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 Introduction to Neural Networks Using Matlab 6.0

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HOBBS BENJAMIN

C++ Coding Standards CRC Press

This topical and timely textbook is a collection of problems for students, researchers, and practitioners interested in state-of-the-art material and device applications in quantum mechanics. Most problem are relevant either to a new device or a device concept or to current research topics which could spawn new technology. It deals with the practical aspects of the field, presenting a broad range of essential topics currently at the leading edge of technological innovation. Includes discussion on: Properties of Schrodinger Equation Operators Bound States in Nanostructures Current and Energy Flux Densities in Nanostructures Density of States Transfer and Scattering Matrix Formalisms for Modelling Diffusive Quantum Transport Perturbation Theory, Variational Approach and their Applications to Device Problems Electrons in a Magnetic or Electromagnetic Field and Associated Phenomena Time-dependent Perturbation Theory and its Applications Optical Properties of Nanostructures Problems in Quantum Mechanics: For Material Scientists, Applied Physicists and Device Engineers is an ideal companion to engineering, condensed matter physics or materials science curricula. It appeals to future and present engineers, physicists, and materials scientists, as well as professionals in these fields needing more in-depth understanding of nanotechnology and nanoscience.

Fuzzy Image Processing and Applications with MATLAB Springer Science & Business Media

This concise but comprehensive textbook reviews the most popular neural-network methods and their associated techniques. Each chapter provides state-of-the-art descriptions of important major research results of the respective neural-network methods. A range of relevant computational intelligence topics, such as fuzzy logic and evolutionary algorithms – powerful tools for neural-network learning – are introduced. The systematic survey of neural-network models and exhaustive references list will point readers toward topics for future research. The algorithms outlined also make this textbook a valuable reference for scientists and practitioners working in pattern recognition, signal processing, speech and image processing, data analysis and artificial intelligence.

Instrument Engineers' Handbook, Volume 3 Prentice Hall

Collaborative Networks: Reference Modeling works to establish a theoretical foundation for Collaborative Networks. Particular emphasis is put on modeling multiple facets of collaborative networks and establishing a comprehensive modeling framework that captures and structures diverse perspectives of these complex entities. Further, this book introduces a contribution to the definition of reference models for Collaborative Networks. Collaborative Networks: Reference Modeling provides valuable elements for researchers, PhD students, engineers, managers, and leading practitioners interested in collaborative systems and networked society.

Fusion of Neural Networks, Fuzzy Systems and Genetic Algorithms CRC Press

Offering a wide range of programming examples implemented in MATLAB(R), *Computational Intelligence Paradigms: Theory and Applications Using MATLAB(R)* presents theoretical concepts and a general framework for computational intelligence (CI) approaches, including artificial neural networks, fuzzy systems, evolutionary computation, genetic algorithms and programming, and swarm intelligence. It covers numerous intelligent computing methodologies and algorithms used in CI research. The book first focuses on neural networks, including common artificial neural networks; neural networks based on data classification, data association, and data conceptualization; and real-world applications of neural networks. It then discusses fuzzy sets, fuzzy rules, applications of fuzzy systems, and different types of fused neuro-fuzzy systems, before providing MATLAB illustrations of ANFIS, classification and regression trees, fuzzy c-means clustering algorithms, fuzzy ART map, and Takagi-Sugeno inference systems. The authors also describe the history, advantages, and disadvantages of evolutionary computation and include solved MATLAB programs to illustrate the implementation of evolutionary computation in various problems. After exploring the operators and parameters of genetic algorithms, they cover the steps and MATLAB routines of genetic programming. The final chapter introduces swarm intelligence and its applications, particle swarm optimization, and ant colony optimization. Full of worked examples and end-of-chapter questions, this comprehensive book explains how to use MATLAB to implement CI techniques for the solution of biological problems. It will help readers with their work on evolution dynamics, self-organization, natural and artificial morphogenesis, emergent collective behaviors, swarm intelligence, evolutionary strategies, genetic programming, and the evolution of social behaviors.

Reversible Digital Watermarking Springer Science & Business Media

Digital Watermarking is the art and science of embedding information in existing digital content for Digital Rights Management (DRM) and authentication. Reversible watermarking is a class of (fragile) digital watermarking that not only authenticates multimedia data content, but also helps to maintain perfect integrity of the original multimedia "cover data." In non-reversible watermarking schemes, after embedding and extraction of the watermark, the cover data undergoes some distortions, although perceptually negligible in most cases. In contrast, in reversible watermarking, zero-distortion of the cover data is achieved, that is the cover data is guaranteed to be restored bit-by-bit. Such a feature is desirable when highly sensitive data is watermarked, e.g., in military, medical, and legal imaging applications. This work deals with development, analysis, and evaluation of state-of-the-art reversible watermarking techniques for digital images. In this work we establish the motivation for research on reversible watermarking using a couple of case studies with medical and military images. We present a detailed review of the state-of-the-art research in this field. We investigate the various subclasses of reversible watermarking algorithms, their operating principles, and computational complexities. Along with this, to give the readers an idea about the detailed working of a reversible watermarking scheme, we present a prediction-based reversible watermarking technique, recently published by us. We discuss the major issues and challenges behind implementation of reversible watermarking techniques, and recently proposed solutions for them. Finally, we provide an overview of some open problems and scope of work for future researchers in this area.

Think Like a Data Scientist Springer

Summary Think Like a Data Scientist presents a step-by-step approach to data science, combining analytic, programming, and business perspectives into easy-to-digest techniques and thought processes for solving real world data-centric problems. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Technology Data collected from customers, scientific measurements, IoT sensors, and so on is valuable only if you understand it. Data scientists revel in the interesting and rewarding challenge of observing, exploring, analyzing, and interpreting this data. Getting started with data science means more than mastering analytic tools and techniques, however; the real magic happens when you begin to think like a data scientist. This book will get you there. About the Book Think Like a Data Scientist teaches you a step-by-step approach to solving real-world data-centric problems. By breaking down carefully crafted examples, you'll learn to combine analytic, programming, and business perspectives into a repeatable process for extracting real knowledge from data. As you read, you'll discover (or remember) valuable statistical techniques and explore powerful data science software. More importantly, you'll put this knowledge together using a structured process for data science. When you've finished, you'll have a strong foundation for a lifetime of data science learning and practice. What's Inside The data science process, step-by-step How to anticipate problems Dealing with uncertainty Best practices in software and scientific thinking About the Reader Readers need beginner programming skills and knowledge of basic statistics. About the Author Brian Godsey has worked in software, academia, finance, and defense and has launched several data-centric start-ups. Table of Contents PART 1 - PREPARING AND GATHERING DATA AND KNOWLEDGE Philosophies of data science Setting goals by asking good questions Data all around us: the virtual wilderness Data wrangling: from capture to domestication Data assessment: poking and prodding PART 2 - BUILDING A PRODUCT WITH SOFTWARE AND STATISTICS Developing a plan Statistics and modeling: concepts and foundations Software: statistics in action Supplementary software: bigger, faster, more efficient Plan execution: putting it all together PART 3 - FINISHING OFF THE PRODUCT AND WRAPPING UP Delivering a product After product delivery: problems and revisions Wrapping up: putting the project away

Quantitative Conservation Biology Springer Science & Business Media

This volume presents approaches and methodologies for predicting the structure and diversity of key aquatic communities (namely, diatoms, benthic macroinvertebrates and fish), under natural conditions and under man-made disturbance. The intent is to offer an organized means for modeling, evaluating and restoring freshwater ecosystems.

Artificial Intelligence and Soft Computing Springer

The goal of this book is to provide practical, intelligible, and intuitive explanations of population modelling to empirical ecologists and conservation biologists. Modelling methods that do not require large amounts of data (typically unavailable for endangered species) are emphasised. As such, the book is appropriate for undergraduate and graduate students interested in quantitative conservation biology, managers charged with preserving endangered species, and, in short, for any conservation biologist or ecologist seeking to better understand the analysis and modelling of population data.

Applied Statistics Using SPSS, STATISTICA and MATLAB Springer

Instrument Engineers' Handbook - Volume 3: Process Software and Digital Networks, Fourth Edition is the latest addition to an enduring collection that industrial automation (AT) professionals often refer to as the "bible." First published in 1970, the entire handbook is approximately 5,000 pages, designed as standalone volumes that cover the measurement (Volume 1), control (Volume 2), and software (Volume 3) aspects of automation. This fourth edition of the third volume provides an in-depth, state-of-the-art review of control software packages used in plant optimization, control, maintenance, and safety. Each updated volume of this renowned reference requires about ten years to prepare, so revised installments have been issued every decade, taking into account the numerous developments that occur from one publication to the next. Assessing the rapid evolution of automation and optimization in control systems used in all types of industrial plants, this book details the wired/wireless communications and software used. This includes the ever-increasing number of applications for intelligent instruments, enhanced networks, Internet use, virtual private networks, and integration of control systems with the main networks used by management, all of which operate in a linked global environment. Topics covered include: Advances in new displays, which help operators to more quickly assess and respond to plant conditions Software and networks that help monitor, control, and optimize industrial processes, to determine the efficiency, energy consumption, and profitability of operations Strategies to counteract changes in market conditions and energy and raw material costs Techniques to fortify the safety of plant operations and the security of digital communications systems This volume explores why the holistic approach to integrating process and enterprise networks is convenient and efficient, despite associated problems involving cyber and local network security, energy conservation, and other issues. It shows how firewalls must separate the business (IT) and the operation (automation technology, or AT) domains to guarantee the safe function of all industrial plants. This book illustrates how these concerns must be addressed using effective technical solutions and proper management policies and practices. Reinforcing the fact that all industrial control systems are, in general, critically interdependent, this handbook provides a wide range of software application examples from industries including: automotive, mining, renewable energy, steel, dairy, pharmaceutical, mineral processing, oil, gas, electric power, utility, and nuclear power.

Computational Intelligence in Biomedical Engineering Springer

This volume of *Advances in Soft Computing and Lecture Notes in Computer Science* vols. 5551, 5552 and 5553, constitute the Proceedings of the 6 International Symposium of Neural Networks (ISNN 2009) held in Wuhan, China during May 26-29, 2009. ISNN is a prestigious annual symposium on neural networks with past events held in Dalian (2004), Chongqing (2005), Chengdu (2006), N- jing (2007) and Beijing (2008). Over the past few years, ISNN has matured into a well-established series of international conference on neural networks and their applications to other fields. Following this tradition, ISNN 2009 provided an a- demic forum for the participants to disseminate their new research findings and discuss emerging areas of research. Also, it created a stimulating environment for the participants to interact and exchange information on future research challenges and opportunities of neural networks and their applications. ISNN 2009 received 1,235 submissions from about 2,459 authors in 29 co- tries and regions (Australia, Brazil, Canada, China, Democratic People's Republic of Korea, Finland, Germany, Hong Kong, Hungary, India, Islamic Republic of Iran, Japan, Jordan, Macao, Malaysia, Mexico, Norway, Qatar, Republic of Korea, Singapore, Spain, Taiwan, Thailand, Tunisia, United Kingdom, United States, Venezuela, Vietnam, and Yemen) across six continents (Asia, Europe, North America, South America, Africa, and Oceania). Based on rigorous reviews by the Program Committee members and reviewers, 95 high-quality papers were selected to be published in this volume.

Technology Trends CRC Press

This book constitutes the refereed proceedings of the 5th Asia-Pacific Web Conference, APWeb 2003, held in Xian, China in April 2003. The 39 revised full papers and 16 short papers presented together with two invited papers were carefully reviewed and selected from a total of 136 submissions. The papers are organized in topical sections on XML and database design; efficient XML data management; XML transformation; Web mining; Web clustering, ranking, and profiling; payment and security; Web application architectures; advanced applications; Web multimedia; network protocols; workflow management systems; advanced search; and data allocation and replication.

Advances in Computational Algorithms and Data Analysis John Wiley & Sons

MATLAB is an interactive system for numerical computation that is widely used for teaching and research in industry and academia. It provides a modern programming language and problem solving environment, with powerful data structures, customizable graphics, and easy-to-use editing and debugging tools. This third edition of *MATLAB Guide* completely revises and updates the best-selling second edition and is more than 30 percent longer. The book remains a lively, concise introduction to the most popular and important features of MATLAB and the Symbolic Math Toolbox. Key features are a tutorial in Chapter 1 that gives a hands-on overview of MATLAB; a thorough treatment of MATLAB mathematics, including the linear algebra and numerical analysis functions and the differential equation solvers; and a web page at <http://www.siam.org/books/ot150> that provides example program files, updates, and links to MATLAB resources. The new edition contains color figures throughout; includes pithy discussions of related topics in new "Asides" boxes that augment the text; has new chapters on the Parallel Computing Toolbox, object-oriented programming, graphs, and large data sets; covers important new MATLAB data types such as categorical arrays, string arrays, tall arrays, tables, and timetables; contains more on MATLAB workflow, including the Live Editor and unit tests; and fully reflects major updates to the MATLAB graphics system. This book is suitable for both beginners and more experienced users, including students, researchers, and practitioners.

Collaborative Networks: Reference Modeling Simon and Schuster

Learn how to process and analysis data using Python KEY FEATURES - The book has theories explained elaborately along with Python code and corresponding output to support the theoretical explanations. The Python codes are provided with step-by-step comments to explain each instruction of the code. - The book is not just dealing with the background mathematics alone or only the programs but beautifully correlates the background mathematics to the theory and then finally translating it into the programs. - A rich set of chapter-end exercises are provided, consisting of both short-answer questions and long-answer questions. DESCRIPTION This book introduces the fundamental concepts of Data Science, which has proved to be a major game-changer in business solving problems. Topics covered in the book include fundamentals of Data Science, data preprocessing, data plotting and visualization, statistical data analysis, machine learning for data analysis, time-series analysis, deep learning for Data Science, social media analytics, business analytics, and Big Data analytics. The content of the book describes the fundamentals of each of the Data Science

related topics together with illustrative examples as to how various data analysis techniques can be implemented using different tools and libraries of Python programming language. Each chapter contains numerous examples and illustrative output to explain the important basic concepts. An appropriate number of questions is presented at the end of each chapter for self-assessing the conceptual understanding. The references presented at the end of every chapter will help the readers to explore more on a given topic. WHAT WILL YOU LEARN Perform processing on data for making it ready for visual plot and understand the pattern in data over time. Understand what machine learning is and how learning can be incorporated into a program. Know how tools can be used to perform analysis on big data using python and other standard tools. Perform social media analytics, business analytics, and data analytics on any data of a company or organization. WHO THIS BOOK IS FOR The book is for readers with basic programming and mathematical skills. The book is for any engineering graduates that wish to apply data science in their projects or wish to build a career in this direction. The book can be read by anyone who has an interest in data analysis and would like to explore more out of interest or to apply it to certain real-life problems. TABLE OF CONTENTS 1. Fundamentals of Data Science 2. Data Preprocessing 3. Data Plotting and Visualization 4. Statistical Data Analysis 5. Machine Learning for Data Science 6. Time-Series Analysis 7. Deep Learning for Data Science 8. Social Media Analytics 9. Business Analytics 10. Big Data Analytics

Modelling Community Structure in Freshwater Ecosystems CRC Press

Offering a wide range of programming examples implemented in MATLAB, Computational Intelligence Paradigms: Theory and Applications Using MATLAB presents theoretical concepts and a general framework for computational intelligence (CI) approaches, including artificial neural networks, fuzzy systems, evolutionary computation, genetic algorithms and pr

The Quick Python Book John Wiley & Sons

This new book builds on the original classic textbook entitled: An Introduction to Computational Fluid Mechanics by C. Y. Chow which was originally published in 1979. In the decades that have passed since this book was published the field of computational fluid dynamics has seen a number of changes in both the sophistication of the algorithms used but also advances in the computer hardware and software available. This new book incorporates the latest algorithms in the solution techniques and supports this by using numerous examples of applications to a broad range of industries from mechanical and aerospace disciplines to civil and the biosciences. The computer programs are developed and available in MATLAB. In addition the core text provides up-to-date solution methods for the Navier-Stokes equations, including fractional step time-advancement, and pseudo-spectral methods. The computer codes at the following website: www.wiley.com/go/biringen

Modern Electronics Devices and Communication Systems CRC Press

This book presents select and peer-reviewed proceedings of the International Conference on Smart Communication and Imaging Systems (MEDCOM 2021). The contents explore the recent technological advances in the field of next-generation electronics devices and communication systems. The topics include the design and development of smart, secure, and reliable future communication networks; satellite, radar, and microwave techniques for intelligent communication. The book also covers methods and applications of GIS and remote sensing; medical image analysis and its applications in smart health. This book can be useful for students, researchers, and professionals working in the field of communication systems and image processing.

Intelligent Control Systems Using Soft Computing Methodologies Pearson Education

This book is about computing eigenvalues, eigenvectors, and invariant subspaces of matrices. Treatment includes generalized and structured eigenvalue problems and all vital aspects of eigenvalue computations. A unique feature is the detailed treatment of structured eigenvalue problems, providing insight on accuracy and efficiency gains to be expected from algorithms that take the structure of a matrix into account.

Neural Networks in a Softcomputing Framework Tata McGraw-Hill Education

In recent years, intelligent control has emerged as one of the most active and fruitful areas of research and development. Until now, however, there

has been no comprehensive text that explores the subject with focus on the design and analysis of biological and industrial applications. Intelligent Control Systems Using Soft Computing Methodologies does all that and more. Beginning with an overview of intelligent control methodologies, the contributors present the fundamentals of neural networks, supervised and unsupervised learning, and recurrent networks. They address various implementation issues, then explore design and verification of neural networks for a variety of applications, including medicine, biology, digital signal processing, object recognition, computer networking, desalination technology, and oil refinery and chemical processes. The focus then shifts to fuzzy logic, with a review of the fundamental and theoretical aspects, discussion of implementation issues, and examples of applications, including control of autonomous underwater vehicles, navigation of space vehicles, image processing, robotics, and energy management systems. The book concludes with the integration of genetic algorithms into the paradigm of soft computing methodologies, including several more industrial examples, implementation issues, and open problems and open problems related to intelligent control technology. Suitable as a textbook or a reference, Intelligent Control Systems explores recent advances in the field from both the theoretical and the practical viewpoints. It also integrates intelligent control design methodologies to give designers a set of flexible, robust controllers and provide students with a tool for solving the examples and exercises within the book.

Advances in Self-Organising Maps CRC Press

In contrast to classical image analysis methods that employ "crisp" mathematics, fuzzy set techniques provide an elegant foundation and a set of rich methodologies for diverse image-processing tasks. However, a solid understanding of fuzzy processing requires a firm grasp of essential principles and background knowledge. Fuzzy Image Processing and Applications with MATLAB® presents the integral science and essential mathematics behind this exciting and dynamic branch of image processing, which is becoming increasingly important to applications in areas such as remote sensing, medical imaging, and video surveillance, to name a few. Many texts cover the use of crisp sets, but this book stands apart by exploring the explosion of interest and significant growth in fuzzy set image processing. The distinguished authors clearly lay out theoretical concepts and applications of fuzzy set theory and their impact on areas such as enhancement, segmentation, filtering, edge detection, content-based image retrieval, pattern recognition, and clustering. They describe all components of fuzzy, detailing preprocessing, threshold detection, and match-based segmentation. Minimize Processing Errors Using Dynamic Fuzzy Set Theory This book serves as a primer on MATLAB and demonstrates how to implement it in fuzzy image processing methods. It illustrates how the code can be used to improve calculations that help prevent or deal with imprecision—whether it is in the grey level of the image, geometry of an object, definition of an object's edges or boundaries, or in knowledge representation, object recognition, or image interpretation. The text addresses these considerations by applying fuzzy set theory to image thresholding, segmentation, edge detection, enhancement, clustering, color retrieval, clustering in pattern recognition, and other image processing operations. Highlighting key ideas, the authors present the experimental results of their own new fuzzy approaches and those suggested by different authors, offering data and insights that will be useful to teachers, scientists, and engineers, among others.

Numerical Computing with MATLAB MIT Press

Assuming no previous statistics education, this practical reference provides a comprehensive introduction and tutorial on the main statistical analysis topics, demonstrating their solution with the most common software package. Intended for anyone needing to apply statistical analysis to a large variety of science and engineering problems, the book explains and shows how to use SPSS, MATLAB, STATISTICA and R for analysis such as data description, statistical inference, classification and regression, factor analysis, survival data and directional statistics. It concisely explains key concepts and methods, illustrated by practical examples using real data, and includes a CD-ROM with software tools and data sets used in the examples and exercises. Readers learn which software tools to apply and also gain insights into the comparative capabilities of the primary software packages.