Fuzzy Logic Solution

ALEXIS PITTS

A Fuzzy Logic Solution for Navigation of the Subsurface Explorer Planetary Exploration Robot Springer
The purpose of this book is to present a methodology for designing and tuning fuzzy expert systems in order to identify nonlinear objects; that is, to build input-output models using expert and experimental information. The results of these identifications are used for direct and inverse fuzzy evidence in forecasting and diagnosis problem solving. The book is organised as follows: Chapter 1 presents the basic knowledge about fuzzy sets, genetic algorithms and neural nets necessary for a clear understanding of the rest of this book. Chapter 2 analyzes direct fuzzy inference based on fuzzy if-then rules. Chapter 3 is devoted to the tuning of fuzzy rules for direct inference using genetic algorithms and neural nets. Chapter 4 presents models and algorithms for extracting fuzzy rules from experimental data. Chapter 5 describes a method for solving fuzzy logic equations necessary for the inverse fuzzy inference in diagnostic systems. Chapters 6 and 7 are devoted to inverse fuzzy inference based on fuzzy relations and fuzzy rules. Chapter 8 presents a method for extracting fuzzy relations from data. All the algorithms presented in Chapters 2-8 are validated by computer experiments and illustrated by solving medical and technical forecasting and diagnosis problems. Finally, Chapter 9 includes applications of the proposed methodology in dynamic and inventory control systems, prediction of results of football games, decision making in road accident investigations, project management and reliability analysis.

Artificial Intelligence Techniques for Networked Manufacturing Enterprises Management CRC Press
This book comprises the select proceedings of the International Conference in Power, Energy, Control, Signals and Systems (IPECS) 2022. The book focuses on intelligent solutions for smart grids and smart cities. The content of this book is designed to develop many innovative ideas for an energy-efficient and sustainable future. It focuses on recent technological advances and challenges in the field of grid integration of renewable energy resources, AI/ML in power and energy systems, security enhancement of power systems/electronics using advanced ML techniques for integration of renewable energies, electric vehicle-energy storage, and battery charging technologies, etc. The book also covers the latest advances especially in instrumentation and control in smart grid applications —Internet of Things and cyber-physical systems, power semiconductor device technology leading to improvements in power losses for power electronic systems, economic and sustainable design of smart cities-security and data privacy in smart cities, lighting, and illumination. This book proves to be a valuable resource for those in academia and industry.
Intelligent Knowledge-Based Systems Springer Nature
In this book, recent developments on fuzzy logic, neural networks and optimization algorithms, as well as their hybrid combinations, are presented. In addition, the above-mentioned methods are applied to 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 techniques. 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 offer theoretical concepts

and applications of meta-heuristics in different areas. Another group of papers describe diverse applications of fuzzy logic, neural networks and hybrid intelligent systems in medical problems. 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 and classification problems.

Computational Intelligence: Soft Computing and Fuzzy-Neuro Integration with Applications Physica

This book introduces a dynamic, on-line fuzzy inference system. In this system membership functions and control rules are not determined until the system is applied and each output of its lookup table is calculated based on current inputs. The book describes the real-world uses of new fuzzy techniques to simplify readers' tuning processes and enhance the performance of their control systems. It further contains application examples.

An Introduction to Fuzzy Logic Applications Springer Nature

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.

Fuzzy Mathematics in Economics and Engineering Springer Verlag

Soft computing is a consortium of computing methodologies that provide a foundation for the conception, design, and deployment of intelligent systems and aims to formalize the human ability to make rational decisions in an environment of uncertainty and imprecision. This book is based on a NATO Advanced Study Institute held in 1996 on soft computing and its applications. The distinguished contributors consider the principal constituents of soft computing, namely fuzzy logic, neurocomputing, genetic computing, and probabilistic reasoning, the relations between them, and their fusion in industrial applications. Two areas emphasized in the book are how to achieve a synergistic combination of the main constituents of soft computing and how the combination can be used to achieve a high Machine Intelligence Quotient.

Advanced Solutions in Power Systems Springer-Verlag

This edition provides a comprehensive introduction to fuzzy logic, and leads the reader through the complete process of designing, constructing, implementing, verifying and maintaining a platform-independent fuzzy system model. The book has been extensively revised to bring the subject up-to-date, and features two new chapters: "Building and Using Fuzzy Cognitive Map Models" and "Building ME-OWA Models."

Intelligent Control Springer Science & Business Media

The resurgence of artificial intelligence has been fueled by the availability of the present generation of high-performance computational tools and techniques. This book is designed to provide introductory guidance to artificial intelligence, particularly from the perspective of digital systems engineering. Artificial Intelligence and Digital Systems Engineering provides a general introduction to the origin of AI and covers the wide application areas and software and hardware interfaces. It will prove to be instrumental in helping new users expand their knowledge horizon to the growing market of AI tools, as well as showing how AI is applicable to the development of games, simulation, and consumer products, particularly using artificial neural networks. This book is for the general reader, university students, and instructors of industrial, production, civil, mechanical, and manufacturing engineering. It will also be of interest to managers of technology, projects, business, plants, and operations.

Intelligent and Fuzzy Techniques: Smart and Innovative Solutions Springer

This book gathers the most recent developments in fuzzy & intelligence systems and real complex systems presented at INFUS 2020, held in Istanbul on July 21–23, 2020. The INFUS conferences are a well-established international research forum to advance the foundations and applications of intelligent and fuzzy systems, computational intelligence, and soft computing, highlighting studies on fuzzy & intelligence systems and real complex systems at universities and international research institutions. Covering a range of topics, including the theory and applications of fuzzy set extensions such as intuitionistic fuzzy sets, hesitant fuzzy sets, spherical fuzzy sets, and fuzzy decision-making; machine learning; risk assessment; heuristics; and clustering, the book is a valuable resource for academics, M.Sc. and Ph.D. students, as well as managers and engineers in industry and the service sectors.

Fuzzy Evidence in Identification, Forecasting and Diagnosis Solutions Manual to a First Course in Fuzzy Logic

Fuzzy logic provides a unique method of approximate reasoning in an imperfect world. This text is a bridge to the principles of fuzzy logic through an application-focused approach to selected topics in Engineering and Management. The many examples point to the richer solutions obtained through fuzzy logic and to the possibilities of much wider applications. There are relatively few texts available at present in fuzzy logic applications. The style and content of this text is complementary to those already available. New areas of application are presented in a graded approach in which the underlying concepts are first described. The text is broadly divided into two parts which treat Processes and Materials and also System Applications. The level enables a selection of the text to be made for the substance of a senior undergraduate level course. There is also sufficient volume and quality for the basis of a postgraduate course. A more restricted and judicious selection can provide the material for a professional short course.

Fuzzy Logic Foundations and Industrial Applications Springer Science & Business Media

Fuzzy Logic, at present is a hot topic, among academicians as well various programmers. This book is provided to give a broad, in-depth overview of the field of Fuzzy Logic. The basic principles of Fuzzy Logic are discussed in detail with various solved examples. The different approaches and solutions to the problems given in the book are well balanced and pertinent to the Fuzzy Logic research projects. The applications of Fuzzy Logic are also dealt to make the readers understand the concept of Fuzzy Logic. The solutions to the problems are programmed using MATLAB 6.0 and the simulated results are given. The MATLAB Fuzzy Logic toolbox is provided for easy reference.

Mathematical Modeling using Fuzzy Logic CRC Press

Artificial Intelligence Techniques for Networked Manufacturing Enterprises Management addresses prominent concepts and applications of AI technologies in the management of networked manufacturing enterprises. The aim of this book is to align latest practices, innovation and case studies with academic frameworks and theories, where AI techniques are used efficiently for networked manufacturing enterprises. More specifically, it includes the latest research results and projects at different levels addressing quick-response system, theoretical performance analysis, performance and capability demonstration. The role of emerging AI technologies in the modelling, evaluation and optimisation of networked enterprises' activities at different decision levels is also covered. Artificial Intelligence Techniques for Networked Manufacturing Enterprises Management is a valuable guide for postgraduates and researchers in industrial engineering, computer science, automation and operations research.

Application of Fuzzy Logic for the Solution of Inverse Kinematics and Hierarchical Controls of Robotic Manipulators Physica

Fuzzy Logic Foundations and Industrial Applications is an organized edited collection of contributed chapters covering basic fuzzy logic theory, fuzzy linear programming, and applications. Special emphasis has been given to coverage of recent research results, and to industrial applications of fuzzy logic. The chapters are new works that have been written exclusively for this book by many of the leading and prominent researchers (such as Ronald Yager, Ellen Hisdal, Etienne Kerre, and others) in this field. The contributions are original and each chapter is self-contained. The authors have been careful to indicate direct links between fuzzy set theory and its industrial applications. Fuzzy Logic Foundations and Industrial Applications is an invaluable work that provides researchers and industrial engineers with up-to-date coverage of new results on fuzzy logic and relates these results to their industrial use.

Smart Solutions in Today's Transport Springer Science & Business Media

This book is designed to provide rich research hub for researchers, teachers, and students to ease research hassle/challenges. The book is rich and comprehensive enough to provide answers to frequently asked research questions because the content of the book touches several disciplines cutting across computing, engineering, medicine, education, and sciences in general. The rich multidisciplinary contents of the book promise to leave all users satisfied. The valuable features in the book include but not limited to: demonstration of mathematical expressions for implementation of machine learning models, integration of learning techniques, and projection of future AI and IoT technologies. These technologies will enable systems to be simulative, predictive, and self-operating smart systems. The primary audience of the book include but not limited to researchers, teachers, and postgraduate and undergraduate students in computing, engineering, medicine, education, and science fields.

Fuzzy TOPSIS Allied Publishers

This book is an excellent starting point for any curriculum in fuzzy systems fields such as computer science, mathematics, business/economics and engineering. It covers the basics leading to: fuzzy clustering, fuzzy pattern recognition, fuzzy database, fuzzy image processing, soft computing, fuzzy applications in operations research, fuzzy decision making, fuzzy rule based systems, fuzzy systems modeling, fuzzy mathematics. It is not a book designed for researchers - it is where you really learn the "basics" needed for any of the above-mentioned applications. It includes many figures and problem sets at the end of sections.

The Fuzzy Systems Handbook Physica

Mathematical Modeling using Fuzzy Logic has been a dream project for the author. Fuzzy logic provides a unique method of approximate reasoning in an imperfect world. This text is a bridge to the principles of fuzzy logic through an application-focused approach to selected topics in engineering and management. The many examples point to the richer solutions obtained through fuzzy logic and to the possibilities of much wider applications. There are relatively very few texts available at present in fuzzy logic applications. The style and content of this text is complementary to those already available. New areas of application, like application of fuzzy logic in modeling of sustainability, are presented in a graded approach in which the underlying concepts are first described. The text is broadly divided into two parts: the first treats processes, materials, and system applications related to fuzzy logic, and the second delves into the modeling of sustainability with the help of fuzzy logic. This book offers comprehensive coverage of the most essential topics, including: Treating processes, materials, system applications related to fuzzy logic Highlighting new areas of application of fuzzy logic Identifying possibilities of much wider applications of fuzzy logic Modeling of sustainability with the help of fuzzy logic The level enables a selection of the text to be made for the substance of undergraduate-, graduate-, and postgraduate-level courses. There is also sufficient volume and quality for the basis of a postgraduate course. A more restricted and judicious selection can provide the material for a professional short course and various university-level courses.

Modeling and Control of Uncertain Nonlinear Systems with Fuzzy Equations and Z-Number Academic Press

Provides insight on both classical means and new trends in the application of power electronic and artificial intelligence techniques in power system operation and control This book presents advanced solutions for power system controllability improvement, transmission capability enhancement and operation planning. The book is organized into three parts. The first part describes the CSC-HVDC and VSC-HVDC technologies, the second part presents the FACTS devices, and the third part refers to the artificial intelligence techniques. All technologies and tools approached in this book are essential for power system development to comply with the smart grid requirements. Discusses detailed operating principles and diagrams, theory of modeling, control strategies and physical installations around the world of HVDC and FACTS systems Covers a wide range of Artificial Intelligence techniques that are successfully applied for many power system problems, from planning and monitoring to operation and control Each chapter is carefully edited, with drawings and illustrations that helps the reader to easily understand the principles of operation or application Advanced Solutions in Power Systems: HVDC, FACTS, and Artificial Intelligence is written for graduate students, researchers in transmission and distribution networks, and power system operation. This book also serves as a reference for professional software developers and practicing engineers.

The Fuzzy Systems Handbook CRC Press
This book constitutes the thoroughly refereed proceedings of the 17th International Conference on Transport Systems Telematics, TST 2017, held in Katowice-Ustrón, Poland, in April 2017. The 40 full papers presented in this volume were carefully reviewed and selected from 128 submissions. They present and organize the knowledge from within the field of intelligent transportation systems, the specific solutions applied in it and their influence on improving efficiency of transport systems.
Fuzzy Logic Springer Science & Business Media
Initially conceived as a methodology for the representation and manipulation of imprecise and vague information, fuzzy computation has found wide use in problems that fall well beyond its originally intended scope of application. Many scientists and engineers now use the paradigms of fuzzy computation to tackle problems that are either intractable
Machine Learning and the Internet of Things in Education John Wiley & Sons
This book aims to justify the use of fuzzy logic as a logic and as an uncertainty theory in the decision-making context. It also discusses the development of the TOPSIS method (Technique for Order of Preference by Similarity to Ideal Solution) with related examples and MATLAB codes. This is the first book devoted to TOPSIS and its fuzzy versions. It presents the use of fuzzy logic as a logic and as an uncertainty theory in the decision-making content and discusses the development of the TOPSIS method in classical and fuzzy context. The book justifies the use of fuzzy logic as an uncertainty theory and provides illustrative examples for each fuzzy TOPSIS extension, along with related MATLAB codes and case studies. This book is for industrial engineers, operations research engineers, systems engineers, and production engineers working in the areas of decision analysis, multi-criteria decision making, and multiple objective optimization.