Aspects Of Computational Intelligence Theory And Applications Revised And Selected Papers Of The 15th Ieee International Conference On Intelligent In Intelligent Engineering And Informatics

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Computational Intelligence. Theory and Applications

This eighteen-chapter book presents the latest applications of lattice theory in Computational Intelligence (CI). The book focuses on neural computation, mathematical morphology, machine learning, and (fuzzy) inference/logic. The book comes out of a special session held during the World Council for Curriculum and Instruction World Conference (WCCI 2006). The articles presented here demonstrate how lattice theory may suggest viable alternatives in practical

clustering, classification, pattern analysis, and regression applications.

Challenges for Computational Intelligence

This book constitutes the refereed proceedings of the International Conference on Computational Intelligence, 7th Dortmund Fuzzy Days, held in Dortmund, Germany, in October 2001. The 71 revised full papers presented were carefully reviewed and selected from an overwhelming number of submissions. Also included are four invited contributions and 24 poster presentations. The papers are devoted to foundational and practical issues in fuzzy systems, soft computing, neural networks, evolutionary algorithms, and machine learning and thus cover the whole range of computational intelligence.

Embodied Artificial Intelligence

Cooperative game theory is a branch of (micro-)economics that studies the behavior of self-interested agents in strategic settings where binding agreements among agents are possible. Our aim in this book is to present a survey of work on the computational aspects of cooperative game theory. We begin by formally defining transferable utility games in characteristic function form, and introducing key solution concepts such as the core and the Shapley value. We then discuss two

major issues that arise when considering such games from a computational perspective: identifying compact representations for games, and the closely related problem of efficiently computing solution concepts for games. We survey several formalisms for cooperative games that have been proposed in the literature, including, for example, cooperative games defined on networks, as well as general compact representation schemes such as MC-nets and skill games. As a detailed case study, we consider weighted voting games: a widely-used and practically important class of cooperative games that inherently have a natural compact representation. We investigate the complexity of solution concepts for such games, and generalizations of them. We briefly discuss games with non-transferable utility and partition function games. We then overview algorithms for identifying welfare-maximizing coalition structures and methods used by rational agents to form coalitions (even under uncertainty), including bargaining algorithms. We conclude by considering some developing topics, applications, and future research directions.

Computational Intelligence in Archaeology

Martin Charles Golumbic has been making seminal contributions to algorithmic graph theory and artificial intelligence throughout his career. He is universally admired as a long-standing pillar of the discipline of computer science. He has contributed to the development of fundamental research in artificial intelligence in

the area of complexity and spatial-temporal reasoning as well as in the area of compiler optimization. Golumbic's work in graph theory led to the study of new perfect graph families such as tolerance graphs, which generalize the classical graph notions of interval graph and comparability graph. He is credited with introducing the systematic study of algorithmic aspects in intersection graph theory, and initiated research on new structured families of graphs including the edge intersection graphs of paths in trees (EPT) and trivially perfect graphs. Golumbic is currently the founder and director of the Caesarea Edmond Benjamin de Rothschild Institute for Interdisciplinary Applications of Computer Science at the University of Haifa. He also served as chairman of the Israeli Association of Artificial Intelligence (1998-2004), and founded and chaired numerous international symposia in discrete mathematics and in the foundations of artificial intelligence. This Festschrift volume, published in honor of Martin Charles Golumbic on the occasion of his 60th birthday, contains 20 papers, written by graduate students, research collaborators, and computer science colleagues, who gathered at a conference on subjects related to Martin Golumbic's manifold contributions in the field of algorithmic graph theory and artificial intelligence, held in Jerusalem, Tiberias and Haifa, Israel in September 2008.

Philosophy of Artificial Intelligence

Computational Intelligence and Its Applications in Healthcare presents rapidly

growing applications of computational intelligence for healthcare systems, including intelligent synthetic characters, man-machine interface, menu generators, user acceptance analysis, pictures archiving, and communication systems. Computational intelligence is the study of the design of intelligent agents, which are systems that act intelligently: they do what they think are appropriate for their circumstances and goals; they're flexible to changing environments and goals; they learn from experience; and they make appropriate choices given perceptual limitations and finite computation. Computational intelligence paradigms offer many advantages in maintaining and enhancing the field of healthcare. Provides coverage of fuzzy logic, neural networks, evolutionary computation, learning theory, probabilistic methods, telemedicine, and robotics applications Includes coverage of artificial intelligence and biological applications, soft computing, image and signal processing, and genetic algorithms Presents the latest developments in computational methods in healthcare Bridges the gap between obsolete literature and current literature

Computational Intelligence Paradigms

Originating from a Dagstuhl seminar, the collection of papers presented in this book constitutes on the one hand a representative state-of-the-art survey of embodied artificial intelligence, and on the other hand the papers identify the important research trends and directions in the field. Following an introductory

overview, the 23 papers are organized into topical sections on - philosophical and conceptual issues - information, dynamics, and morphology - principles of embodiment for real-world applications - developmental approaches - artificial evolution and self-reconfiguration

Agents and Artificial Intelligence

Computational Intelligence with its roots in Fuzzy Logic, Neural Networks and Evolutionary Algorithms has become an important research and application field in computer science in the last decade. Methodologies from these areas and combinations of them enable users from engineering, business, medicine and many more branches to capture and process vague, incomplete, uncertain and imprecise data and knowledge. Many algorithms and tools have been developed to solve problems in the realms of high and low level control, information processing, diagnostics, decision support, classification, optimisation and many more. This book tries to show the impact and feedback between theory and applications of Computational Intelligence, highlighted on selected examples.

Advances in Computational Intelligence

During the last three decades, interest has increased significantly in the

representation and manipulation of imprecision and uncertainty. Perhaps the most important technique in this area concerns fuzzy logic or the logic of fuzziness initiated by L. A. Zadeh in 1965. Since then, fuzzy logic has been incorporated into many areas of fundamental science and into the applied sciences. More importantly, it has been successful in the areas of expert systems and fuzzy control. The main body of this book consists of so-called IF-THEN rules, on which experts express their knowledge with respect to a certain domain of expertise. Fuzzy IF-THEN Rules in Computational Intelligence: Theory and Applications brings together contributions from leading global specialists who work in the domain of representation and processing of IF-THEN rules. This work gives special attention to fuzzy IF-THEN rules as they are being applied in computational intelligence. Included are theoretical developments and applications related to IF-THEN problems of propositional calculus, fuzzy predicate calculus, implementations of the generalized Modus Ponens, approximate reasoning, data mining and data transformation, techniques for complexity reduction, fuzzy linguistic modeling, large-scale application of fuzzy control, intelligent robotic control, and numerous other systems and practical applications. This book is an essential resource for engineers, mathematicians, and computer scientists working in fuzzy sets, soft computing, and of course, computational intelligence.

Computational Intelligence Applications in Modeling and

Multi-objective optimization (MO) is a fast-developing field in computational intelligence research. Giving decision makers more options to choose from using some post-analysis preference information, there are a number of competitive MO techniques with an increasingly large number of MO real-world applications. Multi-Objective Optimization in Computational Intelligence: Theory and Practice explores the theoretical, as well as empirical, performance of MOs on a wide range of optimization issues including combinatorial, real-valued, dynamic, and noisy problems. This book provides scholars, academics, and practitioners with a fundamental, comprehensive collection of research on multi-objective optimization techniques, applications, and practices.

Computational Aspects of Cooperative Game Theory

Offering a wide range of programming examples implemented in MATLAB®, Computational Intelligence Paradigms: Theory and Applications Using MATLAB® presents theoretical concepts and a general framework for computational intelligence (CI) approaches, including artificial neural networks, fuzzy systems, evolutionary computation, genetic algorithms and programming, and swarm intelligence. It covers numerous intelligent computing methodologies and

algorithms used in CI research. The book first focuses on neural networks, including common artificial neural networks; neural networks based on data classification, data association, and data conceptualization; and real-world applications of neural networks. It then discusses fuzzy sets, fuzzy rules, applications of fuzzy systems, and different types of fused neuro-fuzzy systems, before providing MATLAB illustrations of ANFIS, classification and regression trees, fuzzy c-means clustering algorithms, fuzzy ART map, and Takagi–Sugeno inference systems. The authors also describe the history, advantages, and disadvantages of evolutionary computation and include solved MATLAB programs to illustrate the implementation of evolutionary computation in various problems. After exploring the operators and parameters of genetic algorithms, they cover the steps and MATLAB routines of genetic programming. The final chapter introduces swarm intelligence and its applications, particle swarm optimization, and ant colony optimization. Full of worked examples and end-of-chapter questions, this comprehensive book explains how to use MATLAB to implement CI techniques for the solution of biological problems. It will help readers with their work on evolution dynamics, self-organization, natural and artificial morphogenesis, emergent collective behaviors, swarm intelligence, evolutionary strategies, genetic programming, and the evolution of social behaviors.

Computational Intelligence

Presenting the theoretical and practical developments of an autonomous decision-making methodology, this work describes the strides made by intelligent systems and soft computing for the control of industrial systems. It uses practical examples of qualitative control techniques tested in industry and provides suitable intelligent computational algorithms and interfaces for industrial applications.

Computational Intelligence and Its Applications in Healthcare

Computational Intelligence

Provides an in-depth and even treatment of the three pillars of computational intelligence and how they relate to one another This book covers the three fundamental topics that form the basis of computational intelligence: neural networks, fuzzy systems, and evolutionary computation. The text focuses on inspiration, design, theory, and practical aspects of implementing procedures to solve real-world problems. While other books in the three fields that comprise computational intelligence are written by specialists in one discipline, this book is co-written by current former Editor-in-Chief of IEEE Transactions on Neural Networks and Learning Systems, a former Editor-in-Chief of IEEE Transactions on Fuzzy Systems, and the founding Editor-in-Chief of IEEE Transactions on

Evolutionary Computation. The coverage across the three topics is both uniform and consistent in style and notation. Discusses single-layer and multilayer neural networks, radial-basis function networks, and recurrent neural networks Covers fuzzy set theory, fuzzy relations, fuzzy logic interference, fuzzy clustering and classification, fuzzy measures and fuzzy integrals Examines evolutionary optimization, evolutionary learning and problem solving, and collective intelligence Includes end-of-chapter practice problems that will help readers apply methods and techniques to real-world problems Fundamentals of Computational intelligence is written for advanced undergraduates, graduate students, and practitioners in electrical and computer engineering, computer science, and other engineering disciplines.

Computational Intelligence

Industrial engineering is a branch of engineering dealing with the optimization of complex processes or systems. It is concerned with the development, improvement, implementation and evaluation of production and service systems. Computational Intelligence Systems find a wide application area in industrial engineering: neural networks in forecasting, fuzzy sets in capital budgeting, ant colony optimization in scheduling, Simulated Annealing in optimization, etc. This book will include most of the application areas of industrial engineering through these computational intelligence systems. In the literature, there is no book

including many real and practical applications of Computational Intelligence Systems from the point of view of Industrial Engineering. Every chapter will include explanatory and didactic applications. It is aimed that the book will be a main source for MSc and PhD students.

Computational Intelligence Systems and Applications

This book constitutes the refereed proceedings of the International Conference on Computational Intelligence held in Dortmund, Germany, as the 5th Fuzzy Days, in April 1997. Besides three invited contributions, the book presents 53 revised full papers selected from a total of 130 submissions. Also included are 35 posters documenting a broad scope of applications of computational intelligence techniques in a variety of areas. The volume addresses all current issues in computational intelligence, e.g. fuzzy logic, fuzzy control, neural networks, evolutionary algorithms, genetic programming, neuro-fuzzy systems, adaptation and learning, machine learning, etc.

Computational Intelligence. Theory and Applications

Computational Intelligence Techniques and Their Applications to Software Engineering Problems focuses on computational intelligence approaches as

applicable in varied areas of software engineering such as software requirement prioritization, cost estimation, reliability assessment, defect prediction, maintainability and quality prediction, size estimation, vulnerability prediction, test case selection and prioritization, and much more. The concepts of expert systems, case-based reasoning, fuzzy logic, genetic algorithms, swarm computing, and rough sets are introduced with their applications in software engineering. The field of knowledge discovery is explored using neural networks and data mining techniques by determining the underlying and hidden patterns in software data sets. Aimed at graduate students and researchers in computer science engineering, software engineering, information technology, this book: Covers various aspects of in-depth solutions of software engineering problems using computational intelligence techniques Discusses the latest evolutionary approaches to preliminary theory of different solve optimization problems under software engineering domain Covers heuristic as well as meta-heuristic algorithms designed to provide better and optimized solutions Illustrates applications including software requirement prioritization, software cost estimation, reliability assessment, software defect prediction, and more Highlights swarm intelligence-based optimization solutions for software testing and reliability problems

Advances in Computational Intelligence

This book constitutes the refereed proceedings of the International Conference on

Computational Intelligence, 6th Dortmund Fuzzy Days, held in Dortmund, Germany, in May 1999. The 68 revised full papers presented were carefully reviewed and selected from an overwhelming number of submissions. Also included are three invited contributions and 13 poster presentations. The papers are devoted to foundational and practical issues in fuzzy systems, neural networks, and genetic algorithms and thus cover the whole range of computational intelligence.

Computational Aspects of Cooperative Game Theory

This cross-disciplinary book dives into the technical and computational aspects that make cooperative games possible. It is appropriate for professional researchers, graduate students, and advanced undergraduates hoping to pursue careers in academia and / or industry.

Computational Intelligence

Computational Intelligence Systems in Industrial Engineering

In recent years computational intelligence has been extended by adding many

other subdisciplines and this new field requires a series of challenging problems that will give it a sense of direction in order to ensure that research efforts are not wasted. This book written by top experts in computational intelligence provides such clear directions and a much-needed focus on the most important and challenging research issues.

Computational Intelligence Paradigms

FLINS, originally an acronym for Fuzzy Logic and Intelligent Technologies in Nuclear Science, is now extended to Computational Intelligence for applied research. The contributions to the ninth in the series of FLINS conferences cover state-of-the-art research, development, and technology for computational intelligence systems ? both from foundations and applications points-of-view.

Graph Theory, Computational Intelligence and Thought

Advanced Intelligent Computing Theories and Applications. With Aspects of Artificial Intelligence

Provides analytical theories offered by innovative artificial intelligence computing

methods in the archaeological domain.

Computational Intelligence Based on Lattice Theory

Can we make machines that think and act like humans or other natural intelligent agents? The answer to this question depends on how we see ourselves and how we see the machines in question. Classical AI and cognitive science had claimed that cognition is computation, and can thus be reproduced on other computing machines, possibly surpassing the abilities of human intelligence. This consensus has now come under threat and the agenda for the philosophy and theory of AI must be set anew, re-defining the relation between AI and Cognitive Science. We can re-claim the original vision of general AI from the technical AI disciplines; we can reject classical cognitive science and replace it with a new theory (e.g. embodied); or we can try to find new ways to approach AI, for example from neuroscience or from systems theory. To do this, we must go back to the basic questions on computing, cognition and ethics for AI. The 30 papers in this volume provide cutting-edge work from leading researchers that define where we stand and where we should go from here.

Philosophy and Theory of Artificial Intelligence

Computational Intelligence: An Introduction, Second Edition offers an in-depth exploration into the adaptive mechanisms that enable intelligent behaviour in complex and changing environments. The main focus of this text is centred on the computational modelling of biological and natural intelligent systems, encompassing swarm intelligence, fuzzy systems, artificial neutral networks, artificial immune systems and evolutionary computation. Engelbrecht provides readers with a wide knowledge of Computational Intelligence (CI) paradigms and algorithms; inviting readers to implement and problem solve real-world, complex problems within the CI development framework. This implementation framework will enable readers to tackle new problems without any difficulty through a single Java class as part of the CI library. Key features of this second edition include: A tutorial, hands-on based presentation of the material. State-of-the-art coverage of the most recent developments in computational intelligence with more elaborate discussions on intelligence and artificial intelligence (AI). New discussion of Darwinian evolution versus Lamarckian evolution, also including swarm robotics, hybrid systems and artificial immune systems. A section on how to perform empirical studies; topics including statistical analysis of stochastic algorithms, and an open source library of CI algorithms. Tables, illustrations, graphs, examples, assignments, Java code implementing the algorithms, and a complete CI implementation and experimental framework. Computational Intelligence: An Introduction, Second Edition is essential reading for third and fourth year undergraduate and postgraduate students studying CI. The first edition has been

prescribed by a number of overseas universities and is thus a valuable teaching tool. In addition, it will also be a useful resource for researchers in Computational Intelligence and Artificial Intelligence, as well as engineers, statisticians, operational researchers, and bioinformaticians with an interest in applying AI or CI to solve problems in their domains. Check out http://www.ci.cs.up.ac.za for examples, assignments and Java code implementing the algorithms.

Computational Intelligence in Time Series Forecasting

In this book, comprising recent research of leading researchers, a broad variety of problems is introduced, motivated, and then new results on these problems are presented. This handbook-like volume is for readers with theoretical as well as practical background knowledge about Computational Intelligence.

Artificial Intelligence in Theory and Practice

Offering a wide range of programming examples implemented in MATLAB(R), Computational Intelligence Paradigms: Theory and Applications Using MATLAB(R) presents theoretical concepts and a general framework for computational intelligence (CI) approaches, including artificial neural networks, fuzzy systems, evolutionary computation, genetic algorithms and programming, and swarm

intelligence. It covers numerous intelligent computing methodologies and algorithms used in CI research. The book first focuses on neural networks, including common artificial neural networks; neural networks based on data classification, data association, and data conceptualization; and real-world applications of neural networks. It then discusses fuzzy sets, fuzzy rules, applications of fuzzy systems, and different types of fused neuro-fuzzy systems, before providing MATLAB illustrations of ANFIS, classification and regression trees, fuzzy c-means clustering algorithms, fuzzy ART map, and Takagi-Sugeno inference systems. The authors also describe the history, advantages, and disadvantages of evolutionary computation and include solved MATLAB programs to illustrate the implementation of evolutionary computation in various problems. After exploring the operators and parameters of genetic algorithms, they cover the steps and MATLAB routines of genetic programming. The final chapter introduces swarm intelligence and its applications, particle swarm optimization, and ant colony optimization. Full of worked examples and end-of-chapter questions, this comprehensive book explains how to use MATLAB to implement CI techniques for the solution of biological problems. It will help readers with their work on evolution dynamics, self-organization, natural and artificial morphogenesis, emergent collective behaviors, swarm intelligence, evolutionary strategies, genetic programming, and the evolution of social behaviors.

Fundamentals of Computational Intelligence

The rough and fuzzy set approaches presented here open up many new frontiers for continued research and development Computational Intelligence and Feature Selection provides readers with the background and fundamental ideas behind Feature Selection (FS), with an emphasis on techniques based on rough and fuzzy sets. For readers who are less familiar with the subject, the book begins with an introduction to fuzzy set theory and fuzzy-rough set theory. Building on this foundation, the book provides: A critical review of FS methods, with particular emphasis on their current limitations Program files implementing major algorithms, together with the necessary instructions and datasets, available on a related Web site Coverage of the background and fundamental ideas behind FS A systematic presentation of the leading methods reviewed in a consistent algorithmic framework Real-world applications with worked examples that illustrate the power and efficacy of the FS approaches covered An investigation of the associated areas of FS, including rule induction and clustering methods using hybridizations of fuzzy and rough set theories Computational Intelligence and Feature Selection is an ideal resource for advanced undergraduates, postgraduates, researchers, and professional engineers. However, its straightforward presentation of the underlying concepts makes the book meaningful to specialists and nonspecialists alike.

Computational Intelligence in Control Engineering

The development of computational intelligence (CI) systems was inspired by observable and imitable aspects of intelligent activity of human being and nature. The essence of the systems based on computational intelligence is to process and interpret data of various nature so that that CI is strictly connected with the increase of available data as well as capabilities of their processing, mutually supportive factors. Developed theories of computational intelligence were quickly applied in many fields of engineering, data analysis, forecasting, biomedicine and others. They are used in images and sounds processing and identifying, signals processing, multidimensional data visualization, steering of objects, analysis of lexicographic data, requesting systems in banking, diagnostic systems, expert systems and many other practical implementations. This book consists of 16 contributed chapters by subject experts who are specialized in the various topics addressed in this book. The special chapters have been brought out in the broad areas of Control Systems, Power Electronics, Computer Science, Information Technology, modeling and engineering applications. Special importance was given to chapters offering practical solutions and novel methods for the recent research problems in the main areas of this book, viz. Control Systems, Modeling, Computer Science, IT and engineering applications. This book will serve as a reference book for graduate students and researchers with a basic knowledge of control theory, computer science and soft-computing techniques. The resulting design procedures are emphasized using Matlab/Simulink software.

Computational Intelligence Techniques and Their Applications to Software Engineering Problems

This book constitutes the thoroughly refereed post-conference proceedings of the 4th International Conference on Agents and Artificial Intelligence, ICAART 2012, held in Vilamoura, Portugal, in February 2012. The 28 revised full papers presented together with one invited paper were carefully reviewed and selected from 292 submissions. The papers are organized in two topical sections on artificial intelligence and on agents.

Computational Intelligence

This book constitutes the refereed proceedings of the 8th Dortmund Fuzzy Days, held in Dortmund, Germany, 2004. The Fuzzy-Days conference has established itself as an international forum for the discussion of new results in the field of Computational Intelligence. All the papers had to undergo a thorough review guaranteeing a solid quality of the programme. The papers are devoted to foundational and practical issues in fuzzy systems, neural networks, evolutionary algorithms, and machine learning and thus cover the whole range of computational intelligence.

Aspects of Computational Intelligence: Theory and Applications

Computational Intelligence: Principles, Techniques and Applications presents both theories and applications of computational intelligence in a clear, precise and highly comprehensive style. The textbook addresses the fundamental aspects of fuzzy sets and logic, neural networks, evolutionary computing and belief networks. The application areas include fuzzy databases, fuzzy control, image understanding, expert systems, object recognition, criminal investigation, telecommunication networks, and intelligent robots. The book contains many numerical examples and homework problems with sufficient hints so that the students can solve them on their own.

Distributed Artificial Intelligence: Theory and Praxis

The papers in this volume comprise the refereed proceedings of the conference 'Artificial Intelligence in Theory and Practice' (IFIP AI 2006), which formed part of the 19th World Computer Congress of IFIP, the International Federation for Information Processing (WCC- 2006), in Santiago, Chile in August 2006. The conference is organised by the IFIP Technical Committee on Artificial Intelligence (Technical Committee 12) and its Working Group 12.5 (Artificial Intelligence Applications). All papers were reviewed by at least two members of our Programme

Committee. The best papers were selected for the conference and are included in this volume. The international nature of IFIP is amply reflected in the large number of countries represented here. The conference featured invited talks by Rose Dieng, John Atkinson, John Debenham and myself. IFIP AI 2006 also included the Second IFIP Symposium on Professional Practice in Artificial Intelligence, organised by Professor John Debenham, which ran alongside the refereed papers. I should like to thank the conference chair. Professor Debenham for all his efforts in organising the Symposium and the members of our programme committee for reviewing an unexpectedly large number of papers to a very tight deadline. This is the latest in a series of conferences organised by IFIP Technical Committee 12 dedicated to the techniques of Artificial Intelligence and their real-world applications. The wide range and importance of these applications is clearly indicated by the papers in this volume. Further information about TCI 2 can be found on our website http://www.ifiptcl2.org.

On Being a Machine: Formal aspects of artificial intelligence

This volume covers the state-of-the art of the research and development in various aspects of computational intelligence and gives some perspective directions of development. Except the traditional engineering areas that contain theoretical knowledge, applications, designs and projects, the book includes the area of use of computational intelligence in biomedical engineering. „Aspects of Computational

Intelligence: Theory and Applications" is a compilation of carefully selected extended papers written on the basis of original contributions presented at the 15th IEEE International Conference on Intelligence Engineering Systems 2011, INES 2011 held at June 23.-26. 2011 in AquaCity Poprad, Slovakia.

Computational Intelligence and Feature Selection

Foresight in an engineering business can make the difference between success and failure, and can be vital to the effective control of industrial systems. The authors of this book harness the power of intelligent technologies individually and in combination.

Computational Intelligence in Theory and Practice

This book deals with the major philosophical issues in the theoretical framework of Artificial Intelligence (AI) in particular and cognitive science in general. The researchers in AI are concerned with the issues of consciousness, human subjectivity, creativity, etc. Cognitive Science and AI argue that consciousness can be artificially created and comprehended in the function of robots. The robotic activities explain the mechanism involved in computation, language processing, sensing the information, etc. Contrary to this thesis, the philosophical study tries to

show that human consciousness, thinking, imagination, etc. are much larger concepts and need to be delved into in the broad theoretical framework. This book is a critique of the mechanistic theory of mind. It shows the basic foundation of AI and its limitations in explaining the activities of the human mental life. Machine-functionalism fails to account for the subjective nature of consciousness and the creativity involved in the conscious acts. There are two aspects of this thesis-- the epistemological and the metaphysical. Epistemologically, the subject of consciousness intimately knows the raw feelings or the qualia. Metaphysically speaking, however, the raw feelings are real in the sense that they are part of the furniture of the mental world. Therefore, we can hardly deny that the mental world is real.

Computational Intelligence. Theory and Applications

The International Conference on Intelligent Computing (ICIC) was formed to p- vide an annual forum dedicated to the emerging and challenging topics in artificial intelligence, machine learning, bioinformatics, and computational biology, etc. It aims to bring together researchers and practitioners from both academia and ind- try to share ideas, problems and solutions related to the multifaceted aspects of intelligent computing. ICIC 2008, held in Shanghai, China, September 15–18, 2008, constituted the 4th International Conference on Intelligent Computing. It built upon the success of ICIC 2007, ICIC 2006 and ICIC 2005 held in Qingdao, Kunming and

Hefei, China, 2007, 2006 and 2005, respectively. This year, the conference concentrated mainly on the theories and methodologies as well as the emerging applications of intelligent computing. Its aim was to unify the picture of contemporary intelligent computing techniques as an integral concept that highlights the trends in advanced computational intelligence and bridges theoretical research with applications. Therefore, the theme for this conference was "Emerging Intelligent Computing Technology and Applications". Papers focusing on this theme were solicited, addressing theories, methodologies, and applications in science and technology.

Computational Intelligence, Theory and Applications

Traditional Artificial Intelligence (AI) systems adopted symbolic processing as their main paradigm. Symbolic AI systems have proved effective in handling problems characterized by exact and complete knowledge representation. Unfortunately, these systems have very little power in dealing with imprecise, uncertain and incomplete data and information which significantly contribute to the description of many real world problems, both physical systems and processes as well as mechanisms of decision making. Moreover, there are many situations where the expert domain knowledge (the basis for many symbolic AI systems) is not sufficient for the design of intelligent systems, due to incompleteness of the existing knowledge, problems caused by different biases of human experts, difficulties in

forming rules, etc. In general, problem knowledge for solving a given problem can consist of an explicit knowledge (e.g., heuristic rules provided by a domain an implicit, hidden knowledge "buried" in past-experience expert) and numerical data. A study of huge amounts of these data (collected in databases) and the synthesizing of the knowledge "encoded" in them (also referred to as knowledge discovery in data or data mining), can significantly improve the performance of the intelligent systems designed.

Multi-Objective Optimization in Computational Intelligence: Theory and Practice

Distributed AI is the branch of AI concerned with how to coordinate behavior among a collection of semi-autonomous problem-solving agents: how they can coordinate their knowledge, goals and plans to act together, to solve joint problems, or to make individually or globally rational decisions in the face of uncertainty and multiple, conflicting perspectives. Distributed, coordinated systems of problem solvers are rapidly becoming practical partners in critical human problem-solving environments, and DAI is a rapidly developing field of both application and research, experiencing explosive growth around the world. This book presents a collection of articles surveying several major recent developments in DAI. The book focuses on issues that arise in building practical DAI systems in

real-world settings, and covers work undertaken in a number of major research and development projects in the U.S. and in Europe. It provides a synthesis of recent thinking, both theoretical and applied, on major problems of DAI in the 1990s.

Fuzzy If-Then Rules in Computational Intelligence

Computational Intelligence: Concepts to Implementations provides the most complete and practical coverage of computational intelligence tools and techniques to date. This book integrates various natural and engineering disciplines to establish Computational Intelligence. This is the first comprehensive textbook on the subject, supported with lots of practical examples. It asserts that computational intelligence rests on a foundation of evolutionary computation. This refreshing view has set the book apart from other books on computational intelligence. This book lays emphasis on practical applications and computational tools, which are very useful and important for further development of the computational intelligence field. Focusing on evolutionary computation, neural networks, and fuzzy logic, the authors have constructed an approach to thinking about and working with computational intelligence that has, in their extensive experience, proved highly effective. The book moves clearly and efficiently from concepts and paradigms to algorithms and implementation techniques by focusing, in the early chapters, on the specific con. It explores a number of key themes,

including self-organization, complex adaptive systems, and emergent computation. It details the metrics and analytical tools needed to assess the performance of computational intelligence tools. The book concludes with a series of case studies that illustrate a wide range of successful applications. This book will appeal to professional and academic researchers in computational intelligence applications, tool development, and systems. Moves clearly and efficiently from concepts and paradigms to algorithms and implementation techniques by focusing, in the early chapters, on the specific concepts and paradigms that inform the authors' methodologies Explores a number of key themes, including self-organization, complex adaptive systems, and emergent computation Details the metrics and analytical tools needed to assess the performance of computational intelligence tools Concludes with a series of case studies that illustrate a wide range of successful applications Presents code examples in C and C++ Provides, at the end of each chapter, review questions and exercises suitable for graduate students, as well as researchers and practitioners engaged in self-study

ROMANCE ACTION & ADVENTURE MYSTERY & THRILLER BIOGRAPHIES & HISTORY CHILDREN'S YOUNG ADULT FANTASY HISTORICAL FICTION HORROR LITERARY FICTION NON-FICTION SCIENCE FICTION