

Neural Networks And Back Propagation Algorithm

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Long Short-Term Memory Networks With Python
- Jason Brownlee 2017-07-20

The Long Short-Term Memory network, or LSTM for short, is a type of recurrent neural network that achieves state-of-the-art results on challenging prediction problems. In this laser-focused Ebook, finally cut through the math, research papers and patchwork descriptions about LSTMs. Using clear explanations, standard Python libraries and step-by-step tutorial lessons you will discover what LSTMs are, and how to develop a suite of LSTM models to get the most out of the method on your sequence prediction problems.

Machine Learning Algorithms From Scratch with Python - Jason Brownlee 2016-11-16

You must understand algorithms to get good at machine learning. The problem is that they are only ever explained using Math. No longer. In this Ebook, finally cut through the math and learn exactly how machine learning algorithms work. Using clear explanations, simple pure Python code (no libraries!) and step-by-step tutorials you will discover how to load and prepare data, evaluate model skill, and implement a suite of linear, nonlinear and ensemble machine learning algorithms from scratch.

Neural Network Projects with Python - James Loy 2019-02-28

Build your Machine Learning portfolio by

creating 6 cutting-edge Artificial Intelligence projects using neural networks in Python Key FeaturesDiscover neural network architectures (like CNN and LSTM) that are driving recent advancements in AIBuild expert neural networks in Python using popular libraries such as KerasIncludes projects such as object detection, face identification, sentiment analysis, and moreBook Description Neural networks are at the core of recent AI advances, providing some of the best resolutions to many real-world problems, including image recognition, medical diagnosis, text analysis, and more. This book goes through some basic neural network and deep learning concepts, as well as some popular libraries in Python for implementing them. It contains practical demonstrations of neural networks in domains such as fare prediction, image classification, sentiment analysis, and more. In each case, the book provides a problem statement, the specific neural network architecture required to tackle that problem, the reasoning behind the algorithm used, and the associated Python code to implement the solution from scratch. In the process, you will gain hands-on experience with using popular Python libraries such as Keras to build and train your own neural networks from scratch. By the end of this book, you will have mastered the different neural network architectures and created cutting-edge AI projects in Python that

will immediately strengthen your machine learning portfolio. What you will learnLearn various neural network architectures and its advancements in AIMaster deep learning in Python by building and training neural networkMaster neural networks for regression and classificationDiscover convolutional neural networks for image recognitionLearn sentiment analysis on textual data using Long Short-Term MemoryBuild and train a highly accurate facial recognition security systemWho this book is for This book is a perfect match for data scientists, machine learning engineers, and deep learning enthusiasts who wish to create practical neural network projects in Python. Readers should already have some basic knowledge of machine learning and neural networks.

Research Anthology on Artificial Neural Network Applications - Management

Association, Information Resources 2021-07-16 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.

Artificial Neural Networks - ICANN 2007 -

Joaquim Marques de Sá 2007-09-14

This book is the first of a two-volume set that constitutes the refereed proceedings of the 17th

International Conference on Artificial Neural Networks, ICANN 2007, held in Porto, Portugal, September 2007. Coverage includes advances in neural network learning methods, advances in neural network architectures, neural dynamics and complex systems, data analysis, evolutionary computing, agents learning, as well as temporal synchronization and nonlinear dynamics in neural networks.

Backpropagation - Yves Chauvin 2013-02-01

Composed of three sections, this book presents the most popular training algorithm for neural networks: backpropagation. The first section presents the theory and principles behind backpropagation as seen from different perspectives such as statistics, machine learning, and dynamical systems. The second presents a number of network architectures that may be designed to match the general concepts of Parallel Distributed Processing with backpropagation learning. Finally, the third section shows how these principles can be applied to a number of different fields related to the cognitive sciences, including control, speech recognition, robotics, image processing, and cognitive psychology. The volume is designed to provide both a solid theoretical foundation and a set of examples that show the versatility of the concepts. Useful to experts in the field, it should also be most helpful to students seeking to understand the basic principles of connectionist learning and to engineers wanting to add neural networks in general -- and backpropagation in particular -- to their set of problem-solving methods.

An Introduction to Neural Networks - Kevin Gurney 2018-10-08

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.

Applications of Evolutionary Computing - Mario Giacobini 2009-04-02

This book constitutes the refereed joint proceedings of eleven European workshops on the Theory and Applications of Evolutionary Computation, EvoWorkshops 2009, held in Tübingen, Germany, in April 2009 within the scope of the EvoStar 2009 event. The 68 revised full papers and 23 revised short papers presented were carefully reviewed and selected from a total of 143 submissions. With respect to the eleven workshops covered, the papers are organized in topical sections on telecommunication networks and other parallel and distributed systems, environmental issues, finance and economics, games, design automation, image analysis and signal processing, interactive evolution and humanized computational intelligence, music, sound, art and design, continuous parameter optimisation, stochastic and dynamic environments, as well as transportation and logistics.

Backpropagation - Yves Chauvin (Ph. D.) 1995
Composed of three sections, this book presents the most popular training algorithm for neural networks: backpropagation. The first section presents the theory and principles behind backpropagation as seen from different perspectives such as statistics, machine learning, and dynamical systems. The second presents a number of network architectures that may be designed to match the general concepts of Parallel Distributed Processing with backpropagation learning. Finally, the third section shows how these principles can be applied to a number of different fields related to the cognitive sciences, including control, speech recognition, robotics, image processing, and cognitive psychology. The volume is designed to provide both a solid theoretical foundation and a

set of examples that show the versatility of the concepts. Useful to experts in the field, it should also be most helpful to students seeking to understand the basic principles of connectionist learning and to engineers wanting to add neural networks in general -- and backpropagation in particular -- to their set of problem-solving methods.

Spike-timing dependent plasticity - Henry Markram

Hebb's postulate provided a crucial framework to understand synaptic alterations underlying learning and memory. Hebb's theory proposed that neurons that fire together, also wire together, which provided the logical framework for the strengthening of synapses. Weakening of synapses was however addressed by "not being strengthened", and it was only later that the active decrease of synaptic strength was introduced through the discovery of long-term depression caused by low frequency stimulation of the presynaptic neuron. In 1994, it was found that the precise relative timing of pre and postsynaptic spikes determined not only the magnitude, but also the direction of synaptic alterations when two neurons are active together. Neurons that fire together may therefore not necessarily wire together if the precise timing of the spikes involved are not tightly correlated. In the subsequent 15 years, Spike Timing Dependent Plasticity (STDP) has been found in multiple brain regions and in many different species. The size and shape of the time windows in which positive and negative changes can be made vary for different brain regions, but the core principle of spike timing dependent changes remain. A large number of theoretical studies have also been conducted during this period that explore the computational function of this driving principle and STDP algorithms have become the main learning algorithm when modeling neural networks. This Research Topic will bring together all the key experimental and theoretical research on STDP.

Feed-Forward Neural Networks - Anne-Johan Annema 1995-05-31

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.

Recognition of ECG Arrhythmia - Ankita Mittal 2013

Neural network have impressively demonstrated the capability of modeling spatial information. On the other hand, the application of parallel distributed models to processing of temporal data has been restricted in several places. Here in this research work the technique that is being used, adds the dimensions of time to the well known Back-Propagation neural network algorithm. In space time neural network, the synaptic weights between two artificial neurons are replaced with an adaptable - adjustable filter. Instead of single synaptic weight, it provides a plurality of weights, which represents not only association but also temporal dependencies. Now the synaptic weights of the neural network are the coefficients of the adaptable digital filter, which gives a neural network that is defined both spatially and temporally. This network is a Time-Delayed neural network and is also known as Elman network. In this present book, an attempt is made to design a Spatio-Temporal artificial neural network which is used to classify arrhythmia. In this book a neural network is developed using back propagation algorithm and

is tested for the classification of arrhythmia.
Knowledge and Systems Engineering - Viet-Ha Nguyen 2014-09-29

This volume contains papers presented at the Sixth International Conference on Knowledge and Systems Engineering (KSE 2014), which was held in Hanoi, Vietnam, during 9-11 October, 2014. The conference was organized by the University of Engineering and Technology, Vietnam National University, Hanoi. Besides the main track of contributed papers, this proceedings feature the results of four special sessions focusing on specific topics of interest and three invited keynote speeches. The book gathers a total of 51 carefully reviewed papers describing recent advances and development on various topics including knowledge discovery and data mining, natural language processing, expert systems, intelligent decision making, computational biology, computational modeling, optimization algorithms, and industrial applications.

R: Mining spatial, text, web, and social media data - Bater Makhabel 2017-06-19

Create data mining algorithms About This Book Develop a strong strategy to solve predictive modeling problems using the most popular data mining algorithms Real-world case studies will take you from novice to intermediate to apply data mining techniques Deploy cutting-edge sentiment analysis techniques to real-world social media data using R Who This Book Is For This Learning Path is for R developers who are looking to making a career in data analysis or data mining. Those who come across data mining problems of different complexities from web, text, numerical, political, and social media domains will find all information in this single learning path. What You Will Learn Discover how to manipulate data in R Get to know top classification algorithms written in R Explore solutions written in R based on R Hadoop projects Apply data management skills in handling large data sets Acquire knowledge about neural network concepts and their applications in data mining Create predictive models for classification, prediction, and recommendation Use various libraries on R CRAN for data mining Discover more about data potential, the pitfalls, and inferencial gotchas Gain an insight into the concepts of supervised

and unsupervised learning Delve into exploratory data analysis Understand the minute details of sentiment analysis In Detail Data mining is the first step to understanding data and making sense of heaps of data. Properly mined data forms the basis of all data analysis and computing performed on it. This learning path will take you from the very basics of data mining to advanced data mining techniques, and will end up with a specialized branch of data mining—social media mining. You will learn how to manipulate data with R using code snippets and how to mine frequent patterns, association, and correlation while working with R programs. You will discover how to write code for various predication models, stream data, and time-series data. You will also be introduced to solutions written in R based on R Hadoop projects. Now that you are comfortable with data mining with R, you will move on to implementing your knowledge with the help of end-to-end data mining projects. You will learn how to apply different mining concepts to various statistical and data applications in a wide range of fields. At this stage, you will be able to complete complex data mining cases and handle any issues you might encounter during projects. After this, you will gain hands-on experience of generating insights from social media data. You will get detailed instructions on how to obtain, process, and analyze a variety of socially-generated data while providing a theoretical background to accurately interpret your findings. You will be shown R code and examples of data that can be used as a springboard as you get the chance to undertake your own analyses of business, social, or political data. This Learning Path combines some of the best that Packt has to offer in one complete, curated package. It includes content from the following Packt products: Learning Data Mining with R by Bater Makhabel R Data Mining Blueprints by Pradeepta Mishra Social Media Mining with R by Nathan Danneman and Richard Heimann Style and approach A complete package with which will take you from the basics of data mining to advanced data mining techniques, and will end up with a specialized branch of data mining—social media mining.

Applied Optimal Control - A. E. Bryson
2018-05-04

This best-selling text focuses on the analysis and design of complicated dynamics systems. CHOICE called it "a high-level, concise book that could well be used as a reference by engineers, applied mathematicians, and undergraduates. The format is good, the presentation clear, the diagrams instructive, the examples and problems helpful...References and a multiple-choice examination are included.

Artificial Intelligence - David L. Poole
2017-09-25

Artificial Intelligence presents a practical guide to AI, including agents, machine learning and problem-solving simple and complex domains.

Reinventing Discovery - Michael Nielsen
2020-04-07

"Reinventing Discovery argues that we are in the early days of the most dramatic change in how science is done in more than 300 years. This change is being driven by new online tools, which are transforming and radically accelerating scientific discovery"--

Intelligent Systems - Bogdan M. Wilamowski
2018-10-03

The Industrial Electronics Handbook, Second Edition combines traditional and newer, more specialized knowledge that will help industrial electronics engineers develop practical solutions for the design and implementation of high-power applications. Embracing the broad technological scope of the field, this collection explores fundamental areas, including analog and digital circuits, electronics, electromagnetic machines, signal processing, and industrial control and communications systems. It also facilitates the use of intelligent systems—such as neural networks, fuzzy systems, and evolutionary methods—in terms of a hierarchical structure that makes factory control and supervision more efficient by addressing the needs of all production components. Enhancing its value, this fully updated collection presents research and global trends as published in the IEEE Transactions on Industrial Electronics Journal, one of the largest and most respected publications in the field. As intelligent systems continue to replace and sometimes outperform human intelligence in decision-making processes, they have made substantial contributions to the solution of very complex problems. As a result, the field of computational

intelligence has branched out in several directions. For instance, artificial neural networks can learn how to classify patterns, such as images or sequences of events, and effectively model complex nonlinear systems. Simple and easy to implement, fuzzy systems can be applied to successful modeling and system control. Illustrating how these and other tools help engineers model nonlinear system behavior, determine and evaluate system parameters, and ensure overall system control, Intelligent Systems: Addresses various aspects of neural networks and fuzzy systems Focuses on system optimization, covering new techniques such as evolutionary methods, swarm, and ant colony optimizations Discusses several applications that deal with methods of computational intelligence Other volumes in the set: Fundamentals of Industrial Electronics Power Electronics and Motor Drives Control and Mechatronics Industrial Communication Systems *Neural Networks with R* - Giuseppe Ciaburro 2017-09-27

Uncover the power of artificial neural networks by implementing them through R code. About This Book Develop a strong background in neural networks with R, to implement them in your applications Build smart systems using the power of deep learning Real-world case studies to illustrate the power of neural network models Who This Book Is For This book is intended for anyone who has a statistical background with knowledge in R and wants to work with neural networks to get better results from complex data. If you are interested in artificial intelligence and deep learning and you want to level up, then this book is what you need! What You Will Learn Set up R packages for neural networks and deep learning Understand the core concepts of artificial neural networks Understand neurons, perceptrons, bias, weights, and activation functions Implement supervised and unsupervised machine learning in R for neural networks Predict and classify data automatically using neural networks Evaluate and fine-tune the models you build. In Detail Neural networks are one of the most fascinating machine learning models for solving complex computational problems efficiently. Neural networks are used to solve wide range of problems in different areas of AI and machine

learning. This book explains the niche aspects of neural networking and provides you with foundation to get started with advanced topics. The book begins with neural network design using the neural net package, then you'll build a solid foundation knowledge of how a neural network learns from data, and the principles behind it. This book covers various types of neural network including recurrent neural networks and convoluted neural networks. You will not only learn how to train neural networks, but will also explore generalization of these networks. Later we will delve into combining different neural network models and work with the real-world use cases. By the end of this book, you will learn to implement neural network models in your applications with the help of practical examples in the book. Style and approach A step-by-step guide filled with real-world practical examples.

From Natural to Artificial Neural Computation - International Workshop on Artificial Neural Networks 1995-05-24

This volume presents the proceedings of the International Workshop on Artificial Neural Networks, IWANN '95, held in Torremolinos near Malaga, Spain in June 1995. The book contains 143 revised papers selected from a wealth of submissions and five invited contributions; it covers all current aspects of neural computation and presents the state of the art of ANN research and applications. The papers are organized in sections on neuroscience, computational models of neurons and neural nets, organization principles, learning, cognitive science and AI, neurosimulators, implementation, neural networks for perception, and neural networks for communication and control.

Deep Learning with TensorFlow 2 and Keras - Antonio Gulli 2019-12-27

Build machine and deep learning systems with the newly released TensorFlow 2 and Keras for the lab, production, and mobile devices Key FeaturesIntroduces and then uses TensorFlow 2 and Keras right from the startTeaches key machine and deep learning techniquesUnderstand the fundamentals of deep learning and machine learning through clear explanations and extensive code samplesBook Description Deep Learning with TensorFlow 2

and Keras, Second Edition teaches neural networks and deep learning techniques alongside TensorFlow (TF) and Keras. You'll learn how to write deep learning applications in the most powerful, popular, and scalable machine learning stack available. TensorFlow is the machine learning library of choice for professional applications, while Keras offers a simple and powerful Python API for accessing TensorFlow. TensorFlow 2 provides full Keras integration, making advanced machine learning easier and more convenient than ever before. This book also introduces neural networks with TensorFlow, runs through the main applications (regression, ConvNets (CNNs), GANs, RNNs, NLP), covers two working example apps, and then dives into TF in production, TF mobile, and using TensorFlow with AutoML. What you will learn

Build machine learning and deep learning systems with TensorFlow 2 and the Keras API

Use Regression analysis, the most popular approach to machine learning

Understand ConvNets (convolutional neural networks) and how they are essential for deep learning systems such as image classifiers

Use GANs (generative adversarial networks) to create new data that fits with existing patterns

Discover RNNs (recurrent neural networks) that can process sequences of input intelligently, using one part of a sequence to correctly interpret another

Apply deep learning to natural human language and interpret natural language texts to produce an appropriate response

Train your models on the cloud and put TF to work in real environments

Explore how Google tools can automate simple ML workflows without the need for complex modeling

Who this book is for

This book is for Python developers and data scientists who want to build machine learning and deep learning systems with TensorFlow. This book gives you the theory and practice required to use Keras, TensorFlow 2, and AutoML to build machine learning systems. Some knowledge of machine learning is expected.

Recent Advances in Computer Science and Information Engineering - Zhihong Qian
2012-01-25

CSIE 2011 is an international scientific Congress for distinguished scholars engaged in scientific, engineering and technological research, dedicated to build a platform for exploring and

discussing the future of Computer Science and Information Engineering with existing and potential application scenarios. The congress has been held twice, in Los Angeles, USA for the first and in Changchun, China for the second time, each of which attracted a large number of researchers from all over the world. The congress turns out to develop a spirit of cooperation that leads to new friendship for addressing a wide variety of ongoing problems in this vibrant area of technology and fostering more collaboration over the world. The congress, CSIE 2011, received 2483 full paper and abstract submissions from 27 countries and regions over the world. Through a rigorous peer review process, all submissions were refereed based on their quality of content, level of innovation, significance, originality and legibility. 688 papers have been accepted for the international congress proceedings ultimately.

[Introduction to Deep Learning and Neural Networks with Python™](#) - Ahmed Fawzy Gad
2020-12-07

[Introduction to Deep Learning and Neural Networks with Python™: A Practical Guide](#) is an intensive step-by-step guide for neuroscientists to fully understand, practice, and build neural networks. Providing math and Python™ code examples to clarify neural network calculations, by book's end readers will fully understand how neural networks work starting from the simplest model $Y=X$ and building from scratch. Details and explanations are provided on how a generic gradient descent algorithm works based on mathematical and Python™ examples, teaching you how to use the gradient descent algorithm to manually perform all calculations in both the forward and backward passes of training a neural network. Examines the practical side of deep learning and neural networks Provides a problem-based approach to building artificial neural networks using real data Describes Python™ functions and features for neuroscientists Uses a careful tutorial approach to describe implementation of neural networks in Python™ Features math and code examples (via companion website) with helpful instructions for easy implementation

[Artificial Intelligence with Python](#) - Prateek Joshi
2017-01-27

Build real-world Artificial Intelligence

applications with Python to intelligently interact with the world around you About This Book Step into the amazing world of intelligent apps using this comprehensive guide Enter the world of Artificial Intelligence, explore it, and create your own applications Work through simple yet insightful examples that will get you up and running with Artificial Intelligence in no time Who This Book Is For This book is for Python developers who want to build real-world Artificial Intelligence applications. This book is friendly to Python beginners, but being familiar with Python would be useful to play around with the code. It will also be useful for experienced Python programmers who are looking to use Artificial Intelligence techniques in their existing technology stacks. What You Will Learn Realize different classification and regression techniques Understand the concept of clustering and how to use it to automatically segment data See how to build an intelligent recommender system Understand logic programming and how to use it Build automatic speech recognition systems Understand the basics of heuristic search and genetic programming Develop games using Artificial Intelligence Learn how reinforcement learning works Discover how to build intelligent applications centered on images, text, and time series data See how to use deep learning algorithms and build applications based on it In Detail Artificial Intelligence is becoming increasingly relevant in the modern world where everything is driven by technology and data. It is used extensively across many fields such as search engines, image recognition, robotics, finance, and so on. We will explore various real-world scenarios in this book and you'll learn about various algorithms that can be used to build Artificial Intelligence applications. During the course of this book, you will find out how to make informed decisions about what algorithms to use in a given context. Starting from the basics of Artificial Intelligence, you will learn how to develop various building blocks using different data mining techniques. You will see how to implement different algorithms to get the best possible results, and will understand how to apply them to real-world scenarios. If you want to add an intelligence layer to any application that's based on images, text, stock market, or

some other form of data, this exciting book on Artificial Intelligence will definitely be your guide! Style and approach This highly practical book will show you how to implement Artificial Intelligence. The book provides multiple examples enabling you to create smart applications to meet the needs of your organization. In every chapter, we explain an algorithm, implement it, and then build a smart application.

Learning Deep Architectures for AI - Yoshua Bengio 2009

Theoretical results suggest that in order to learn the kind of complicated functions that can represent high-level abstractions (e.g. in vision, language, and other AI-level tasks), one may need deep architectures. Deep architectures are composed of multiple levels of non-linear operations, such as in neural nets with many hidden layers or in complicated propositional formulae re-using many sub-formulae. Searching the parameter space of deep architectures is a difficult task, but learning algorithms such as those for Deep Belief Networks have recently been proposed to tackle this problem with notable success, beating the state-of-the-art in certain areas. This paper discusses the motivations and principles regarding learning algorithms for deep architectures, in particular those exploiting as building blocks unsupervised learning of single-layer models such as Restricted Boltzmann Machines, used to construct deeper models such as Deep Belief Networks.

Practical Computer Vision Applications Using Deep Learning with CNNs - Ahmed Fawzy Gad 2018-12-05

Deploy deep learning applications into production across multiple platforms. You will work on computer vision applications that use the convolutional neural network (CNN) deep learning model and Python. This book starts by explaining the traditional machine-learning pipeline, where you will analyze an image dataset. Along the way you will cover artificial neural networks (ANNs), building one from scratch in Python, before optimizing it using genetic algorithms. For automating the process, the book highlights the limitations of traditional hand-crafted features for computer vision and why the CNN deep-learning model is the state-

of-art solution. CNNs are discussed from scratch to demonstrate how they are different and more efficient than the fully connected ANN (FCNN). You will implement a CNN in Python to give you a full understanding of the model. After consolidating the basics, you will use TensorFlow to build a practical image-recognition model that you will deploy to a web server using Flask, making it accessible over the Internet. Using Kivy and NumPy, you will create cross-platform data science applications with low overheads. This book will help you apply deep learning and computer vision concepts from scratch, step-by-step from conception to production. What You Will Learn Understand how ANNs and CNNs work Create computer vision applications and CNNs from scratch using Python Follow a deep learning project from conception to production using TensorFlow Use NumPy with Kivy to build cross-platform data science applications Who This Book Is For Data scientists, machine learning and deep learning engineers, software developers.

Neural Networks - Raul Rojas 2013-06-29

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.

An Introduction to Neural Networks - Kevin Gurney 1997-08-05

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.

Computer Information Systems and Industrial Management - Khalid Saeed 2016-09-08

This book constitutes the proceedings of the 15th IFIP TC8 International Conference on Computer Information Systems and Industrial Management, CISIM 2016, held in Vilnius, Lithuania, in September 2016. The 63 regular papers presented together with 1 invited paper and 5 keynotes in this volume were carefully reviewed and selected from about 89 submissions. The main topics covered are rough set methods for big data analytics; images, visualization, classification; optimization, tuning; scheduling in manufacturing and other applications; algorithms; decisions; intelligent distributed systems; and biometrics, identification, security.

Neural Networks: Tricks of the Trade - Grégoire Montavon 2012-11-14

The twenty last years have been marked by an increase in available data and computing power. In parallel to this trend, the focus of neural network research and the practice of training neural networks has undergone a number of important changes, for example, use of deep learning machines. The second edition of the book augments the first edition with more tricks, which have resulted from 14 years of theory and experimentation by some of the world's most prominent neural network researchers. These tricks can make a substantial difference (in terms of speed, ease of implementation, and accuracy) when it comes to putting algorithms to work on real problems.

[Deep Learning for Computer Vision](#) -

Rajalingappaa Shanmugamani 2018-01-23

Learn how to model and train advanced neural networks to implement a variety of Computer Vision tasks

Key Features

- Train different kinds of deep learning model from scratch to solve specific problems in Computer Vision
- Combine the power of Python, Keras, and TensorFlow to build deep learning models for object detection, image classification, similarity learning, image captioning, and more
- Includes tips on optimizing and improving the performance of your models under various constraints

Book Description

Deep learning has shown its power in several application areas of Artificial Intelligence, especially in Computer Vision. Computer Vision is the science of understanding and manipulating images, and finds enormous applications in the areas of robotics, automation, and so on. This book will also show you, with practical examples, how to develop Computer Vision applications by leveraging the power of deep learning. In this book, you will learn different techniques related to object classification, object detection, image segmentation, captioning, image generation, face analysis, and more. You will also explore their applications using popular Python libraries such as TensorFlow and Keras. This book will help you master state-of-the-art, deep learning algorithms and their implementation. What you will learn

- Set up an environment for deep learning with Python, TensorFlow, and Keras
- Define and train a model for image and video classification
- Use features from a pre-trained Convolutional Neural Network model for image retrieval
- Understand and implement object detection using the real-world Pedestrian Detection scenario
- Learn about various problems in image captioning and how to overcome them by training images and text together
- Implement similarity matching and train a model for face recognition
- Understand the concept of generative models and use them for image generation
- Deploy your deep learning models and optimize them for high performance

Who this book is for

This book is targeted at data scientists and Computer Vision practitioners who wish to apply the concepts of Deep Learning to overcome any problem related to Computer Vision. A basic knowledge of programming in Python—and some understanding of machine learning concepts—is

required to get the best out of this book.

Management Intelligent Systems - Jorge Casillas
2013-11-18

This symposium was born as a research forum to present and discuss original, rigorous and significant contributions on Artificial Intelligence-based (AI) solutions—with a strong, practical logic and, preferably, with empirical applications—developed to aid the management of organizations in multiple areas, activities, processes and problem-solving; what we call Management Intelligent Systems (MiS). This volume presents the proceedings of these activities in a collection of contributions with many original approaches. They address diverse Management and Business areas of application such as decision support, segmentation of markets, CRM, product design, service personalization, organizational design, e-commerce, credit scoring, workplace integration, innovation management, business database analysis, workflow management, location of stores, etc. A wide variety of AI techniques have been applied to these areas such as multi-objective optimization and evolutionary algorithms, classification algorithms, ant algorithms, fuzzy rule-based systems, intelligent agents, Web mining, neural networks, Bayesian models, data warehousing, rough sets, etc. This volume also includes a track focused on the latest research on Intelligent Systems and Technology Enhanced Learning (iTEL), as well as its impacts for learners and institutions. It aims at bringing together researchers and developers from both the professional and the academic realms to present, discuss and debate the latest advances on intelligent systems and technology-enhanced learning. The symposium was organized by the Soft Computing and Intelligent Information Systems Research Group (<http://sci2s.ugr.es>) of the University of Granada (Spain) and the Bioinformatics, Intelligent System and Educational Technology Research Group (<http://bisite.usal.es/>) of the University of Salamanca (Spain). The present edition was held in Salamanca (Spain) on May 22–24, 2013.

Prediction of Burnout - Felix Ladstätter 2008-05

This Study about burnout in nurses takes a different approach than all prior empirical work on this topic given that nonlinear relationships

between job stressors, personal factors and the three burnout dimensions are investigated using artificial neural networks, a type of computer simulation that is especially well suited to capturing nonlinearities in data. The burnout process is related to organizational, personal, interpersonal, social, and cultural variables and these relationships are not exclusively linear. Due to this nonlinearity, hierarchical stepwise multiple regression or other linear statistical methods, may perhaps not be the most suitable method to analyze the data effectively. Compounding the dilemma is that multiple linear regression returns no direct indicator with regard to whether the data is best portrayed linearly. In standard least squares linear regression, the model has to be specified previously and assumptions have to be made concerning the underlying relationship between independent variables and dependent variables. Since by default, the relationship is often assumed to be linear, the regression line can be erroneous even though the error of the fit can be small. Artificial neural networks do not have these limitations with nonlinearities and are therefore predestined for the analysis of nonlinear relationships. This study is a complex research of burnout that includes socio-demographic characteristics, job stressors, and hardy personality. Typically, studies on burnout have investigated primarily the effects of organizational factors. Recently, authors revealed and confirmed the important effects of personality variables on the burnout process. The objective of developing an instrument to predict burnout (NuBuNet abbreviation for Nursing Burnout Network) in nurses is accomplished by using two different types of artificial neural networks: A three-layer feed-forward network with the gradient decent back-propagation training algorithm and a radial basis function network with two different training algorithms: the pseudo inverse algorithm and a hybrid algorithm. The implementation of the artificial neural networks used in this study is carried out in a MATLAB development environment. Instead of writing each artificial neural network as a stand-alone program, an object-oriented programming style is chosen to include all functions into one single system. Three artificial neural networks are implemented in the

technical part of this study. A self-organizing map, a three-layer back-propagation network, and a radial basis function network. Whereas the self-organizing map is only used in the data preparation process, the back-propagation network and the radial basis function network is used in the burnout model approximation. After an exhaustive training and simulation session including more than 150 networks and an analysis of all results, the network with the best results is chosen to be compared to the hierarchical stepwise multiple regression. The network paradigms are better suited for the analysis of burnout than hierarchical stepwise multiple regression. Both can capture nonlinear relationships that are relevant for theory development. At predicting the three burnout sub-dimensions emotional exhaustion, depersonalization, and lack of personal accomplishment however, the radial basis function network is slightly better than the three-layer feed-forward network.

TensorFlow for Deep Learning - Bharath Ramsundar 2018-03-01

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
Artificial Intelligence - Michael Negnevitsky 2005

Keeping the maths to a minimum, Negnevitsky explains the principles of AI, demonstrates how systems are built, what they are useful for and how to choose the right tool for the job.

Information Technology and Mobile Communication - Vinu V Das 2011-04-13

This book constitutes the refereed proceedings of the International Conference on Advances in Information Technology and Mobile Communication, AIM 2011, held at Nagpur, India, in April 2011. The 31 revised full papers presented together with 27 short papers and 34 poster papers were carefully reviewed and selected from 313 submissions. The papers cover all current issues in theory, practices, and applications of Information Technology, Computer and Mobile Communication Technology and related topics.

The Nature of Code - Daniel Shiffman 2012

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.

Generative Adversarial Networks Projects - Kailash Ahirwar 2019-01-31

Explore various Generative Adversarial Network architectures using the Python ecosystem Key

Features Use different datasets to build advanced projects in the Generative Adversarial Network domain Implement projects ranging from generating 3D shapes to a face aging application Explore the power of GANs to contribute in open source research and projects Book Description Generative Adversarial Networks (GANs) have the potential to build next-generation models, as they can mimic any distribution of data. Major research and development work is being undertaken in this field since it is one of the rapidly growing areas of machine learning. This book will test unsupervised techniques for training neural networks as you build seven end-to-end projects in the GAN domain. Generative Adversarial Network Projects begins by covering the concepts, tools, and libraries that you will use to build efficient projects. You will also use a variety of datasets for the different projects covered in the book. The level of complexity of the operations required increases with every chapter, helping you get to grips with using GANs. You will cover popular approaches such as 3D-GAN, DCGAN, StackGAN, and CycleGAN, and you'll gain an understanding of the architecture and functioning of generative models through their practical implementation. By the end of this book, you will be ready to build, train, and optimize your own end-to-end GAN models at work or in your own projects. What you will learn Train a network on the 3D ShapeNet dataset to generate realistic shapes Generate anime characters using the Keras implementation of DCGAN Implement an SRGAN network to generate high-resolution images Train Age-cGAN on Wiki-Cropped images to improve face verification Use Conditional GANs for image-to-image translation Understand the generator and discriminator implementations of StackGAN in Keras Who this book is for If you're a data scientist, machine learning developer, deep learning practitioner, or AI enthusiast looking for a project guide to test your knowledge and expertise in building real-world GANs models, this book is for you.

Better Deep Learning - Jason Brownlee 2018-12-13
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. Neural Networks for Complete Beginners - Mark Smart 2017-02-23

This book is an exploration of an artificial neural network. It has been created to suit even the complete beginners to artificial neural networks. The first part of the book is an overview of artificial neural networks so as to help the reader understand what they are. You will also learn the relationship between the neurons which make up the human brain and the artificial neurons. Artificial neural networks embrace the concept of learning which is

common in human beings. This book guides you to understand how learning takes place in artificial neural networks. The back-propagation algorithm, which is used for training artificial neural networks, is discussed. The book also guides you through the architecture of an artificial neural network. The various types of artificial neural networks based on their architecture are also discussed. The book guides you on the necessary steps for one to build a neural network. The perception, which is a type of an artificial neural network, is explored, and you will explore how to implement one programmatically. The following topics are discussed in this book: -What is a Neural Network? -Learning in Neural Networks -The Architecture of Neural Networks -Building Neural Networks -The Perceptron