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Simulating neural networks with Mathematica by Freeman, James A. Publication date 1994 Topics Mathematica (Computer file), Neural networks (Computer science), 54.72 artificial intelligence, Neurale netwerken, Kunstmatige intelligentie, Inteligencia artificial (computacao), Mathematica (computerprogramma)

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Neural Networks is a Mathematica package designed to train, visualize, and validate neural network models. A neural network model is a structure that can be adjusted to produce a mapping from a given set of data to features of or relationships among the data. The model is adjusted, or trained, using a collection of data from

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Simulating Neural Networks with Mathematica book by James ...
Additional Physical Format: Online version: Freeman, James A. Simulating neural networks with Mathematica. Reading, Mass. : Addison-Wesley, ©1994

An introduction to neural networks, their operation and their application, in the context of Mathematica, a mathematical programming language. Feature show how to simulate neural network operations using Mathematica and illustrates the techniques for employing Mathematics to assess neural network behaviour and performance.

Neural Networks presents concepts of neural-network models and techniques of parallel distributed processing in a three-step approach: - A brief overview of the neural structure of the brain and the history of neural-network modeling introduces to associative memory, preceptrons, feature-sensitive networks, learning strategies, and practical applications. - The second part covers subjects like statistical physics of spin glasses, the mean-field theory of the Hopfield model, and the "space of interactions" approach to the storage capacity of neural networks. - The final part discusses nine programs with practical demonstrations of neural-network models. The software and source code in C are on a 3 1/2" MS-DOS diskette can be run with Microsoft, Borland, Turbo-C, or compatible compilers.

This practical introduction describes the kinds of real-world problems neural network technology can solve. Surveying a range of neural network applications, the book demonstrates the construction and operation of artificial neural systems. Through numerous examples, the author explains the process of building neural-network applications that utilize recent connectionist developments, and conveys an understanding both of the potential, and the limitations of different network models. Examples are described in enough detail for you to assimilate the information and then use the accumulated experience of others to create your own applications. These examples are deliberately restricted to those that can be easily understood, and recreated, by any reader, even the novice practitioner. In some cases the author describes alternative approaches to the same application, to allow you to compare and contrast their advantages and disadvantages. Organized by application areas, rather than by specific network architectures or learning algorithms, Builiding Neural Networks shows why certain networks are more suitable than others for solving specific kinds of problems. Skapura also reviews principles of neural information processing and furnishes an operations summary of the most popular neural-network processing models. Finally, the book provides information on the practical aspects of application design, and contains six topic-oriented chapters on specific applications of neural-network systems. These applications include networks that perform: Pattern matching, storage, and recall Business and financial systems Data extraction from images Mechanical process control systems New neural networks that combine pattern matching with fuzzy logic The book includes application-oriented excercises that further help you see how a neural network solves a problem, and that reinforce your understanding of modeling techniques. 0201539217B04062001

Most practical applications of artificial neural networks are based on a computational model involving the propagation of continuous variables from one processing unit to the next. In recent years, data from neurobiological experiments have made it increasingly clear that biological neural networks, which communicate through pulses, use the timing of the pulses to transmit information and perform computation. This realization has stimulated significant research on pulsed neural networks, including theoretical analyses and model development, neurobiological modeling, and hardware implementation. This book presents the complete spectrum of current research in pulsed neural networks and includes the most important work from many of the key scientists in the field. Terrence J. Sejnowski's foreword, "Neural Pulse Coding," presents an overview of the topic. The first half of the book consists of longer tutorial articles spanning neurobiology, theory, algorithms, and hardware. The second half contains a larger number of shorter research chapters that present more advanced concepts. The contributors use consistent notation and terminology throughout the book. Contributors Peter S. Burge, Stephen R. Deiss, Rodney J. Douglas, John G. Elias, Wulfram Gerstner, Alister Hamilton, David Horn, Axel Jahnke, Richard Kempter, Wolfgang Maass, Alessandro Mortara, Alan F. Murray, David P. M. Northmore, Irit Opher, Kostas A. Papathanasiou, Michael Recce, Barry J. P. Rising, Ulrich Roth, Tim Schönauer, Terrence J. Sejnowski, John Shawe-Taylor, Max R. van Daalen, J. Leo van Hemmen, Philippe Venier, Hermann Wagner, Adrian M. Whatley, Anthony M. Zador

In response to the exponentially increasing need to analyze vast amounts of data, Neural Networks for Applied Sciences and Engineering: From Fundamentals to Complex Pattern Recognition provides scientists with a simple but systematic introduction to neural networks. Beginning with an introductory discussion on the role of neural networks in

Artificial neural networks may probably be the single most successful technology in the last two decades which has been widely used in a large variety of applications in various areas. The purpose of this book is to provide recent advances of artificial neural networks in biomedical applications. The book begins with fundamentals of artificial neural networks, which cover an introduction, design, and optimization. Advanced architectures for biomedical applications, which offer improved performance and desirable properties, follow. Parts continue with biological applications such as gene, plant biology, and stem cell, medical applications such as skin diseases, sclerosis, anesthesia, and physiotherapy, and clinical and other applications such as clinical outcome, telecare, and pre-med student failure prediction. Thus, this book will be a fundamental source of recent advances and applications of artificial neural networks in biomedical areas. The target audience includes professors and students in engineering and medical schools, researchers and engineers in biomedical industries, medical doctors, and healthcare professionals.

This book constitutes the refereed proceedings of the 8th Mexican International Conference on Artificial Intelligence, MICAI 2009, held in Guanajuato, Mexico, in November 2009. The 63 revised full papers presented together with one invited talk were carefully reviewed and selected from 215 submissions. The papers are organized in topical sections on logic and reasoning, ontologies, knowledge management and knowledge-based systems, uncertainty and probabilistic reasoning, natural language processing, data mining, machine learning, pattern recognition, computer vision and image processing, robotics, planning and scheduling, fuzzy logic, neural networks, intelligent tutoring systems, bioinformatics and medical applications, hybrid intelligent systems and evolutionary algorithms.

Comprehensive and impeccably edited, Neural Networks in QSAR and Drug Design is the first book to present an all-inclusive coverage of the topic. The book provides a practice-oriented introduction to the different neural network paradigms, allowing the reader to easily understand and reproduce the results demonstrated. Numerous examples are detailed, demonstrating a variety of applications to QSAR and drug design. The contributors include some of the most distinguished names in the field, and the book provides an exhaustive bibliography, guiding readers to all the literature related to a particular type of application or neural network paradigm. The extensive index acts as a guide to the book, and makes retrieving information from chapters an easy task. A further research aid is a list of software with indications of availablility and price, as well as the editors scale rating the ease of use and interest/price ratio of each software package. The presentation of new, powerful tools for modeling molecular properties and the inclusion of many important neural network paradigms, coupled with extensive reference aids, makes Neural Networks in QSAR and Drug Design an essential reference source for those on the frontiers of this field. Presents the first coverage of neural networks in QSAR and Drug Design Allows easy understanding and reproduction of the results described within Includes an exhaustive bibliography with more than 200 references Provides a list of applicable software packages with availability and price

These lectures explain the very basic concepts of neural networks at a most elementary level, requiring only very rudimentary knowledge of Python, or actually any programming language. With simplicity in mind, the code for various algorithms of neural networks is written from absolute scratch, i.e. without any use of dedicated higher-level libraries. That way one can follow all the programming steps in an explicit manner. The book is intended for undergraduate students and for advanced high school pupils and their teachers.

The book introduces the latest methods and algorithms developed in machine and deep learning (hybrid symbolic-numeric computations, robust statistical techniques for clustering and eliminating data as well as convolutional neural networks) dealing not only with images and the use of computers, but also their applications to visualization tasks generalized by up-to-date points of view. Associated algorithms are deposited on iCloud.