Introduction to fuzzy logic control. History of industrial applications of

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.

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.
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Explore the diverse electrical engineering application of polymer composite materials with this in-depth collection edited by leaders in the field. Polymer Composites for Electrical Engineering delivers a comprehensive exploration of the fundamental principles, state-of-the-art research, and future challenges of polymer composites. Written from the perspective of electrical engineering applications, like electrical and thermal energy storage, high temperature applications, fire retardance, power cables, electric stress control, and others, the book covers all major application branches of these widely used materials. Rather than focus on polymer composite materials themselves, the distinguished editors have chosen to collect contributions from industry leaders in the area of real and practical electrical engineering applications of polymer composites. The book's relevance will only increase as advanced polymer composites receive more attention and interest in the area of advanced electronic devices and electric power equipment. Unique amongst its peers, Polymer Composites for Electrical Engineering offers readers a collection of practical and insightful materials that will be of great interest to both academic and industrial audiences. Those resources include:

- A comprehensive discussion of glass fiber reinforced polymer composites for power equipment, including GIS, bushing, transformers, and more
- Explorations of polymer composites for capacitors, outdoor insulation, electric stress control, power cable insulation, electrical and thermal energy storage, and high temperature applications
- A treatment of semi-conductive polymer composites for power cables
- In-depth analysis of fire-retardant polymer composites for electrical engineering
- An examination of polymer composite conductors

Perfect for postgraduate students and researchers working in the fields of electrical, electronic, and polymer engineering, Polymer Composites for Electrical Engineering will also earn a place in the libraries of those working in the areas of composite materials, energy science and technology, and nanotechnology.

Methods from Fuzzy Logic since the end of the 80th were the sources for remarkable applications of computer modelling in fields which before looked essentially inaccessible. The main tool for that,
the fuzzy controllers - a method of rule based rough modelling using fuzzy information - is presented in this book and investigated from a mathematical point of view. The basic notions from fuzzy set theory and many-valued logic are explained in detail, and a theory of fuzzy equations and systems of them is developed and applied to fuzzy controllers. The final chapter discussed methodological issues arising out of the process of developing and evaluating fuzzy models.


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.
This volume constitutes the thoroughly refereed post-workshop proceedings of the 5th International Workshop on Fuzzy Logic and Applications held in Naples, Italy, in October 2003. The 40 revised full papers presented have gone through two rounds of reviewing and revision. All current issues of theoretical, experimental and applied fuzzy logic and related techniques are addressed with special attention to rough set theory, neural networks, genetic algorithms and soft computing. The papers are organized in topical sections on fuzzy sets and systems, fuzzy control, neuro-fuzzy systems, fuzzy decision theory, and application, and soft computing in image processing.

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.
Fuzzy sets and fuzzy logic are powerful mathematical tools for modeling and controlling uncertain systems in industry, humanity, and nature; they are facilitators for approximate reasoning in decision making in the absence of complete and precise information. Their role is significant when applied to complex phenomena not easily described by traditional mathematics. The unique feature of the book is twofold: 1) It is the first introductory course (with examples and exercises) which brings in a systematic way fuzzy sets and fuzzy logic into the educational university and college system. 2) It is designed to serve as a basic text for introducing engineers and scientists from various fields to the theory of fuzzy sets and fuzzy logic, thus enabling them to initiate projects and make applications.

Disks contain simulation edition of fuzzyTECH development software from Inform Software corporation.

Fuzzy logic has become an important tool for a number of different applications ranging from the control of engineering systems to artificial intelligence. In this concise introduction, the author presents a succinct guide to the basic ideas of fuzzy logic, fuzzy sets, fuzzy relations, and fuzzy reasoning, and shows how they may be applied. The book culminates in a chapter which describes fuzzy logic control: the design of intelligent control systems using fuzzy if-then rules which make use of human knowledge and experience to behave in a manner similar to a human controller. Throughout, the level of mathematical knowledge required is kept basic and the concepts are illustrated with numerous diagrams to aid in comprehension. As a result, all those curious to know more about fuzzy concepts and their real-world application will find this a good place to start.

This edited volume contains ten papers on the subject of fuzzy technology. Fuzzy technology emerged as a combination of fuzzy sets theory, fuzzy logic and fuzzy-based reasoning. As a technology it gained a very practical meaning through thousands of applications in different theoretical as well as practical disciplines, covering mathematics, physics, chemistry, biology, life science, social science, economy, computer science, and (foremost) electrical,
electronic, mechanical, nuclear, chemical, textile, aeronautic, ocean,
and many other engineering disciplines. The goal of this book is to
create an interest in fuzzy technology among researchers, engineers,
professionals and students involved in the research and development
in the broad area of artificial intelligence. This book is also intended
to bring the reader up-to-date in the area of implementations and
applications of fuzzy technology, as well as to generate and stimulate
new research ideas in this area. It may inspire and motivate the
researcher in new directions, as well as creating a force for new
efforts to make a fuzzy technology commonly known and used in
science and engineering. This volume appears at a time of
unprecedented research interest in the field of fuzzy technology. I
intentionally wrote research due to the events that have occurred
during the last couple of years. To be more specific, I should
describe this interest geographically.

These are exciting times in the fields of Fuzzy Logic and the
Semantic Web, and this book will add to the excitement, as it is the
first volume to focus on the growing connections between these two
fields. This book is expected to be a valuable aid to anyone
considering the application of Fuzzy Logic to the Semantic Web,
because it contains a number of detailed accounts of these combined
fields, written by leading authors in several countries. The Fuzzy
Logic field has been maturing for forty years. These years have
witnessed a tremendous growth in the number and variety of
applications, with a real-world impact across a wide variety of
domains with humanlike behavior and reasoning. And we believe that
in the coming years, the Semantic Web will be major field of
applications of Fuzzy Logic. This book, the first in the new series
Capturing Intelligence, shows the positive role Fuzzy Logic, and
more generally Soft Computing, can play in the development of the
Semantic Web, filling a gap and facing a new challenge. It covers
concepts, tools, techniques and applications exhibiting the
usefulness, and the necessity, for using Fuzzy Logic in the Semantic
Web. It finally opens the road to new systems with a high Web IQ.
Most of today's Web content is suitable for human consumption. The
Semantic Web is presented as an extension of the current web in
which information is given well-defined meaning, better enabling computers and people to work in cooperation. For example, within the Semantic Web, computers will understand the meaning of semantic data on a web page by following links to specified ontologies. But while the Semantic Web vision and research attracts attention, as long as it will be used two-valued-based logical methods no progress will be expected in handling ill-structured, uncertain or imprecise information encountered in real world knowledge. Fuzzy Logic and associated concepts and techniques (more generally, Soft Computing), has certainly a positive role to play in the development of the Semantic Web. Fuzzy Logic will not supposed to be the basis for the Semantic Web but its related concepts and techniques will certainly reinforce the systems classically developed within W3C. In fact, Fuzzy Logic cannot be ignored in order to bridge the gap between human-understandable soft logic and machine-readable hard logic. None of the usual logical requirements can be guaranteed: there is no centrally defined format for data, no guarantee of truth for assertions made, no guarantee of consistency.

To support these arguments, this book shows how components of the Semantic Web (like XML, RDF, Description Logics, Conceptual Graphs, Ontologies) can be covered, with in each case a Fuzzy Logic focus. First volume to focus on the growing connections between Fuzzy Logic and the Semantic Web Keynote chapter by Lotfi Zadeh The Semantic Web is presently expected to be a major field of applications of Fuzzy Logic It fills a gap and faces a new challenge in the development of the Semantic Web It opens the road to new systems with a high Web IQ Contributed chapters by Fuzzy Logic leading experts

Many biological systems and objects are intrinsically fuzzy as their properties and behaviors contain randomness or uncertainty. In addition, it has been shown that exact or optimal methods have significant limitation in many bioinformatics problems. Fuzzy set theory and fuzzy logic are ideal to describe some biological systems/objects and provide good tools for some bioinformatics problems. This book comprehensively addresses several important bioinformatics topics using fuzzy concepts and approaches,
including measurement of ontological similarity, protein structure prediction/analysis, and microarray data analysis. It also reviews other bioinformatics applications using fuzzy techniques.

Contents:
- Introduction to Bioinformatics
- Introduction to Fuzzy Set Theory and Fuzzy Logic
- Fuzzy Similarities in Ontologies
- Fuzzy Logic in Structural Bioinformatics
- Application of Fuzzy Logic in Microarray Data Analyses
- Other Applications
- Summary and Outlook

Readership: Postdoctoral fellows, students, senior investigators and professional practitioners/bioinformatics experts. Also used as a textbook for upper undergraduates and graduates in bioinformatics.

Keywords: Bioinformatics; Fuzzy Set Theory; Fuzzy Logic; Clustering; Ontology; Protein Structure

Key Features:
- Bridges two important research areas — computational intelligence and bioinformatics
- Chapters are connected seamlessly through a systematic design of the overall structure of the book
- Provides appendices on fundamental biological concepts and online resources related to the book
- James Keller, a renowned scientist in computational intelligence, pioneered a number of methods in fuzzy set theory
- Dong Xu, a well-known researcher in bioinformatics, developed several widely-used bioinformatics tools

This book presents the synthesis and analysis of fuzzy controllers and its application to a class of mechanical systems. It mainly focuses on the use of type-2 fuzzy controllers to account for disturbances known as hard or nonsmooth nonlinearities. The book, which summarizes the authors’ research on type-2 fuzzy logic and control of mechanical systems, presents models, simulation and experiments towards the control of servomotors with dead-zone and Coulomb friction, and the control of both wheeled mobile robots and a biped robot. Closed-loop systems are analyzed in the framework of smooth and nonsmooth Lyapunov functions.

The 7th International Workshop on Fuzzy Logic and Applications, held in Camogli, Italy in July 2007, presented the latest findings in the field. This volume features the refereed proceedings from that meeting. It includes 84 full papers as well as three keynote speeches. The papers are organized into topical sections covering fuzzy set...
theory, fuzzy information access and retrieval, fuzzy machine learning, and fuzzy architectures and systems.

This book constitutes the refereed proceedings of the 9th International Workshop on Fuzzy Logic and Applications, WILF 2011 held in Trani, Italy in August 2011. The 34 revised full papers presented were carefully reviewed and selected from 50 submissions. The papers are organized in topical sections on advances in theory of fuzzy sets, advances in fuzzy systems, advances in classification and clustering; and applications.

Special Features: · New edition of a classic text is brought up-to-date with the latest advances in the area of fuzzy logic· Includes abundant new illustrations and examples using MATLAB code constituting an invaluable tool for students as well as for self-study by practicing engineers· Introduces new material on expansions of the MLFE method using genetic algorithms, cognitive mapping, fuzzy agent-based models and total uncertainty· Features completely revised end--of --chapter problems· Companion website with MATLAB code examples and instructors solutions set. About The Book: This new edition features the latest advances in the field including material on expansion of the MLFE method using genetic algorithms, cognitive mapping, fuzzy agent-based models and total uncertainty. Redundant or obsolete topics have been removed, resulting in a more concise yet inclusive text that will ensure the book retains its broad appeal at the forefront of the literature.Fuzzy Logic with Engineering Applications, 3rd Edition is oriented mainly towards methods and techniques. Every chapter has been revised, featuring new illustrations and examples throughout. Supporting MATLAB code is downloadable at www.wileyeurope.com/go/fuzzylogic. This will benefit student learning in all basic operations, the generation of membership functions, and the specialized applications in the latter chapters of the book, providing an invaluable tool for students as well as for self-study by practicing engineers.

Fuzzy social choice theory is useful for modeling the uncertainty and imprecision prevalent in social life yet it has been scarcely applied
and studied in the social sciences. Filling this gap, Application of Fuzzy Logic to Social Choice Theory provides a comprehensive study of fuzzy social choice theory. The book explains the concept of a fuzzy maximal subset of a set of alternatives, fuzzy choice functions, the factorization of a fuzzy preference relation into the "union" (conorm) of a strict fuzzy relation and an indifference operator, fuzzy non-Arrowian results, fuzzy versions of Arrow’s theorem, and Black’s median voter theorem for fuzzy preferences. It examines how unambiguous and exact choices are generated by fuzzy preferences and whether exact choices induced by fuzzy preferences satisfy certain plausible rationality relations. The authors also extend known Arrowian results involving fuzzy set theory to results involving intuitionistic fuzzy sets as well as the Gibbard–Satterthwaite theorem to the case of fuzzy weak preference relations. The final chapter discusses Georgescu’s degree of similarity of two fuzzy choice functions.

This book constitutes the post-conference proceedings of the 12th International Workshop on Fuzzy Logic and Applications, WILF 2018, held in Genoa, Italy, in September 2018. The 17 revised full papers and 9 short papers were carefully reviewed and selected from 26 submissions. The papers are organized in topical sections on fuzzy logic theory, recent applications of fuzzy logic, and fuzzy decision making. Also included are papers from the round table "Zadeh and the future of logic" and a tutorial.

Since its inception, fuzzy logic has attracted an incredible amount of interest, and this interest continues to grow at an exponential rate. As such, scientists, researchers, educators and practitioners of fuzzy logic continue to expand on the applicability of what and how fuzzy can be utilised in the real-world. In this book, the authors present key application areas where fuzzy has had significant success. The chapters cover a plethora of application domains, proving credence to the versatility and robustness of a fuzzy approach. A better understanding of fuzzy will ultimately allow for a better appreciation of fuzzy. This book provides the reader with a varied range of examples to illustrate what fuzzy logic can be capable of and how it
can be applied. The text will be ideal for individuals new to the notion of fuzzy, as well as for early career academics who wish to further expand on their knowledge of fuzzy applications. The book is also suitable as a supporting text for advanced undergraduate and graduate-level modules on fuzzy logic, soft computing, and applications of AI. Dr. Jenny Carter is a Senior Lecturer in the Department of Computer Science at the University of Huddersfield, UK. Her other publications include the Springer books, Transnational Higher Education in Computing Courses, and Higher Education Computer Science. Dr. Tianhua Chen is a Senior Lecturer in Artificial Intelligence with the Department of Computer Science at the University of Huddersfield. Dr. Francisco Chiclana is a Professor of Computational Intelligence and Decision Making in the School of Computer Science and Informatics at De Montfort University, Leicester, UK. Dr. Arjab Singh Khuman is a Senior Lecturer and Researcher at the same institution.

The present book contains 20 articles collected from amongst the 53 total submitted manuscripts for the Special Issue “Fuzzy Sets, Fuzzy Logic and Their Applications” of the MDPI journal Mathematics. The articles, which appear in the book in the series in which they were accepted, published in Volumes 7 (2019) and 8 (2020) of the journal, cover a wide range of topics connected to the theory and applications of fuzzy systems and their extensions and generalizations. This range includes, among others, management of the uncertainty in a fuzzy environment; fuzzy assessment methods of human-machine performance; fuzzy graphs; fuzzy topological and convergence spaces; bipolar fuzzy relations; type-2 fuzzy; and intuitionistic, interval-valued, complex, picture, and Pythagorean fuzzy sets, soft sets and algebras, etc. The applications presented are oriented to finance, fuzzy analytic hierarchy, green supply chain industries, smart health practice, and hotel selection. This wide range of topics makes the book interesting for all those working in the wider area of Fuzzy sets and systems and of fuzzy logic and for those who have the proper mathematical background who wish to become familiar with recent advances in fuzzy mathematics, which has entered to almost all sectors of human life and activity.
Fuzzy logic has vast applications in power and electrical engineering. This collection is the first book to cover research advancements in the application of fuzzy logic in the planning and operation of smart grids. A global group of researchers and scholars present innovative approaches to fuzzy-based smart grid planning and operation, cover theoretical concepts and experimental results of the application of fuzzy-based techniques, and define and apply these techniques to deal with smart grid issues. Applications of Fuzzy Logic in Planning and Operation of Smart Grids is an ideal resource for researchers on the theory and application of fuzzy logic, practicing engineers working in electrical power engineering and power system planning, and post-graduates and students in advanced graduate-level courses. The first book to cover fuzzy logic in planning and operation of smart grids; Defines and applies fuzzy-based techniques; Covers theoretical concepts and applications.

Every year, Captain Kangaroo sets the contestants on their way in the great balloon race. All the animals are there the platypus, the wombats, the koalas and the emus are all there. But when the contestants bump into a dust cloud, Captain Kangaroo has to step in to steer them back on course. Which of his emergency aircraft will he choose? And can you find the animals who have stowed away inside each basket?

This book constitutes the proceedings of the 11th International Workshop on Fuzzy Logic and Applications, WILF 2016, held in Naples, Italy, in December 2016. The 22 revised full papers presented together with 2 invited lectures were carefully reviewed and selected from numerous submissions. The papers are organized in topical sections on fuzzy measures and transforms; granularity and multi-logics, clustering and learning; knowledge systems; and soft computing and applications.

The term "fuzzy logic," as it is understood in this book, stands for all aspects of representing and manipulating knowledge based on the rejection of the most fundamental principle of classical logic---the
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principle of bivalence. According to this principle, each declarative sentence is required to be either true or false. In fuzzy logic, these classical truth values are not abandoned. However, additional, intermediate truth values between true and false are allowed, which are interpreted as degrees of truth. This opens a new way of thinking—thinking in terms of degrees rather than absolutes. For example, it leads to the definition of a new kind of sets, referred to as fuzzy sets, in which membership is a matter of degree. The book examines the genesis and development of fuzzy logic. It surveys the prehistory of fuzzy logic and inspects circumstances that eventually lead to the emergence of fuzzy logic. The book explores in detail the development of propositional, predicate, and other calculi that admit degrees of truth, which are known as fuzzy logic in the narrow sense. Fuzzy logic in the broad sense, whose primary aim is to utilize degrees of truth for emulating common-sense human reasoning in natural language, is scrutinized as well. The book also examines principles for developing mathematics based on fuzzy logic and provides overviews of areas in which this has been done most effectively. It also presents a detailed survey of established and prospective applications of fuzzy logic in various areas of human affairs, and provides an assessment of the significance of fuzzy logic as a new paradigm.

Fuzzy Logic for Embedded Systems Applications, by a recognized expert in the field, covers all the basic theory relevant to electronics design, with particular emphasis on embedded systems, and shows how the techniques can be applied to shorten design cycles and handle logic problems that are tough to solve using conventional linear techniques. All the latest advances in the field are discussed and practical circuit design examples presented. Fuzzy logic has been found to be particularly suitable for many embedded control applications. The intuitive nature of the fuzzy-based system design saves engineers time and reduces costs by shortening product development cycles and making system maintenance and adjustments easier. Yet despite its wide acceptance—and perhaps because of its name—it is still misunderstood and feared by many engineers. There is a need for embedded systems designers—both
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hardware and software-to get up to speed on the principles and applications of fuzzy logic in order to ascertain when and how to use them appropriately. Fuzzy Logic for Embedded Systems Applications provides practical guidelines for designing electronic circuits and devices for embedded systems using fuzzy-based logic. It covers both theory and applications with design examples. * Unified approach to fuzzy electronics from an engineering point of view * Easy to follow with plenty of examples * Review and evaluation of free resources

Dynamic fuzzy problem are problems that are universally focused by academies. Mathematicians and cybernetic experts have used fuzzy logic to developed theories and solve static problems in so called subjective and objective worlds. This book includes 12 chapters. Chapter 1 is about basic conceptions of Dynamic Fuzzy Sets (DFS). Chapter 2 introduces Dynamic Fuzzy (DF) decomposition theorem. Chapter 3 is about L form of DFS module structure. Chapter 4 is about representation theorem of DFS. Chapter 5 introduces extension theorem of DFS. Chapter 6 is about DF measure theory. In chapter 7 it is Dynamic Fuzzy Logic (DFL). Chapter 8 is about reasoning methods of DFL. Chapter 9 is about bases of DFL programming language. Chapter 10 introduces multi-agent learning model based on DFL. Chapter 11 is about autonomic computing model based on DFL. The last Chapter introduces application of DFL in machine learning.

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.

This book presents a comprehensive report on the evolution of Fuzzy Logic since its formulation in Lotfi Zadeh’s seminal paper on “fuzzy sets,” published in 1965. In addition, it features a stimulating sampling from the broad field of research and development inspired by Zadeh’s paper. The chapters, written by pioneers and prominent scholars in the field, show how fuzzy sets have been successfully applied to artificial intelligence, control theory, inference, and reasoning. The book also reports on theoretical issues; features recent applications of Fuzzy Logic in the fields of neural networks, clustering, data mining and software testing; and highlights an important paradigm shift caused by Fuzzy Logic in the area of uncertainty management. Conceived by the editors as an academic celebration of the fifty years’ anniversary of the 1965 paper, this work is a must-have for students and researchers willing to get an inspiring picture of the potentialities, limitations, achievements and accomplishments of Fuzzy Logic-based systems.

Soft computing is a new, emerging discipline rooted in a group of technologies that aim to exploit the tolerance for imprecision and uncertainty in achieving solutions to complex problems. The principal components of soft computing are fuzzy logic, neurocomputing,
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genetic algorithms and probabilistic reasoning. This volume is a collection of up-to-date articles giving a snapshot of the current state of the field. It covers the whole expanse, from theoretical foundations to applications. The contributors are among the world leaders in the field.

"This book studies recent theoretical advances of fuzzy sets and numbers, fuzzy systems, fuzzy logic and their generalizations/extensions (e.g. intuitionistic fuzzy sets, neutrosophic sets, soft sets, rough sets, grey system theory etc.), as well as applications of them to science, technology and everyday life"--

This book comprises a selection of papers on theoretical advances and applications of fuzzy logic and soft computing from the IFSA 2007 World Congress, held in Cancun, Mexico, June 2007. These papers constitute an important contribution to the theory and applications of fuzzy logic and soft computing methodologies.

An Introduction to Fuzzy Logic Applications in Intelligent Systems consists of a collection of chapters written by leading experts in the field of fuzzy sets. Each chapter addresses an area where fuzzy sets have been applied to situations broadly related to intelligent systems. The volume provides an introduction to and an overview of recent applications of fuzzy sets to various areas of intelligent systems. Its purpose is to provide information and easy access for people new to the field. The book also serves as an excellent reference for researchers in the field and those working in the specifics of systems development. People in computer science, especially those in artificial intelligence, knowledge-based systems, and intelligent systems will find this to be a valuable sourcebook. Engineers, particularly control engineers, will also have a strong interest in this book. Finally, the book will be of interest to researchers working in decision support systems, operations research, decision theory, management science and applied mathematics. An Introduction to Fuzzy Logic Applications in Intelligent Systems may also be used as an introductory text and, as such, it is tutorial in nature.
The emergence of fuzzy logic and its applications has dramatically changed the face of industrial control engineering. Over the last two decades, fuzzy logic has allowed control engineers to meet and overcome the challenges of developing effective controllers for increasingly complex systems with poorly defined dynamics. Today's engineers need a working knowledge of the principles and techniques of fuzzy logic-Intelligent Control provides it. The author first introduces the traditional control techniques and contrasts them with intelligent control. He then presents several methods of representing and processing knowledge and introduces fuzzy logic as one such method. He highlights the advantages of fuzzy logic over other techniques, indicates its limitations, and describes in detail a hierarchical control structure appropriate for use in intelligent control systems. He introduces a variety of applications, most in the areas of robotics and mechatronics but with others including air conditioning and process/production control. One appendix provides discussion of some advanced analytical concepts of fuzzy logic, another describes a commercially available software system for developing fuzzy logic application. Intelligent Control is filled with worked examples, exercises, problems, and references. No prior knowledge of the subject nor advanced mathematics are needed to comprehend much of the book, making it well-suited as a senior undergraduate or first-year graduate text and a convenient reference tool for practicing professionals.

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.

Fuzzy technology has emerged as one of the most exciting new concepts available. Fuzzy Logic and its Applications covers a wide range of the theory and applications of fuzzy logic and related systems, including industrial applications of fuzzy technology,
implementing human intelligence in machines and systems. There are four main themes: intelligent systems, engineering, mathematical foundations, and information sciences. Both academics and the technical community will learn how and why fuzzy logic is appreciated in the conceptual, design and manufacturing stages of intelligent systems, gaining an improved understanding of the basic science and the foundations of human reasoning.

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