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New Soft Computing Techniques for System Modeling, Pattern Classification and Image Processing

This book provides insights into contemporary issues and challenges in soft computing applications and techniques in healthcare. It will be a useful guide to identify, categorise and assess the role of different soft computing techniques for disease, diagnosis and prediction due to technological advancements. The book explores applications in soft computing and covers empirical properties of artificial neural network (ANN), evolutionary computing, fuzzy logic and statistical techniques. It presents basic and advanced concepts to help beginners and industry professionals get up to speed on the latest developments in soft computing and healthcare systems. It incorporates the latest methodologies and challenges facing soft computing, examines descriptive, predictive and social network techniques and discusses analytics tools and their role in providing effective solutions for science and technology. The primary users for the book include researchers, academicians, postgraduate students, specialists and practitioners. Dr. Ashish Mishra is a professor in the Department of

Computer Science and Engineering, Gyan Ganga Institute of Technology and Sciences, Jabalpur, Madhya Pradesh, India. He has contributed in organising the INSPIRE Science Internship Camp. He is a member of the Institute of Electrical and Electronics Engineers and is a life member of the Computer Society of India. His research interests include the Internet of Things, data mining, cloud computing, image processing and knowledge-based systems. He holds nine patents in Intellectual Property, India. He has authored four books in the areas of data mining, image processing and LaTeX. Dr. G. Suseendran is an assistant professor, Department of Information Technology, School of Computing Sciences, Vels Institute of Science, Technology & Advanced Studies (VISTAS), Chennai, Tamil Nadu, India. His research interests include ad-hoc networks, the Internet of Things, data mining, cloud computing, image processing, knowledge-based systems, and Web information exploration. He has published more than 75 research papers in various international journals such as Science Citation Index, Springer Book Chapter, Scopus, IEEE Access and UGC-referred journals. Prof. Trung-Nghia Phung is an associate professor and Head of Academic Affairs, Thai Nguyen University of Information and Communication Technology (ICTU). He has published more than 60 research papers. His main research interest lies in the field of speech, audio, and biomedical signal processing. He serves as a technical committee program member, track chair, session chair, and reviewer of many international conferences and journals. He was a co-Chair of the International Conference on Advances in Information and Communication Technology 2016 (ICTA 2016) and a Session Chair of the 4th International Conference on Information System Design and Intelligent Applications (INDIA 2017).

Soft Computing

Rapid advancements in the application of soft computing tools and techniques have proven valuable in the development of highly scalable systems and resulted in brilliant applications, including those in biometric identification, interactive voice response systems, and data mining. Although many resources on the subject adequately cover the theoretic concepts, few provide clear insight into practical application. Filling this need, *Real Life Applications of Soft Computing* explains such applications, including the underlying technology and its implementation. While these systems initially seem complex, the authors clearly demonstrate how they can be modeled, designed, and implemented. Written in a manner that makes it accessible to novices, the book begins by covering the theoretical foundations of soft computing. It supplies a concise explanation of various models, principles, algorithms, tools, and techniques, including artificial neural networks, fuzzy systems, evolutionary algorithms, and hybrid algorithms. Supplying in-depth exposure to real life systems, the text provides: Multi-dimensional coverage supported by references, figures, and tables Warnings about common pitfalls in the implementation process, as well as detailed examinations of possible solutions A timely account of developments in various areas of application Solved examples and exercises in each chapter Detailing a wide range of contemporary applications, the text includes coverage of those in biometric systems, including physiological and behavioral biometrics. It also examines applications in legal threat assessment, robotic path planning, and navigation control. The authors consider

fusion methods in biometrics and bioinformatics and also provide effective disease identification techniques. Complete with algorithms for robotic path planning, the book addresses character recognition and presents the picture compression technique by using a customized hybrid algorithm. The authors conclude with a discussion of parallel architecture for artificial neural networks and supply guidelines for creating and implementing effective soft computing designs.

Soft Computing in Textile Engineering

Soft computing is a branch of computing which, unlike hard computing, can deal with uncertain, imprecise and inexact data. The three constituents of soft computing are fuzzy-logic-based computing, neurocomputing, and genetic algorithms. Fuzzy logic contributes the capability of approximate reasoning, neurocomputing offers function approximation and learning capabilities, and genetic algorithms provide a methodology for systematic random search and optimization. These three capabilities are combined in a complementary and synergetic fashion. This book presents a cohesive set of contributions dealing with important issues and applications of soft computing in systems and control technology. The contributions include state-of-the-art material, mathematical developments, fresh results, and how-to-do issues. Among the problems studied via neural, fuzzy, neurofuzzy and genetic methodologies are: data fusion, reinforcement learning, approximation properties, multichannel imaging, signal processing, system optimization, gaming, and several forms of control. The book can serve as a reference for researchers and practitioners in the field. Readers can find in it a large amount of useful and timely information, and thus save considerable effort in searching for other scattered literature.

Proceedings of International Conference on Soft Computing Techniques and Engineering Application

This book is prepared for the engineering students pursuing degree in computer science and information technology branch. The main consideration in writing the book is to present the considerable requirements of the syllabus in a simple manner as possible. This book contains many solved examples which will help student to gain confidence in problem solving. Valuable suggestion is heartily welcome for further improvement of this book

Soft Computing

Neural Networks and Other Soft Computing Techniques with Applications in the Oil Industry

This book reports on an in-depth study of fuzzy time series (FTS) modeling. It reviews and summarizes previous research

work in FTS modeling and also provides a brief introduction to other soft-computing techniques, such as artificial neural networks (ANNs), rough sets (RS) and evolutionary computing (EC), focusing on how these techniques can be integrated into different phases of the FTS modeling approach. In particular, the book describes novel methods resulting from the hybridization of FTS modeling approaches with neural networks and particle swarm optimization. It also demonstrates how a new ANN-based model can be successfully applied in the context of predicting Indian summer monsoon rainfall. Thanks to its easy-to-read style and the clear explanations of the models, the book can be used as a concise yet comprehensive reference guide to fuzzy time series modeling, and will be valuable not only for graduate students, but also for researchers and professionals working for academic, business and government organizations.

Applied Soft Computing Techniques for Renewable Energy

Soft computing is used where a complex problem is not adequately specified for the use of conventional math and computer techniques. Soft computing has numerous real-world applications in domestic, commercial and industrial situations. This book elaborates on the most recent applications in various fields of engineering.

Soft Computing Techniques for Engineering Optimization

This Special Edited Volume is a unique approach towards Computational solution for the upcoming field of study called Vision Science. From a scientific firmament Optics, Ophthalmology, and Optical Science has surpassed an Odyssey of optimizing configurations of Optical systems, Surveillance Cameras and other Nano optical devices with the metaphor of Nano Science and Technology. Still these systems are falling short of its computational aspect to achieve the pinnacle of human vision system. In this edited volume much attention has been given to address the coupling issues Computational Science and Vision Studies. It is a comprehensive collection of research works addressing various related areas of Vision Science like Visual Perception and Visual system, Cognitive Psychology, Neuroscience, Psychophysics and Ophthalmology, linguistic relativity, color vision etc. This issue carries some latest developments in the form of research articles and presentations. The volume is rich of contents with technical tools for convenient experimentation in Vision Science. There are 18 research papers having significance in an array of application areas. The volume claims to be an effective compendium of computing developments like Frequent Pattern Mining, Genetic Algorithm, Gabor Filter, Support Vector Machine, Region Based Mask Filter, 4D stereo camera systems, Principal Component Analysis etc. The detailed analysis of the papers can immensely benefit to the researchers of this domain. It can be an Endeavour in the pursuit of adding value in the existing stock of knowledge in Vision Science.

Soft Computing Applications and Techniques in Healthcare

This is a comprehensive textbook on fundamentals of methodologies and practices in soft computing domain for students of undergraduate and postgraduate engineering and allied courses who have opted for this course. Experts on the subject have deftly explained the concepts with help of examples and pseudo algorithms for various methods. Since computational intelligence and machine intelligence are backbone and foundation for smart systems, soft computing provides basis for building such systems. This book will equip readers to provide soft computing techniques with low cost and reasonably good solutions to hard problems.

Soft Computing: Methodologies and Applications

This book discusses the applications of different soft computing techniques for the web-based systems and services. The respective chapters highlight recent developments in the field of soft computing applications, from web-based information retrieval to online marketing and online healthcare. In each chapter author endeavor to explain the basic ideas behind the proposed applications in an accessible format for readers who may not possess a background in these fields. This carefully edited book covers a wide range of new applications of soft computing techniques in Web recommender systems, Online documents classification, Online documents summarization, Online document clustering, Online market intelligence, Web usage profiling, Web data extraction, Social network extraction, Question answering systems, Online health care, Web knowledge management, Multimedia information retrieval, Navigation guides, User profiles extraction, Web-based distributed information systems, Web security applications, Internet of Things Applications and so on. The book is aimed for researchers and practitioner who are engaged in developing and applying intelligent systems principles for solving real-life problems. Further, it has been structured so that each chapter can be read independently of the others.

Real Life Applications of Soft Computing

The main objective of ICSCTEA 2013 is to provide a platform for researchers, engineers and academicians from all over the world to present their research results and development activities in soft computing techniques and engineering application. This conference provides opportunities for them to exchange new ideas and application experiences face to face, to establish business or research relations and to find global partners for future collaboration.

Soft Computing

The field of engineering is a creative one. The problems encountered in this field are generally unstructured and imprecise and tackled by intuitions and past experiences of a designer. The conventional methods of computing, relying on analytical or empirical relations, become time consuming when dealing with real-life problems. To study, model and analyse such

problems, approximate computer-based soft computing techniques, inspired by the reasoning, intuition, logic and wisdom possessed by human beings, are employed. This book is an attempt to put together knowledge and experience of soft computing techniques in civil engineering. The principal concern of the book is to show how soft computing techniques can be applied to solve problems in research and practice. An attempt has been made to present various civil engineering research problems using soft computing techniques such as analytic hierarchy process (AHP), fuzzy logic, artificial neural network (ANN), genetic algorithm (GA) and linear programming (LP), etc. Students and research scholars need a good text or reference book which covers the different methods of soft computing used for civil engineering problems. Soft computing techniques are applied to a huge quantity of problems spread in several areas of science. In contrast to conventional computing techniques which rely on exact solutions, soft computing aims at exploiting given tolerance of imprecision, the trivial and uncertain nature of the problem to yield an approximate solution to a problem in quick time. Soft computing being a multi-disciplinary field uses a variety of statistical, probabilistic and optimization tools which complement each other to produce its three main branches viz., Neural Networks, Genetic Algorithms and Fuzzy Logic. Six different soft computing techniques and their application to civil engineering problem has been discussed. The application of the analytic hierarchy method has been demonstrated through solid waste management and project indexing problem. The fuzzy rule based technique is discussed with its application to condition assessment of water mains and reservoir operation. Application of Artificial Neural Network (ANN) is discussed through analysing ground water quality index and in transportation engineering. Genetic algorithm and its application on water distribution network have been discussed. The cellular automata application in the civil engineering is included in this book. Lastly, application of linear programming for optimization of cropping pattern is also included.

Soft Computing Techniques in Software Engineering

The Soft Computing techniques, which are based on the information processing of biological systems are now massively used in the area of pattern recognition, making prediction & planning, as well as acting on the environment. Ideally speaking, soft computing is not a subject of homogeneous concepts and techniques; rather, it is an amalgamation of distinct methods that confirms to its guiding principle. At present, the main aim of soft computing is to exploit the tolerance for imprecision and uncertainty to achieve tractability, robustness and low solutions cost. The principal constituents of soft computing techniques are probabilistic reasoning, fuzzy logic, neuro-computing, genetic algorithms, belief networks, chaotic systems, as well as learning theory. This book covers contributions from various authors to demonstrate the use of soft computing techniques in various applications of engineering.

Biomimicry for Optimization, Control, and Automation

The papers collected in this book are concerned with the application of the so-called "soft-computing" techniques to the aim of defining flexible systems. The topics covered witness the actual research trend towards an integration of distinct formal techniques for defining flexible systems. The contributions in this volume mainly concern the definition of systems in several application fields, such as image processing, control, asset allocation, medicine, time series forecasting, qualitative modeling, support to design, reliability analysis, diagnosis, filtering, data analysis, land mines detection and so forth. The papers presented in this volume are organized into three main thematic sections: Fuzzy Systems, Neural Networks and Genetic and Evolutionary Algorithms, although, as outlined before, some works employ more than one technique from these fields.

Applied Soft Computing Technologies: The Challenge of Complexity

This book provides a better understanding of Fuzzy set theory, Fuzzy logic and Neural Networks and various other techniques seem very well suited for modeling and controlling a real system. Energy is of major importance to civilization, because it is driving force which binds human race. The estimation of energy in the form of renewable and sustainable is one of the important aspects to understand the how resources are harnessed and to predict what might happen under various possible future conditions. Using available modelling techniques to generate the best algorithms, the objective is to determine the best solution in terms of comparing the performances of the solutions through different parameters for a specific case. Consumption of Fossil fuels at a rapid pace has generated an alarming situation and with the subsequent increase in the number of vehicle the pollution level has reached well beyond human's control. This is frightening enough to observe the fact that the pollution level has surpassed all records and the need of the hour is to find an alternate fuel which can really be of great assistance in reducing the exhaust emission and augment the performance parameters of engine. Major researches are carried out on various engines to draw closer towards a realistic solution. Experiments performed on various engines are considered to be time consuming and the expenses met to perform these experiments are too costly, so the need of soft computing techniques involved in this area. Soft computing can be better described as the process to find the solution to an inexact problem. Soft computing has showed lot of potential in giving the researchers the exact solution may be in case of validating or predicting the performance and emission parameters. Artificial Neural Network (ANN), Adaptive Neuro Fuzzy Inference system (ANFIS), Fuzzy Expert System (FES), Response Surface Methodology (RSM) and Support Vector Machine (SVM) are the various soft computing techniques widely used. This book focuses on to carry out the comprehensive review and various other experimental works of various researchers who have carried out the work on these various soft computing techniques on various engines with various alternative fuels On the basis of modelling techniques, time is saved to a great extent and the capital investment involved is comparably very low. Various modelling techniques are being readily used to predict the performance parameters for various engines and modelling techniques have become the readily available tool to compare and validate the experimental work being carried out by researchers to

get accurate matching with the experimental data. The benefit of this issue will be at large in connecting with varieties of work done in the field of Biomass which includes wood and wood waste, municipal solid waste. Landfill gas and biogas. Ethanol, Biodiesel, Hydropower, Geothermal, Wind, Solar. Thus soft computing techniques are fast and reliable hence, they can be a substitute for conventional experiments.

Applications of Soft Computing in Time Series Forecasting

This book comprises a selection of papers on new methods for analysis and design of hybrid intelligent systems using soft computing techniques from the IFSA 2007 World Congress, held in Cancun, Mexico, June 2007.

Artificial Intelligence and Soft Computing

This book examines the present and future of soft computer techniques. It explains how to use the latest technological tools, such as multicore processors and graphics processing units, to implement highly efficient intelligent system methods using a general purpose computer.

Soft Computing Applications in Industry

The evolution of soft computing applications has offered a multitude of methodologies and techniques that are useful in facilitating new ways to address practical and real scenarios in a variety of fields. In particular, these concepts have created significant developments in the engineering field. *Soft Computing Techniques and Applications in Mechanical Engineering* is a pivotal reference source for the latest research findings on a comprehensive range of soft computing techniques applied in various fields of mechanical engineering. Featuring extensive coverage on relevant areas such as thermodynamics, fuzzy computing, and computational intelligence, this publication is an ideal resource for students, engineers, research scientists, and academicians involved in soft computing techniques and applications in mechanical engineering areas.

PRINCIPLES OF SOFT COMPUTING (With CD)

Market_Desc: · B. Tech (UG) students of CSE, IT, ECE· College Libraries· Research Scholars· Operational Research· Management Sector
Special Features: Dr. S. N. Sivanandam has published 12 books· He has delivered around 150 special lectures of different specialization in Summer/Winter school and also in various Engineering colleges· He has guided and co guided 30 PhD research works and at present 9 PhD research scholars are working under him· The total number of technical publications in International/National Journals/Conferences is around 700· He has also received Certificate of Merit

2005-2006 for his paper from The Institution of Engineers (India). He has chaired 7 International Conferences and 30 National Conferences. He is a member of various professional bodies like IE (India), ISTE, CSI, ACS and SSI. He is a technical advisor for various reputed industries and engineering institutions. His research areas include Modeling and Simulation, Neural Networks, Fuzzy Systems and Genetic Algorithm, Pattern Recognition, Multidimensional system analysis, Linear and Nonlinear control system, Signal and Image processing, Control System, Power system, Numerical methods, Parallel Computing, Data Mining and Database Security About The Book: This book is meant for a wide range of readers who wish to learn the basic concepts of soft computing. It can also be helpful for programmers, researchers and management experts who use soft computing techniques. The basic concepts of soft computing are dealt in detail with the relevant information and knowledge available for understanding the computing process. The various neural network concepts are explained with examples, highlighting the difference between various architectures. Fuzzy logic techniques have been clearly dealt with suitable examples. Genetic algorithm operators and the various classifications have been discussed in lucid manner, so that a beginner can understand the concepts with minimal effort.

Soft Computing Techniques and Applications in Mechanical Engineering

Softcomputing techniques play a vital role in the industry. This book presents several important papers contributed by some of the well-known scientists from all over the globe. The application domains discussed in this book include: agroecology, bioinformatics, branched fluid-transport network layout design, dam scheduling, data analysis and exploration, detection of phishing attacks, distributed terrestrial transportation, fault detection of motors, fault diagnosis of electronic circuits, fault diagnosis of power distribution systems, flood routing, hazard sensing, health care, industrial chemical processes, knowledge management in software development, local multipoint distribution systems, missing data estimation, parameter calibration of rainfall intensity models, parameter identification for systems engineering, petroleum vessel mooring, query answering in P2P systems, real-time strategy games, robot control, satellite heat pipe design, monsoon rainfall forecasting, structural design, tool condition monitoring, vehicle routing, water network design, etc. The softcomputing techniques presented in this book are on (or closely related to): ant-colony optimization, artificial immune systems, artificial neural networks, Bayesian models, case-based reasoning, clustering techniques, differential evolution, fuzzy classification, fuzzy neural networks, genetic algorithms, harmony search, hidden Markov models, locally weighted regression analysis, probabilistic principal component analysis, relevance vector machines, self-organizing maps, other machine learning and statistical techniques, and the combinations of the above techniques.

High Performance Programming for Soft Computing

Science has made great progress in the twentieth century, with the establishment of proper disciplines in the fields of

physics, computer science, molecular biology, and many others. At the same time, there have also emerged many engineering ideas that are interdisciplinary in nature, beyond the realm of such orthodox disciplines. These include, for example, artificial intelligence, fuzzy logic, artificial neural networks, evolutionary computation, data mining, and so on. In order to generate new technology that is truly human-friendly in the twenty-first century, integration of various methods beyond specific disciplines is required. Soft computing is a key concept for the creation of such human friendly technology in our modern information society. Professor Rutkowski is a pioneer in this field, having devoted himself for many years to publishing a large variety of original work. The present volume, based mostly on his own work, is a milestone in the development of soft computing, integrating various disciplines from the fields of information science and engineering. The book consists of three parts, the first of which is devoted to probabilistic neural networks. Neural excitation is stochastic, so it is natural to investigate the Bayesian properties of connectionist structures developed by Professor Rutkowski. This new approach has proven to be particularly useful for handling regression and classification problems via Preface in time-varying environments. Throughout this book, major themes are selected from theoretical subjects that are tightly connected with challenging applications.

Soft Computing Techniques in Vision Science

Here is a collection of papers presented at the 11th On-line World Conference on Soft Computing in Industrial Applications, held in September-October 2006. This carefully edited book provides a comprehensive overview of recent advances in the industrial applications of soft computing and covers a wide range of application areas, including data analysis and data mining, computer graphics, intelligent control, systems, pattern recognition, classifiers, as well as modeling optimization.

Soft Computing in Electromagnetics

This volume presents new trends and developments in soft computing techniques. Topics include: neural networks, fuzzy systems, evolutionary computation, knowledge discovery, rough sets, and hybrid methods. It also covers various applications of soft computing techniques in economics, mechanics, medicine, automatics and image processing. The book contains contributions from internationally recognized scientists, such as Zadeh, Bubnicki, Pawlak, Amari, Batyrshin, Hirota, Koczy, Kosinski, Novák, S.-Y. Lee, Pedrycz, Raudys, Setiono, Sincak, Strumillo, Takagi, Usui, Wilamowski and Zurada. An excellent overview of soft computing methods and their applications.

Soft Computing Applications for Database Technologies

The series of Online World Conferences on Soft Computing (WSC) is organized by the World Federation of Soft Computing

(WFSC) and has become an established annual event in the academic calendar and was already held for the 8th time in 2003. Starting as a small workshop held at Nagoya University, Japan in 1994 it has - tured to the premier online event on soft computing in industrial applications. It has been hosted by the universities of Granada, Spain, Fraunhofer Gesellschaft, Berlin, Cran?eld University, Helsinki University of Technology and Nagoya University. The goal of WFSC is to promote soft computing across the world, by using the internet as a forum for virtual technical discussion and publishing at no cost to authors and participants. The of?cial journal of the World Federation on Soft Computing is the journal Applied Soft Computing. The 8th WSC Conference (WSC8) took place from September 29th to October 10th, 2003. Registered participants had the opportunity to follow and discuss the online presentations of authors from all over the world. Out of more than 60 subm- sions the program committee had accepted 27 papers for ?nal presentation at WSC8.

Soft Computing Applications

Soft computing techniques have emerged as the most popular and widely used techniques in the field of Software Engineering as they offer the advantages of reduced cost, time, maintenance and increased productivity. In this book, few soft computing techniques (i.e. Fuzzy-Logic (FL), Neural Network (NN) and Neuro-Fuzzy (NF)) have been proposed to automate the software development process and are found to be suitable at the various phases of software development. The book is organized into nine chapters according to the phases of Software Development Life Cycle (SDLC). Effective utilization of soft computing techniques should result in increased productivity and quality, reduced cycle time, and lesser costs in the long run. Therefore, this book is useful to further explore various emerging soft computing technologies, including neural computing techniques such as Support Vector Machine (SVM), Adaptive Neuro-Fuzzy Inference System (ANFIS), hybrid soft computing models based on neural, fuzzy and evolutionary computation technologies.

Analysis and Design of Intelligent Systems Using Soft Computing Techniques

Applications and Science in Soft Computing

"This book investigates the advent of soft computing and its applications in database technologies"--Provided by publisher.

Artificial intelligence and Soft computing

Soft-Computing Techniques for the Trajectory Planning of Multi-Robot Manipulator Systems.

Soft Computing in Chemical and Physical Sciences

This book can be regarded as 'Soft computing for physicists and chemists self-taught'. It prepares the readers with a solid background of soft computing and how to adapt soft computing techniques to problem solving in physical and chemical research. Soft computing methods have been little explored by researchers in physical and chemical sciences primarily because of the absence of books that bridge the gap between the traditional computing paradigm pursued by researchers in science and the new soft computing paradigm that has emerged in computer science. This book is the interface between these primary sources and researchers in physics and chemistry.

Soft Computing in Industrial Applications

Soft computing refers to a collection of computational techniques which study, model and analyse complex phenomena. As many textile engineering problems are inherently complex in nature, soft computing techniques have often provided optimum solutions to these cases. Although soft computing has several facets, it mainly revolves around three techniques; artificial neural networks, fuzzy logic and genetic algorithms. The book is divided into five parts, covering the entire process of textile production, from fibre manufacture to garment engineering. These include soft computing techniques in yarn manufacture and modelling, fabric and garment manufacture, textile properties and applications and textile quality evaluation. Covers the entire process of textile production, from fibre manufacture to garment engineering including artificial neural networks, fuzzy logic and genetic algorithms Examines soft computing techniques in yarn manufacture and modelling, fabric and garment manufacture Specifically reviews soft computing in relation to textile properties and applications featuring garment modelling and sewing machines

Applications of Soft Computing for the Web

Soft computing techniques have reached a significant level of recognition and acceptance from both the academic and industrial communities. The papers collected in this volume illustrate the depth of the current theoretical research trends and the breadth of the application areas in which soft computing methods are making contributions. This volume consists of forty six selected papers presented at the Fourth International Conference on Recent Advances in Soft Computing, which was held in Nottingham, United Kingdom on 12 and 13 December 2002 at Nottingham Trent University. This volume is organized in five parts. The first four parts address mainly the fundamental and theoretical advances in soft computing, namely Artificial Neural Networks, Evolutionary Computing, Fuzzy Systems and Hybrid Systems. The fifth part of this volume presents papers that deal with practical issues and industrial applications of soft computing techniques. We would like to express our sincere gratitude to all the authors who submitted contributions for inclusion. We are also indebted to Janusz

Kacprzyk for his - vices related to this volume. We hope you find the volume an interesting refl- tion of current theoretical and application based soft computing research.

Soft Computing

This book covers the issues related to optimization of engineering and management problems using soft computing techniques with an industrial outlook. It covers a broad area related to real life complex decision making problems using a heuristics approach. It also explores a wide perspective and future directions in industrial engineering research on a global platform/scenario. The book highlights the concept of optimization, presents various soft computing techniques, offers sample problems, and discusses related software programs complete with illustrations. Features Explains the concept of optimization and relevance to soft computing techniques towards optimal solution in engineering and management Presents various soft computing techniques Offers problems and their optimization using various soft computing techniques Discusses related software programs, with illustrations Provides a step-by-step tutorial on how to handle relevant software for obtaining the optimal solution to various engineering problems

Soft Computing in Wireless Sensor Networks

This book focuses on the suitable methods to solve optimization problems in wireless network system utilizing digital sensors like Wireless Sensor Network. This kind of system has been emerging as the cornerstone technology for all new smart devices and its direct application in many fields in life.

Soft Computing Techniques in Engineering Applications

Soft computing techniques are emerging as an important tool in solving design, performance and optimisation problems in electromagnetics. Soft Computing in Electromagnetics offers detailed discussion on the application of soft computing concepts in the field of metamaterial antennas, radar absorbers, transmission line characterisation and optimised radar absorbing material (RAM) and introduces implementation of soft computing tools in a relatively new area of metamaterials. The soft computing methods are used to optimise fault detection, electromagnetic propagation and path loss detection. The development of two CAD packages for design of metamaterial split ring resonators (SRR) and path-loss prediction is discussed. The concepts are explained with the help of algorithms and the corresponding software codes. Numerical examples and MATLAB codes are provided throughout the text to facilitate understanding.

Soft Computing in Water Resources Engineering

Soft computing encompasses various computational methodologies, which, unlike conventional algorithms, are tolerant of imprecision, uncertainty, and partial truth. Soft computing technologies offer adaptability as a characteristic feature and thus permit the tracking of a problem through a changing environment. Besides some recent developments in areas like rough sets and probabilistic networks, fuzzy logic, evolutionary algorithms, and artificial neural networks are core ingredients of soft computing, which are all bio-inspired and can easily be combined synergetically. This book presents a well-balanced integration of fuzzy logic, evolutionary computing, and neural information processing. The three constituents are introduced to the reader systematically and brought together in differentiated combinations step by step. The text was developed from courses given by the authors and offers numerous illustrations as

Neural Networks and Soft Computing

Engineers have attempted to solve water resources engineering problems with the help of empirical, regression-based and numerical models. Empirical models are not universal, nor are regression-based models. The numerical models are, on the other hand, physics-based but require substantial data measurement and parameter estimation. Hence, there is a need to employ models that are robust, user-friendly, and practical and that do not have the shortcomings of the existing methods. Artificial intelligence methods meet this need. Soft Computing in Water Resources Engineering introduces the basics of artificial neural networks (ANN), fuzzy logic (FL) and genetic algorithms (GA). It gives details on the feed forward back propagation algorithm and also introduces neuro-fuzzy modelling to readers. Artificial intelligence method applications covered in the book include predicting and forecasting floods, predicting suspended sediment, predicting event-based flow hydrographs and sedimentographs, locating seepage path in an earth-fill dam body, and the predicting dispersion coefficient in natural channels. The author also provides an analysis comparing the artificial intelligence models and contemporary non-artificial intelligence methods (empirical, numerical, regression, etc.). The ANN, FL, and GA are fairly new methods in water resources engineering. The first publications appeared in the early 1990s and quite a few studies followed in the early 2000s. Although these methods are currently widely known in journal publications, they are still very new for many scientific readers and they are totally new for students, especially undergraduates. Numerical methods were first taught at the graduate level but are now taught at the undergraduate level. There are already a few graduate courses developed on AI methods in engineering and included in the graduate curriculum of some universities. It is expected that these courses, too, will soon be taught at the undergraduate levels.

Application of Soft Computing Techniques in Civil Engineering

This volume presents the proceedings of the 9th Online World Conference on Soft Computing in Industrial Applications, held on the World Wide Web in 2004. It includes lectures, original papers and tutorials presented during the conference. The

book brings together outstanding research and developments in soft computing, including evolutionary computation, fuzzy logic, neural networks, and their fusion, and its applications in science and technology.

Soft Computing

Biomimicry uses our scientific understanding of biological systems to exploit ideas from nature in order to construct some technology. In this book, we focus on how to use biomimicry of the functional operation of the "hardware and software" of biological systems for the development of optimization algorithms and feedback control systems that extend our capabilities to implement sophisticated levels of automation. The primary focus is not on the modeling, emulation, or analysis of some biological system. The focus is on using "bio-inspiration" to inject new ideas, techniques, and perspective into the engineering of complex automation systems. There are many biological processes that, at some level of abstraction, can be represented as optimization processes, many of which have as a basic purpose automatic control, decision making, or automation. For instance, at the level of everyday experience, we can view the actions of a human operator of some process (e. g. , the driver of a car) as being a series of the best choices he or she makes in trying to achieve some goal (staying on the road); emulation of this decision-making process amounts to modeling a type of biological optimization and decision-making process, and implementation of the resulting algorithm results in "human mimicry" for automation. There are clearer examples of biological optimization processes that are used for control and automation when you consider nonhuman biological or behavioral processes, or the (internal) biology of the human and not the resulting external behavioral characteristics (like driving a car). For instance, there are homeostasis processes where, for instance, temperature is regulated in the human body.

Soft Computing in Systems and Control Technology

With all the material available in the field of artificial intelligence (AI) and soft computing-texts, monographs, and journal articles-there remains a serious gap in the literature. Until now, there has been no comprehensive resource accessible to a broad audience yet containing a depth and breadth of information that enables the reader to fully understand and readily apply AI and soft computing concepts. Artificial Intelligence and Soft Computing fills this gap. It presents both the traditional and the modern aspects of AI and soft computing in a clear, insightful, and highly comprehensive style. It provides an in-depth analysis of mathematical models and algorithms and demonstrates their applications in real world problems. Beginning with the behavioral perspective of "human cognition," the text covers the tools and techniques required for its intelligent realization on machines. The author addresses the classical aspects-search, symbolic logic, planning, and machine learning-in detail and includes the latest research in these areas. He introduces the modern aspects of soft computing from first principles and discusses them in a manner that enables a beginner to grasp the subject. He also

covers a number of other leading aspects of AI research, including nonmonotonic and spatio-temporal reasoning, knowledge acquisition, and much more. Artificial Intelligence and Soft Computing: Behavioral and Cognitive Modeling of the Human Brain is unique for its diverse content, clear presentation, and overall completeness. It provides a practical, detailed introduction that will prove valuable to computer science practitioners and students as well as to researchers migrating to the subject from other disciplines.

Soft-Computing Techniques for the Trajectory Planning of Multi-Robot Manipulator Systems

This book is an introduction to some new fields in soft computing with its principal components of fuzzy logic, ANN and EA. The approach in this book is to provide an understanding of the soft computing field and to work through soft computing using examples. It also aims to integrate pseudo-code operational summaries and Matlab codes, to present computer simulation, to include real world applications and to highlight the distinctive work of human consciousness in machine.

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