

Neural Networks Fuzzy Logic And Genetic Algorithms By Rajasekaran Free

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.

Understand the fundamentals of the emerging field of fuzzy neural networks, their applications and the most used paradigms with this carefully organized state-of-the-art textbook. Previously tested at a number of noteworthy conference tutorials, the simple numerical examples presented in this book provide excellent tools for progressive learning. UNDERSTANDING NEURAL NETWORKS AND FUZZY LOGIC offers a simple presentation and bottom-up approach that is ideal for working professional engineers, undergraduates, medical/biology majors, and anyone with a nonspecialist background. Sponsored by: IEEE Neural Networks Council

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 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.

Synthesis and Applications

Neural Networks and Soft Computing
Fuzzy Logic, Neural Networks, and Genetic Algorithms
Neural Networks, Fuzzy Logic and Genetic Algorithms
Neural and Fuzzy Logic Control of Drives and Power Systems
Neural Networks and Fuzzy Systems

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.

This book comprises papers on diverse aspects of fuzzy logic, neural networks, and nature-inspired optimization meta-heuristics and their application in various areas such as intelligent control and robotics, pattern recognition, medical diagnosis, time series prediction and optimization of complex problems. The book is organized into seven main parts, each with a collection of papers on a similar subject. The first part presents new concepts and algorithms based on type-2 fuzzy logic for dynamic parameter adaptation in meta-heuristics. The second part discusses network theory and applications, and includes papers describing applications of neural networks in diverse areas, such as time series prediction and pattern recognition. The third part addresses the theory and practice of meta-heuristics in different areas of application, while the fourth part describes diverse fuzzy logic applications in the control area, which can be considered as intelligent controllers. The next two parts explore applications in areas, such as time series prediction, and pattern recognition and new optimization and evolutionary algorithms and their applications respectively. Lastly, the seventh part addresses the design and application of different hybrid intelligent systems.

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.

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

Theory and Applications

Neural Network and Fuzzy Logic Applications in C/C++

Fuzzy And Neural Approaches in Engineering

Neural Networks & Fuzzy Logic

Foundations of Neural Networks, Fuzzy Systems, and Knowledge Engineering

****Introduces cutting-edge control systems to a wide readership of engineers and students *The first book on neuro-fuzzy control systems to take a practical, applications-based approach, backed up with worked examples and case studies *Learn to use VHDL in real-world applications Introducing cutting edge control systems through real-world applications Neural networks and fuzzy logic based systems offer a modern control solution to AC machines used in variable speed drives, enabling industry to save costs and increase efficiency by replacing expensive and high-maintenance DC motor systems. The use of fast micros has revolutionised the field with sensorless vector control and direct torque control. This book reflects recent research findings and acts as a useful guide to the new generation of control systems for a wide readership of advanced undergraduate and graduate students, as well as practising engineers. The authors guide readers quickly and concisely through the complex topics of neural networks, fuzzy logic, mathematical modelling of electrical machines, power systems control and VHDL design. Unlike the academic monographs that have previously been published on each of these subjects, this book combines them and is based round case studies of systems analysis, control strategies, design, simulation and***

implementation. The result is a guide to applied control systems design that will appeal equally to students and professional design engineers. The book can also be used as a unique VHDL design aid, based on real-world power engineering applications.

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.

NEURAL NETWORKS, FUZZY SYSTEMS AND EVOLUTIONARY

ALGORITHMS : SYNTHESIS AND APPLICATIONS PHI Learning Pvt. Ltd.

A practical reference that presents concise and comprehensive reports on the major activities in fuzzy logic and neural networks, with emphasis on the applications and systems of interest to computer engineers. Each of the 31 chapters focuses on the most important activity of a specific topic, and the chapters are organized into three parts: principles and algorithms; applications; and architectures and systems. The applications for fuzzy logic include home appliance design and manufacturing process; those for neural networks include radar, sonar, and speech signal processing, remote sensing, and electrical power systems. Annotation copyright by Book News, Inc., Portland, OR

Deep Neuro-Fuzzy Systems with Python

Computational Intelligence

Neural Networks and Fuzzy-logic Control on Personal Computers and

Workstations

Neural Networks, Fuzzy Systems, and Evolutionary Computation Proceedings of the Sixth International Conference on Neural Network and Soft Computing, Zakopane, Poland, June 11-15, 2002

Artificial neural networks, fuzzy logic and neuro-fuzzy system in the role of short term load forecast

Neural Networks and Fuzzy-Logic Control introduces a simple integrated environment for programming displays and report generation. It includes the only currently available software that permits combined simulation of multiple neural networks, fuzzy-logic controllers, and dynamic systems such as robots or physiological models. The enclosed educational version of DESIRE/NEUNET differs from the full system mainly in the size of its data area and includes a compiler, two screen editors, color graphics, and many ready-to-run examples. The software lets users or instructors add their own help screens and interactive menus. The version of DESIRE/NEUNET included here is for PCs, viz. 286/287, 386/387, 486DX, Pentium, P6, SX with math coprocessor.

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 inference, 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.

CD-ROM contains: BackProp -- Data files -- Display -- Images -- MATLAB examples

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.

Fusion of Neural Networks, Fuzzy Systems and Genetic Algorithms
Explainable Neural Networks Based on Fuzzy Logic and Multi-criteria Decision Tools

Synergies of Fuzzy Logic, Neural Networks and Evolutionary Computing
Neural Networks and Other Soft Computing Techniques with Applications in the Oil Industry

With Case Studies and Applications from the Industry
Neural Networks, Fuzzy Logic, and Genetic Algorithms

This book presents recent advances on the design of intelligent systems based on fuzzy logic, neural networks and nature-inspired optimization and their application in areas such as, intelligent control and robotics, pattern recognition, time series prediction and optimization of complex problems. The book is organized in eight main parts, which contain a group of papers around a similar subject. The first part consists of papers with the main theme of theoretical aspects of fuzzy logic, which basically consists of papers that propose new concepts and algorithms based on fuzzy systems. The second part contains papers with the main theme of neural networks theory, which are basically papers dealing with new concepts and algorithms in neural networks. The third part contains papers describing applications of neural networks in diverse areas, such as time series prediction and pattern recognition. The fourth part contains papers describing new nature-inspired optimization algorithms. The fifth part presents diverse

applications of nature-inspired optimization algorithms. The sixth part contains papers describing new optimization algorithms. The seventh part contains papers describing applications of fuzzy logic in diverse areas, such as time series prediction and pattern recognition. Finally, the eighth part contains papers that present enhancements to meta-heuristics based on fuzzy logic techniques.

Written by one of the foremost experts in the field of neural networks, this is the first book to combine the theories and applications of neural networks and fuzzy systems. The book is divided into three sections: Neural Network Theory, Neural Network Applications, and Fuzzy Theory and Applications. It describes how neural networks can be used in applications such as: signal and image processing, function estimation, robotics and control, analog VLSI and optical hardware design; and concludes with a presentation of the new geometric theory of fuzzy sets, systems, and associative memories.

With today's growing and overloading volume of information, it is becoming tremendously difficult to analyse the huge amounts of data that contain this information. It makes it very strenuous and inconvenient to introduce an appropriate methodology of decision-making fast enough to the point that it can be considered as real-time. The demand for real-time processing information and related data -- both structured and unstructured -- is on the rise and consequently makes it harder and harder to implement correct decision making at the enterprise level to keep the organisation robust and resilient against either manmade threats or natural disasters. Neural networking and fuzzy systems combined show how an artificial intelligence (AI) can be driven, by these combinations as a trainable system that is more dynamic than static when it comes to machine and deep learning language to deal with both adversary and friendly events in real-time. Dynamic systems of AI that are built around such an innovative approach allows the robots of the future to be more adaptive with mechanisms such as principle adoption, self-organisation, and the convergence of global stability from the viewpoint of business and intelligence security needed in today's cyber world. To deal with uncertainty, vagueness, and imprecision, Lofti A Zadeh introduced fuzzy sets and fuzzy logic. In the present book, fuzzy classification is applied to extend portfolio analysis, scoring methods, customer segmentation and performance measurement, and thus improves managerial decisions. As an integral part of the book, case studies show how fuzzy classification -- with its query facilities -- can extend customer equity, enable mass customisation, and refine marketing campaigns. This book shows interoperability between the two sciences/techniques show how: 1) To utilise fuzzy theory of the

first and second kind to an adaptive control; and 2) how to invent a structured fuzzy system and robots of future, with unsupervised neural network techniques to face an unstructured world of big data and unpredictable global events all in real-time. An important aspect of this approach is to examine biological neural systems and study how artificial neural networks are, how they are based on them, and how they are driven by them as well. Key areas discussed include: 1) Structural diversity; 2) temporal lobe; 3) origins of artificial neural systems; 4) brain structure and function; 5) biological nerve cells; 6) synapses; 7) random and fixed positions in the brain's neural networks; and 8) how biological systems really compare to computational neural networks. The book is designed to be appropriate for courses in engineering, computer science, mathematics, psychology and biology. The extensively revised and updated edition provides a logical and easy-to-follow progression through C++ programming for two of the most popular technologies for artificial intelligence--neural and fuzzy programming. The authors cover theory as well as practical examples, giving programmers a solid foundation as well as working examples with reusable code.

Theory and Applications : a Special Issue

C++ Neural Networks and Fuzzy Logic

Integrating Neural Networks, Fuzzy Logic and Genetic Algorithms for Intelligent Control

Artificial Intelligence for Smarter Power Systems

Fuzzy Logic Hybrid Extensions of Neural and Optimization Algorithms: Theory and Applications

Concepts, Modeling and Algorithms for Fast Learning

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.

Motor monitoring, incipient fault detection, and diagnosis are important and difficult topics in the engineering field. These topics deal with motors ranging from small DC motors used in intensive care units to the huge motors used in nuclear power plants. With proper machine monitoring and fault detection schemes, improved safety and reliability can be achieved for different engineering system operations. The importance of incipient fault detection can be found in the cost saving which can be obtained by detecting potential machine failures before they occur. Non-invasive, inexpensive, and reliable fault detection techniques are often preferred by many engineers. A large number of techniques, such as expert system approaches and vibration analysis, have been developed for motor fault detection purposes. Those techniques have achieved a certain degree of success. However, due to the complexity and importance of the systems, there is a need to further improve existing fault detection techniques. A major key to the success in fault detection is the ability to use appropriate technology to effectively fuse the relevant information to provide accurate and reliable results. The advance in technology will provide opportunities for improving existing fault detection schemes. With the maturing technology of artificial neural network and fuzzy logic, the motor fault detection problem can be solved using an innovative approach based on measurements that are easily accessible, without the need for rigorous mathematical models. This approach can identify and aggregate the relevant information for accurate and reliable motor fault detection. This book will introduce the necessary concepts of neural network and fuzzy logic, describe the advantages and challenges of using these technologies to solve motor fault detection problems, and discuss several design considerations and methodologies in applying these techniques to motor incipient fault detection.

This volume contains the proceedings of the Eighth Austrian Artificial Intelligence Conference, held in Linz, Austria, in June 1993. The focus of the conference was on "Fuzzy Logic in Artificial Intelligence". The volume contains abstracts of two invited talks and full versions of 17 carefully selected papers. The invited talks were: "The role of fuzzy logic and soft computing in the conception and design of intelligent systems" by Lotfi A. Zadeh, and "A contextual approach for AI systems development" by Irina V. Ezhkova. The contributed papers are grouped into sections on theoretical issues, machine learning, expert systems, robotics and control, applications to medicine, and applications to car driving. Additionally, the volume contains descriptions of the four

workshops that took place during the conference.

AN INDISPENSABLE RESOURCE FOR ALL THOSE WHO DESIGN AND IMPLEMENT TYPE-1 AND TYPE-2 FUZZY NEURAL NETWORKS IN REAL TIME SYSTEMS Delve into the type-2 fuzzy logic systems and become engrossed in the parameter update algorithms for type-1 and type-2 fuzzy neural networks and their stability analysis with this book! Not only does this book stand apart from others in its focus but also in its application-based presentation style. Prepared in a way that can be easily understood by those who are experienced and inexperienced in this field. Readers can benefit from the computer source codes for both identification and control purposes which are given at the end of the book. A clear and an in-depth examination has been made of all the necessary mathematical foundations, type-1 and type-2 fuzzy neural network structures and their learning algorithms as well as their stability analysis. You will find that each chapter is devoted to a different learning algorithm for the tuning of type-1 and type-2 fuzzy neural networks; some of which are: • Gradient descent • Levenberg-Marquardt • Extended Kalman filter In addition to the aforementioned conventional learning methods above, number of novel sliding mode control theory-based learning algorithms, which are simpler and have closed forms, and their stability analysis have been proposed. Furthermore, hybrid methods consisting of particle swarm optimization and sliding mode control theory-based algorithms have also been introduced. The potential readers of this book are expected to be the undergraduate and graduate students, engineers, mathematicians and computer scientists. Not only can this book be used as a reference source for a scientist who is interested in fuzzy neural networks and their real-time implementations but also as a course book of fuzzy neural networks or artificial intelligence in master or doctorate university studies. We hope that this book will serve its main purpose successfully. Parameter update algorithms for type-1 and type-2 fuzzy neural networks and their stability analysis Contains algorithms that are applicable to real time systems Introduces fast and simple adaptation rules for type-1 and type-2 fuzzy neural networks Number of case studies both in identification and control Provides MATLAB® codes for some algorithms in the book

Fuzzy Neural Networks for Real Time Control Applications
Type-2 Fuzzy Logic: Theory and Applications
Design of Intelligent Systems Based on Fuzzy Logic, Neural Networks and Nature-Inspired Optimization
Fuzzy Logic and Neural Network Handbook
A Dynamical Systems Approach to Machine Intelligence
Fuzzy Logic in Artificial Intelligence

Esta dissertação investiga o desempenho de técnicas de

inteligência computacional na previsão de carga em curto prazo. O objetivo deste trabalho foi propor e avaliar sistemas de redes neurais, lógica nebulosa, neuro-fuzzy e híbridos para previsão de carga em curto prazo, utilizando como entradas variáveis que influenciam o comportamento da carga, tais como: temperatura, índice de conforto e perfil de consumo. Este trabalho envolve 4 etapas principais: um estudo sobre previsão de carga e sobre as variáveis que influenciam o comportamento da carga; um estudo da aplicação de técnicas de inteligência computacional em previsão de carga; a definição de sistemas de redes neurais, lógica fuzzy e neuro-fuzzy em previsão de carga; e estudo de casos. No estudo sobre previsão de carga, foi observada a influência de algumas variáveis no comportamento da curva de carga de uma empresa de energia elétrica. Entre estas variáveis se encontram alguns dados meteorológicos (Temperatura, Umidade, Luminosidade, Índice de conforto, etc.), além de informações sobre o perfil de consumo de carga das empresas. Também foi observado o comportamento da série de carga com relação ao dia da semana, sua sazonalidade e a correlação entre o valor atual e valores passados. Foi realizado um levantamento bibliográfico sobre a aplicação de técnicas de inteligência computacional na previsão de carga. Os modelos de redes neurais, são os mais explorados até o momento. Os modelos de lógica fuzzy começaram a ser utilizados mais recentemente. Modelos neuro-fuzzy são mais recentes que os demais, não existindo portanto, muita bibliografia a respeito. Os projetos de aplicação dos três modelos foram classificados quanto à sua arquitetura, desempenho, erros medidos, entradas utilizadas e horizonte da previsão. Foram propostos e implementados 4 sistemas de previsão de carga: lógica fuzzy, redes neurais, sistema neuro-fuzzy hierárquico e um sistema híbrido neural/neuro-fuzzy. Os sistemas foram especializados para cada dia da semana, pelo fato do comportamento da carga ser distinto entre estes dias. Para os sistemas neural, neuro-fuzzy e híbrido os dados também foram separados em inverno e verão, pois o perfil de consumo de carga é diferente nestas estações. O sistema com lógica fuzzy foi modelado para realizar previsões de curtíssimo prazo (10 em 10 minutos), utilizando para isto o histórico de carga, hora do dia e intervalo de dez minutos dentro da hora do dia. As regras do sistema foram geradas automaticamente a partir do histórico de carga e os conjuntos nebulosos foram pré-definidos. O sistema com redes neurais teve sua arquitetura definida através de experimentos, utilizando-se apenas dados de carga, hora do dia e mês como entradas. O modelo de rede escolhido foi com retropropagação do erro (backpropagation). Foram realizados testes incluindo outras entradas como temperatura e perfil de

consumo. Para o sistema neuro-fuzzy foi escolhido um sistema neuro-fuzzy hierárquico, que define automaticamente sua estrutura e as regras a partir do histórico dos dados. Em uma última etapa, foi estudado um sistema híbrido neural/ neuro-fuzzy, no qual a previsão da rede neural é uma entrada do sistema neuro-fuzzy. Para os três últimos modelos as previsões realizadas foram em curto prazo, com um horizonte de uma hora. Os sistemas propostos foram testados em estudos de casos e os resultados comparados entre si e com os resultados obtidos em outros projetos na área. Os dados de carga utilizados no sistema com lógica fuzzy foram da CEMIG, no período de 1994 a 1996, em intervalos de 10 minutos, para previsões em curtíssimo prazo. Os resultados obtidos podem ser considerados bons em comparação com um sistema de redes neurais utilizando os mesmos dados. Para os demais modelos foram utilizados os seguintes dados: dados horários de carga da Light e da CPFL, no período de 1996 a 1998; dados de temperatura (horária para região de atuação da Light e diária para a região da CPFL) no período de 1996 a 1998; a codificação do mês e hora do dia; e um perfil de carga por classe de consumo, para realizar previsões de curto prazo (1 hora, 24 passos a frente). Os dados foram separados em inverno e verão, além de dia da semana, o que torna os modelos bastante especializados. Os resultados obtidos pelos modelos foram da ordem de 0,0 % para o sistema com lógica fuzzy, 0,0 % para redes neurais, 0,0 % para o sistema neuro-fuzzy e 0,0 % para o sistema híbrido. Este trabalho verificou a aplicabilidade das técnicas de inteligência computacional na previsão de carga, demonstrando que um estudo preliminar das séries a serem previstas e a sua relação com outras variáveis tem forte influência sobre as previsões.

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

Download File PDF Neural Networks Fuzzy Logic And Genetic Algorithms By Rajasekaran Free

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.

Gain insight into fuzzy logic and neural networks, and how the integration between the two models makes intelligent systems in the current world. This book simplifies the implementation of fuzzy logic and neural network concepts using Python. You'll start by walking through the basics of fuzzy sets and relations, and how each member of the set has its own membership function values. You'll also look at different architectures and models that have been developed, and how rules and reasoning have been defined to make the architectures possible. The book then provides a closer look at neural networks and related architectures, focusing on the various issues neural networks may encounter during training, and how different optimization methods can help you resolve them. In the last section of the book you'll examine the integrations of fuzzy logics and neural networks, the adaptive neuro fuzzy Inference systems, and various approximations related to the same. You'll review different types of deep neuro fuzzy classifiers, fuzzy neurons, and the adaptive learning capability of the neural networks. The book concludes by reviewing advanced neuro fuzzy models and applications. What You'll Learn Understand fuzzy logic, membership functions, fuzzy relations, and fuzzy inference Review neural networks, back propagation, and optimization Work with different architectures such as Takagi-Sugeno model, Hybrid model, genetic algorithms, and approximations Apply Python implementations of deep neuro fuzzy system Who This book Is For Data scientists and software engineers with a basic understanding of Machine Learning who want to expand into the hybrid applications of deep learning and fuzzy logic. 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. Intelligent Hybrid Systems

Computer Vision and Fuzzy-neural Systems

Intelligent Control

*NEURAL NETWORKS, FUZZY SYSTEMS AND EVOLUTIONARY ALGORITHMS :
SYNTHESIS AND APPLICATIONS*

*Modular Neural Networks and Type-2 Fuzzy Systems for Pattern
Recognition*

Basic Concepts and Applications

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.

The research presented in this book shows how combining deep neural networks with a special class of fuzzy logical rules and multi-criteria decision tools can make deep neural networks more interpretable - and even, in many cases, more efficient. Fuzzy logic together with multi-criteria decision-making tools provides very powerful tools for modeling human thinking. Based on their common theoretical basis, we propose a consistent framework for modeling human thinking by using the tools of all three fields: fuzzy logic, multi-criteria decision-making, and deep learning to help reduce the black-box nature of neural models; a challenge that is of vital importance to the whole research community.

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. Using an engineering and science perspective, it explores diverse neural network, fuzzy logic and genetic algorithm techniques plus developing applications best suited for each of the methods discussed. Sample results are described and judgment made as to how well each application worked. The book/disk set includes an object-oriented user interface along with the code for numerous programs.

Fuzzy Logic and Expert Systems Applications

8th Austrian Artificial Intelligence Conference, FLAI'93, Linz, Austria, June 28-30, 1993. Proceedings

Artificial Neural Networks, Fuzzy Logic and Genetic Algorithms

Fuzzy Logic and Neural Networks

Industrial Applications

Decision Making Based on Fuzzy Logic

This book covers the use of fuzzy logic for power grids. Power systems need to accommodate intermittent renewables and changes in loads while ensuring high power quality. Fuzzy logic uses values between 0 and 1 rather than binary ones, offering advantages in adaptability for energy systems with renewables.

Fuzzy Logic Augmentation of Neural and Optimization Algorithms: Theoretical Aspects and Real Applications

Understanding Neural Networks and Fuzzy Logic

Artificial Neural Networks, Fuzzy Logic and Genetic Algorithms

Methodologies Of Using Neural Network And Fuzzy Logic Technologies For Motor Incipient Fault Detection

Neural Network Driven Artificial Intelligence

A Hybrid Approach Based on Fuzzy Logic, Neural Networks and Genetic Algorithms