

# Neural Networks Fuzzy Logic And Genetic Algorithms By Rajasekaran And G A V Pai Ebook

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[Intelligent Hybrid Systems](#) - Da Ruan 1997-09-30    Networks, and Genetic Algorithms is an  
Intelligent Hybrid Systems: Fuzzy Logic, Neural    organized edited collection of contributed

chapters covering basic principles, methodologies, and applications of fuzzy systems, neural networks and genetic algorithms. All chapters are original contributions by leading researchers written exclusively for this volume. This book reviews important concepts and models, and focuses on specific methodologies common to fuzzy systems, neural networks and evolutionary computation. The emphasis is on development of cooperative models of hybrid systems. Included are applications related to intelligent data analysis, process analysis, intelligent adaptive information systems, systems identification, nonlinear systems, power and water system design, and many others. Intelligent Hybrid Systems: Fuzzy Logic, Neural Networks, and Genetic Algorithms provides researchers and engineers with up-to-date coverage of new results, methodologies and applications for building intelligent systems capable of solving large-scale problems.

Advances in Fuzzy Logic, Neural Networks and Genetic Algorithms - Takeshi Furuhashi  
1995-11-15

This book presents 14 rigorously reviewed revised papers selected from more than 50 submissions for the 1994 IEEE/ Nagoya-University World Wisepersons Workshop, WWW'94, held in August 1994 in Nagoya, Japan. The combination of approaches based on fuzzy logic, neural networks and genetic algorithms are expected to open a new paradigm of machine learning for the realization of human-like information processing systems. The first six papers in this volume are devoted to the combination of fuzzy logic and neural networks; four papers are on how to combine fuzzy logic and genetic algorithms. Four papers investigate challenging applications of fuzzy systems and of fuzzy-genetic algorithms.

*Soft Computing and Its Applications* - R A Aliev  
2001-09-06

The concept of soft computing is still in its initial

stages of crystallization. Presently available books on soft computing are merely collections of chapters or articles about different aspects of the field. This book is the first to provide a systematic account of the major concepts and methodologies of soft computing, presenting a unified framework that makes the subject more accessible to students and practitioners.

Particularly worthy of note is the inclusion of a wealth of information about neuro-fuzzy, neuro-genetic, fuzzy-genetic and neuro-fuzzy-genetic systems, with many illuminating applications and examples.

Wavelets in Soft Computing - Marc Thuillard  
2001

This book presents the state of integration of wavelet theory and multiresolution analysis into soft computing. It is the first book on hybrid methods combining wavelet analysis with fuzzy logic, neural networks or genetic algorithms. Much attention is given to new approaches (fuzzy-wavelet) that permit one to develop, using

wavelet techniques, linguistically interpretable fuzzy systems from data. The book also introduces the reader to wavelet-based genetic algorithms and multiresolution search. A special place is given to methods that have been implemented in real world applications, particularly the different techniques combining fuzzy logic or neural networks with wavelet theory.

*Foundations of Neural Networks, Fuzzy Systems, and Knowledge Engineering* - Nikola K. Kasabov 1996

Neural networks and fuzzy systems are different approaches to introducing human-like reasoning into expert systems. This text is the first to combine the study of these two subjects, their basics and their use, along with symbolic AI methods to build comprehensive artificial intelligence systems. In a clear and accessible style, Kasabov describes rule- based and connectionist techniques and then their combinations, with fuzzy logic included, showing

the application of the different techniques to a set of simple prototype problems, which makes comparisons possible. A particularly strong feature of the text is that it is filled with applications in engineering, business, and finance. AI problems that cover most of the application-oriented research in the field (pattern recognition, speech and image processing, classification, planning, optimization, prediction, control, decision making, and game simulations) are discussed and illustrated with concrete examples. Intended both as a text for advanced undergraduate and postgraduate students as well as a reference for researchers in the field of knowledge engineering, Foundations of Neural Networks, Fuzzy Systems, and Knowledge Engineering has chapters structured for various levels of teaching and includes original work by the author along with the classic material. Data sets for the examples in the book as well as an integrated software environment that can be

used to solve the problems and do the exercises at the end of each chapter are available free through anonymous ftp.

### **High Performance Programming for Soft Computing** - Oscar Humberto Montiel Ross

2014-02-04

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 in Water Resources Engineering* - G. Tayfur 2014-11-02

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.

Neural Networks - Raul Rojas 2013-06-29

Neural networks are a computing paradigm that is finding increasing attention among computer scientists. In this book, theoretical laws and models previously scattered in the literature are brought together into a general theory of artificial neural nets. Always with a view to

biology and starting with the simplest nets, it is shown how the properties of models change when more general computing elements and net topologies are introduced. Each chapter contains examples, numerous illustrations, and a bibliography. The book is aimed at readers who seek an overview of the field or who wish to deepen their knowledge. It is suitable as a basis for university courses in neurocomputing.

Modular Neural Networks and Type-2 Fuzzy Systems for Pattern Recognition - Patricia Melin  
2011-10-18

This book describes hybrid intelligent systems using type-2 fuzzy logic and modular neural networks for pattern recognition applications. Hybrid intelligent systems combine several intelligent computing paradigms, including fuzzy logic, neural networks, and bio-inspired optimization algorithms, which can be used to produce powerful pattern recognition systems. Type-2 fuzzy logic is an extension of traditional type-1 fuzzy logic that enables managing higher

levels of uncertainty in complex real world problems, which are of particular importance in the area of pattern recognition. The book is organized in three main parts, each containing a group of chapters built around a similar subject. The first part consists of chapters with the main theme of theory and design algorithms, which are basically chapters that propose new models and concepts, which are the basis for achieving intelligent pattern recognition. The second part contains chapters with the main theme of using type-2 fuzzy models and modular neural networks with the aim of designing intelligent systems for complex pattern recognition problems, including iris, ear, face and voice recognition. The third part contains chapters with the theme of evolutionary optimization of type-2 fuzzy systems and modular neural networks in the area of intelligent pattern recognition, which includes the application of genetic algorithms for obtaining optimal type-2 fuzzy integration systems and ideal neural

network architectures for solving problems in this area.

Soft Computing - Andrea Tettamanzi 2001-09-07

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 **Soft Computing in Case Based Reasoning** - Sankar Kumar Pal 2012-12-06

This text demonstrates how various soft computing tools can be applied to design and develop methodologies and systems with case based reasoning, that is, for real-life decision-making or recognition problems. Comprising contributions from experts, it introduces the basic concepts and theories, and includes many reports on real-life applications. This book is of interest to graduate students and researchers in computer science, electrical engineering and information technology, as well as researchers and practitioners from the fields of systems design, pattern recognition and data mining.

**Compensatory Genetic Fuzzy Neural Networks and Their Applications** - Yan-Qing Zhang 1998

This book presents a powerful hybrid intelligent system based on fuzzy logic, neural networks,

genetic algorithms and related intelligent techniques. The new compensatory genetic fuzzy neural networks have been widely used in fuzzy control, nonlinear system modeling, compression of a fuzzy rule base, expansion of a sparse fuzzy rule base, fuzzy knowledge discovery, time series prediction, fuzzy games and pattern recognition. This effective soft computing system is able to perform both linguistic-word-level fuzzy reasoning and numerical-data-level information processing. The book also proposes various novel soft computing techniques.

Advances in Fuzzy Logic, Neural Networks and Genetic Algorithms - Takeshi Furuhashi  
1995-11-15

This book presents 14 rigorously reviewed revised papers selected from more than 50 submissions for the 1994 IEEE/ Nagoya-University World Wisepersons Workshop, WWW'94, held in August 1994 in Nagoya, Japan. The combination of approaches based on fuzzy logic, neural networks and genetic algorithms

are expected to open a new paradigm of machine learning for the realization of human-like information processing systems. The first six papers in this volume are devoted to the combination of fuzzy logic and neural networks; four papers are on how to combine fuzzy logic and genetic algorithms. Four papers investigate challenging applications of fuzzy systems and of fuzzy-genetic algorithms.

The Nonlinear Workbook - W.-H. Steeb 2008  
"The study of nonlinear dynamical systems has advanced tremendously in the last 20 years, making a big impact on science and technology. This book provides all the techniques and methods used in nonlinear dynamics. The concepts and underlying mathematics are discussed in detail." "The text has been designed for a one-year course at both the junior and senior levels in nonlinear dynamics. The topics discussed in the book are part of e-learning and distance learning courses conducted by the International School for Scientific Computing,

University of Johannesburg."--BOOK JACKET.

**Fuzzy Learning and Applications** - Marco Russo 2000-12-13

With low computational complexity and relatively short development time, Fuzzy Logic is an indispensable tool for engineering applications. The field is growing at an unprecedented rate, and there is a need for a book that describes essential tools, applications, examples, and perspectives in the field of fuzzy learning. The editors of *Fuzzy Learning and Applications* fill this need, providing an essential book for researchers, scientists, and engineers alike. Organized into four parts, this book starts with the simplest learning method and gradually arrives at the most complex. First, it summarizes all the symbols and formulae used in the succeeding chapters and presents a historical overview of fuzzy learning. Next, it deals with current techniques, ranging from deterministic to hybrid methods. It then illustrates the enormous number of possibilities offered by

fuzzy learning. Finally, it covers hardware dedicated to fuzzy learning, from digital to analog designs and implementations. With *Fuzzy Learning and Applications*, readers will discover the enormous possibilities fuzzy learning offers.

**Intelligent Optimisation Techniques** - Duc Pham 2012-12-06

This work gives a concise introduction to four important optimization techniques, presenting a range of applications drawn from electrical, manufacturing, mechanical, and systems engineering—such as the design of microstrip antennas, digital FIR filters, and fuzzy logic controllers. The book also contains the C programs used to implement the main techniques for those wishing to experiment with them.

**Introduction to Neural Networks, Fuzzy Logic & Genetic Algorithms** - Sudarshan K. Valluru 2010

*Soft Computing in Human-Related Sciences* -

Horia-Nicolai L Teodorescu 1999-04-29

Hard boundaries have traditionally existed between such fields as fuzzy systems, neural networks, genetic algorithms, chaotic systems and expert systems. Gradually those boundaries are tending to vanish and "soft computing"-based systems that mix these different approaches have begun to emerge. Soft Computing Techniques in Human-Related Sciences focuses on the use of novel techniques such as artificial neural networks, fuzzy logic and genetic algorithms to solve practical problems related to humans: their activities, health and social needs. This volume illustrates and presents in an organized manner some of the recent progress in the applications of soft computing to fields related to social science, medical science, psychology, psychiatry , management of health and community services, and humanoid robots. Soft Computing Techniques in Human-Related Sciences begins with an introductory chapter to aid newcomers

with the basic concepts, and progresses to the methodology of the use of soft computing in robotics, prosthetics, medicine, psychology and man-machine interaction.

Fuzzy Logic for Beginners - Masao Mukaidono  
2001

There are many uncertainties in the real world. Fuzzy theory treats a kind of uncertainty called fuzziness, where it shows that the boundary of yes or no is ambiguous and appears in the meaning of words or is included in the subjunctives or recognition of human beings. Fuzzy theory is essential and is applicable to many systems -- from consumer products like washing machines or refrigerators to big systems like trains or subways. Recently, fuzzy theory has been a strong tool for combining new theories (called soft computing) such as genetic algorithms or neural networks to get knowledge from real data. This introductory book enables the reader to understand easily what fuzziness is and how one can apply fuzzy theory to real

problems -- which explains why it was a best-seller in Japan.

### **Intelligent Hybrid Systems** - Da Ruan

2012-12-06

Intelligent Hybrid Systems: Fuzzy Logic, Neural Networks, and Genetic Algorithms is an organized edited collection of contributed chapters covering basic principles, methodologies, and applications of fuzzy systems, neural networks and genetic algorithms. All chapters are original contributions by leading researchers written exclusively for this volume. This book reviews important concepts and models, and focuses on specific methodologies common to fuzzy systems, neural networks and evolutionary computation. The emphasis is on development of cooperative models of hybrid systems. Included are applications related to intelligent data analysis, process analysis, intelligent adaptive information systems, systems identification, nonlinear systems, power and water system

design, and many others. Intelligent Hybrid Systems: Fuzzy Logic, Neural Networks, and Genetic Algorithms provides researchers and engineers with up-to-date coverage of new results, methodologies and applications for building intelligent systems capable of solving large-scale problems.

### **Hybrid Intelligent Systems for Pattern Recognition Using Soft Computing** - Patricia

Melin 2005-03-08

This monograph describes new methods for intelligent pattern recognition using soft computing techniques including neural networks, fuzzy logic, and genetic algorithms. Hybrid intelligent systems that combine several soft computing techniques are needed due to the complexity of pattern recognition problems. Hybrid intelligent systems can have different architectures, which have an impact on the efficiency and accuracy of pattern recognition systems, to achieve the ultimate goal of pattern recognition. This book also shows results of the

application of hybrid intelligent systems to real-world problems of face, fingerprint, and voice recognition. This monograph is intended to be a major reference for scientists and engineers applying new computational and mathematical tools to intelligent pattern recognition and can be also used as a textbook for graduate courses in soft computing, intelligent pattern recognition, computer vision, or applied artificial intelligence.

*Fuzzy Logic Hybrid Extensions of Neural and Optimization Algorithms: Theory and Applications* - Oscar Castillo 2021-03-25

We describe in this book, recent developments on fuzzy logic, neural networks and optimization algorithms, as well as their hybrid combinations, and their application in areas such as, intelligent control and robotics, pattern recognition, medical diagnosis, time series prediction and optimization of complex problems. The book contains a collection of papers focused on hybrid intelligent systems based on soft computing.

There are some papers with the main theme of type-1 and type-2 fuzzy logic, which basically consists of papers that propose new concepts and algorithms based on type-1 and type-2 fuzzy logic and their applications. There also some papers that presents theory and practice of meta-heuristics in different areas of application. Another group of papers describe diverse applications of fuzzy logic, neural networks and hybrid intelligent systems in medical applications. There are also some papers that present theory and practice of neural networks in different areas of application. In addition, there are papers that present theory and practice of optimization and evolutionary algorithms in different areas of application. Finally, there are some papers describing applications of fuzzy logic, neural networks and meta-heuristics in pattern recognition problems.

**Type-2 Fuzzy Logic: Theory and Applications** - Oscar Castillo 2008-02-20

This book describes new methods for building

intelligent systems using type-2 fuzzy logic and soft computing (SC) techniques. The authors extend the use of fuzzy logic to a higher order, which is called type-2 fuzzy logic. Combining type-2 fuzzy logic with traditional SC techniques, we can build powerful hybrid intelligent systems that can use the advantages that each technique offers. This book is intended to be a major reference tool and can be used as a textbook.

NEURAL NETWORKS, FUZZY SYSTEMS AND EVOLUTIONARY ALGORITHMS : SYNTHESIS AND APPLICATIONS - S. RAJASEKARAN  
2017-05-01

The second edition of this book provides a comprehensive introduction to a consortium of technologies underlying soft computing, an evolving branch of computational intelligence, which in recent years, has turned synonymous to it. The constituent technologies discussed comprise neural network (NN), fuzzy system (FS), evolutionary algorithm (EA), and a number of hybrid systems, which include classes such as

neuro-fuzzy, evolutionary-fuzzy, and neuro-evolutionary systems. The hybridization of the technologies is demonstrated on architectures such as fuzzy backpropagation network (NN-FS hybrid), genetic algorithm-based backpropagation network (NN-EA hybrid), simplified fuzzy ARTMAP (NN-FS hybrid), fuzzy associative memory (NN-FS hybrid), fuzzy logic controlled genetic algorithm (EA-FS hybrid) and evolutionary extreme learning machine (NN-EA hybrid) Every architecture has been discussed in detail through illustrative examples and applications. The algorithms have been presented in pseudo-code with a step-by-step illustration of the same in problems. The applications, demonstrative of the potential of the architectures, have been chosen from diverse disciplines of science and engineering. This book, with a wealth of information that is clearly presented and illustrated by many examples and applications, is designed for use as a text for the courses in soft computing at both

the senior undergraduate and first-year postgraduate levels of computer science and engineering. It should also be of interest to researchers and technologists desirous of applying soft computing technologies to their respective fields of work.

Fuzzy And Neural Approaches in Engineering -

Lefteri H. Tsoukalas 1997-02-05

Neural networks and fuzzy systems represent two distinct technologies that deal with uncertainty. This definitive book presents the fundamentals of both technologies, and demonstrates how to combine the unique capabilities of these two technologies for the greatest advantage. Steering clear of unnecessary mathematics, the book highlights a wide range of dynamic possibilities and offers numerous examples to illuminate key concepts. It also explores the value of relating genetic algorithms and expert systems to fuzzy and neural technologies.

Computational Intelligence - Russell C. Eberhart

2011-04-18

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

**Fuzzy Sets, Neural Networks, and Soft Computing** - Ronald R. Yager 1994

Brings together chapters by experts involved in a new area based on the confluence of genetic algorithms, fuzzy systems, and neural networks. Papers cover the broad ground of fuzzy logic control, neural fuzzy systems, genetic fuzzy systems, process control, and adaptive systems. Topics include the composition of heterogeneous control laws, ellipsoidal learning and fuzzy throttle control for platoons of smart cars, supervised and unsupervised learning, and propagation and satisfaction of flexible

constraints. Annotation copyright by Book News, Inc., Portland, OR

**Genetic Algorithms and Fuzzy Logic Systems** - Elie Sanchez 1997

Ever since fuzzy logic was introduced by Lotfi Zadeh in the mid-sixties and genetic algorithms by John Holland in the early seventies, these two fields widely been subjects of academic research the world over. During the last few years, they have been experiencing extremely rapid growth in the industrial world, where they have been shown to be very effective in solving real-world problems. These two substantial fields, together with neurocomputing techniques, are recognized as major parts of soft computing; a set of computing technologies already riding the waves of the next century to produce the human-centered intelligent systems of tomorrow; the collection of papers presented in this book shows the way. The book also contains an extensive bibliography on fuzzy logic and genetic algorithms.

*Fuzzy Logic Hybrid Extensions of Neural and Optimization Algorithms: Theory and Applications* - Oscar Castillo 2021-03-24

We describe in this book, recent developments on fuzzy logic, neural networks and optimization algorithms, as well as their hybrid combinations, and their application in areas such as, intelligent control and robotics, pattern recognition, medical diagnosis, time series prediction and optimization of complex problems. The book contains a collection of papers focused on hybrid intelligent systems based on soft computing. There are some papers with the main theme of type-1 and type-2 fuzzy logic, which basically consists of papers that propose new concepts and algorithms based on type-1 and type-2 fuzzy logic and their applications. There also some papers that presents theory and practice of meta-heuristics in different areas of application. Another group of papers describe diverse applications of fuzzy logic, neural networks and hybrid intelligent systems in medical

applications. There are also some papers that present theory and practice of neural networks in different areas of application. In addition, there are papers that present theory and practice of optimization and evolutionary algorithms in different areas of application. Finally, there are some papers describing applications of fuzzy logic, neural networks and meta-heuristics in pattern recognition problems.

### **Fuzzy Logic and Expert Systems**

**Applications** - Cornelius T. Leondes 1998-02-09

This volume covers the integration of fuzzy logic and expert systems. A vital resource in the field, it includes techniques for applying fuzzy systems to neural networks for modeling and control, systematic design procedures for realizing fuzzy neural systems, techniques for the design of rule-based expert systems using the massively parallel processing capabilities of neural networks, the transformation of neural systems into rule-based expert systems, the characteristics and relative merits of integrating

fuzzy sets, neural networks, genetic algorithms, and rough sets, and applications to system identification and control as well as nonparametric, nonlinear estimation. Practitioners, researchers, and students in industrial, manufacturing, electrical, and mechanical engineering, as well as computer scientists and engineers will appreciate this reference source to diverse application methodologies. Fuzzy system techniques applied to neural networks for modeling and control Systematic design procedures for realizing fuzzy neural systems Techniques for the design of rule-based expert systems Characteristics and relative merits of integrating fuzzy sets, neural networks, genetic algorithms, and rough sets System identification and control Nonparametric, nonlinear estimation Practitioners, researchers, and students in industrial, manufacturing, electrical, and mechanical engineering, as well as computer scientists and engineers will find this volume a

unique and comprehensive reference to these diverse application methodologies

Soft Computing - Andrea Tettamanzi 2013-04-17

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

*Soft Computing for Recognition Based on Biometrics* - Patricia Melin 2010-09-20

This book describes bio-inspired models and applications of hybrid intelligent systems using soft computing techniques for image analysis and pattern recognition based on biometrics and other sources. Each section groups papers on a similar subject.

*Intelligent Control* - Nazmul Siddique 2013-11-29

Intelligent Control considers non-traditional modelling and control approaches to nonlinear systems. Fuzzy logic, neural networks and evolutionary computing techniques are the main tools used. The book presents a modular switching fuzzy logic controller where a PD-type fuzzy controller is executed first followed by a PI-type fuzzy controller thus improving the performance of the controller compared with a PID-type fuzzy controller. The advantage of the

switching-type fuzzy controller is that it uses one rule-base thus minimises the rule-base during execution. A single rule-base is developed by merging the membership functions for change of error of the PD-type controller and sum of error of the PI-type controller. Membership functions are then optimized using evolutionary algorithms. Since the two fuzzy controllers were executed in series, necessary further tuning of the differential and integral scaling factors of the controller is then performed. Neural-network-based tuning for the scaling parameters of the fuzzy controller is then described and finally an evolutionary algorithm is applied to the neurally-tuned-fuzzy controller in which the sigmoidal function shape of the neural network is determined. The important issue of stability is addressed and the text demonstrates empirically that the developed controller was stable within the operating range. The text concludes with ideas for future research to show the reader the potential for further study in this area.

Intelligent Control will be of interest to researchers from engineering and computer science backgrounds working in the intelligent and adaptive control.

### **COMPUTATIONAL STRUCTURAL MECHANICS - S. RAJASEKARAN 2001-01-01**

This class-room tested book, representing the teaching experience of over two decades by the authors, is designed to cater to the needs of senior undergraduate and first-year postgraduate students of civil engineering for a course in Advanced Structural Analysis/Matrix Methods of Structural Analysis/Computer Methods of Structural Analysis. The book endeavours to fulfil two principal objectives. First, it acquaints students with the matrix methods of structural analysis and their underlying concepts and principles. Second, it demonstrates the development of well-structured computer programs for the analysis of structures by the matrix methods. After a thorough presentation of the mathematical tools

and theory required for linear elastic analysis of structural systems, the text focuses on the flexibility and stiffness methods of analysis for computer usage. The direct stiffness method which forms the backbone of most computer programs is also discussed. Besides, the physical behaviour of structures is analyzed throughout with the help of axial thrust, shear force, bending moment and deflected shape diagrams. A large number of worked-out examples are included to amplify the concepts and to illustrate the effect of external loads, including the effect of temperature, lack of fit, and settlement of supports, etc. The CD-ROM contains many illustrative computer programs and the usage of modern packages such as Excel and Matlab. The book will also be a useful reference for practising structural engineers who wish to pursue the versatility of matrix methods as a tool for computer applications.

**Artificial Neural Nets and Genetic Algorithms** - Vera Kurkova 2013-11-11

The first ICANNGA conference, devoted to biologically inspired computational paradigms, Neural Net works and Genetic Algorithms, was held in Innsbruck, Austria, in 1993. The meeting attracted researchers from all over Europe and further afield, who decided that this particular blend of topics should form a theme for a series of biennial conferences. The second meeting, held in Ales, France, in 1995, carried on the tradition set in Innsbruck of a relaxed and stimulating environment for the exchange of ideas. The series has continued in Norwich, UK, in 1997, and Portoroz, Slovenia, in 1999. The Institute of Computer Science, Czech Academy of Sciences, is pleased to host the fifth conference in Prague. We have chosen the Liechtenstein palace under the Prague Castle as the conference site to enhance the traditionally good atmosphere of the meeting. There is an inspirational genius loci of the historical center of the city, where four hundred years ago a fruitful combination of theoretical and empirical

method, through the collaboration of Johannes Kepler and Tycho de Brahe, led to the discovery of the laws of planetary orbits.

### **Computational Intelligence** - Nazmul

Siddique 2013-05-06

Computational Intelligence: Synergies of Fuzzy Logic, Neural Networks and Evolutionary Computing presents an introduction to some of the cutting edge technological paradigms under the umbrella of computational intelligence.

Computational intelligence schemes are investigated with the development of a suitable framework for fuzzy logic, neural networks and evolutionary computing, neuro-fuzzy systems, evolutionary-fuzzy systems and evolutionary neural systems. Applications to linear and non-linear systems are discussed with examples. Key features: Covers all the aspects of fuzzy, neural and evolutionary approaches with worked out examples, MATLAB® exercises and applications in each chapter Presents the synergies of technologies of

computational intelligence such as evolutionary fuzzy neural fuzzy and evolutionary neural systems Considers real world problems in the domain of systems modelling, control and optimization Contains a foreword written by Lotfi Zadeh Computational Intelligence: Synergies of Fuzzy Logic, Neural Networks and Evolutionary Computing is an ideal text for final year undergraduate, postgraduate and research students in electrical, control, computer, industrial and manufacturing engineering.

### *Fusion of Neural Networks, Fuzzy Systems and Genetic Algorithms* - Lakhmi C. Jain 2020-01-29

Artificial neural networks can mimic the biological information-processing mechanism in a very limited sense. Fuzzy logic provides a basis for representing uncertain and imprecise knowledge and forms a basis for human reasoning. Neural networks display genuine promise in solving problems, but a definitive theoretical basis does not yet exist for their

design. Fusion of Neural Networks, Fuzzy Systems and Genetic Algorithms integrates neural net, fuzzy system, and evolutionary computing in system design that enables its readers to handle complexity - offsetting the demerits of one paradigm by the merits of another. This book presents specific projects where fusion techniques have been applied. The chapters start with the design of a new fuzzy-neural controller. Remaining chapters discuss the application of expert systems, neural networks, fuzzy control, and evolutionary computing techniques in modern engineering systems. These specific applications include: direct frequency converters electro-hydraulic systems motor control toaster control speech recognition vehicle routing fault diagnosis Asynchronous Transfer Mode (ATM) communications networks telephones for hard-of-hearing people control of gas turbine aero-engines telecommunications systems design Fusion of Neural Networks, Fuzzy Systems and

Genetic Algorithms covers the spectrum of applications - comprehensively demonstrating the advantages of fusion techniques in industrial applications.

### **Soft Computing in Textile Engineering -**

Abhijit Majumdar 2010-11-29

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

Advances in Soft Computing - Félix Castro  
2018-12-31

The two-volume set LNAI 10632 and 10633 constitutes the proceedings of the 16th Mexican International Conference on Artificial Intelligence, MICAI 2017, held in Ensenada, Mexico, in October 2017. The total of 60 papers presented in these two volumes was carefully reviewed and selected from 203 submissions. The contributions were organized in the following topical sections: Part I: neural networks; evolutionary algorithms and

optimization; hybrid intelligent systems and fuzzy logic; and machine learning and data mining. Part II: natural language processing and social networks; intelligent tutoring systems and educational applications; and image processing and pattern recognition.

**Fusion of Neural Networks, Fuzzy Systems and Genetic Algorithms** - Lakhmi C. Jain  
2020-01-29

Artificial neural networks can mimic the biological information-processing mechanism in - a very limited sense. Fuzzy logic provides a basis for representing uncertain and imprecise knowledge and forms a basis for human reasoning. Neural networks display genuine promise in solving problems, but a definitive theoretical basis does not yet exist for their design. Fusion of Neural Networks, Fuzzy Systems and Genetic Algorithms integrates neural net, fuzzy system, and evolutionary computing in system design that enables its readers to handle complexity - offsetting the

demerits of one paradigm by the merits of another. This book presents specific projects where fusion techniques have been applied. The chapters start with the design of a new fuzzy-neural controller. Remaining chapters discuss the application of expert systems, neural networks, fuzzy control, and evolutionary computing techniques in modern engineering systems. These specific applications include: direct frequency converters electro-hydraulic systems motor control toaster control speech

recognition vehicle routing fault diagnosis Asynchronous Transfer Mode (ATM) communications networks telephones for hard-of-hearing people control of gas turbine aero-engines telecommunications systems design Fusion of Neural Networks, Fuzzy Systems and Genetic Algorithms covers the spectrum of applications - comprehensively demonstrating the advantages of fusion techniques in industrial applications.