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Nota di contenuto	Introduction -- Part I: Neural Networks -- Introduction -- Threshold Logic Units -- General Neural Networks -- Multi-Layer Perceptrons -- Radial Basis Function Networks -- Self-Organizing Maps -- Hopfield Networks -- Recurrent Networks -- Mathematical Remarks for Neural Networks -- Part II: Evolutionary Algorithms -- Introduction to Evolutionary Algorithms -- Elements of Evolutionary Algorithms -- Fundamental Evolutionary Algorithms -- Computational Swarm Intelligence -- Part III: Fuzzy Systems -- Fuzzy Sets and Fuzzy Logic -- The Extension Principle -- Fuzzy Relations -- Similarity Relations -- Fuzzy Control -- Fuzzy Data Analysis -- Part IV: Bayes and Markov Networks -- Introduction to Bayes Networks -- Elements of Probability and Graph Theory -- Decompositions -- Evidence Propagation -- Learning Graphical Models -- Belief Revision -- Decision Graphs.

Sommario/riassunto

Computational intelligence comprises concepts, paradigms, algorithms, and implementations of systems that are intended to exhibit intelligent behavior in complex environments. It relies heavily on (at least) nature-inspired methods, which have the advantage that they tolerate incomplete, imprecise and uncertain knowledge and thus also facilitate finding solutions that are approximative, manageable and robust at the same time. Fully updated, this new edition of the authoritative textbook provides a clear and logical introduction to Computational Intelligence, covering the fundamental concepts, algorithms and practical implementations behind efforts to develop systems that exhibit intelligent behavior in complex environments. Rather than aim for completeness, the goal is to give a methodical introduction, supporting fundamental concepts and their implementations with explanation of the theoretical background of proposed problem solutions. Topics and features: Offers new material on deep learning, scalarization, large-scale optimization algorithms, and collective decision-making algorithms Contains numerous classroom-tested examples and definitions Discusses in detail the classical areas of artificial neural networks, fuzzy systems, evolutionary algorithms, and Bayes and Markov networks Reviews the latest developments, including such topics as ant colony optimization and probabilistic graphical models Provides supplementary material, including module descriptions, lecture slides, exercises with solutions, and software tools This seminal textbook is primarily meant as a companion book for lectures on the covered topics in the area of computational intelligence. However, it is also eminently suitable as a guidebook for self-study by students and practitioners from industry and commerce. Dr. Rudolf Kruse is the former leader of the Computational Intelligence Research Group and now Emeritus Professor of the Department of Computer Science at the University of Magdeburg, Germany. Dr. Sanaz Mostaghim is a full Professor of Computer Science and Dr. Christian Braune is a Senior Lecturer at the same institution. Dr. Christian Borgelt is a Professor of Data Science at the Paris Lodron University of Salzburg, Austria. Dr. Matthias Steinbrecher is a Development Architect at SAP SE, Potsdam, Germany.