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Interactive Granular Computations in Networks and Systems Engineering: A Practical Perspective

Springer The book outlines selected projects conducted under the supervision of the author. Moreover, it discusses significant relations between Interactive Granular Computing (IGrC) and numerous dynamically developing scientific domains worldwide, along with features characteristic of the author's approach to IGrC. The results presented are a continuation and elaboration of various aspects of Wisdom Technology, initiated and developed in cooperation with Professor Andrzej Skowron. Based on the empirical findings from these projects, the author explores the following areas: (a) understanding the causes of the theory and practice gap problem (TPGP) in complex systems engineering (CSE); (b) generalizing computing models of complex adaptive systems (CAS) (in particular, natural computing models) by constructing an interactive granular computing (IGrC) model of networks of interrelated interacting complex granules (c-granules), belonging to a single agent and/or to a group of agents; (c) developing methodologies based on the IGrC model to minimize the negative consequences of the TPGP. The book introduces approaches to the above issues, using the proposed IGrC model. In particular, the IGrC model refers to the key mechanisms used to control the processes related to the implementation of CSE projects. One of the main aims was to develop a mechanism of IGrC control over computations that model a project's implementation processes to maximize the chances of its success, while at the same time minimizing the emerging risks. In this regard, the IGrC control is usually performed by means of properly selected and enforced (among project participants) project principles. These principles constitute examples of c-granules, expressed by complex vague concepts (represented by c-granules too). The c-granules evolve with time (in particular, the meaning of the concepts is also subject of change). This methodology is illustrated using project principles applied by the author during the implementation of the POLTAX, AlgoTradix, Merix, and Excavio projects outlined in the book.

Computational Collective Intelligence

13th International Conference, ICCCI 2021, Rhodes, Greece, September 29 – October 1, 2021, Proceedings

Springer Nature This book constitutes the refereed proceedings of the 13th International Conference on Computational Collective Intelligence, ICCCI 2021, held in September/October 2021. The conference was held virtually due to the COVID-19 pandemic. The 58 full papers were carefully reviewed and selected from 230 submissions. The papers are grouped in topical issues on knowledge engineering and semantic web; social networks and recommender systems; collective decision-making; cooperative strategies for decision making and optimization; data mining and machine learning; computer vision techniques; natural language processing; Internet of Things: technologies and applications; Internet of Things and computational technologies for collective intelligence; computational intelligence for multimedia understanding.

Rough Sets

International Joint Conference, IJCRS 2017, Olsztyn,

Poland, July 3–7, 2017, Proceedings, Part I

Springer This two-volume set LNAI 10313 and LNAI 10314 constitutes the proceedings of the International Joint Conference on Rough Sets, IJCRS 2017, held in Olsztyn, Poland, in July 2017. The 74 revised full papers presented together with 16 short papers and 16 invited talks, were carefully reviewed and selected from 130 submissions. The papers in this two set-volume of IJCRS 2017 follow the track already rutted by RSCTC and JRS conferences which aimed at unification of many facets of rough set theory from theoretical aspects of the rough set idea bordering on theory of concepts and going through algebraic structures, topological structures, logics for uncertain reasoning, decision algorithms, relations to other theories of vagueness and ambiguity, then to extensions of the rough set idea like granular structures, rough mereology, and to applications of the idea in diverse fields of applied science including hybrid methods like rough-fuzzy, neuro-rough, neuro-rough-fuzzy computing. IJCRS 2017 encompasses topics spread among four main tracks: Rough Sets and Data Science (in relation to RSCTC series organized since 1998); Rough Sets and Granular Computing (in relation to RSFDGrC series organized since 1999); Rough Sets and Knowledge Technology (in relation to RSKT series organized since 2006); and Rough Sets and Intelligent Systems (in relation to RSEISP series organized since 2007).

Intelligence Science III

4th IFIP TC 12 International Conference, ICIS 2020, Durgapur, India, February 24–27, 2021, Revised Selected Papers

Springer Nature This book constitutes the refereed post-conference proceedings of the 4th International Conference on Intelligence Science, ICIS 2020, held in Durgapur, India, in February 2021 (originally November 2020). The 23 full papers and 4 short papers presented were carefully reviewed and selected from 42 submissions. One extended abstract is also included. They deal with key issues in brain cognition; uncertain theory; machine learning; data intelligence; language cognition; vision cognition; perceptual intelligence; intelligent robot; and medical artificial intelligence.

Interpretable Artificial Intelligence: A Perspective of Granular Computing

Springer Nature This book offers a comprehensive treatise on the recent pursuits of Artificial Intelligence (AI) – Explainable Artificial Intelligence (XAI) by casting the crucial features of interpretability and explainability in the original framework of Granular Computing. The innovative perspective established with the aid of information granules provides a high level of human centricity and transparency central to the development of AI constructs. The chapters reflect the breadth of the area and cover recent developments in the methodology, advanced algorithms and applications of XAI to visual analytics, knowledge representation, learning and interpretation. The book appeals to a broad audience including researchers and practitioners interested in gaining exposure to the rapidly growing body of knowledge in AI and intelligent systems.

Granular Computing

Analysis and Design of Intelligent Systems

CRC Press Information granules, as encountered in natural language, are implicit in nature. To make them fully operational so they can be effectively used to analyze and design intelligent systems, information granules need to be made explicit. An emerging discipline, granular computing focuses on formalizing information granules and unifying them to create a coherent methodological and developmental environment for intelligent system design and analysis. *Granular Computing: Analysis and Design of Intelligent Systems* presents the unified principles of granular computing along with its comprehensive algorithmic framework and design practices. Introduces the concepts of information granules, information granularity, and granular computing Presents the key formalisms of information granules Builds on the concepts of information granules with discussion of higher-order and higher-type information granules Discusses the operational concept of information granulation and degranulation by highlighting the essence of this tandem and its quantification in terms of the associated reconstruction error Examines the principle of justifiable granularity Stresses the need to look at information granularity as an important design asset that helps construct more realistic models of real-world systems or facilitate collaborative pursuits of system modeling Highlights the concepts, architectures, and design algorithms of granular models Explores application domains where granular computing and granular models play a visible role, including pattern recognition, time series, and decision making Written by an internationally renowned authority in the field, this innovative book introduces readers to granular computing as a new paradigm for the analysis and synthesis of intelligent systems. It is a valuable resource for those engaged in research and practical developments in computer, electrical, industrial, manufacturing, and biomedical engineering. Building from fundamentals, the book is also suitable for readers from nontechnical disciplines where information granules assume a visible position.

Rough Sets

International Joint Conference, IJCRS 2018, Quy Nhon, Vietnam, August 20-24, 2018, Proceedings

Springer This LNAI 1103 constitutes the proceedings of the International Joint Conference on Rough Sets, IJCRS 2018, held in Quy Nhon, Vietnam, in August 2018. The 40 full papers presented together with 5 short papers were carefully reviewed and selected from 61 submissions. The IJCRS conferences aim at bringing together experts from universities and research centers as well as the industry representing fields of research in which theoretical and applicational aspects of rough set theory already find or may potentially find usage.

Granular Computing Based Machine Learning

A Big Data Processing Approach

Springer This book explores the significant role of granular computing in advancing machine learning towards in-depth processing of big data. It begins by introducing the main characteristics of big data, i.e., the five Vs—Volume, Velocity, Variety, Veracity and Variability. The book explores granular computing as a response to the fact that learning tasks have become increasingly more complex due to the vast and rapid increase in the size of data, and that traditional machine learning has proven too shallow to adequately deal with big data. Some popular types of traditional machine learning are presented in terms of their key features and limitations in the context of big data. Further, the book discusses why granular-computing-based machine learning is called for, and demonstrates how granular computing concepts can be used in different ways to advance machine learning for big data processing. Several case studies involving big data are presented by using biomedical data and sentiment data, in order to show the advances in big data processing through the shift from traditional machine learning to granular-computing-based machine learning. Finally, the book stresses the theoretical significance, practical importance, methodological impact and philosophical aspects of granular-computing-based machine learning, and suggests several further directions for advancing machine learning to fit the needs of modern industries. This book is aimed at PhD students, postdoctoral researchers and academics who are actively involved in fundamental research on machine learning or applied research on data mining and knowledge discovery, sentiment analysis, pattern recognition, image processing, computer vision and big data analytics. It will also benefit a broader audience of researchers and practitioners who are actively engaged in the research and development of intelligent systems.

Springer Handbook of Computational Intelligence

Springer The Springer Handbook for Computational Intelligence is the first book covering the basics, the state-of-the-art and important applications of the dynamic and rapidly expanding discipline of computational intelligence. This comprehensive handbook makes readers familiar with a broad spectrum of approaches to solve various problems in science and technology. Possible approaches include, for example, those being inspired by biology, living organisms and animate systems. Content is organized in seven parts: foundations; fuzzy logic; rough sets; evolutionary computation; neural networks; swarm intelligence and hybrid computational intelligence systems. Each Part is supervised by its own Part Editor(s) so that high-quality content as well as completeness are assured.

Pattern Recognition and Machine Intelligence

7th International Conference, PReMI 2017, Kolkata, India, December 5-8, 2017, Proceedings

Springer This book constitutes the proceedings of the 7th International Conference on Pattern Recognition and Machine Intelligence, PReMI 2017, held in Kolkata, India, in December 2017. The total of 86 full papers presented in this volume were carefully reviewed and selected from 293 submissions. They were organized in topical sections named: pattern recognition and machine learning; signal and image processing; computer vision and video processing; soft and natural computing; speech and natural language processing; bioinformatics and computational biology; data mining and big data analytics; deep learning; spatial data science and engineering; and applications of pattern recognition and machine intelligence.

Computer Information Systems and Industrial Management

15th IFIP TC8 International Conference, CISIM 2016, Vilnius, Lithuania, September 14-16, 2016, Proceedings

Springer This book constitutes the proceedings of the 15th IFIP TC8 International Conference on Computer Information Systems and Industrial Management, CISIM 2016, held in Vilnius, Lithuania, in September 2016. The 63 regular papers presented together with 1 invited paper and 5 keynotes in this volume were carefully reviewed and selected from about 89 submissions. The main topics covered are rough set methods for big data analytics; images, visualization, classification; optimization, tuning; scheduling in manufacturing and other applications; algorithms; decisions; intelligent distributed systems; and biometrics, identification, security.

Novel Developments in Granular Computing: Applications for Advanced Human Reasoning and Soft Computation

Applications for Advanced Human Reasoning and Soft Computation

IGI Global "This book investigates granular computing (GrC), which emerged as one of the fastest growing information processing paradigms in computational intelligence and human-centric systems"--Provided by publisher.

Rough Sets, Fuzzy Sets, Data Mining, and Granular Computing

14th International Conference, RSFDGrC 2013, Halifax, NS, Canada, October 11-14, 2013. Proceedings

Springer This book constitutes the thoroughly refereed conference proceedings of the 14th International Conference on Rough Sets, Fuzzy Sets, Data Mining and Granular Computing, RSFDGrC 2013, held in Halifax, Canada in October 2013 as one of the co-located conference of the 2013 Joint Rough Set Symposium, JRS 2013. The 69 papers (including 44 regular and 25 short papers) included in the JRS proceedings (LNCS 8170 and LNCS 8171) were carefully reviewed and selected from 106 submissions. The papers in this volume cover topics such as inconsistency, incompleteness, non-determinism; fuzzy and rough hybridization; granular computing and covering-based rough sets; soft clustering; image and medical data analysis.

Intelligence Science I

Second IFIP TC 12 International Conference, ICIS 2017, Shanghai, China, October 25-28, 2017, Proceedings

Springer This book constitutes the refereed proceedings of the Second International Conference on Intelligence Science, ICIS 2017, held in Shanghai, China, in October 2017. The 38 full papers and 9 short papers presented were carefully reviewed and selected from 82 submissions. They deal with key issues in intelligence science and have been organized in the following topical sections: theory of intelligence science; cognitive computing; big data analysis and machine learning; machine perception; intelligent information processing; and intelligent applications.

Rough Sets and Intelligent Systems Paradigms

Second International Conference, RSEISP 2014, Granada and Madrid, Spain, July 9-13, 2014. Proceedings

Springer This book constitutes the refereed proceedings of the 23rd Australasian Joint Conference on Rough Sets and Intelligent Systems Paradigms, RSEISP 2014, held in Granada and Madrid, Spain, in July 2014. RSEISP 2014 was held along with the 9th International Conference on Rough Sets and Current Trends in Computing, RSCTC 2014, as a major part of the 2014 Joint Rough Set

Symposium, JRS 2014. JRS 2014 received 40 revised full papers and 37 revised short papers which were carefully reviewed and selected from 120 submissions and presented in two volumes. This volume contains the papers accepted for the conference RSEISP 2014, as well as the three invited papers presented at the conference. The papers are organized in topical sections on plenary lecture and tutorial papers; foundations of rough set theory; granular computing and covering-based rough sets; applications of rough sets; induction of decision rules - theory and practice; knowledge discovery; spatial data analysis and spatial databases; information extraction from images.

Data Mining in Dynamic Social Networks and Fuzzy Systems

IGI Global Many organizations, whether in the public or private sector, have begun to take advantage of the tools and techniques used for data mining. Utilizing data mining tools, these organizations are able to reveal the hidden and unknown information from available data. Data Mining in Dynamic Social Networks and Fuzzy Systems brings together research on the latest trends and patterns of data mining tools and techniques in dynamic social networks and fuzzy systems. With these improved modern techniques of data mining, this publication aims to provide insight and support to researchers and professionals concerned with the management of expertise, knowledge, information, and organizational development.

Intelligent Decision Technologies

Proceedings of the 4th International Conference on Intelligent Decision Technologies (IDT'2012) - Volume 2

Springer Science & Business Media The Intelligent Decision Technologies (IDT) International Conference encourages an interchange of research on intelligent systems and intelligent technologies that enhance or improve decision making. The focus of IDT is interdisciplinary and includes research on all aspects of intelligent decision technologies, from fundamental development to real applications. IDT has the potential to expand their support of decision making in such areas as finance, accounting, marketing, healthcare, medical and diagnostic systems, military decisions, production and operation, networks, traffic management, crisis response, human-machine interfaces, financial and stock market monitoring and prediction, and robotics. Intelligent decision systems implement advances in intelligent agents, fuzzy logic, multi-agent systems, artificial neural networks, and genetic algorithms, among others. Emerging areas of active research include virtual decision environments, social networking, 3D human-machine interfaces, cognitive interfaces, collaborative systems, intelligent web mining, e-commerce, e-learning, e-business, bioinformatics, evolvable systems, virtual humans, and designer drugs. This volume contains papers from the Fourth KES International Symposium on Intelligent Decision Technologies (KES IDT'12), hosted by researchers in Nagoya University and other institutions in Japan. This book contains chapters based on papers selected from a large number of submissions for consideration for the conference from the international community. The volume represents the current leading thought in intelligent decision technologies.

Rough Sets and Intelligent Systems - Professor Zdzisław Pawlak in Memoriam

Volume 1

Springer Science & Business Media This book is dedicated to the memory of Professor Zdzisław Pawlak who passed away almost six year ago. He is the founder of the Polish school of Artificial Intelligence and one of the pioneers in Computer Engineering and Computer Science with worldwide influence. He was a truly great scientist, researcher, teacher and a human being. This book prepared in two volumes contains more than 50 chapters. This demonstrates that the scientific approaches discovered by of Professor Zdzisław Pawlak, especially the rough set approach as a tool for dealing with imperfect knowledge, are vivid and intensively explored by many researchers in many places throughout the world. The submitted papers prove that interest in rough set research is growing and is possible to see many new excellent results both on theoretical foundations and applications of rough sets alone or in combination with other approaches. We are proud to offer the readers this book.

Big Data Analysis: New Algorithms for a New Society

Springer This edited volume is devoted to Big Data Analysis from a Machine Learning standpoint as presented by some of the most eminent researchers in this area. It demonstrates that Big Data Analysis opens up new research problems which were either never considered before, or were only considered within a limited range. In addition to providing methodological discussions on the principles of mining Big Data and the difference between traditional statistical data analysis and newer computing frameworks, this book presents recently developed algorithms affecting such areas as business, financial forecasting, human mobility, the Internet of Things, information networks, bioinformatics, medical systems and life science. It explores, through a number of specific examples, how the study of Big Data Analysis has evolved and how it has started and will most likely continue to affect society. While the benefits brought upon by Big Data Analysis are underlined, the book also discusses some of the warnings that have been issued

concerning the potential dangers of Big Data Analysis along with its pitfalls and challenges.

Pattern Recognition And Big Data

World Scientific Containing twenty six contributions by experts from all over the world, this book presents both research and review material describing the evolution and recent developments of various pattern recognition methodologies, ranging from statistical, linguistic, fuzzy-set-theoretic, neural, evolutionary computing and rough-set-theoretic to hybrid soft computing, with significant real-life applications. *Pattern Recognition and Big Data* provides state-of-the-art classical and modern approaches to pattern recognition and mining, with extensive real life applications. The book describes efficient soft and robust machine learning algorithms and granular computing techniques for data mining and knowledge discovery; and the issues associated with handling Big Data. Application domains considered include bioinformatics, cognitive machines (or machine mind developments), biometrics, computer vision, the e-nose, remote sensing and social network analysis.

Computational Intelligence In Software Engineering, Advances In Fuzzy Systems: Applications And Theory

World Scientific This unique volume is the first publication on software engineering and computational intelligence (CI) viewed as a synergistic interplay of neurocomputing, granular computation (including fuzzy sets and rough sets), and evolutionary methods. It presents a unified view of CI in the context of software engineering. The book addresses a number of crucial issues: what is CI, what role does it play in software development, how are CI elements built into successive phases of the software life cycle, and what is the role played by CI in quantifying fundamental features of software artifacts? With contributions from leading researchers and practitioners, the book provides the reader with a wealth of new concepts and approaches, complete algorithms, in-depth case studies, and thought-provoking exercises. The topics coverage include neurocomputing, granular as well as evolutionary computing, object-oriented analysis and design in software engineering. There is also an extensive bibliography.

Three Approaches to Data Analysis

Test Theory, Rough Sets and Logical Analysis of Data

Springer Science & Business Media In this book, the following three approaches to data analysis are presented: - Test Theory, founded by Sergei V. Yablonskii (1924-1998); the first publications appeared in 1955 and 1958, - Rough Sets, founded by Zdzisław I. Pawlak (1926-2006); the first publications appeared in 1981 and 1982, - Logical Analysis of Data, founded by Peter L. Hammer (1936-2006); the first publications appeared in 1986 and 1988. These three approaches have much in common, but researchers active in one of these areas often have a limited knowledge about the results and methods developed in the other two. On the other hand, each of the approaches shows some originality and we believe that the exchange of knowledge can stimulate further development of each of them. This can lead to new theoretical results and real-life applications and, in particular, new results based on combination of these three data analysis approaches can be expected. - Logical Analysis of Data, founded by Peter L. Hammer (1936-2006); the first publications appeared in 1986 and 1988. These three approaches have much in common, but researchers active in one of these areas often have a limited knowledge about the results and methods developed in the other two. On the other hand, each of the approaches shows some originality and we believe that the exchange of knowledge can stimulate further development of each of them. This can lead to new theoretical results and real-life applications and, in particular, new results based on combination of these three data analysis approaches can be expected. These three approaches have much in common, but researchers active in one of these areas often have a limited knowledge about the results and methods developed in the other two. On the other hand, each of the approaches shows some originality and we believe that the exchange of knowledge can stimulate further development of each of them. This can lead to new theoretical results and real-life applications and, in particular, new results based on combination of these three data analysis approaches can be expected.

Future Generation Information Technology

Second International Conference, FGIT 2010, Jeju Island, Korea, December 13-15, 2010. Proceedings

Springer As information technology (IT) becomes specialized and fragmented, it is easy to lose sight that many topics have common threads and because of this, advances in one s- discipline may transmit to another. The presentation of results between different s- disciplines encourages this interchange for the advancement of IT as a whole. This volume comprises the selection of papers presented at the Second International Mega-Conference on Future Generation Information Technology (FGIT 2010), composed of the following 11 international conferences: Advanced Software Engineering and Its Applications (ASEA 2010), Bio-Science and Bio-Technology (BSBT 2010), Control and Automation (CA 2010), Disaster Recovery and Business Continuity (DRBC 2010), Database Theory and Application (DTA 2010), Future Generation Communication and Networking (FGCN 2010), Grid and Distributed Computing (GDC 2010), Multimedia, Computer Graphics and Broadcasting (MulGraB 2010), Security Technology (SecTech 2010), Signal Processing, Image Processing and Pattern Recognition (SIP 2010), as well as u- and e-Service, Science and Technology (UNESST 2010).

In total, 1,630 papers were submitted to FGIT 2010 from 30 countries. The submitted papers went through a rigorous reviewing process and 395 papers were accepted. Of these 395 papers, 60 were assigned to this volume. In addition, this volume contains 7 invited papers and abstracts. Of the remaining accepted papers, 269 were distributed among 8 volumes of proceedings published by Springer in the CCIS series. 66 papers were withdrawn due to technical reasons.

Rough Sets and Knowledge Technology

10th International Conference, RSKT 2015, Held as Part of the International Joint Conference on Rough Sets, IJCRS 2015, Tianjin, China, November 20-23, 2015, Proceedings

Springer This book constitutes the thoroughly refereed conference proceedings of the 10th International Conference on Rough Sets and Knowledge Technology, RSKT 2015, held in Tianjin, China, in November 2015, as part of the International Joint Conference on Rough Sets, IJCRS 2015, together with the 15th International Conference on Rough Sets, Fuzzy Sets, Data Mining and Granular Computing, RSFDgrC 2015. The 66 papers presented at IJCRS 2015 were carefully reviewed and selected from 97 submissions. The 38 papers included in this volume are organized in the following topical sections: rough sets: the experts speak; reducts and rules; three-way decisions; logic and algebra; clustering; rough sets and graphs; and modeling and learning. In addition the volume contains 6 contributions by new fellows of the International Rough Set Society, an invited talk and a tutorial.

Thriving Rough Sets

10th Anniversary - Honoring Professor Zdzisław Pawlak's Life and Legacy & 35 Years of Rough Sets

Springer This special book is dedicated to the memory of Professor Zdzisław Pawlak, the father of rough set theory, in order to commemorate both the 10th anniversary of his passing and 35 years of rough set theory. The book consists of 20 chapters distributed into four sections, which focus in turn on a historical review of Professor Zdzisław Pawlak and rough set theory; a review of the theory of rough sets; the state of the art of rough set theory; and major developments in rough set based data mining approaches. Apart from Professor Pawlak's contributions to rough set theory, other areas he was interested in are also included. Moreover, recent theoretical studies and advances in applications are also presented. The book will offer a useful guide for researchers in Knowledge Engineering and Data Mining by suggesting new approaches to solving the problems they encounter.

Decision Making Theories and Methods Based on Interval-Valued Intuitionistic Fuzzy Sets

Springer Nature This is the first book to provide a comprehensive and systematic introduction to the ranking methods for interval-valued intuitionistic fuzzy sets, multi-criteria decision-making methods with interval-valued intuitionistic fuzzy sets, and group decision-making methods with interval-valued intuitionistic fuzzy preference relations. Including numerous application examples and illustrations with tables and figures and presenting the authors' latest research developments, it is a valuable resource for researchers and professionals in the fields of fuzzy mathematics, operations research, information science, management science and decision analysis.

Applications of Evolutionary Computation

EvoApplications 2011: EvoCOMNET, EvoFIN, EvoHOT, EvoMUSART, EvoSTIM, and EvoTRANSLOG, Torino, Italy, April 27-29, 2011, Proceedings

Springer Science & Business Media This book constitutes the refereed proceedings of the International Conference on the Applications of Evolutionary Computation, EvoApplications 2011, held in Torino, Italy, in April 2011 colocated with the Evo 2011 events. Thanks to the large number of submissions received, the proceedings for EvoApplications 2011 are divided across two volumes (LNCS 6624 and 6625). The present volume contains contributions for EvoCOMNET, EvoFIN, EvoHOT, EvoMUSART, EvoSTIM, and EvoTRANSLOC. The 51 revised full papers presented were carefully reviewed and selected from numerous submissions. This volume presents an overview*

about the latest research in EC. Areas where evolutionary computation techniques have been applied range from telecommunication networks to complex systems, finance and economics, games, image analysis, evolutionary music and art, parameter optimization, scheduling, and logistics. These papers may provide guidelines to help new researchers tackling their own problem using EC.

Handbook of Granular Computing

John Wiley & Sons Although the notion is a relatively recent one, the notions and principles of Granular Computing (GrC) have appeared in a different guise in many related fields including granularity in Artificial Intelligence, interval computing, cluster analysis, quotient space theory and many others. Recent years have witnessed a renewed and expanding interest in the topic as it begins to play a key role in bioinformatics, e-commerce, machine learning, security, data mining and wireless mobile computing when it comes to the issues of effectiveness, robustness and uncertainty. The Handbook of Granular Computing offers a comprehensive reference source for the granular computing community, edited by and with contributions from leading experts in the field. Includes chapters covering the foundations of granular computing, interval analysis and fuzzy set theory; hybrid methods and models of granular computing; and applications and case studies. Divided into 5 sections: Preliminaries, Fundamentals, Methodology and Algorithms, Development of Hybrid Models and Applications and Case Studies. Presents the flow of ideas in a systematic, well-organized manner, starting with the concepts and motivation and proceeding to detailed design that materializes in specific algorithms, applications and case studies. Provides the reader with a self-contained reference that includes all pre-requisite knowledge, augmented with step-by-step explanations of more advanced concepts. The Handbook of Granular Computing represents a significant and valuable contribution to the literature and will appeal to a broad audience including researchers, students and practitioners in the fields of Computational Intelligence, pattern recognition, fuzzy sets and neural networks, system modelling, operations research and bioinformatics.

Agent and Multi-Agent Systems: Technologies and Applications

4th KES International Symposium, KES-AMSTA 2010, Gdynia, Poland, June 23-25, 2010. Proceedings, Part I

Springer Simulation and Decision Making, Multi-Agent Applications, Management and e-Business, Mobile Agents and Robots, and Machine Learning. In addition to the main tracks of the symposium there were the following five special sessions: Agent-Based Optimization (ABO2010), Agent-Enabled Social Computing (AESC2010), Digital Economy (DE2010), Using Intelligent Systems for Information Technology Assessment (ISITA2010) and a Doctoral Track. Accepted and presented papers highlight new trends and challenges in agent and multi-agent research. We hope these results will be of value to the research community working in the fields of artificial intelligence, collective computational intelligence, robotics, machine learning and, in particular, agent and multi-agent systems technologies and applications. We would like to express our sincere thanks to the Honorary Chairs, Romuald Cwilewicz, President of the Gdynia Maritime University, Poland, and Lakhmi C. Jain, University of South Australia, Australia, for their support. Our special thanks go to the Local Organizing Committee chaired by Ireneusz Czarnowski, who did very solid and excellent work. Thanks are due to the Program Co-chairs, all Program and Reviewer Committee members and all the additional reviewers for their valuable efforts in the review process, which helped us to guarantee the highest quality of selected papers for the conference. We cordially thank the organizers and chairs of special sessions, which essentially contributed to the success of the conference.

Advances in Computational Intelligence

11th Mexican International Conference on Artificial Intelligence, MICAI 2012, San Luis Potosi, Mexico, October 27 - November 4, 2012. Revised Selected Papers, Part II

Springer The two-volume set LNAI 7629 and LNAI 7630 constitutes the refereed proceedings of the 11th Mexican International Conference on Artificial Intelligence, MICAI 2012, held in San Luis Potosí, Mexico, in October/November 2012. The 80 revised papers presented were carefully reviewed and selected from 224 submissions. The second volume includes 40 papers focusing on soft computing. The papers are organized in the following topical sections: natural language processing; evolutionary and nature-inspired metaheuristic algorithms; neural networks and hybrid intelligent systems; fuzzy systems and probabilistic models in decision making.

Human-Centric Information Processing Through Granular Modelling

Springer Science & Business Media Information granules and their processing permeate a way in which we perceive the world, carryout processing at the conceptual (abstract) level, and communicate our findings to the surrounding environment. The importance of information granulation becomes even more apparent when we are faced with a rapidly growing flood of data, become challenged to make decisions in complex data settings and are required to appreciate the context from which the data is derived. Human centricity of systems that claim to be "intelligent" and the granular computing come hand in hand. It is not surprising at all to witness that the paradigm of Granular Computing has started to gain visibility and continues along this path by gathering interest from the circles of academics and practitioners. It is quite remarkable that the spectrum of application and research areas that have adopted information granulation as a successful strategy for dealing with information complexity covers such diverse fields as bioinformatics, image understanding, environmental monitoring, urban sustainability, to mention few most visible in the literature. Undoubtedly, there are two important aspects of Granular Computing that are worth stressing. First, there are several formalisms in which information granules are articulated so be intervals (sets), fuzzy sets, rough sets, soft sets, approximate sets, near sets and alike. They are complementary and each of them offers some interesting views at the complexity of the world and cyberspace.

Man-Machine Interactions

Springer Science & Business Media This volume reflects a number of research streams on the development of computer systems and software that makes it possible to employ them in a variety of human activities ranging from logic studies and artificial intelligence, rule-based control of technological processes, image analysis, expert systems and decision support, to assistance in creative works. In particular, the volume points to a number of new advances in man-machine communication, interaction between visualization and modeling, rough granular computing in human-centric information processing and the discovery of affinities between perceptual granules. The topical subdivisions of this volume include human-computer interactions, decision support, rough fuzzy investigations, advances in classification methodology, pattern analysis and signal processing, computer vision and image analysis, advances in algorithmics, databases and data warehousing, and embedded system applications.

Wisdom Web of Things

Springer This book provides a thorough overview of the Wisdom Web of Things (W2T), a holistic framework for computing and intelligence in an emerging hyper-world with a social-cyber-physical space. Fast-evolving Web intelligence research and development initiatives are now moving toward understanding the multifaceted nature of intelligence and incorporating it at the Web scale in a ubiquitous environment with data, connection and service explosion. The book focuses on the framework and methodology of W2T, as well as its applications in different problem domains, such as intelligent businesses, urban computing, social computing, brain informatics and healthcare. From the researcher and developer perspectives, the book takes a systematic, structured view of various W2T facets and their overall contribution to the development of W2T as a whole. Written by leading international researchers, this book is an essential reference for researchers, educators, professionals, and tertiary HDR students working on the World Wide Web, ubiquitous computing, knowledge management, and business intelligence.

Rough Sets, Fuzzy Sets, Data Mining, and Granular Computing

10th International Conference, RSFDGrC 2005, Regina, Canada, August 31 - September 3, 2005, Proceedings

Springer Science & Business Media The two volume set LNAI 3641 and LNAI 3642 constitutes the refereed proceedings of the 10th International Conference on Rough Sets, Fuzzy Sets, Data Mining, and Granular Computing, RSFDGrC 2005, held in Regina, Canada in August/September 2005. The 119 revised full papers presented were carefully reviewed and selected from a total of 277 submissions. They comprise the two volumes together with 6 invited papers, 22 approved workshop papers, and 5 special section papers that all were carefully selected and thoroughly revised. The first volume includes 75 contributions related to rough set approximations, rough-algebraic foundations, feature selection and reduction, reasoning in information systems, rough-probabilistic approaches, rough-fuzzy hybridization, fuzzy methods in data analysis, evolutionary computing, machine learning, approximate and uncertain reasoning, probabilistic network models, spatial and temporal reasoning, non-standard logics, and granular computing. The second volume contains 77 contributions and deals with rough set software, data mining, hybrid and hierarchical methods, information retrieval, image recognition and processing, multimedia applications, medical applications, web content analysis, business and industrial applications, the approved workshop papers and the papers accepted for a special session on intelligent and sapient systems.

Computational Intelligence in Medical Informatics

Springer Science & Business Media Medical Informatics (MI) is an emerging interdisciplinary science. This book deals with the application of computational intelligence in MI. Addressing the various issues of medical informatics using different computational intelligence approaches is the novelty of this edited volume. This volume comprises of 15 chapters selected on the basis of fundamental ideas/concepts including an introductory chapter giving the fundamental definitions and some important research challenges.

Agents and Data Mining Interaction

7th International Workshop, ADMI 2011, Taipei, Taiwan, May 2-6, 2011, Revised Selected Papers

Springer This book constitutes the thoroughly refereed post-workshop proceedings of the 7th International Workshop on Agents and Data Mining Interaction, ADMI 2011, held in Taipei, Taiwan, in May 2011 in conjunction with AAMAS 2011, the 10th International Joint Conference on Autonomous Agents and Multiagent Systems. The 11 revised full papers presented were carefully reviewed and selected from 24 submissions. The papers are organized in topical sections on agents for data mining; data mining for agents; and agent mining applications.

Securing IoT and Big Data

Next Generation Intelligence

CRC Press This book covers IoT and Big Data from a technical and business point of view. The book explains the design principles, algorithms, technical knowledge, and marketing for IoT systems. It emphasizes applications of big data and IoT. It includes scientific algorithms and key techniques for fusion of both areas. Real case applications from different industries are offering to facilitate ease of understanding the approach. The book goes on to address the significance of security algorithms in combining IoT and big data which is currently evolving in communication technologies. The book is written for researchers, professionals, and academicians from interdisciplinary and transdisciplinary areas. The readers will get an opportunity to know the conceptual ideas with step-by-step pragmatic examples which makes ease of understanding no matter the level of the reader.

Granular Computing

An Introduction

Springer Science & Business Media This book is about Granular Computing (GC) - an emerging conceptual and of information processing. As the name suggests, GC concerns computing paradigm processing of complex information entities - information granules. In essence, information granules arise in the process of abstraction of data and derivation of knowledge from information. Information granules are everywhere. We commonly use granules of time (seconds, months, years). We granulate images; millions of pixels manipulated individually by computers appear to us as granules representing physical objects. In natural language, we operate on the basis of word-granules that become crucial entities used to realize interaction and communication between humans. Intuitively, we sense that information granules are at the heart of all our perceptual activities. In the past, several formal frameworks and tools, geared for processing specific information granules, have been proposed. Interval analysis, rough sets, fuzzy sets have all played important role in knowledge representation and processing. Subsequently, information granulation and information granules arose in numerous application domains. Well-known ideas of rule-based systems dwell inherently on information granules. Qualitative modeling, being one of the leading threads of AI, operates on a level of information granules. Multi-tier architectures and hierarchical systems (such as those encountered in control engineering), planning and scheduling systems all exploit information granularity. We also utilize information granules when it comes to functionality granulation, reusability of information and efficient ways of developing underlying information infrastructures.

Active Media Technology

9th International Conference, AMT 2013, Maebashi, Japan, October 29-31, 2013. Proceedings

Springer This book constitutes the refereed proceedings of the 9th International Conference on Active Media Technology, AMT 2013, held in Maebashi, Japan, in October 2013. The 26 revised full papers presented together with 2 short papers, 16 workshop papers, and 12 special session papers were carefully reviewed and selected from numerous submissions. The papers are organized in topical sections on active computer systems, interactive systems, and application of AMT based systems; active media machine learning and

data mining techniques; AMT for semantic web, social networks, and cognitive foundations. Additionally, the main topic of the workshop papers is: intelligence for strategic foresight; and for the special session papers: technologies and theories of narrative; evolutionary computation and its application; and intelligent media search techniques.

Electrical Engineering and Intelligent Systems

Springer Science & Business Media The revised and extended papers collected in this volume represent the cutting-edge of research at the nexus of electrical engineering and intelligent systems. They were selected from well over 1000 papers submitted to the high-profile international World Congress on Engineering held in London in July 2011. The chapters cover material across the full spectrum of work in the field, including computational intelligence, control engineering, network management, and wireless networks. Readers will also find substantive papers on signal processing, Internet computing, high performance computing, and industrial applications. The Electrical Engineering and Intelligent Systems conference, as part of the 2011 World Congress on Engineering was organized under the auspices of the non-profit International Association of Engineers (IAENG). With more than 30 nations represented on the conference committees alone, the Congress features the best and brightest scientific minds from a multitude of disciplines related to engineering. These peer-reviewed papers demonstrate the huge strides currently being taken in this rapidly developing field and reflect the excitement of those at the frontiers of this research.