes and the demanding quality of services of costumers, the enterprises need advanced decision support systems. The proposed decision support system is aimed to hedge with third party producers to assist manufacturers in the cost-benefit analysis.

Chapter 5 by *Tashi and Ghernaouti-Hélie* proposes a security assurance model for information security in organizations. As information security is becoming very complex and critical, models for assessing assurance of security in IT enterprises is becoming imperative. In this chapter the authors bring a framework and an in-depth analysis of assurance models. Also, issues of efficiency and efficacy of the assessing the assurance are tackled.

Jakoubi et al. in Chap. 6 deal with issues arising in risk-aware business process management aiming at establishing the link between business and security. The authors present a survey of existing approaches in the literature tackling the challenge of integrating economic, risk, and security aspects. Then, a methodology enabling the risk-aware modeling and simulation of business processes is presented.

In Chap. 7, *Pournaras et al.* present AETOS (Adaptive Epidemic Tree Overlay Service), a self-organization approach for maintaining the hierarchical structures in large-scale distributed systems. The approach is shown useful in many complex applications arising in energy optimization, Internet-based multicast applications, etc. The experimental study reveals the complexity of the approach and highlights the findings, namely, ATEOS provides high connectivity in tree overlays optimized according to application requirements.

Chapter 8 by *Kitajima et al.* proposes an intelligent technique for efficiently filtering data in broadcasting systems based on the biological metaphor of attractor selection from living organisms. The approach is shown useful in many complex large-scale applications with particular focus on complex applications from networking domain. The feasibility of the proposed approach is validated by experimental study and simulations.

In Chap. 9, *Gorawski and Chrószcz* introduce a new query system for temporal data analysis. With the increasing complexity of applications and the large amounts of data to store and process, advanced query systems are a must to efficiently cope with the various challenges raised in temporal data analysis. The authors present StreamAPAS system and its declarative query language that enables users to define temporal data analysis.

Chapter 10 by *Pllana et al.* deals with agent-supported programming of multicore computing systems. The authors argue that an intelligent program development environment that proactively supports the user helps a mainstream programmer to overcome the difficulties of programming multicore computing systems. Then, a programming environment is proposed using intelligent software agents. An ex-

ample to illustrate how the best practices from HPC combined with agent-based program development can obtain efficient solutions is also given.

In Chap. 11, *Gentile and Vitabile* bring the state-of-the-art approaches in Human Computer Interaction (HCI). HCI is gaining new *momentum* due to the increasing use of a large variety of computational devices. The authors present a comprehensive view of HCI approaches and have exemplified the presentation by using agents for HCI approaches. The applicability of the approach is shown for context-aware complex distributed applications from eBusiness, Cultural Heritage, etc. for providing services and contents to costumers.

The last chapter by *Doncescu et al.* introduces new operators for advanced knowledge-based systems. Clustering has become central not only to data mining but more broadly to knowledge-based systems. The authors present novel reinforced operators that allow for using different sources of information. The approach is shown useful for advanced decision making in complex intelligent systems.

All in all, the chapters collected in this book provide new insights and approaches on the analysis and the development of *Complex Intelligent Systems* aiming to greatly support modern businesses in an autonomous, intelligent, and adaptable manner. Researchers, academics, developers, practitioners, and students will find in this book the latest trends in these research and development topics.

We hope the readers of this book will share our joy and find it a valuable resource in their research, development, and academic activities.

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