Fuzzy Logic An Introductory Course For Engineering Students Studies In Fuzziness And Soft Computing

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 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.
Type-2 fuzzy sets extend both ordinary and interval-valued fuzzy sets to allow distributions, rather than single values, as degrees of membership. Computations with these truth values are governed by the truth value algebra of type-2 fuzzy sets. The Truth Value Algebra of Type-2 Fuzzy Sets: Order Convolutions of Functions on the Unit Interval explores the fundamental properties of this algebra and the role of these properties in applications. Accessible to anyone with a standard undergraduate mathematics background, this self-contained book offers several options for a one- or two-semester course. It covers topics increasingly used in fuzzy set theory, such as lattice theory, analysis, category theory, and universal algebra. The book discusses the basics of the type-2 truth value algebra, its subalgebra of convex normal functions, and their applications. It also examines the truth value algebra from a more algebraic and axiomatic view.
This book discusses reliability applications for power systems, renewable energy and smart grids and highlights trends in reliable communication, fault-tolerant systems, VLSI system design and embedded systems. Further, it includes chapters on software reliability and other computer engineering and software management-related disciplines, and also examines areas such as big data analytics and ubiquitous computing. Outlining novel, innovative concepts in applied areas of reliability in electrical, electronics and computer engineering disciplines, it is a valuable resource for researchers and practitioners of reliability theory in circuit-based engineering domains.
A First Course in Fuzzy Logic, Fourth Edition is an expanded version of the successful third edition. It provides a comprehensive introduction to the theory and applications of fuzzy logic. This popular text offers a firm mathematical basis for the calculus of fuzzy concepts necessary for designing intelligent systems and a solid background for readers to pursue further studies and real-world applications. New in the Fourth Edition: Features new results on fuzzy sets of type-2 Provides more information on copulas for modeling dependence structures Includes quantum probability for uncertainty modeling in social sciences, especially in economics With its comprehensive updates, this new edition presents all the background necessary for students, instructors and professionals to begin using fuzzy logic in its many--applications in

computer science, mathematics, statistics, and engineering. About the Authors: Hung T. Nguyen is a Professor Emeritus at the Department of Mathematical Sciences, New Mexico State University. He is also an Adjunct Professor of Economics at Chiang Mai University, Thailand. Carol L. Walker is also a Professor Emeritus at the Department of Mathematical Sciences, New Mexico State University. Elbert A. Walker is a Professor Emeritus, Department of Mathematical Sciences, New Mexico State University.

This book makes use of the LISP programming language to provide readers with the necessary background to understand and use fuzzy logic to solve simple to medium-complexity real-world problems. It introduces the basics of LISP required to use a Fuzzy LISP programming toolbox, which was specifically implemented by the author to "teach" the theory behind fuzzy logic and at the same time equip readers to use their newly-acquired knowledge to build fuzzy models of increasing complexity. The book fills an important gap in the literature, providing readers with a practice-oriented reference guide to fuzzy logic that offers more complexity than popular books yet is more accessible than other mathematical treatises on the topic. As such, students in first-year university courses with a basic tertiary mathematical background and no previous experience with programming should be able to easily follow the content. The book is intended for students and professionals in the fields of computer science and engineering, as well as disciplines including astronomy, biology, medicine and earth sciences. Software developers may also benefit from this book, which is intended as both an introductory textbook and self-study reference guide to fuzzy logic and its applications. The complete set of functions that make up the Fuzzy LISP programming toolbox can be downloaded from a companion book's website.

A First Course in Fuzzy Logic, Third Edition continues to provide the ideal introduction to the theory and applications of fuzzy logic. This best-selling text provides a firm mathematical basis for the calculus of fuzzy concepts necessary for designing intelligent systems and a solid background for readers to pursue further studies and real-world applications. New in the Third Edition: A section on type-2 fuzzy sets - a topic that has received much attention in the past few years Additional material on copulas and t-norms More discussions on generalized modus ponens and the compositional rule of inference Complete revision to the chapter on possibility theory Significant expansion of the chapter on fuzzy integrals Many new exercises With its comprehensive updates, this new edition presents all the background necessary for students and professionals to begin using fuzzy logic in its many-and rapidly growing- applications in computer science, mathematics, statistics, and engineering.

Professor Merrie Bergmann presents an accessible introduction to the subject of many-valued and fuzzy logic designed for use on undergraduate and graduate courses in non-classical logic. Bergmann discusses the philosophical issues that give rise to fuzzy logic - problems arising from vague language - and returns to those issues as logical systems are presented. For historical and pedagogical reasons, three-valued logical systems are presented as useful intermediate systems for studying the principles and theory behind fuzzy logic. The major fuzzy logical systems - Lukasiewicz, Gödel, and product logics - are then presented as generalisations of three-valued systems that successfully address the problems of vagueness. A clear presentation of technical concepts, this book includes exercises throughout the text that pose straightforward problems, that ask students to continue proofs begun in the text, and that engage students in the comparison of logical systems.

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.

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.

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 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.

Fuzzy LogicAn Introductory Course for Engineering StudentsSpringer

This book offers an inspiring and naïve view on language and reasoning. It presents a new approach to ordinary reasoning that follows the author's former work on fuzzy logic. Starting from a pragmatic scientific view on meaning as a quantity, and the common sense reasoning from a primitive notion of inference, which is shared by both laypeople and experts, the book shows how this can evolve, through the addition of more and more suppositions, into various formal and specialized modes of precise, imprecise, and approximate reasoning. The logos are intended here as a synonym for rationality, which is usually shown by the processes of questioning, guessing, telling, and computing. Written in a discursive style and without too many technicalities, the book presents a number of reflections on the study of reasoning, together with a new perspective on fuzzy logic and Zadeh's "computing with words" grounded in both language and reasoning. It also highlights some mathematical developments supporting this view. Lastly, it addresses a series of questions aimed at fostering new discussions and future research into this topic. All in all, this book represents an inspiring read for professors and researchers in computer science, and fuzzy logic in particular, as well as for psychologists, linguists and philosophers.

This volume constitutes the refereed proceedings of the 8th International Workshop on Fuzzy Logic and Applications held in Palermo, Italy in June 2009. The papers are organized in topical sections on fuzzy set theory, intuitionistic fuzzy sets, fuzzy classification and clustering, fuzzy image processing and analysis, and fuzzy systems.

The second edition of the popular A First Course in Fuzzy Logic will continue to provide the ideal introduction to the theory and applications of fuzzy logic. The authors provide a firm mathematical basis for the calculus of fuzzy concepts-necessary to design intelligent systems-and give the student a solid background for further studies and real-world applications. This new edition provides many new exercises designed to enhance the reader's understanding of the concepts. The authors have expanded on the algebra background needed for the more advanced topics, and include significant new material on basic connectives and the algebraic properties of fuzzy logic, rough sets, conditional events, distributions of random sets, and derivatives of fuzzy measures. With its comprehensive updates, A First Course in Fuzzy Logic, Second Edition presents all the background necessary for students to begin using fuzzy logic in its many-and rapidly growing-applications.

Discover how to build your own smart Internet of Things projects and bring a new degree of interconnectivity to your world About This Book Learn how to extract and analyse data from physical devices and build smart IoT projects Master the skills of building enticing projects such as a neural network autonomous car, computer vision through a camera, and cloud-based IoT applications This project-based guide leverages revolutionary computing chips such as Raspberry Pi, Arduino, and so on Who This Book Is For If you are hobbyist who is keen on making smart IoT projects, then this book is for you. You should have a basic knowledge of Python. What You Will Learn Implement data science in your IoT projects and build a smart temperature controller Create a simple machine learning application and implement decision system concepts Develop a vision machine using OpenCV Build a robot car with manual and automatic control Implement speech modules with your own voice commands for IoT projects Connect IoT to a cloud-based server In Detail Internet of Things (IoT) is a groundbreaking technology that involves connecting numerous physical devices to the Internet and controlling them. Creating basic IoT projects is common, but imagine building smart IoT projects that can extract data from physical devices, thereby making decisions by themselves. Our book overcomes the challenge of analyzing data from physical devices and accomplishes all that your imagination can dream up by teaching you how to build smart IoT projects. Basic statistics and various applied algorithms in data science and machine learning are introduced to accelerate your knowledge of how to integrate a decision system into a physical device. This book contains IoT projects such as building a smart temperature controller, creating your own vision machine project, building an autonomous mobile robot car, controlling IoT projects through voice commands, building IoT applications utilizing cloud technology and data science, and many more. We will also leverage a small yet powerful IoT chip, Raspberry Pi with Arduino, in order to integrate a smart decision-making system in the IoT projects. Style and approach The book follows a project-based approach to building smart IoT projects using powerful boards such as the Raspberry Pi, Arduino, and the IoT

chip.

The notion of Fuzziness stands as one of the really new concepts that have recently enriched the world of Science. Science grows not only through technical and formal advances on one side and useful applications on the other side, but also as consequence of the introduction and assimilation of new concepts in its corpus. These, in turn, produce new developments and applications. And this is what Fuzziness, one of the few new concepts arisen in the XX Century, has been doing so far. This book aims at paying homage to Professor Lotfi A. Zadeh, the "father of fuzzy logic" and also at giving credit to his exceptional work and personality. In a way, this is reflected in the variety of contributions collected in the book. In some of them the authors chose to speak of personal meetings with Lotfi; in others, they discussed how certain papers of Zadeh were able to open for them a new research horizon. Some contributions documented results obtained from the author/s after taking inspiration from a particular idea of Zadeh, thus implicitly acknowledging him. Finally, there are contributions of several "third generation fuzzysists or softies" who were firstly led into the world of Fuzziness by a disciple of Lotfi Zadeh, who, following his example, took care of opening for them a new road in science. Rudolf Seising is Adjoint Researcher at the European Centre for Soft Computing in Mieres, Asturias (Spain). Enric Trillas and Claudio Moraga are Emeritus Researchers at the European Centre for Soft Computing, Mieres, Asturias (Spain). Settimo Termini is Professor of Theoretical Computer Science at the University of Palermo, Italy and Affiliated Researcher at the European Centre for Soft Computing, Mieres, Asturias (Spain)

Nowadays, voluminous textbooks and monographs in fuzzy logic are devoted only to separate or some combination of separate facets of fuzzy logic. There is a lack of a single book that presents a comprehensive and self-contained theory of fuzzy logic and its applications. Written by world renowned authors, Lofti Zadeh, also known as the Father of Fuzzy Logic, and Rafik Aliev, who are pioneers in fuzzy logic and fuzzy sets, this unique compendium includes all the principal facets of fuzzy logic such as logical, fuzzy-set-theoretic, epistemic and relational. Theoretical problems are prominently illustrated and illuminated by numerous carefully worked-out and thought-through examples. This invaluable volume will be a useful reference guide for academics, practitioners, graduates and undergraduates in fuzzy logic and its applications.

This book provides an essential introduction to the field of dynamical models. Starting from classical theories such as set theory and probability, it allows readers to draw near to the fuzzy case. On one hand, the book equips readers with a fundamental understanding of the theoretical underpinnings of fuzzy sets and fuzzy dynamical systems. On the other, it demonstrates how these theories are used to solve modeling problems in biomathematics, and presents existing derivatives and integrals applied to the context of fuzzy functions. Each of the major topics is accompanied by examples,

worked-out exercises, and exercises to be completed. Moreover, many applications to real problems are presented. The book has been developed on the basis of the authors' lectures to university students and is accordingly primarily intended as a textbook for both upper-level undergraduates and graduates in applied mathematics, statistics, and engineering. It also offers a valuable resource for practitioners such as mathematical consultants and modelers, and for researchers alike, as it may provide both groups with new ideas and inspirations for projects in the fields of fuzzy logic and biomathematics.

Fuzzy theory has become a subject that generates much interest among the courses for graduate students. However, it was not easy to find a suitable textbook to use in the introductory course and to recommend to the students who want to self-study. The main purpose of this book is just to meet that need. The author has given lectures on the fuzzy theory and its applications for ten years and continuously developed lecture notes on the subject. This book is a publication of the modification and summary of the lecture notes. The fundamental idea of the book is to provide basic and concrete concepts of the fuzzy theory and its applications, and thus the author focused on easy illustrations of the basic concepts. There are numerous examples and figures to help readers to understand and also added exercises at the end of each chapter. This book consists of two parts: a theory part and an application part. The first part (theory part) includes chapters from 1 to 8. Chapters 1 and 2 introduce basic concepts of fuzzy sets and operations, and Chapters 3 and 4 deal with the multi-dimensional fuzzy sets. Chapters 5 and 6 are extensions of the fuzzy theory to the number and function, and Chapters 7 and 8 are developments of fuzzy properties on the probability and logic theories.

Although the use of fuzzy control methods has grown nearly to the level of classical control, the true understanding of fuzzy control lags seriously behind. Moreover, most engineers are well versed in either traditional control or in fuzzy control-rarely both. Each has applications for which it is better suited, but without a good understanding of both, engineers cannot make a sound determination of which technique to use for a given situation. A First Course in Fuzzy and Neural Control is designed to build the foundation needed to make those decisions. It begins with an introduction to standard control theory, then makes a smooth transition to complex problems that require innovative fuzzy, neural, and fuzzy-neural techniques. For each method, the authors clearly answer the questions: What is this new control method? Why is it needed? How is it implemented? Real-world examples, exercises, and ideas for student projects reinforce the concepts presented. Developed from lecture notes for a highly successful course titled The Fundamentals of Soft Computing, the text is written in the same reader-friendly style as the authors' popular A First Course in Fuzzy Logic text. A First Course in Fuzzy and Neural Control requires only a basic background in mathematics and engineering and does not overwhelm students with unnecessary material but serves to motivate them toward more advanced studies.

In the early 1970s, fuzzy systems and fuzzy control theories added a new dimension to control systems engineering. From its beginnings as mostly heuristic and somewhat ad hoc, more recent and rigorous approaches to fuzzy control theory have helped make it an integral part of modern control theory and produced many exciting results. Yesterday's "art" of building a working fuzzy controller has turned into today's "science" of systematic design. To keep pace with and further advance the rapidly developing field of applied control technologies, engineers, both present and future, need some systematic training in the analytic theory and rigorous design of fuzzy control systems. Introduction to Fuzzy Sets, Fuzzy Logic, and Fuzzy Control Systems provides that training by introducing a rigorous and complete fundamental theory of fuzzy sets and fuzzy logic, and then building a practical theory for automatic control of uncertain and ill-modeled systems encountered in many engineering applications. The authors proceed through basic fuzzy mathematics and fuzzy systems theory and conclude with an exploration of some industrial application examples. Almost entirely self-contained, Introduction to Fuzzy Sets, Fuzzy Logic, and Fuzzy Control Systems establishes a strong foundation for designing and analyzing fuzzy control systems under uncertain and irregular conditions. Mastering its contents gives students a clear understanding of fuzzy control systems theory that prepares them for deeper and broader studies and for many practical challenges faced in modern industry.
What is fuzzy logic?--a system of concepts and methods for exploring modes of reasoning that are approximate rather than exact. While the engineering community has appreciated the advances in understanding using fuzzy logic for quite some time, fuzzy logic's impact in non-engineering disciplines is only now being recognized. The authors of Fuzzy Logic in Geology attend to this growing interest in the subject and introduce the use of fuzzy set theory in a style geoscientists can understand. This is followed by individual chapters on topics relevant to earth scientists: sediment modeling, fracture detection, reservoir characterization, clustering in geophysical data analysis, ground water movement, and time series analysis. George Klir is the Distinguished Professor of Systems Science and Director of the Center for Intelligent Systems, Fellow of the IEEE and IFSA, editor of nine volumes, editorial board member of 18 journals, and author or co-author of 16 books Foreword by the inventor of fuzzy logic--Professor Lotfi Zadeh
INTRODUCTION TO FUZZY LOGIC Learn more about the history, foundations, and applications of fuzzy logic in this comprehensive resource by an academic leader Introduction to Fuzzy Logic delivers a high-level but accessible introduction to the rapidly growing and evolving field of fuzzy logic and its applications. Distinguished engineer, academic, and author James K. Peckol covers a wide variety of practical topics, including the differences between crisp and fuzzy logic, the people and professionals who find fuzzy logic useful, and the advantages of using fuzzy logic. While the book assumes a solid foundation in embedded systems, including basic logic design, and C/C++ programming, it is written in a practical and easy-to-read style that engages the reader and assists in learning and retention. The author includes introductions of threshold and perceptron logic to further enhance the applicability of the material contained within. After introducing readers to the topic with a brief description of the history and development of the field, Introduction to Fuzzy Logic goes on to discuss a wide variety of foundational and

advanced topics, like: A review of Boolean algebra, including logic minimization with algebraic means and Karnaugh maps A discussion of crisp sets, including classic set membership, set theory and operations, and basic classical crisp set properties A discussion of fuzzy sets, including the foundations of fuzzy set logic, set membership functions, and fuzzy set properties An analysis of fuzzy inference and approximate reasoning, along with the concepts of containment and entailment and relations between fuzzy subsets Perfect for mid-level and upper-level undergraduate and graduate students in electrical, mechanical, and computer engineering courses, Introduction to Fuzzy Logic covers topics included in many artificial intelligence, computational intelligence, and soft computing courses. Math students and professionals in a wide variety of fields will also significantly benefit from the material covered in this book.

This book focuses on an overview of the AI techniques, their foundations, their applications, and remaining challenges and open problems. Many artificial intelligence (AI) techniques do not explain their recommendations. Providing natural-language explanations for numerical AI recommendations is one of the main challenges of modern AI. To provide such explanations, a natural idea is to use techniques specifically designed to relate numerical recommendations and natural-language descriptions, namely fuzzy techniques. This book is of interest to practitioners who want to use fuzzy techniques to make AI applications explainable, to researchers who may want to extend the ideas from these papers to new application areas, and to graduate students who are interested in the state-of-the-art of fuzzy techniques and of explainable AI in short, to anyone who is interested in problems involving fuzziness and AI in general. .

The analysis and control of complex systems have been the main motivation for the emergence of fuzzy set theory since its inception. It is also a major research field where many applications, especially industrial ones, have made fuzzy logic famous. This unique handbook is devoted to an extensive, organized, and up-to-date presentation of fuzzy systems engineering methods. The book includes detailed material and extensive bibliographies, written by leading experts in the field, on topics such as: Use of fuzzy logic in various control systems. Fuzzy rule-based modeling and its universal approximation properties. Learning and tuning techniques for fuzzy models, using neural networks and genetic algorithms. Fuzzy control methods, including issues such as stability analysis and design techniques, as well as the relationship with traditional linear control. Fuzzy sets relation to the study of chaotic systems, and the fuzzy extension of set-valued approaches to systems modeling through the use of differential inclusions. Fuzzy Systems: Modeling and Control is part of The Handbooks of Fuzzy Sets Series. The series provides a complete picture of contemporary fuzzy set theory and its applications. This volume is a key reference for systems engineers and scientists seeking a guide to the vast amount of literature in fuzzy logic modeling and control.

This volume is the published proceedings of selected papers from the IFAC Symposium, Boston, Massachusetts, 24-25 June 1991, where a forum was provided for the discussion of the latest advances and techniques in the education of control and systems engineers. Emerging technologies in this field, neural networks, fuzzy logic and symbolic computation are incorporated in the papers. Containing 35 papers, these proceedings provide a valuable reference source for anyone lecturing in this area, with

many practical applications included.

In this volume, first we formulate a framework of fuzzy types to represent both partial truth and uncertainty about concept and relation types in conceptual graphs. Like fuzzy attribute values, fuzzy types also form a lattice laying a common ground for lattice-based computation of fuzzy granules. Second, for automated reasoning with fuzzy conceptual graphs, we develop foundations of order-sorted fuzzy set logic programming, extending the theory of annotated logic programs of Kifer and Subrahmanian (1992). Third, we show some recent applications of fuzzy conceptual graphs to modelling and computing with generally quantified statements, approximate knowledge retrieval, and natural language query understanding.

Presents an illustrated A-Z encyclopedia containing approximately 600 entries on computer and technology related topics.

This book presents the proceedings of the 10th Conference on Theory and Applications of Soft Computing, Computing with Words and Perceptions, ICSCCW 2019, held in Prague, Czech Republic, on August 27–28, 2019. It includes contributions from diverse areas of soft computing and computing with words, such as uncertain computation, decision-making under imperfect information, neuro-fuzzy approaches, deep learning, natural language processing, and others. The topics of the papers include theory and applications of soft computing, information granulation, computing with words, computing with perceptions, image processing with soft computing, probabilistic reasoning, intelligent control, machine learning, fuzzy logic in data analytics and data mining, evolutionary computing, chaotic systems, soft computing in business, economics and finance, fuzzy logic and soft computing in earth sciences, fuzzy logic and soft computing in engineering, fuzzy logic and soft computing in material sciences, soft computing in medicine, biomedical engineering, and pharmaceutical sciences. Showcasing new ideas in the field of theories of soft computing and computing with words and their applications in economics, business, industry, education, medicine, earth sciences, and other fields, it promotes the development and implementation of these paradigms in various real-world contexts. This book is a useful guide for academics, practitioners and graduates.

On fuzzy logic

This book provides concise yet thorough coverage of the fundamentals and technology of fuzzy sets. Readers will find a lucid and systematic introduction to the essential concepts of fuzzy set-based information granules, their processing and detailed algorithms. Timely topics and recent advances in fuzzy modeling and its principles, neurocomputing, fuzzy set estimation, granulation–degranulation, and fuzzy sets of higher type and order are discussed. In turn, a wealth of examples, case studies, problems and motivating arguments, spread throughout the text and linked with various areas of artificial intelligence, will help readers acquire a solid working knowledge. Given the book's well-balanced combination of the theory and applied facets of fuzzy sets, it will appeal to a broad readership in both academe and industry. It is also ideally suited as a textbook for graduate and undergraduate students in science, engineering, and operations research.

This collection compiles the seminal contributions of Michio Sugeno on fuzzy systems and technologies. Fuzzy Modeling & Control: Selected Works of Sugeno serves as a singular resource that provides a clear, comprehensive treatment of fuzzy control systems. The book comprises two parts fuzzy system identification and modeling systems control Each part outlines the fundamentals of fuzzy logic and covers essential material for understanding the mathematical and modeling details in Sugeno's works. Introductory chapters include extended summaries of each paper or group of papers, suggesting where the theories discussed might be useful in application.

This book introduces readers to fundamental concepts in fuzzy logic. It describes the necessary theoretical background and a number of

basic mathematical models. Moreover, it makes them familiar with fuzzy control, an important topic in the engineering field. The book offers an unconventional introductory textbook on fuzzy logic, presenting theory together with examples and not always following the typical mathematical style of theorem-corollaries. Primarily intended to support engineers during their university studies, and to spark their curiosity about fuzzy logic and its applications, the book is also suitable for self-study, providing a valuable resource for engineers and professionals who deal with imprecision and non-random uncertainty in real-world applications.

This book constitutes the proceedings of the 10th International Workshop on Fuzzy Logic and Applications, WILF 2013, held in Genoa, Italy, in November 2013. After a rigorous peer-review selection process, ultimately 19 regular papers were selected for inclusion in this volume from 29 submissions. In addition the book contains 3 keynote talks and 2 tutorials. The papers are organized in topical sections named: fuzzy machine learning and interpretability; theory and applications.

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