Solution Of Neural Network By Simon Haykin

Get up to speed with the deep learning concepts of Pytorch using a problem-solution approach. Starting with an introduction to PyTorch, you'll get familiarized with tensors, a type of data structure used to calculate arithmetic operations and also learn how they operate. You will then take a look at probability distributions using PyTorch and get acquainted with its concepts. Further you will dive into transformations and graph computations with PyTorch. Along the way you will take a look at common issues faced with neural network implementation and tensor differentiation, and get the best solutions for them. Moving on to algorithms; you will learn how PyTorch works with supervised and unsupervised algorithms. You will see how convolutional neural networks, deep neural networks, and recurrent neural networks work using PyTorch. In conclusion you will get acquainted with natural language processing and text processing using PyTorch. What You Will Learn Master tensor operations for dynamic graph-based calculations using PyTorch Create PyTorch transformations and graph computations for neural networks Carry out supervised and unsupervised learning using PyTorch Work with deep learning algorithms such as CNN and RNN Build LSTM models in PyTorch Use PyTorch for text processing Who This Book Is For Readers wanting to dive straight into programming PyTorch.

The two-volume set LNCS 7951 and 7952 constitutes the refereed proceedings of the 10th International Symposium on Neural Networks, ISNN 2013, held in Dalian, China, in July 2013. The 157 revised full papers presented were carefully reviewed and selected from numerous submissions. The papers are organized in following topics: computational neuroscience, cognitive science, neural network models, learning algorithms, stability and convergence analysis, kernel methods, large margin methods and SVM, optimization algorithms, varational methods, control, robotics, bioinformatics and biomedical engineering, brain-like systems and brain-computer interfaces, data mining and knowledge discovery and other applications of neural networks.

The book should serve as a text for a university graduate course or for an advanced undergraduate course on neural networks in engineering and computer science departments. It should also serve as a self-study course for engineers and computer scientists in the industry. Covering major neural network approaches and architectures with the theories, this text presents detailed case studies for each of the approaches, accompanied with complete computer codes and the corresponding computed results. The case studies are designed to allow easy comparison of network performance to illustrate strengths and weaknesses of the different networks.

Robust and Fault-Tolerant Control proposes novel automatic control strategies for nonlinear systems developed by means of artificial neural networks and pays special attention to robust and fault-tolerant approaches. The book discusses robustness and fault tolerance in the context of model predictive control, fault accommodation and reconfiguration, and iterative learning control strategies. Expanding on its theoretical deliberations the monograph includes many case studies demonstrating how the proposed approaches work in practice. The most important features of the book include: a comprehensive review of neural network architectures with possible applications in system modelling and control; a concise introduction to robust and fault-tolerant control; step-by-step presentation of the control approaches proposed; an abundance of case studies illustrating the important steps in designing robust and fault-tolerant control; and a large number of figures and tables facilitating the performance analysis of the control approaches described. The material presented in this book will be useful for researchers and engineers who wish to avoid spending excessive time in searching neural-network-based control solutions. It is written for electrical, computer science and automatic control engineers interested in control theory and their applications. This monograph will also interest postgraduate students engaged in self-study of nonlinear robust and fault-tolerant control.

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.

This book presents carefully revised versions of tutorial lectures given during a School on Artificial Neural Networks for the industrial world held at the University of Limburg in Maastricht, Belgium. The major ANN architectures are discussed to show their powerful possibilities for empirical data analysis, particularly in situations where other methods seem to fail. Theoretical insight is offered by examining the underlying mathematical principles in a detailed, yet clear and illuminating way. Practical experience is provided by discussing several real-world applications in such areas as control, optimization, pattern recognition, software engineering, robotics, operations research, and CAM.

Complex-Valued Neural Networks have higher functionality, learn faster and generalize better than their real-valued counterparts. This book is devoted to the Multi-Valued Neuron (MVN) and MVN-based neural networks. It contains a comprehensive observation of MVN theory, its learning, and applications. MVN is a complex-valued neuron whose inputs and output are located on the unit circle. Its activation function is a function only of argument (phase) of the weighted sum. MVN derivative-free learning is based on the error-correction rule. A single MVN can learn those input/output mappings that are non-linearly separable in the real domain. Such classical non-linearly separable problems as XOR and Parity n are the simplest that can be learned by a single MVN. Another important advantage of MVN is a proper treatment of the phase information. These properties of MVN become even more remarkable when this neuron is used as a basic one in neural networks. The Multilayer Neural Network based on Multi-Valued Neurons (MLMVN) is an MVN-based feedforward neural network. Its backpropagation learning algorithm is derivative-free and based on the error-correction rule. It does not suffer from the local minima phenomenon. MLMVN outperforms many other machine learning techniques in terms of learning speed, network complexity and generalization capability when solving both benchmark and real-world classification and prediction problems. Another interesting application of MVN is its use as a basic neuron in multi-state associative memories. The book is addressed to those readers who develop theoretical fundamentals of neural networks and use neural networks for solving various real-world problems. It should also be very suitable for Ph.D. and graduate students pursuing their degrees in computational intelligence.

Artificial Neural Network for Drug Design, Delivery and Disposition provides an in-depth look at the use of artificial neural networks (ANN) in pharmaceutical research. With its ability to learn and self-correct in a highly complex environment, this predictive tool has

tremendous potential to help researchers more effectively design, develop, and deliver successful drugs. This book illustrates how to use ANN methodologies and models with the intent to treat diseases like breast cancer, cardiac disease, and more. It contains the latest cutting-edge research, an analysis of the benefits of ANN, and relevant industry examples. As such, this book is an essential resource for academic and industry researchers across the pharmaceutical and biomedical sciences. Written by leading academic and industry scientists who have contributed significantly to the field and are at the forefront of artificial neural network (ANN) research Focuses on ANN in drug design, discovery and delivery, as well as adopted methodologies and their applications to the treatment of various diseases and disorders Chapters cover important topics across the pharmaceutical process, such as ANN in structure-based drug design and the application of ANN in modern drug discovery Presents the future potential of ANN-based strategies in biomedical image analysis and much more

Over the past few years, there has been a surge of research activities on artificial neural networks. Although the thrust originally came from computer scientists and electrical engineers, neural network research has recently attracted researchers in the fields of operations research, operations management and industrial engineering. Despite the huge volume of recent publications devoted to neural network research, there is no single monograph addressing the potential roles of artificial neural networks for design and manufacturing. The focus of this book is on the applications of neural network concepts and techniques to design and manufacturing. This book reviews the state-of-the-art of the research activities, highlights the recent advances in research and development, and discusses the potential directions and future trends along this stream of research. The potential readers of this book will include, but are not limited to, beginners, professionals and practitioners in industries who are applying neural networks to design and manufacturing. The topics include conceptual design, group technology, process planning and scheduling, process monitoring and others. Contents:A Neural Network Approach to Group TechnologyNeuro-Clustering for Group TechnologyA Parallel and Distributed Processing Algorithm for Facility LayoutNeural Networks in Conceptual DesignKnowledge Acquisition in Neural Networks and Expert Systems: The Case of Packer Selection in Oil Well DesignSetup Generation and Feature Sequencing Using an Unsupervised Learning AlgorithmScheduling Computation Tasks onto a Multiprocessor System by Mean Field Annealing of a Hopfield Neural NetworkMulti-Functional Neural Networks for System IdentificationNeural network Applications in On-Line Monitoring of a Turning ProcessNeural Adaptive Systems for Machining Errors Modeling Readership: Engineers, computer scientists and practitioners in industries. keywords:Neural Networks;Computational Intelligence;Design;Manufacturing;Intelligent Systems;Group Technology;Facility Layout;Scheduling;On-Line Machine Monitoring

In this computer-based era, neural networks are an invaluable tool. They have been applied extensively in business forecasting, machine health monitoring, process control, and laboratory data analysis due to their modeling capabilities. There are numerous applications for neural networks, but a great deal of care and expertise is necessary to keep a neural-based project in working order. This all-inclusive coverage gives you everything you need to put neural networks into practice. This informative book shows the reader how to plan, run, and benefit from a neural-based project without running into the roadblocks that often crop up. Theauthor uses the most popular type of neural network, the Multi-Layer Perceptron, and presents every step of its development. Each chapter presents a subsequent stage in network development through easy-to-follow discussion. Every decision and possible problem is considered in depth, and solutions are offered. The book includes a how-to-do-it reference section, and a set of worked examples. The second half of the book examines the sucessful application of neural networks in fields including signal processing, financial prediction, business decision support, and process monitoring and control. The book comes complete with a disk containing C and C++ programs to get you started. Key Features *Divides chapters into three sections for quick reference: Discussion, How to do it, and Examples * Examines many case studies and real world examples to illustrate the methods presented * Includes a disk with C and C++ programs which implement many of the techniques discussed in the text * Allows the reader to devolop a neural network based solution

This handbook presents some of the most recent topics in neural information processing, covering both theoretical concepts and practical applications. The contributions include: Deep architectures Recurrent, recursive, and graph neural networks Cellular neural networks Bayesian networks Approximation capabilities of neural networks Semi-supervised learning Statistical relational learning Kernel methods for structured data Multiple classifier systems Self organisation and modal learning Applications to content-based image retrieval, text mining in large document collections, and bioinformatics This book is thought particularly for graduate students, researchers and practitioners, willing to deepen their knowledge on more advanced connectionist models and related learning paradigms.

This book covers both classical and modern models in deep learning. The primary focus is on the theory and algorithms of deep learning. The theory and algorithms of neural networks are particularly important for understanding important concepts, so that one can understand the important design concepts of neural architectures in different applications. Why do neural networks work? When do they work better than off-the-shelf machine-learning models? When is depth useful? Why is training neural networks so hard? What are the pitfalls? The book is also rich in discussing different applications in order to give the practitioner a flavor of how neural architectures are designed for different types of problems. Applications associated with many different areas like recommender systems, machine translation, image captioning, image classification, reinforcement-learning based gaming, and text analytics are covered. The chapters of this book span three categories: The basics of neural networks: Many traditional machine learning models can be understood as special cases of neural networks. An emphasis is placed in the first two chapters on understanding the relationship between traditional machine learning and neural networks. Support vector machines, linear/logistic regression, singular value decomposition, matrix factorization, and recommender systems are shown to be special cases of neural networks. These methods are studied together with recent feature engineering methods like word2vec. Fundamentals of neural networks: A detailed discussion of training and regularization is provided in Chapters 3 and 4. Chapters 5 and 6 present radial-basis function (RBF) networks and restricted Boltzmann machines. Advanced topics in neural networks: Chapters 7 and 8 discuss recurrent neural networks and convolutional neural networks. Several advanced topics like deep reinforcement learning, neural Turing machines, Kohonen self-organizing maps, and generative adversarial networks are introduced in Chapters 9 and 10. The book is written for graduate students, researchers, and practitioners. Numerous exercises are available along with a solution manual to aid in classroom teaching. Where possible, an application-centric view is highlighted in order to provide an understanding of the practical uses of each class of techniques.

Neural Network DesignNeural Networks and Learning MachinesPrentice Hall

How can we capture the unpredictable evolutionary and emergent properties of nature in software? How can understanding the

mathematical principles behind our physical world help us to create digital worlds? This book focuses on a range of programming strategies and techniques behind computer simulations of natural systems, from elementary concepts in mathematics and physics to more advanced algorithms that enable sophisticated visual results. Readers will progress from building a basic physics engine to creating intelligent moving objects and complex systems, setting the foundation for further experiments in generative design. Subjects covered include forces, trigonometry, fractals, cellular automata, self-organization, and genetic algorithms. The book's examples are written in Processing, an open-source language and development environment built on top of the Java programming language. On the book's website (http: //www.natureofcode.com), the examples run in the browser via Processing's JavaScript mode.

Neural Networks in Telecommunications consists of a carefully edited collection of chapters that provides an overview of a wide range of telecommunications tasks being addressed with neural networks. These tasks range from the design and control of the underlying transport network to the filtering, interpretation and manipulation of the transported media. The chapters focus on specific applications, describe specific solutions and demonstrate the benefits that neural networks can provide. By doing this, the authors demonstrate that neural networks should be another tool in the telecommunications engineer's toolbox. Neural networks offer the computational power of nonlinear techniques, while providing a natural path to efficient massively-parallel hardware implementations. In addition, the ability of neural networks to learn allows them to be used on problems where straightforward heuristic or rule-based solutions do not exist. Together these capabilities mean that neural networks offer unique solutions to problems in telecommunications. For engineers and managers in telecommunications, Neural Networks in Telecommunications provides a single point of access to the work being done by leading researchers in this field, and furnishes an in-depth description of neural network applications.

Learn how to solve challenging machine learning problems with TensorFlow, Google’s revolutionary new software library for deep learning. If you have some background in basic linear algebra and calculus, this practical book introduces machine-learning fundamentals by showing you how to design systems capable of detecting objects in images, understanding text, analyzing video, and predicting the properties of potential medicines. TensorFlow for Deep Learning teaches concepts through practical examples and helps you build knowledge of deep learning foundations from the ground up. It’s ideal for practicing developers with experience designing software systems, and useful for scientists and other professionals familiar with scripting but not necessarily with designing learning algorithms. Learn TensorFlow fundamentals, including how to perform basic computation Build simple learning systems to understand their mathematical foundations Dive into fully connected deep networks used in thousands of applications Turn prototypes into high-quality models with hyperparameter optimization Process images with convolutional neural networks Handle natural language datasets with recurrent neural networks Use reinforcement learning to solve games such as tic-tac-toe Train deep networks with hardware including GPUs and tensor processing units

This book explores the intuitive appeal of neural networks and the genetic algorithm in finance. It demonstrates how neural networks used in combination with evolutionary computation outperform classical econometric methods for accuracy in forecasting, classification and dimensionality reduction. McNelis utilizes a variety of examples, from forecasting automobile production and corporate bond spread, to inflation and deflation processes in Hong Kong and Japan, to credit card default in Germany to bank failures in Texas, to cap-floor volatilities in New York and Hong Kong. * Offers a balanced, critical review of the neural network methods and genetic algorithms used in finance * Includes numerous examples and applications * Numerical illustrations use MATLAB code and the book is accompanied by a website

Though mathematical ideas underpin the study of neural networks, the author presents the fundamentals without the full mathematical apparatus. All aspects of the field are tackled, including artificial neurons as models of their real counterparts; the geometry of network action in pattern space; gradient descent methods, including back-propagation; associative memory and Hopfield nets; and self-organization and feature maps. The traditionally difficult topic of adaptive resonance theory is clarified within a hierarchical description of its operation. The book also includes several real-world examples to provide a concrete focus. This should enhance its appeal to those involved in the design, construction and management of networks in commercial environments and who wish to improve their understanding of network simulator packages. As a comprehensive and highly accessible introduction to one of the most important topics in cognitive and computer science, this volume should interest a wide range of readers, both students and professionals, in cognitive science, psychology, computer science and electrical engineering.

The utility of artificial neural network models lies in the fact that they can be used to infer functions from observations—making them especially useful in applications where the complexity of data or tasks makes the design of such functions by hand impractical. Exploring Neural Networks with C# presents the important properties of neural networks—while keeping the complex mathematics to a minimum. Explaining how to build and use neural networks, it presents complicated information about neural networks structure, functioning, and learning in a manner that is easy to understand. Taking a "learn by doing" approach, the book is filled with illustrations to guide you through the mystery of neural networks. Examples of experiments are provided in the text to encourage individual research. Online access to C# programs is also provided to help you discover the properties of neural networks. Following the procedures and using the programs included with the book will allow you to learn how to work with neural networks and evaluate your progress. You can download the programs as both executable applications and C# source code from http://home.agh.edu.pl/~tad//index.php?page=programy&lang=en

For graduate-level neural network courses offered in the departments of Computer Engineering, Electrical Engineering, and Computer Science. Neural Networks and Learning Machines, Third Edition is renowned for its thoroughness and readability. This well-organized and completely up-to-date text remains the most comprehensive treatment of neural

networks from an engineering perspective. This is ideal for professional engineers and research scientists. Matlab codes used for the computer experiments in the text are available for download at: http://www.pearsonhighered.com/haykin/ Refocused, revised and renamed to reflect the duality of neural networks and learning machines, this edition recognizes that the subject matter is richer when these topics are studied together. Ideas drawn from neural networks and machine learning are hybridized to perform improved learning tasks beyond the capability of either independently.

Neural networks are a computing paradigm that is finding increasing attention among computer scientists. In this book, theoretical laws and models previously scattered in the literature are brought together into a general theory of artificial neural nets. Always with a view to biology and starting with the simplest nets, it is shown how the properties of models change when more general computing elements and net topologies are introduced. Each chapter contains examples, numerous illustrations, and a bibliography. The book is aimed at readers who seek an overview of the field or who wish to deepen their knowledge. It is suitable as a basis for university courses in neurocomputing.

Deep learning neural networks have become easy to define and fit, but are still hard to configure. Discover exactly how to improve the performance of deep learning neural network models on your predictive modeling projects. With clear explanations, standard Python libraries, and step-by-step tutorial lessons, you'll discover how to better train your models, reduce overfitting, and make more accurate predictions.

Semi-empirical Neural Network Modeling presents a new approach on how to quickly construct an accurate, multilayered neural network solution of differential equations. Current neural network methods have significant disadvantages, including a lengthy learning process and single-layered neural networks built on the finite element method (FEM). The strength of the new method presented in this book is the automatic inclusion of task parameters in the final solution formula, which eliminates the need for repeated problem-solving. This is especially important for constructing individual models with unique features. The book illustrates key concepts through a large number of specific problems, both hypothetical models and practical interest. Offers a new approach to neural networks using a unified simulation model at all stages of design and operation Illustrates this new approach with numerous concrete examples throughout the book Presents the methodology in separate and clearly-defined stages

This book introduces a variety of neural network methods for solving differential equations arising in science and engineering. The emphasis is placed on a deep understanding of the neural network techniques, which has been presented in a mostly heuristic and intuitive manner. This approach will enable the reader to understand the working, efficiency and shortcomings of each neural network technique for solving differential equations. The objective of this book is to provide the reader with a sound understanding of the foundations of neural networks and a comprehensive introduction to neural network methods for solving differential equations together with recent developments in the techniques and their applications. The book comprises four major sections. Section I consists of a brief overview of differential equations and the relevant physical problems arising in science and engineering. Section II illustrates the history of neural networks starting from their beginnings in the 1940s through to the renewed interest of the 1980s. A general introduction to neural networks and learning technologies is presented in Section III. This section also includes the description of the multilayer perceptron and its learning methods. In Section IV, the different neural network methods for solving differential equations are introduced, including discussion of the most recent developments in the field. Advanced students and researchers in mathematics, computer science and various disciplines in science and engineering will find this book a valuable reference source.

An introduction to a broad range of topics in deep learning, covering mathematical and conceptual background, deep learning techniques used in industry, and research perspectives. "Written by three experts in the field, Deep Learning is the only comprehensive book on the subject." —Elon Musk, cochair of OpenAI; cofounder and CEO of Tesla and SpaceX Deep learning is a form of machine learning that enables computers to learn from experience and understand the world in terms of a hierarchy of concepts. Because the computer gathers knowledge from experience, there is no need for a human computer operator to formally specify all the knowledge that the computer needs. The hierarchy of concepts allows the computer to learn complicated concepts by building them out of simpler ones; a graph of these hierarchies would be many layers deep. This book introduces a broad range of topics in deep learning. The text offers mathematical and conceptual background, covering relevant concepts in linear algebra, probability theory and information theory, numerical computation, and machine learning. It describes deep learning techniques used by practitioners in industry, including deep feedforward networks, regularization, optimization algorithms, convolutional networks, sequence modeling, and practical methodology; and it surveys such applications as natural language processing, speech recognition, computer vision, online recommendation systems, bioinformatics, and videogames. Finally, the book offers research perspectives, covering such theoretical topics as linear factor models, autoencoders, representation learning, structured probabilistic models, Monte Carlo methods, the partition function, approximate inference, and deep generative models. Deep Learning can be used by undergraduate or graduate students planning careers in either industry or research, and by software engineers who want to begin using deep learning in their products or platforms. A website offers supplementary material for both readers and instructors.

Power system computing with neural networks is one of the fastest growing fields in the history of power system engineering. Since 1988, a considerable amount of work has been done in investigating computing capabilities of neural networks and understanding their relevance to providing efficient solutions for outstanding complex problems of the electric power industry. A principal objective of a power utility is to provide electric energy to its customers in a secure, reliable and economic manner. Toward this aim, utility personnel are engaged in a variety of activities in areas of supervisory control and monitoring, evaluation of operating conditions, operation planning and scheduling, system development, equipment testing, etc. Over the past decades significant advances have been made in the development of

new concepts, design of hardware and software systems, and implementation of solid-state devices which all contributed to the steadily improving power system performance that we are experiencing today. Advanced information processing technologies played an important role in these development efforts. Members of the Special Interest Group for Power Engineering of the INNS recognized the need for bringing together leading researchers in the field of neurocomputing with experts from power utilities and manufacturing companies to assess the current state of affairs and to explore the directions of further research and practice. This book is based on The Summer Workshop on Neural Network Computing for the Electric Power Industry which brought together approximately forty specialists with backgrounds in power engineering, system operation and planning, neural network theory and AI systems design. An informal and highly inspiring atmosphere of the workshop facilitated open discussion and exchange of expertise between the participants.
As book review editor of the IEEE Transactions on Neural Networks, Mohamad Hassoun has had the opportunity to assess the multitude of books on artificial neural networks that have appeared in recent years. Now, in Fundamentals of Artificial Neural Networks, he provides the first systematic account of artificial neural network paradigms by identifying clearly the fundamental concepts and major methodologies underlying most of the current theory and practice employed by neural network researchers. Such a systematic and unified treatment, although sadly lacking in most recent texts on neural networks, makes the subject more accessible to students and practitioners. Here, important results are integrated in order to more fully explain a wide range of existing empirical observations and commonly used heuristics. There are numerous illustrative examples, over 200 end-of-chapter analytical and computer-based problems that will aid in the development of neural network analysis and design skills, and a bibliography of nearly 700 references. Proceeding in a clear and logical fashion, the first two chapters present the basic building blocks and concepts of artificial neural networks and analyze the computational capabilities of the basic network architectures involved. Supervised, reinforcement, and unsupervised learning rules in simple nets are brought together in a common framework in chapter three. The convergence and solution properties of these learning rules are then treated mathematically in chapter four, using the "average learning equation" analysis approach. This organization of material makes it natural to switch into learning multilayer nets using backprop and its variants, described in chapter five. Chapter six covers most of the major neural network paradigms, while associative memories and energy minimizing nets are given detailed coverage in the next chapter. The final chapter takes up Boltzmann machines and Boltzmann learning along with other global search/optimization algorithms such as stochastic gradient search, simulated annealing, and genetic algorithms.
Feed-Forward Neural Networks: Vector Decomposition Analysis, Modelling and Analog Implementation presents a novel method for the mathematical analysis of neural networks that learn according to the back-propagation algorithm. The book also discusses some other recent alternative algorithms for hardware implemented perception-like neural networks. The method permits a simple analysis of the learning behaviour of neural networks, allowing specifications for their building blocks to be readily obtained. Starting with the derivation of a specification and ending with its hardware implementation, analog hard-wired, feed-forward neural networks with on-chip back-propagation learning are designed in their entirety. On-chip learning is necessary in circumstances where fixed weight configurations cannot be used. It is also useful for the elimination of most mis-matches and parameter tolerances that occur in hard-wired neural network chips. Fully analog neural networks have several advantages over other implementations: low chip area, low power consumption, and high speed operation. Feed-Forward Neural Networks is an excellent source of reference and may be used as a text for advanced courses.
People are facing more and more NP-complete or NP-hard problems of a combinatorial nature and of a continuous nature in economic, military and management practice. There are two ways in which one can enhance the efficiency of searching for the solutions of these problems. The first is to improve the speed and memory capacity of hardware. We all have witnessed the computer industry's amazing achievements with hardware and software developments over the last twenty years. On one hand many computers, bought only a few years ago, are being sent to elementary schools for children to learn the ABC's of computing. On the other hand, with economic, scientific and military developments, it seems that the increase of intricacy and the size of newly arising problems have no end. We all realize then that the second way, to design good algorithms, will definitely compensate for the hardware limitations in the case of complicated problems. It is the collective and parallel computation property of artificial neural net works that has activated the enthusiasm of researchers in the field of computer science and applied mathematics. It is hard to say that artificial neural networks are solvers of the above-mentioned dilemma, but at least they throw some new light on the difficulties we face. We not only anticipate that there will be neural computers with intelligence but we also believe that the research results of artificial neural networks might lead to new algorithms on von Neumann's computers.
The two volume set, LNCS 9886 + 9887, constitutes the proceedings of the 25th International Conference on Artificial Neural Networks, ICANN 2016, held in Barcelona, Spain, in September 2016. The 121 full papers included in this volume were carefully reviewed and selected from 227 submissions. They were organized in topical sections named: from neurons to networks; networks and dynamics; higher nervous functions; neuronal hardware; learning foundations; deep learning; classifications and forecasting; and recognition and navigation. There are 47 short paper abstracts that are included in the back matter of the volume.
The analysis and experimental results in this paper lead to the conclusion that many network training problems are ill-conditioned and may not be solved more efficiently by higher order optimization methods. While our analyses are for completely connected networks, they extend to networks with sparse connectivity as well. Our results suggest that neural networks can have considerable redundancy in parameterizing the function space in a neighborhood of a local minimum, independently of whether or not the solution has a small residual.
Learning process - Correlation matrix memory - The perceptron - Least-mean-square algorithm - Multilayer perceptrons - Radial-basic function networks - Recurrent networks rooted in statistical physics - Self-organizing systems I : hebbian learning - Self-organizing systems II : competitive learning - Self-organizing systems III : information-theoretic models - Modular networks - Temporal processing - Neurodynamics - VLSI implementations of neural networks.
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.