Practical Neural Network Recipes In C With Diskette

Inhaltsangabe:Abstract: In the 1980s research efforts and successes made artificial neural networks popular. Since the 1990s engineers have been using this foundation for problem solving. But artifiial neural network solutions for "real-world" problems are sometimes hard to find because of the complexity of the domain and because of the vast number of design attributes the engineer has to deal with. This thesis provides a structured overview of attributes in the design process of artificial neural networks and reviews technical process models. Current development methods for artificial neural networks are then reviewed and critiqued. The thesis concludes with a new design and development method for artificial neural networks. Inhaltsverzeichnis:Table of Contents: List of figuresx List of tablesxi Introduction1 1.Design attributes in ANN3 1.1ANN models4 1.1.1Node level7 1.1.2Network level9 1.1.3Training level9 1.2Data and data representation10 1.3Global system design12 1.4Hardware and software implementation13 1.5Characteristics of ANNs15 1.5.1Advantages of ANNs15 1.5.2Limitations and concerns16 2.Technical process models and engineering methods18 2.1Why use an engineering method?18 2.2Evolutionary model of engineering discipline20 2.3Overview of technical process models22 2.3.1Taxonomy of technical process models24 2.3.2Prototyping25 2.3.3Incremental method26 2.3.4Strict contractual approach26 2.3.5Deciding on process models and methods26 2.3.6Examples of process models27 2.3.7Representation of process models27 2.4Quality criteria of process models29 3.Current engineering methods for ANNs30 3.1Why a special method for ANNs?30 3.1.1Are conventional engineering methodologies suitable for ANNs?30 3.2Methods for expert systems31 3.3System identication methods35 3.4Bailey and Thompson37 3.4.1Criticism43 3.5Medsker and Liebowitz44 3.6Jones and Franklin45 3.7Schalko47 3.8Karayiannis and Nicolaos48 3.8.1Criticism49 3.9Nelson and Illingworth50 3.9.1Criticism51 3.10Whittington and Spracklen52 3.10.1Criticism56 3.11Lawrence and Andriola57 3.11.1Criticism58 3.12General criticism of current methodologies58 4.Proposed design and development method60 4.1Development process61 4.1.1Requirement analysis65 4.1.2Specication68 4.1.3Data and domain analysis70 4.1.4Architectural design76 4.1.5Detailed ANN design84 4.1.6ANN implementation92 4.1.7Training93 4.1.8Monitoring training94 4.1.9ANN quality [...]

Due to an ever-decreasing supply in raw materials and stringent constraints on conventional energy sources, demand for lightweight, efficient and low cost structures has become crucially important in modern engineering design. This requires engineers to search for optimal and robust design options to address design problems that are often large in scale and highly nonlinear, making finding solutions challenging. In the past two decades, metaheuristic algorithms have shown promising power, efficiency and versatility in solving these difficult optimization problems. This book examines the latest developments of metaheuristics and their applications in water, geotechnical and transport engineering offering practical case studies as examples to demonstrate real world applications. Topics cover a range of areas within engineering, including reviews of optimization algorithms, artificial intelligence, cuckoo search, genetic programming, neural networks, multivariate adaptive regression, swarm intelligence, genetic algorithms, ant colony optimization, evolutionary multiobjective optimization with diverse applications in engineering such as behavior of materials, geotechnical design, flood control, water distribution and signal networks. This book can serve as a supplementary text for design courses and computation in engineering as well as a reference for researchers and engineers in metaheursitics, optimization in civil engineering and computational intelligence. Provides detailed descriptions of all major metaheuristic algorithms with a focus on practical implementation Develops new hybrid and advanced methods suitable for civil engineering problems at all levels Appropriate for researchers and advanced students to help to develop their work

This text serves as a cookbook for neural network solutions to practical problems using C++. It will enable those with moderate programming experience to select a neural network model appropriate to solving a particular problem, and to produce a working program implementing that network. The book provides guidance along the entire problem-solving path, including designing the training set, preprocessing variables, training and validating the network, and evaluating its performance. Though the book is not intended as a general course in neural networks, no background in neural works is assumed and all models are presented from the ground up. The principle focus of the book is the three layer feedforward network, for more than a decade as the workhorse of professional arsenals. Other network models with strong performance records are also included. Bound in the book is an IBM diskette that includes the source code for all programs in the book. Much of this code can be easily adapted to C compilers. In addition, the operation of all programs is thoroughly discussed both in the text and in the comments within the code to facilitate translation to other languages.

Leverage the power of deep learning and Keras to develop smarter and more efficient data models Key FeaturesUnderstand different neural networks and their implementation using KerasExplore recipes for training and fine-tuning your neural network modelsPut your deep learning knowledge to practice with real-world use-cases, tips, and tricksBook Description Keras has quickly emerged as a popular deep learning library. Written in Python, it allows you to train convolutional as well as recurrent neural networks with speed and accuracy. The Keras Deep Learning Cookbook shows you how to tackle different problems encountered while training efficient deep learning models, with the help of the popular Keras library. Starting with installing and setting up Keras, the book demonstrates how you can perform deep learning with Keras in the TensorFlow. From loading data to fitting and evaluating your model for optimal performance, you will work through a step-by-step process to tackle every possible problem faced while training deep models. You will implement convolutional and recurrent neural networks, adversarial networks, and more with the help of this handy guide. In addition to this, you will learn how to train these models for real-world image and language processing tasks. By the end of this book, you will have a practical, hands-on understanding of how you can leverage the power of Python and Keras to perform effective deep learning What you will learnInstall and configure Keras in TensorFlowMaster neural network programming using the Keras library Understand the different Keras layers Use Keras to implement simple feed-forward neural networks, CNNs and RNNsWork with various datasets and models used for image and text classificationDevelop text summarization and reinforcement learning models using KerasWho this book is for Keras Deep Learning Cookbook is for you if you are a data scientist or machine learning expert who wants to find practical solutions to common problems encountered while training deep learning models. A basic understanding of Python and some experience in machine learning and neural networks is required for this book.

Exploratory Analysis of Metallurgical Process Data with Neural Networks and Related Methods

Advances in Neural Networks -- ISNN 2010

Handbook of Neural Network Signal Processing

An Introduction

Computational Neural Networks for Geophysical Data Processing

Python Deep Learning Cookbook

Solve different problems in modelling deep neural networks using Python, Tensorflow, and Keras with this practical guide About This Book Practical recipes on training different neural network models and tuning them for optimal performance Use Python frameworks like TensorFlow, Caffe, Keras, Theano for Natural Language Processing, Computer Vision, and more A hands-on guide covering the common as well as the not so common problems in deep learning using Python Who This Book Is For This book is intended for machine learning professionals who are looking to use deep learning algorithms to create real-world applications using Python. Thorough understanding of the machine learning concepts and Python libraries such as NumPy, SciPy and scikit-learn is expected. Additionally, basic knowledge in linear algebra and calculus is desired. What You Will Learn Implement different neural network models in Python Select the best Python framework for deep learning such as PyTorch, Tensorflow, MXNet and Keras Apply tips and tricks related to neural networks internals, to boost learning performances Consolidate machine learning principles and apply them in the deep learning field Reuse and adapt Python code snippets to everyday problems Evaluate the cost/benefits and performance implication of each discussed solution In Detail Deep Learning is revolutionizing a wide range of industries. For many applications, deep learning has proven to outperform humans by making faster and more accurate predictions. This book provides a top-down and bottom-up approach to demonstrate deep learning solutions to real-world problems in different areas. These applications include Computer Vision, Natural Language Processing, Time Series, and Robotics. The Python Deep Learning Cookbook presents technical solutions to the issues presented, along with a detailed explanation of the solutions. Furthermore, a discussion on corresponding pros and cons of implementing the proposed solution using one of the popular frameworks like TensorFlow, PyTorch, Keras and CNTK is provided. The book includes recipes that are related to the basic concepts of neural networks. All techniques s, as well as classical networks topologies. The main purpose of this book is to provide Python programmers a detailed list of recipes to apply deep learning to common and not-so-common scenarios. Style and approach Unique blend of independent recipes arranged in the most logical manner

This book presents a CRISP-DM data mining project for implementing a classification model that achieves a predictive performance very close to the ideal model, namely of 99.55%. This model yields such a high accuracy, mainly, due to the proprietary architecture of the machine learning algorithm used. We implement a multilayer perceptron neural network which is improved using multiple techniques existent in the literature. A detailed theoretical explanation is offered regarding multilayer perceptron, learning algorithms and several optimization techniques, and each decision taken in building the final architecture is motivated. To demonstrate the predictive performance of our classification model, we use a telecommunications synthetic dataset that contains call details records (CDR) for 3,333 customers, with 21 independent variables and one dependent variable which indicates the past behavior of these customers with respect to churn. This is a generic dataset frequently used in research as a benchmark for testing different architectures of machine learning algorithms proposed for classification. The methodology presented in this book is scalable to datasets that have hundreds of thousands of instances and hundreds or thousands of variables coming from various industries such as telecommunications, finance, astronomy, biotech, marketing, healthcare, and many others, and can be applied to any real world classification problem.

Content Description #Includes bibliographical references and index.

Solve different problems in modelling deep neural networks using Python, Tensorflow, and Keras with this practical guideAbout This Book* Practical recipes on training different neural network models and tuning them for optimal performance* Use Python frameworks like TensorFlow, Caffe, Keras, Theano for Natural Language Processing, Computer Vision, and more* A hands-on guide covering the common as well as the not so common problems in deep learning using PythonWho This Book Is ForThis book is intended for machine learning professionals who are looking to use deep learning algorithms to create real-world applications using Python. Thorough understanding of the machine learning concepts and Python libraries such as NumPy, SciPy and scikit-learn is expected. Additionally, basic knowledge in linear algebra and calculus is desired.What You Will Learn* Implement different neural network models in Python* Select the best Python framework for deep learning such as PyTorch, Tensorflow, MXNet and Keras* Apply tips and tricks related to neural networks internals, to boost learning performances* Consolidate machine learning principles and apply them in the deep learning field* Reuse and adapt Python code snippets to everyday problems* Evaluate the cost/benefits and performance implication of each discussed solutionIn DetailDeep Learning is revolutionizing a wide range of industries. For many applications, deep learning has proven to outperform humans by making faster and more accurate predictions. This book provides a top-down and bottom-up approach to demonstrate deep learning solutions to real-world problems in different areas. These applications include Computer Vision, Natural Language Processing, Time Series, and Robotics.The Python Deep Learning Cookbook presents technical solutions to the issues presented, along with a detailed explanation of the solutions. Furthermore, a discussion on corresponding pros and cons of implementing the proposed solution using one of the popular frameworks like TensorFlow, PyTorch, Keras and CNTK is provided. The book includes recipes that are related to the basic concepts of neural networks. All techniques s, as well as classical networks topologies. The main purpose of this book is to provide Python programmers a detailed list of recipes to apply deep learning to common and not-so-common scenarios.Style and approachUnique blend of independent recipes arranged in the most logical manner

Proceedings of the ANNIMAB-1 Conference, Göteborg, Sweden, 13–16 May 2000

A C++ Sourcebook

Multilayer Neural Networks

Advanced Algorithms for Neural Networks

Over 30 recipes for implementing deep neural networks in Python

Proceedings of the Sixth International Conference on Neural Network and Soft Computing, Zakopane, Poland, June 11-15, 2002

The primary purpose of this book is to show that a multilayer neural network can be considered as a multistage system, and then that the learning of this class of neural networks can be treated as a special sort of the optimal control problem. In this way, the optimal control problem methodology, like dynamic programming, with modifications, can yield a new class of learning algorithms for multilayer neural networks. Another purpose of this book is to show that the generalized net theory can be successfully used as a new description of multilayer neural networks. Several generalized net descriptions of neural networks functioning processes are considered, namely: the simulation process of networks, a system of neural networks and the learning algorithms developed in this book. The generalized net approach to modelling of real systems may be used successfully for the description of a variety of technological and intellectual problems, it can be used not only for representing the parallel functioning of homogenous objects, but also for modelling non-homogenous systems, for example systems which consist of a different kind of subsystems. The use of the generalized nets methodology shows a new way to describe functioning of discrete dynamic systems.

Volume 16 Reviews In Computational Chemistry Kenny B. Lipkowitz and Donald B. Boyd The focus of this book is on methods useful in molecular design. Tutorials and reviews span (1) methods for designing compound libraries for combinatorial chemistry and high throughput screening, (2) the workings of artificial neural networks and their use in chemistry, (3) force field methods for modeling materials and designing new substances, and (4) free energy perturbation methods of practical usefulness in ligand design. From Reviews of the Series "This series spans all the subdisciplines in the field, from techniques to practical applications, and includes reviews from many of the acknowledged leaders in the field. the reviews cross many subdisciplines yet are both general enough to be of wide interest while including detailed information of use to workers in particular subdisciplines." -Journal of the American Chemical Society

Advances in 3D visualization and physics-based simulation technology make it possible for game developers to create compelling, visually immersive gaming environments that were only dreamed of years ago. But today's game players have grown in sophistication along with the games they play. It's no longer enough to wow your players with dazzling graphics; the next step in creating even more immersive games is improved artificial intelligence, or AI.Fortunately, advanced AI game techniques are within the grasp of every game developer--not just those who dedicate their careers to AI. If you're new to game programming or if you're an experienced game programmer who needs to get up to speed quickly on AI techniques, you'll find AI for Game Developers to be the perfect starting point for understanding and applying AI techniques to your games.Written for the novice AI programmer, AI for Game Developers introduces you to techniques such as finite state machines, fuzzy logic, neural networks, and many others, in straightforward, easy-to-understand language, supported with code samples throughout the entire book (written in C/C++). From basic techniques such as chasing and evading, pattern movement, and flocking to genetic algorithms, the book presents a mix of deterministic (traditional) and non-deterministic (newer) AI techniques aimed squarely at beginners AI developers. Other topics covered in the book include: Potential function based movements: a technique that handles chasing, evading swarming, and collision avoidance simultaneously Basic pathfinding and waypoints, including an entire chapter devoted to the A* pathfinding algorithm AI scripting Rule-based AI: learn about variants other than fuzzy logic and finite state machines Basic probability Bayesian techniques Unlike other books on the subject, AI for Game Developers doesn't attempt to cover every aspect of game AI, but to provide you with usable, advanced techniques you can apply to your games right now. If you've wanted to use AI to extend the play-life of your games, make them more challenging, and most importantly, make them more fun, then this book is for you.

The use of neural networks is permeating every area of signal processing. They can provide powerful means for solving many problems, especially in nonlinear, real-time, adaptive, and blind signal processing. The Handbook of Neural Network Signal Processing brings together applications that were previously scattered among various publications to provide an up-to-date, detailed treatment of the subject from an engineering point of view. The authors cover basic principles, modeling, algorithms, architectures, implementation procedures, and well-designed simulation examples of audio, video, speech, communication, geophysical, sonar, radar, medical, and many other signals. The subject of neural networks and their application to signal processing is constantly improving. You need a handy reference that will inform you of current applications in this new area. The Handbook of Neural Network Signal Processing provides this much needed service for all engineers and scientists in the field.

A Generalized Net Perspective

Object-Oriented Neural Networks in C++

Neural Networks and Soft Computing

Artificial Neural Networks-Icann '97

Research Anthology on Artificial Neural Network Applications

NEURAL NETWORKS FOR CHURN PREDICTION IN THE MOBILE TELECOMMUNICATIONS INDUSTRY

This book and its sister volume constitutes the proceedings of the 7th International Symposium on Neural Networks, ISNN 2010, held in Shanghai, China, June 6-9, 2010. The 170 revised full papers of Part I and Part II were carefully selected from 591 submissions and focus on topics such as Neurophysiological Foundation, Theory and Models, Learning and Inference, and Neurodynamics. The second vol (LNCS 6064) covers the following 5 topics: SVM and Kernel Methods, Vision and Image, Data Mining and Text Analysis, BCI and Brain Imaging, and applications.

First published in 1998, this volume enters the debate on human behaviour in the form of neural networks in a spatial context. As most transportation research techniques had been developed in the 1960s and 1970s, these authors sought to bring that research into the modern era. Featuring 17 articles from 37 contributors, it begins with an overview and proceeds to examine aspects of travel behaviour, trat management.

R. S. GOVINDARAJU and ARAMACHANDRA RAO School of Civil Engineering Purdue University West Lafayette, IN. , USA Background and Motivation The basic notion of artificial neural networks (ANNs), as we understand them today, was perhaps first formalized by McCulloch and Pitts (1943) in their model of an artificial neuron. Research in this field remained somewhat dormant in the early years, perh of the limited capabilities of this method and because there was no clear indication of its potential uses. However, interest in this area picked up momentum in a dramatic fashion with the works of Hopfield (1982) and Rumelhart et al. (1986). Not only did these studies place artificial neural networks on a firmer mathematical footing, but also opened the dOOf to a host of potential applications for this computa Consequently, neural network computing has progressed rapidly along all fronts: theoretical development of different learning algorithms, computing capabilities, and applications to diverse areas from neurophysiology to the stock market. . Initial studies on artificial neural networks were prompted by adesire to have computers mimic human learning. As a result, the jargon associated with the technical literat subject is replete with expressions such as excitation and inhibition of neurons, strength of synaptic connections, learning rates, training, and network experience. ANNs have also been referred to as neurocomputers by people who want to preserve this analogy.

This is one of the first books to offer practical in-depth coverage of the Probabilistic Neural Network (PNN) and several other neural nets and their related algorithms critical to solving some of today's toughest real-world computing problems. Includes complete C++ source code for basic and advanced applications.

Practical Neural Network Recipes in C++

Artificial Neural Networks: The brain behind AI

Engineering Applications of Neural Networks

Machine Learning with Python Cookbook

World Congress on Neural Networks

Simulated Annealing

This book provides the readers with the knowledge of Simulated Annealing and its vast applications in the various branches of engineering. We encourage readers to explore the application of Simulated Annealing in their work for the task of optimization.

The addition of artificial neural network computing to traditional pattern recognition has given rise to a new, different, and more powerful methodology that is presented in this interesting book. This is a practical guide to the application of artificial neural networks. Geared toward the practitioner, Pattern Recognition with Neural Networks in C++ covers pattern classification and neural network approaches within the same framework. Through the book's presentation of underlying theory and numerous practical examples, readers gain an understanding that will allow them to make judicious design choices rendering neural application predictable and effective. The book provides an intuitive explanation of each method for each network paradigm. This discussion is supported by a rigorous mathematical approach where necessary. C++ has emerged as a rich and descriptive means by which concepts, models, or algorithms can be precisely described. For many of the neural network models discussed, C++ programs are presented for the actual implementation. Pictorial diagrams and in-depth discussions explain each topic. Necessary derivative steps for the mathematical models are included so that readers can incorporate new ideas into their programs as the field advances with new developments. For each approach, the authors clearly state the known theoretical results, the known tendencies of the approach, and their recommendations for getting the best results from the method. The material covered in the book is accessible to working engineers with little or no explicit background in neural networks. However, the material is presented in sufficient depth so that those with prior knowledge will find this book beneficial. Pattern Recognition with Neural Networks in C++ is also suitable for courses in neural networks at an advanced undergraduate or graduate level. This book is valuable for academic as well as practical research.

This practical guide provides nearly 200 self-contained recipes to help you solve machine learning challenges you may encounter in your daily work. If you’re comfortable with Python and its libraries, including pandas and scikit-learn, you’ll be able to address specific problems such as loading data, handling text or numerical data, model selection, and dimensionality reduction and many other topics. Each recipe includes code that you can copy and paste into a toy dataset to ensure that it actually works. From there, you can insert, combine, or adapt the code to help construct your application. Recipes also include a discussion that explains the solution and provides meaningful context. This cookbook takes you beyond theory and concepts by providing the nuts and bolts you need to construct working machine learning applications. You’ll find recipes for: Vectors, matrices, and arrays Handling numerical and categorical data, text, images, and dates and times Dimensionality reduction using feature extraction or feature selection Model evaluation and selection Linear and logical regression, trees and forests, and k-nearest neighbors Support vector machines (SVM), naïve Bayes, clustering, and neural networks Saving and loading trained models

This book constitutes, together with its compagnion LNCS 1606, the refereed proceedings of the International Work-Conference on Artificial and Neural Networks, IWANN'99, held in Alicante, Spain in June 1999. The 91 revised papers presented were carefully reviewed and selected for inclusion in the book. This volume is devoted to applications of biologically inspired artificial neural networks in various engineering disciplines. The papers are organized in parts on artificial neural nets simulation and implementation, image processing, and engineering applications.

Neural Networks

7th International Symposium on Neural Networks, ISNN 2010, Shanghai, China, June 6-9, 2010, Proceedings

Practical Neural Network Recipies in C++

Pyramidal Neural Networks

17th International Conference, EANN 2016, Aberdeen, UK, September 2-5, 2016, Proceedings

Geophysical Applications of Artificial Neural Networks and Fuzzy Logic

In the last two decades the artificial neural networks have been refined and widely used by the researchers and application engineers. We have not witnessed such a large degree of evolution in any other artificial neural network as in the Adaptive Resonance Theory (ART) neural network. The ART network remains plastic, or adaptive, in response to significant events and yet remains stable in response to irrelevant events. This stability-plasticity property is a great step towards realizing intelligent machines capable of autonomous learning in real time environment. The main aim of this book is to report a very small sample of the research on the evolution of ART neural network and its applications. Interested readers may refer literature for many more innovations in ART such as Fuzzy ART, ART2, ART2-a, ARTMAP, ARTMAP-PI, ARTMAP-DS, Gaussian ARTMAP, EXACT ART, and ART-EMAP.

Artificial neural networks and genetic algorithms both are areas of research which have their origins in mathematical models constructed in order to gain understanding of important natural processes. By focussing on the process models rather than the processes themselves, significant new computational techniques have evolved which have found application in a large number of diverse fields. This diversity is reflected in the topics which are subjects of the contributions to this volume. There are contributions reporting successful applications of the technology to the solution of industrial/commercial problems. This may well reflect the maturity of the technology, notably in the sense that 'real' users of modelling/prediction techniques are prepared to accept neural networks as a valid paradigm. Theoretical issues also receive attention, notably in connection with the radial basis function neural network. Contributions in the field of genetic algorithms reflect the wide range of current applications, including, for example, portfolio selection, filter design, frequency assignment, tuning of nonlinear PID controllers. These techniques are also used extensively for combinatorial optimisation problems.

"This book is distinctive in that it implements nodes and links as base objects and then composes them into four different kinds of neural networks. Roger's writing is clear....The text and code are both quite readable. Overall, this book will be useful to anyone who wants to implement neural networks in C++ (and, to a lesser extent, in other object-oriented programming languages.)...I recommend this book to anyone who wants to implement neural networks in C++."--D.L. Chester, Newark, Delaware in COMPUTING REVIEWSObject-Oriented Neural Networks in C++ is a valuable tool for anyone who wants to understand, implement, or utilize neural networks. This book/disk package provides the reader with a foundation from which any neural network architecture can beconstructed. The author has employed object-oriented design and object-oriented programming concepts to develop a set of foundation neural network classes, and shows how these classes can be used to implement a variety of neural network architectures with a great deal of ease and flexibility. A wealth of neural network formulas (with standardized notation), object code implementations, and examples are provided to demonstrate the object-oriented approach to neural network architectures and to facilitatethe development of new neural network architectures. This is the first book to take full advantage of the reusable nature of neural network classes. Key Features * Describes how to use the classes provided to implement a variety of neural network architectures including ADALINE, Backpropagation, Self-Organizing, and BAM * Provides a set of reusable neural network classes, created in C++, capable of implementing any neural network architecture * Includes an IBM disk of the source code for the classes, which is platform independent * Includes an IBM disk with C++ programs described in the book

Artificial neural networks (ANNs) present many benefits in analyzing complex data in a proficient manner. As an effective and efficient problem-solving method, ANNs are incredibly useful in many different fields. From education to medicine and banking to engineering, artificial neural networks are a growing phenomenon as more realize the plethora of uses and benefits they provide. Due to their complexity, it is vital for researchers to understand ANN capabilities in various fields. The Research Anthology on Artificial Neural Network Applications covers critical topics related to artificial neural networks and their multitude of applications in a number of diverse areas including medicine, finance, operations research, business, social media, security, and more. Covering everything from the applications and uses of artificial neural networks to deep learning and non-linear problems, this book is ideal for computer scientists, IT specialists, data scientists, technologists, business owners, engineers, government agencies, researchers, academicians, and students, as well as anyone who is interested in learning more about how artificial neural networks can be used across a wide range of fields.

Creating Intelligent Behavior in Games

Artificial Neural Networks in Medicine and Biology

Proceedings of the International Conference in Alès, France, 1995

1994 International Neural Network Society Annual Meeting

Neural Networks in the Analysis and Design of Structures

Metaheuristics in Water, Geotechnical and Transport Engineering

Deep learning doesn ’ t have to be intimidating. Until recently, this machine-learning method required years of study, but with frameworks such as Keras and Tensorflow, software engineers without a background in machine learning can quickly enter the field. With the recipes in this cookbook, you ’ ll learn how to solve deep-learning problems for classifying and generating text, images, and music. Each chapter consists of several recipes needed to complete a single project, such as training a music recommending system. Author Douwe Osinga also provides a chapter with half a dozen techniques to help you if you ’ re stuck. Examples are written in Python with code available on GitHub as a set of Python notebooks. You ’ ll learn how to: Create applications that will serve real users Use word embeddings to calculate text similarity Build a movie recommender system based on Wikipedia links Learn how AIs see the world by visualizing their internal state Build a model to suggest emojis for pieces of text Reuse pretrained networks to build an inverse image search service Compare how GANs, autoencoders and LSTMs generate icons Detect music styles and index song collections

Prepared by the Water Supply Engineering Technical Committee of the Infrastructure Council of the Environmental and Water Resources Institute of ASCE. This report examines the application of artificial neural network (ANN) technology to water supply engineering problems. Although ANN has rarely been used in in this area, those who have done so report findings that were beyond the capability of traditional statistical and mathematical modeling tools. This report describes the availability of diverse applications, along with the basics of neural network modeling, and summarizes the experiences of groups of researchers around the world who successfully demonstrated significant benefits from using ANN technology in water supply engineering. Topics include: Forecasting salinity levels in River Murray, South Australia; Predicting gastroenteritis rates and waterborne outbreaks; Modeling pH levels in a eutrophic Middle Loire River, France; and ANNs as function approximation tools replacing rigorous mathematical simulation models for analyzing water distribution networks.

This volume presents new trends and developments in soft computing techniques. Topics include: neural networks, fuzzy systems, evolutionary computation, knowledge discovery, rough sets, and hybrid methods. It also covers various applications of soft computing techniques in economics, mechanics, medicine, automatics and image processing. The book contains contributions from internationally recognized scientists, such as Zadeh, Bubnicki, Pawlak, Amari, Batyrshin, Hirota, Koczy, Kosinski, Nov á k, S.-Y. Lee, Pedrycz, Raudys, Setiono, Sincak, Strumillo, Takagi, Usui, Wilamowski and Zurada. An excellent overview of soft computing methods and their applications.

This book constitutes the refereed proceedings of the 17th International Conference on Engineering Applications of Neural Networks, EANN 2016, held in Aberdeen, UK, in September 2016. The 22 revised full papers and three short papers presented together with two tutorials were carefully reviewed and selected from 41 submissions. The papers are organized in topical sections on active learning and dynamic environments; semi-supervised modeling; classification applications; clustering applications; cyber-physical systems and cloud applications; time-series prediction; learning-algorithms.

A Design and Development Method for Artificial Neural Network Projects

Neural Networks in Transport Applications

Keras Deep Learning Cookbook

Artificial Neural Nets and Genetic Algorithms

Artificial Neural Networks in Water Supply Engineering

International Work-Conference on Artificial and Natural Neural Networks, IWANN'99, Alicante, Spain, June 2-4, 1999, Proceedings

This book contains the proceedings of the conference ANNIMAB-I, held 13-16 May 2000 in Goteborg, Sweden. The conference was organized by the Society for Artificial Neural Networks in Medicine and Biology (ANNIMAB-S), which was established to promote research within a new and genuinely cross-disciplinary field. Forty-two contributions were accepted for presentation; in addition to these, S invited papers are also included. Research within medicine and biology has often been characterised by application of statistical methods for evaluating domain specific data. The growing interest in Artificial Neural Networks has not only introduced new methods for data analysis, but also opened up for development of new models of biological and ecological systems. The ANNIMAB-I conference is focusing on some of the many uses of artificial neural networks with relevance for medicine and biology, specifically: · Medical applications of artificial neural networks: for better diagnoses and outcome predictions from clinical and laboratory data, in the processing of ECG and EEG signals, in medical image analysis, etc. More than half of the contributions address such clinically oriented issues. · Uses of ANNs in biology outside clinical medicine: for example, in models of ecology and evolution, for data analysis in molecular biology, and (of course) in models of animal and human nervous systems and their capabilities. · Theoretical aspects: recent developments in learning algorithms, ANNs in relation to expert systems and to traditional statistical procedures, hybrid systems and integrative approaches.

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.

Neural Networks are a new, interdisciplinary tool for information processing. Neurocomputing being successfully introduced to structural problems which are difficult or even impossible to be analysed by standard computers (hard computing). The book is devoted to foundations and applications of NNs in the structural mechanics and design of structures.

Practical Neural Network Recipes in C++Morgan Kaufmann

Engineering Applications of Bio-Inspired Artificial Neural Networks

Practical Solutions from Preprocessing to Deep Learning

Deep Learning Cookbook

Practical Recipes to Get Started Quickly

Reviews in Computational Chemistry

Marine Composites

The past fifteen years has witnessed an explosive growth in the fundamental research and applications of artificial neural networks (ANNs) and fuzzy logic (FL). The main impetus behind this growth has been the ability of such methods to offer solutions not amenable to conventional techniques, particularly in application domains involving pattern recognition, prediction and control. Although the origins of ANNs and FL may be traced back to the 1940s and 1960s, respectively, the most rapid progress has only been achieved in the last fifteen years. This has been due to significant theoretical advances in our understanding of ANNs and FL, complemented by major technological developments in high-speed computing. In geophysics, ANNs and FL have enjoyed significant success and are now employed routinely in the following areas (amongst others): 1. Exploration Seismology. (a) Seismic data processing (trace editing; first break picking; deconvolution and multiple suppression; wavelet estimation; velocity analysis; noise identification/reduction; statics analysis; dataset matching/prediction, attenuation), (b) AVO analysis, (c) Chimneys, (d) Compression I dimensionality reduction, (e) Shear-wave analysis, (f) Interpretation (event tracking; lithology prediction and well-log analysis; prospect appraisal; hydrocarbon prediction; inversion; reservoir characterisation; quality assessment; tomography). 2. Earthquake Seismology and Subterranean Nuclear Explosions. 3. Mineral Exploration. 4. Electromagnetic I Potential Field Exploration. (a) Electromagnetic methods, (b) Potential field methods, (c) Ground penetrating radar, (d) Remote sensing, (e) inversion.

"This book is the first book to provide opportunities for millions working in economics, accounting, finance and other business areas education on HONNs, the ease of their usage, and directions on how to obtain more accurate application results. It provides significant, informative advancements in the subject and introduces the HONN group models and adaptive HONNs"--Provided by publisher.

This volume is concerned with the analysis and interpretation of multivariate measurements commonly found in the mineral and metallurgical industries, with the emphasis on the use of neural networks. The book is primarily aimed at the practicing metallurgist or process engineer, and a considerable part of it is of necessity devoted to the basic theory which is introduced as briefly as possible within the large scope of the field. Also, although the book focuses on neural networks, they cannot be divorced from their statistical framework and this is discussed in length. The book is therefore a blend of basic theory and some of the most recent advances in the practical application of neural networks.

This book was primarily written for an audience that has heard about neural networks or has had some experience with the algorithms, but would like to gain a deeper understanding of the fundamental material. For those that already have a solid grasp of how to create a neural network application, this work can provide a wide range of examples of nuances in network design, data set design, testing strategy, and error analysis. Computational, rather than artificial, modifiers are used for neural networks in this book to make a distinction between networks that are implemented in hardware and those that are implemented in software. The term artificial neural network covers any implementation that is inorganic and is the most general term. Computational neural networks are only implemented in software but represent the vast majority of applications. While this book cannot provide a blue print for every conceivable geophysics application, it does outline a basic approach that has been used successfully.

AI for Game Developers

7th International Conference, Lausanne, Switzerland, October 8-10, 1997 Proceedings

Artificial Higher Order Neural Networks for Economics and Business

Innovations in ART Neural Networks

Over 75 practical recipes on neural network modeling, reinforcement learning, and transfer learning using Python

A large amount of information about the world we live in is supplied by our visual systems. Humans perform the task of vision effortlessly without being aware of this complex process. Hierarchical structures permit successful examination of such intricate operations. This book investigates hierarchical-structured neural networks for vision and image processing tasks and proposes various new neural network models for that purpose. It exploits the capabilities of hierarchical neural networks in a systematic way by considering the similarities to hierarchical structures already in use by computer vision researchers. All issues of hierarchical neural networks are treated in considerable detail; that is, the structure of the network, the representation issue, and learning mechanisms are analyzed theoretically as well as experimentally. Considering the similarity between conventional vision algorithms and hierarchical neural networks not only allows a transfer of knowledge between these two fields, but also gives voice to many new algorithms.

Marine Composites: Design and Performance presents up-to-date information and recent research findings on the application and use of advanced fibre-reinforced composites in the marine environment. Following the success of their previously published title: Marine Applications of Advanced Fibre-reinforced Composites which was published in 2015; this exemplary new book provides comprehensive information on materials selection, characterization, and performance. There are also dedicated sections on sandwich structures, manufacture, advanced concepts, naval architecture and design considerations, and various applications. The book will be an essential reference resource for designers, materials engineers, manufactures, marine scientists, mechanical engineers, civil engineers, coastal engineers, boat manufacturers, offshore platform and marine renewable design engineers. Presents a unique, high-level reference on composite materials and their application and use in marine structures Provides comprehensive coverage on all aspects of marine composites, including the latest advances in damage modelling and assessment of performance Contains contributions from leading experts in the field, from both industry and academia Covers a broad range of naval, offshore and marine structures

Centered around 20 major topic areas of both theoretical and practical importance, the World Congress on Neural Networks provides its registrants -- from a diverse background encompassing industry, academia, and government -- with the latest research and applications in the neural network field.

Artificial Neural Networks in Hydrology

Pattern Recognition with Neural Networks in C++

Design and Performance