

Deep Convolutional Neural Network Based Approach For

Guide to Convolutional Neural Networks [Practical Convolutional Neural Networks](#) [Practical Convolutional Neural Networks](#) [A Guide to Convolutional Neural Networks for Computer Vision Learning](#) [TensorFlow Hands-On Convolutional Neural Networks with TensorFlow](#) [Advanced Applied Deep Learning](#) [Convolutional Neural Networks in Visual Computing](#) [Artificial Neural Networks and Machine Learning -- ICANN 2014](#) [Tree-Based Convolutional Neural Networks](#) [Deep Learning and Convolutional Neural Networks for Medical Image Computing](#) [Interpretable Machine Learning](#) [Hands-On Convolutional Neural Networks with TensorFlow](#) [Deep Learning and Convolutional Neural Networks for Medical Imaging and Clinical Informatics](#) [Convolutional Neural Networks with Swift for TensorFlow](#) [DEEP LEARNING AND CONVOLUTIONAL NEURAL NETWORKS. MATLAB APPLICATIONS](#) [Neural Networks and Deep Learning](#) [Deep Learning Applications in Medical Imaging](#) [Deep Learning and Convolutional Neural Networks for Medical Imaging and Clinical Informatics](#) [Deep Learning for Computer Vision](#) [Applied Deep Learning](#) [Convolutional Neural Networks in Python](#) [Convolutional Neural Networks for Medical Image Processing Applications](#) [Deep Learning](#) [Deep Learning with Keras](#) [MATLAB Deep Learning](#) [Rough Sets and Knowledge Technology](#) [The Architecture of Convnets and Data Processing](#) [Advantages of Convolutional Neural Networks Supervised Machine Learning for Text Analysis in R](#) [Hands-On Neural Network Programming with C#](#) [Research Anthology on Artificial Neural Network Applications](#) [Deep Convolutional Neural Network for The Prognosis of Diabetic Retinopathy](#) [Design and Implementation of a Convolutional Neural Network Using Tensor-train Decomposition](#) [Java Deep Learning Cookbook](#) [Progress in Pattern Recognition, Image Analysis, Computer Vision, and Applications](#) [Deep Learning in Computer Vision](#) [Face Image Analysis with Convolutional Neural Networks](#) [Machine Learning and Deep Learning in Real-Time Applications](#) [Robot Intelligence Technology and Applications](#) [3 Hunting Convolutional Neural Networks](#)

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Applied Deep Learning Feb 13 2021 Work with advanced topics in deep learning, such as optimization algorithms, hyper-parameter tuning, dropout, and error analysis as well as strategies to address typical problems encountered when training deep neural networks. You'll begin by studying the activation functions mostly with a single neuron (ReLU, sigmoid, and Swish), seeing how to perform linear and logistic regression using TensorFlow, and choosing the right cost function. The next section talks about more complicated neural network architectures with several layers and neurons and explores the problem of random initialization of weights. An entire chapter is dedicated to a complete overview of neural network error analysis, giving examples of solving problems originating from variance, bias, overfitting, and datasets coming from different distributions. Applied Deep Learning also discusses how to implement logistic regression completely from scratch without using any Python library except NumPy, to let you appreciate how libraries such as TensorFlow allow quick and efficient experiments. Case studies for each method are included to put into practice all theoretical information. You'll discover tips and tricks for writing optimized Python code (for example vectorizing loops with NumPy). What You Will Learn Implement advanced techniques in the right way in Python and TensorFlow Debug and optimize advanced methods (such as dropout and regularization) Carry out error analysis (to realize if one has a bias problem, a variance problem, a data offset problem, and so on) Set up a machine learning project focused on deep learning on a complex dataset Who This Book Is For Readers with a medium understanding of machine learning, linear algebra, calculus, and basic Python programming.

Deep Learning in Computer Vision Oct 31 2019 Deep learning algorithms have brought a revolution to the computer vision community by introducing non-traditional and efficient solutions to several image-related problems that had long remained unsolved or partially addressed. This book presents a collection of eleven chapters where each individual chapter explains the deep learning principles of a specific topic, introduces reviews of up-to-date techniques, and presents research findings to the computer vision community. The book covers a broad scope of topics in deep learning concepts and applications such as accelerating the convolutional neural network inference on field-programmable gate arrays, fire detection in surveillance applications, face recognition, action and activity recognition, semantic segmentation for autonomous driving, aerial imagery registration, robot vision, tumor detection, and skin lesion segmentation as well as skin melanoma classification. The content of this book has been organized such that each chapter can be read independently from the others. The book is a valuable companion for researchers, for postgraduate and possibly senior undergraduate students who are taking an advanced course in related topics, and for those who are interested in deep learning with applications in computer vision, image processing, and pattern recognition.

Convolutional Neural Networks for Medical Image Processing Applications Dec 14 2020 The rise in living standards increases the expectation of people in almost every field. At the forefront is health. Over the past few centuries, there have been major developments in healthcare. Medical device technology and developments in artificial intelligence (AI) are among the most important ones. The improving technology and our ability to harness the technology effectively by means such as AI have led to unprecedented advances, resulting in early diagnosis of diseases. AI algorithms enable the fast and early evaluation of images from medical devices to maximize the benefits. While developments in the field of AI were quickly adapted to the field of health, in some cases this contributed to the formation of innovative artificial intelligence algorithms. Today, the most effective artificial intelligence method is accepted as deep learning. Convolutional neural network (CNN) architectures are deep learning algorithms used for image processing. This book contains applications of CNN methods. The content is quite extensive, including the application of different CNN methods to various medical image processing problems. Readers will be able to analyze the effects of CNN methods presented in the book in medical applications.

Artificial Neural Networks and Machine Learning -- ICANN 2014 Feb 25 2022 The book constitutes the proceedings of the 24th International Conference on Artificial Neural Networks, ICANN 2014, held in Hamburg, Germany, in September 2014. The 107 papers included in the proceedings were carefully reviewed and selected from 173 submissions. The focus of the papers is on following topics: recurrent networks; competitive learning and self-organization; clustering and classification; trees and graphs; human-machine interaction; deep networks; theory; reinforcement learning and action; vision; supervised learning; dynamical models and time series; neuroscience; and applications.

Deep Learning and Convolutional Neural Networks for Medical Image Computing Dec 26 2021 This book presents a detailed review of the state of the art in deep learning approaches for semantic object detection and segmentation in medical image computing, and large-scale radiology database mining. A particular focus is placed on the application of convolutional neural networks, with the theory supported by practical examples. Features: highlights how the use of deep neural networks can address new questions and protocols, as well as improve upon existing challenges in medical image computing; discusses the insightful research experience of Dr. Ronald M. Summers; presents a comprehensive review of the latest research and literature; describes a range of different methods that make use of deep learning for object or landmark detection tasks in 2D and 3D medical imaging; examines a varied selection of techniques for semantic segmentation using deep learning principles in medical imaging; introduces a novel approach to interleaved text and image deep mining on a large-scale radiology image database.

Guide to Convolutional Neural Networks Nov 05 2022 This must-read text/reference introduces the fundamental concepts of convolutional neural networks (ConvNets), offering practical guidance on using libraries to implement ConvNets in applications of traffic sign detection and classification. The work presents techniques for optimizing the computational efficiency of ConvNets, as well as visualization techniques to better understand the underlying processes. The proposed models are also thoroughly evaluated from different perspectives, using exploratory and quantitative analysis. Topics and features: explains the fundamental concepts behind training linear classifiers and feature learning; discusses the wide range of loss functions for training binary and multi-class classifiers; illustrates how to derive ConvNets from fully connected neural networks, and reviews different techniques for evaluating neural networks; presents a practical library for implementing ConvNets, explaining how to use a Python interface for the library to create and assess neural networks; describes two real-world examples of the detection and classification of traffic signs using deep learning methods; examines a range of varied techniques for visualizing neural networks, using a Python interface; provides self-study exercises at the end of each chapter, in addition to a helpful glossary, with relevant Python scripts supplied at an associated website. This self-contained guide will benefit those who seek to both understand the theory behind deep learning, and to gain hands-on experience in implementing ConvNets in practice. As no prior background knowledge in the field is required to follow the material, the book is ideal for all students of computer vision and machine learning, and will also be of great interest to practitioners working on autonomous cars and advanced driver assistance systems.

Progress in Pattern Recognition, Image Analysis, Computer Vision, and Applications Dec 02 2019 This book constitutes the refereed proceedings of the 19th Iberoamerican Congress on Pattern Recognition, CIARP 2014, held in Puerto Vallarta, Jalisco, Mexico, in November 2014. The 115 papers presented were carefully reviewed and selected from 160 submissions. The papers are organized in topical sections on image coding, processing and analysis; segmentation, analysis of shape and texture; analysis of signal, speech and language; document processing and recognition; feature extraction, clustering and classification; pattern recognition and machine learning; neural networks for pattern recognition; computer vision and robot vision; video segmentation and tracking.

Learning TensorFlow Jul 01 2022 Roughly inspired by the human brain, deep neural networks trained with large amounts of data can solve complex tasks with unprecedented accuracy. This practical book provides an end-to-end guide to TensorFlow, the leading open source software library that helps you build and train neural networks for computer vision, natural language processing (NLP), speech recognition, and general predictive analytics. Authors Tom Hope, Yehzekel Resheff, and Itay Lieder provide a hands-on approach to TensorFlow fundamentals for a broad technical audience—from data scientists and engineers to students and researchers. You'll begin by working through some basic examples in TensorFlow before diving deeper into topics such as neural network architectures, TensorBoard visualization, TensorFlow abstraction libraries, and multithreaded input pipelines. Once you finish this book, you'll know how to build and deploy production-ready deep learning systems in TensorFlow. Get up and running with TensorFlow, rapidly and painlessly Learn how to use TensorFlow to build deep learning models from the ground up Train popular deep learning models for computer vision and NLP Use extensive abstraction libraries to make development easier and faster Learn how to scale TensorFlow, and use clusters to distribute model training Deploy TensorFlow in a production setting

DEEP LEARNING AND CONVOLUTIONAL NEURAL NETWORKS. MATLAB APPLICATIONS Jul 21 2021 Deep Learning (translated as deep learning) is a subset of machine learning based on artificial neural networks. The process of this learning is called deep because this network structure consists of having multiple inputs, outputs and hidden layers. Each layer contains units that transform the input data into information, and in this way, the next layer can use it for a certain predictive task. In this way, a machine can learn through its own data processing. MATLAB has the tool Neural Network Toolbox (Deep Learning toolbox from release 18) that provides algorithms, functions, and apps to create, train, visualize, and simulate neural networks. You can perform classification, regression, clustering, dimensionality reduction, time-series forecasting, and dynamic system modeling and control. The toolbox includes convolutional neural network and autoencoder deep learning algorithms for image classification and feature learning tasks. To speed up training of large data sets, you can distribute computations and data across multicore processors, GPUs, and computer clusters using Parallel Computing Toolbox.

Research Anthology on Artificial Neural Network Applications Apr 05 2020 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.

Robot Intelligence Technology and Applications 3 Jul 29 2019 This book covers all aspects of robot intelligence from perception at sensor level and reasoning at cognitive level to behavior planning at execution level for each low level segment of the machine. It also presents the technologies for cognitive reasoning, social interaction with humans, behavior generation, ability to cooperate with other robots, ambience awareness, and an artificial genome that can be passed on to other robots. These technologies are to materialize cognitive intelligence, social intelligence, behavioral intelligence, collective intelligence, ambient intelligence and genetic intelligence. The book aims at serving researchers and practitioners with a timely dissemination of the recent progress on robot intelligence technology and its applications, based on a collection of papers presented at the 3rd International Conference on Robot Intelligence Technology and Applications (RITA), held in Beijing, China, November 6 - 8, 2014. For better readability, this edition has the total 74 papers grouped into 3 chapters: Chapter I: Ambient, Behavioral, Cognitive, Collective, and Social Robot Intelligence, Chapter II: Computational Intelligence and Intelligent Design for Advanced Robotics, Chapter III: Applications of Robot Intelligence Technology, where individual chapters, edited respectively by Peter Sincak, Hyun Myung, Jun Jo along with Weimin Yang and Jong-Hwan Kim, begin with a brief introduction written by the respective chapter editors.

Hands-On Neural Network Programming with C# May 07 2020 Create and unleash the power of neural networks by implementing C# and .Net code Key FeaturesGet a strong foundation of neural networks with access to various machine learning and deep learning librariesReal-world case studies illustrating various neural network techniques and architectures used by practitionersCutting-edge coverage of Deep Networks, optimization algorithms, convolutional networks, autoencoders and many moreBook Description Neural networks have made a surprise comeback in the last few years and have brought tremendous innovation in the world of artificial intelligence. The goal of this book is to provide C# programmers with practical guidance in solving complex computational challenges using neural networks and C# libraries such as CNTK, and TensorFlowSharp. This book will take you on a step-by-step practical journey, covering everything from the mathematical and theoretical aspects of neural networks, to building your own deep neural networks into your applications with the C# and .NET frameworks. This book begins by giving you a quick refresher of neural networks. You will learn how to build a neural network from scratch using packages such as Encog, AForge, and Accord. You will learn about various concepts and techniques, such as deep networks, perceptrons, optimization algorithms, convolutional networks, and autoencoders. You will learn ways to add intelligent features to your .NET apps, such as facial and motion detection, object detection and labeling, language understanding, knowledge, and intelligent search. Throughout this book, you will be working on interesting demonstrations that will make it easier to implement complex neural networks in your enterprise applications. What you will learnUnderstand perceptrons and how to implement them in C#Learn how to train and visualize a neural network using cognitive servicesPerform image recognition for detecting and labeling objects using C# and TensorFlowSharpDetect specific image characteristics such as a face using Accord.NetDemonstrate particle swarm optimization using a simple XOR problem and EncogTrain convolutional neural networks using ConvNetSharpFind optimal parameters for your neural network functions using numeric and heuristic optimization techniques.Who this book is for This book is for Machine Learning Engineers, Data Scientists, Deep Learning Aspirants and Data Analysts who are now looking to move into advanced machine learning and deep learning with C#. Prior knowledge of machine learning and working experience with C# programming is required to take most out of this book

Deep Learning Applications in Medical Imaging May 19 2021 Before the modern age of medicine, the chance of surviving a terminal disease such as cancer was minimal at best. After embracing the age of computer-aided medical analysis technologies, however, detecting and preventing individuals from contracting a variety of life-threatening diseases has led to a greater survival percentage and increased the development of algorithmic technologies in healthcare. Deep Learning Applications in Medical Imaging is a pivotal reference source that provides vital research on the application of generating pictorial depictions of the interior of a body for medical intervention and clinical analysis. While highlighting topics such as artificial neural networks, disease prediction, and healthcare analysis, this publication explores image acquisition and pattern recognition as well as the methods of treatment and care. This book is ideally designed for diagnosticians, medical imaging specialists, healthcare professionals, physicians, medical researchers, academicians, and students.

Deep Learning and Convolutional Neural Networks for Medical Imaging and Clinical Informatics Apr 17 2021 This book reviews the state of the art in deep learning approaches to high-performance robust disease detection, robust and accurate organ segmentation in medical image computing (radiological and pathological imaging modalities), and the construction and mining of large-scale radiology databases. It particularly focuses on the application of convolutional neural networks, and on recurrent neural networks like LSTM, using numerous practical examples to complement the theory. The book's chief features are as follows: It highlights how deep neural networks can be used to address new questions and protocols, and to tackle current challenges in medical image computing; presents a comprehensive review of the latest research and literature; and describes a range of different methods that employ deep learning for object or landmark detection tasks in 2D and 3D medical imaging. In addition, the book examines a broad selection of techniques for semantic segmentation using deep learning principles in medical imaging; introduces a novel approach to text and image deep embedding for a large-scale chest x-ray image

database; and discusses how deep learning relational graphs can be used to organize a sizable collection of radiology findings from real clinical practice, allowing semantic similarity-based retrieval. The intended reader of this edited book is a professional engineer, scientist or a graduate student who is able to comprehend general concepts of image processing, computer vision and medical image analysis. They can apply computer science and mathematical principles into problem solving practices. It may be necessary to have a certain level of familiarity with a number of more advanced subjects: image formation and enhancement, image understanding, visual recognition in medical applications, statistical learning, deep neural networks, structured prediction and image segmentation.

Deep Convolutional Neural Network for The Prognosis of Diabetic Retinopathy Mar 05 2020

Convolutional Neural Networks in Visual Computing Mar 29 2022 This book covers the fundamentals in designing and deploying techniques using deep architectures. It is intended to serve as a beginner's guide to engineers or students who want to have a quick start on learning and/or building deep learning systems. This book provides a good theoretical and practical understanding and a complete toolkit of basic information and knowledge required to understand and build convolutional neural networks (CNN) from scratch. The book focuses explicitly on convolutional neural networks, filtering out other material that co-occur in many deep learning books on CNN topics.

Supervised Machine Learning for Text Analysis in R Jun 07 2020 Text data is important for many domains, from healthcare to marketing to the digital humanities, but specialized approaches are necessary to create features for machine learning from language. Supervised Machine Learning for Text Analysis in R explains how to preprocess text data for modeling, train models, and evaluate model performance using tools from the tidyverse and tidymodels ecosystem. Models like these can be used to make predictions for new observations, to understand what natural language features or characteristics contribute to differences in the output, and more. If you are already familiar with the basics of predictive modeling, use the comprehensive, detailed examples in this book to extend your skills to the domain of natural language processing. This book provides practical guidance and directly applicable knowledge for data scientists and analysts who want to integrate unstructured text data into their modeling pipelines. Learn how to use text data for both regression and classification tasks, and how to apply more straightforward algorithms like regularized regression or support vector machines as well as deep learning approaches. Natural language must be dramatically transformed to be ready for computation, so we explore typical text preprocessing and feature engineering steps like tokenization and word embeddings from the ground up. These steps influence model results in ways we can measure, both in terms of model metrics and other tangible consequences such as how fair or appropriate model results are.

Interpretable Machine Learning Nov 24 2021 This book is about making machine learning models and their decisions interpretable. After exploring the concepts of interpretability, you will learn about simple, interpretable models such as decision trees, decision rules and linear regression. Later chapters focus on general model-agnostic methods for interpreting black box models like feature importance and accumulated local effects and explaining individual predictions with Shapley values and LIME. All interpretation methods are explained in depth and discussed critically. How do they work under the hood? What are their strengths and weaknesses? How can their outputs be interpreted? This book will enable you to select and correctly apply the interpretation method that is most suitable for your machine learning project.

Practical Convolutional Neural Networks Oct 04 2022 This book helps you master CNN, from the basics to the most advanced concepts in CNN such as GANs, instance classification and attention mechanism for vision models and more. You will implement advanced CNN models using complex image and video datasets. By the end of the book you will learn CNN's best practices to implement smart ConvNet ...

Convolutional Neural Networks with Swift for TensorFlow Aug 22 2021 Dive into and apply practical machine learning and dataset categorization techniques while learning TensorFlow and deep learning. This book uses convolutional neural networks to do image recognition all in the familiar and easy to work with Swift language. It begins with a basic machine learning overview and then ramps up to neural networks and convolutions and how they work. Using Swift and TensorFlow, you'll perform data augmentation, build and train large networks, and build networks for mobile devices. You'll also cover cloud training and the network you build can categorize greyscale data, such as mnist, to large scale modern approaches that can categorize large datasets, such as imagenet. Convolutional Neural Networks with Swift for TensorFlow uses a simple approach that adds progressive layers of complexity until you have arrived at the current state of the art for this field. What You'll Learn Categorize and augment datasets Build and train large networks, including via cloud solutions Deploy complex systems to mobile devices Who This Book Is For Developers with Swift programming experience who would like to learn convolutional neural networks by example using Swift for TensorFlow as a starting point.

A Guide to Convolutional Neural Networks for Computer Vision Aug 02 2022 Computer vision has become increasingly important and effective in recent years due to its wide-ranging applications in areas as diverse as smart surveillance and monitoring, health and medicine, sports and recreation, robotics, drones, and self-driving cars. Visual recognition tasks, such as image classification, localization, and detection, are the core building blocks of many of these applications, and recent developments in Convolutional Neural Networks (CNNs) have led to outstanding performance in these state-of-the-art visual recognition tasks and systems. As a result, CNNs now form the crux of deep learning algorithms in computer vision. This self-contained guide will benefit those who seek to both understand the theory behind CNNs and to gain hands-on experience on the application of CNNs in computer vision. It provides a comprehensive introduction to CNNs starting with the essential concepts behind neural networks: training, regularization, and optimization of CNNs. The book also discusses a wide range of loss functions, network layers, and popular CNN architectures, reviews the different techniques for the evaluation of CNNs, and presents some popular CNN tools and libraries that are commonly used in computer vision. Further, this text describes and discusses case studies that are related to the application of CNN in computer vision, including image classification, object detection, semantic segmentation, scene understanding, and image generation. This book is ideal for undergraduate and graduate students, as no prior background knowledge in the field is required to follow the material, as well as new researchers, developers, engineers, and practitioners who are interested in gaining a quick understanding of CNN models.

Deep Learning Nov 12 2020 Deep Learning - 2 BOOK BUNDLE!! Deep Learning with Keras This book will introduce you to various supervised and unsupervised deep learning algorithms like the multilayer perceptron, linear regression and other more advanced deep convolutional and recurrent neural networks. You will also learn about image processing, handwritten recognition, object recognition and much more. Furthermore, you will get familiar with recurrent neural networks like LSTM and GAN as you explore processing sequence data like time series, text, and audio. The book will definitely be your best companion on this great deep learning journey with Keras introducing you to the basics you need to know in order to take next steps and learn more advanced deep neural networks. Here is a Preview of What You'll Learn Here... The difference between deep learning and machine learning Deep neural networks Convolutional neural networks Building deep learning models with Keras Multi-layer perceptron network models Activation functions Handwritten recognition using MNIST Solving multi-class classification problems Recurrent neural networks and sequence classification And much more... Convolutional Neural Networks in Python This book covers the basics behind Convolutional Neural Networks by introducing you to this complex world of deep learning and artificial neural networks in a simple and easy to understand way. It is perfect for any beginner out there looking forward to learning more about this machine learning field. This book is all about how to use convolutional neural networks for various image, object and other common classification problems in Python. Here, we also take a deeper look into various Keras layer used for building CNNs we take a look at different activation functions and much more, which will eventually lead you to creating highly accurate models able of performing great task results on various image classification, object classification and other problems. Therefore, at the end of the book, you will have a better insight into this world, thus you will be more than prepared to deal with more complex and challenging tasks on your own. Here is a Preview of What You'll Learn In This Book... Convolutional neural networks structure How convolutional neural networks actually work Convolutional neural networks applications The importance of convolution operator Different convolutional neural networks layers and their importance Arrangement of spatial parameters How and when to use stride and zero-padding Method of parameter sharing Matrix multiplication and its importance Pooling and dense layers Introducing non-linearity relu activation function How to train your convolutional neural network models using backpropagation How and why to apply dropout CNN model training process How to build a convolutional neural network Generating predictions and calculating loss functions How to train and evaluate your MNIST classifier How to build a simple image classification CNN And much, much more! Get this book bundle NOW and SAVE money!

MATLAB Deep Learning Sep 10 2020 Get started with MATLAB for deep learning and AI with this in-depth primer. In this book, you start with machine learning fundamentals, then move on to neural networks, deep learning, and then convolutional neural networks. In a blend of fundamentals and applications, MATLAB Deep Learning shows MATLAB as the underlying programming language and tool for the examples and case studies in this book. With this book, you'll be able to tackle some of today's real world big data, smart bots, and other complex data problems. You'll see how deep learning is a complex and more intelligent aspect of machine learning for modern smart data analysis and usage. What You'll Learn Use MATLAB for deep learning Discover neural networks and multi-layer neural networks Work with convolution and pooling layers Build a MNIST example with these layers Who This Book Is For Those who want to learn deep learning using MATLAB. Some MATLAB experience may be useful.

The Architecture of Convnets and Data Processing. Advantages of Convolutional Neural Networks Jul 09 2020 Essay from the year 2020 in the subject Mathematics - Miscellaneous, grade: 1.3, University of Ulm, language: English, abstract: In the past two decades in particular, artificial neural networks have led to new approaches and processes in machine learning in many areas. They have replaced many existing processes. In some areas, they even exceed human performance. Impressive progress has been made in the area of image recognition and classification. Above all, this includes the introduction of convolutional neural networks (ConvNets). They belong to the class of neural networks. The first ConvNet was developed by LeCun et al. in 1989. ConvNets were especially developed to enhance image processing. Therefore, they provide a unique architecture. Due to their structure and functionality, ConvNets are particularly well suited within this field of application compared to other methods.

Deep Learning with Keras Oct 12 2020 Get to grips with the basics of Keras to implement fast and efficient deep-learning models About This Book Implement various deep-learning algorithms in Keras and see how deep-learning can be used in games See how various deep-learning models and practical use-cases can be implemented using Keras A practical, hands-on guide with real-world examples to give you a strong foundation in Keras Who This Book Is For If you are a data scientist with experience in machine learning or an AI programmer with some exposure to neural networks, you will find this book a useful entry point to deep-learning with Keras. A knowledge of Python is required for this book. What You Will Learn Optimize step-by-step functions on a large neural network using the Backpropagation Algorithm Fine-tune a neural network to improve the quality of results Use deep learning for image and audio processing Use Recursive Neural Tensor Networks (RNTNs) to outperform standard word embedding in special cases Identify problems for which Recurrent Neural Network (RNN) solutions are suitable Explore the process required to implement Autoencoders Evolve a deep neural network using reinforcement learning In Detail This book starts by introducing you to supervised learning algorithms such as simple linear regression, the classical multilayer perceptron and more sophisticated deep convolutional networks. You will also explore image processing with recognition of hand written digit images, classification of images into different categories, and advanced objects recognition with related image annotations. An example of identification of salient points for face detection is also provided. Next you will be introduced to Recurrent Networks, which are optimized for processing sequence data such as text, audio or time series. Following that, you will learn about unsupervised learning algorithms such as Autoencoders and the very popular Generative Adversarial Networks (GAN). You will also explore non-traditional uses of neural networks as Style Transfer. Finally, you will look at Reinforcement Learning and its application to AI game playing, another popular direction of research and application of neural networks. Style and approach This book is an easy-to-follow guide full of examples and real-world applications to help you gain an in-depth understanding of Keras. This book will showcase more than twenty working Deep Neural Networks coded in Python using Keras.

Hands-On Convolutional Neural Networks with TensorFlow Oct 24 2021 Learn how to apply TensorFlow to a wide range of deep learning and Machine Learning problems with this practical guide on training CNNs for image classification, image recognition, object detection and many computer vision challenges. Key Features Learn the fundamentals of Convolutional Neural Networks Harness Python and TensorFlow to train CNNs Build scalable deep learning models that can process millions of items Book Description Convolutional Neural Networks (CNN) are one of the most popular architectures used in computer vision apps. This book is an introduction to CNNs through solving real-world problems in deep learning while teaching you their implementation in popular Python library - TensorFlow. By the end of the book, you will be training CNNs in no time! We start with an overview of popular machine learning and deep learning models, and then get you set up with a TensorFlow development environment. This environment is the basis for implementing and training deep learning models in later chapters. Then, you will use Convolutional Neural Networks to work on problems such as image classification, object detection, and semantic segmentation. After that, you will use transfer learning to see how these models can solve other deep learning problems. You will also get a taste of implementing generative models such as autoencoders and generative adversarial networks. Later on, you will see useful tips on machine learning best practices and troubleshooting. Finally, you will learn how to apply your models on large datasets of millions of images. What you will learn Train machine learning models with TensorFlow Create systems that can evolve and scale during their life cycle Use CNNs in image recognition and classification Use TensorFlow for building deep learning models Train popular deep learning models Fine-tune a neural network to improve the quality of results with transfer learning Build TensorFlow models that can scale to large datasets and systems Who this book is for This book is for Software Engineers, Data Scientists, or Machine Learning practitioners who want to use CNNs for solving real-world problems. Knowledge of basic machine learning concepts, linear algebra and Python will help.

Deep Learning for Computer Vision Mar 17 2021 Step-by-step tutorials on deep learning neural networks for computer vision in python with Keras.

Practical Convolutional Neural Networks Sep 03 2022 One stop guide to implementing award-winning, and cutting-edge CNN architectures Key Features Fast-paced guide with use cases and real-world examples to get well versed with CNN techniques Implement CNN models on image classification, transfer learning, Object Detection, Instance Segmentation, GANs and more Implement powerful use-cases like image captioning, reinforcement learning for hard attention, and recurrent attention models Book Description Convolutional Neural Network (CNN) is revolutionizing several application domains such as visual recognition systems, self-driving cars, medical discoveries, innovative eCommerce and more. You will learn to create innovative solutions around image and video analytics to solve complex machine learning and computer vision related problems and implement real-life CNN models. This book starts with an overview of deep neural networks with the example of image classification and walks you through building your first CNN for human face detector. We will learn to use concepts like transfer learning with CNN, and Auto-Encoders to build very powerful models, even when not much of supervised training data of labeled images is available. Later we build upon the learning achieved to build advanced vision related algorithms for object detection, instance segmentation, generative adversarial networks, image captioning, attention mechanisms for vision, and recurrent models for vision. By the end of this book, you should be ready to implement advanced, effective and efficient CNN models at your professional project or personal initiatives by working on complex image and video datasets. What you will learn From CNN basic building blocks to advanced concepts understand practical areas they can be applied to Build an image classifier CNN model to understand how different components interact with each other, and then learn how to optimize it Learn different algorithms that can be applied to Object Detection, and Instance Segmentation Learn advanced concepts like attention mechanisms for CNN to improve prediction accuracy Understand transfer learning and implement award-winning CNN architectures like AlexNet, VGG, GoogLeNet, ResNet and more Understand the working of generative adversarial networks and how it can create new, unseen images Who this book is for This book is for data scientists, machine learning and deep learning practitioners. Cognitive and Artificial Intelligence enthusiasts who want to move one step further in building Convolutional Neural Networks. Get hands-on experience with extreme datasets and different CNN architectures to build efficient and smart ConvNet models. Basic knowledge of deep learning concepts and Python programming language is expected.

Java Deep Learning Cookbook Jan 03 2020 Use Java and Deeplearning4j to build robust, scalable, and highly accurate AI models from scratch Key Features Install and configure Deeplearning4j to implement deep learning models from scratch Explore recipes for developing, training, and fine-tuning your neural network models in Java Model neural networks using datasets containing images, text, and time-series data Book Description Java is one of the most widely used programming languages in the world. With this book, you will see how to perform deep learning using Deeplearning4j (DL4J) – the most popular Java library for training neural networks efficiently. This book starts by showing you how to install and configure Java and DL4J on your system. You will then gain insights into deep learning basics and use your knowledge to create a deep neural network for binary classification from scratch. As you progress, you will discover how to build a convolutional neural network (CNN) in DL4J, and understand how to construct numeric vectors from text. This deep learning book will also guide you through performing anomaly detection on unsupervised data and help you set up neural networks in distributed systems effectively. In addition to this, you will learn how to import models from Keras and change the configuration in a pre-trained DL4J model. Finally, you will explore benchmarking in DL4J and optimize neural networks for optimal results. By the end of this book, you will have a clear understanding of how you can use DL4J to build robust deep learning applications in Java. What you will learn Perform data normalization and wrangling using DL4J Build deep neural networks using DL4J Implement CNNs to solve image classification problems Train autoencoders to solve anomaly detection problems using DL4J Perform benchmarking and optimization to improve your model's performance Implement reinforcement learning for real-world use cases using RL4J Leverage the capabilities of DL4J in distributed systems Who this book is for This book is for a data scientist, machine learning developer, or a deep learning enthusiast who wants to implement deep learning models in Java, this book is for you. Basic understanding of Java programming as well as some experience with machine learning and neural networks is required to get the most out of this book.

Advanced Applied Deep Learning Apr 29 2022 Develop and optimize deep learning models with advanced architectures. This book teaches you the intricate details and subtleties of the algorithms that are at the core of convolutional neural networks. In Advanced Applied Deep Learning, you will study advanced topics on CNN and object detection using Keras and TensorFlow. Along the way, you will look at the fundamental operations in CNN, such as convolution and pooling, and then look at more advanced architectures such as inception networks, resnets, and many more. While the book discusses theoretical topics, you will discover how to work efficiently with Keras with many tricks and tips, including how to customize logging in Keras with custom callback classes, what is eager execution, and how to use it in your models. Finally, you will study how object detection works, and build a complete implementation of the YOLO (you only look once) algorithm in Keras and TensorFlow. By the end of the book you will have implemented various models in Keras and learned many advanced tricks that will bring your skills to the next level. What You Will Learn See how convolutional neural networks and object detection work Save weights and models on disk Pause training and restart it at a later stage Use hardware acceleration (GPUs) in your code Work with the Dataset TensorFlow abstraction and use pre-trained models and transfer learning Remove and add layers to pre-trained networks to adapt them to your specific project Apply pre-trained models such as Alexnet and VGG16 to new datasets Who This Book Is For Scientists and researchers with intermediate-to-advanced Python and machine learning know-how. Additionally, intermediate knowledge of Keras and TensorFlow is expected.

Machine Learning and Deep Learning in Real-Time Applications Aug 29 2019 Artificial intelligence and its various components are rapidly engulfing almost every professional industry. Specific features of AI that have proven to be vital solutions

to numerous real-world issues are machine learning and deep learning. These intelligent agents unlock higher levels of performance and efficiency, creating a wide span of industrial applications. However, there is a lack of research on the specific uses of machine/deep learning in the professional realm. Machine Learning and Deep Learning in Real-Time Applications provides emerging research exploring the theoretical and practical aspects of machine learning and deep learning and their implementations as well as their ability to solve real-world problems within several professional disciplines including healthcare, business, and computer science. Featuring coverage on a broad range of topics such as image processing, medical improvements, and smart grids, this book is ideally designed for researchers, academicians, scientists, industry experts, scholars, IT professionals, engineers, and students seeking current research on the multifaceted uses and implementations of machine learning and deep learning across the globe.

Convolutional Neural Networks in Python Jan 15 2021 Convolutional Neural Networks in Python This book covers the basics behind Convolutional Neural Networks by introducing you to this complex world of deep learning and artificial neural networks in a simple and easy to understand way. It is perfect for any beginner out there looking forward to learning more about this machine learning field. This book is all about how to use convolutional neural networks for various image, object and other common classification problems in Python. Here, we also take a deeper look into various Keras layer used for building CNNs we take a look at different activation functions and much more, which will eventually lead you to creating highly accurate models able of performing great task results on various image classification, object classification and other problems. Therefore, at the end of the book, you will have a better insight into this world, thus you will be more than prepared to deal with more complex and challenging tasks on your own. Here Is a Preview of What You'll Learn In This Book... Convolutional neural networks structure How convolutional neural networks actually work Convolutional neural networks applications The importance of convolution operator Different convolutional neural networks layers and their importance Arrangement of spatial parameters How and when to use stride and zero-padding Method of parameter sharing Matrix multiplication and its importance Pooling and dense layers Introducing non-linearity relu activation function How to train your convolutional neural network models using backpropagation How and why to apply dropout CNN model training process How to build a convolutional neural network Generating predictions and calculating loss functions How to train and evaluate your MNIST classifier How to build a simple image classification CNN And much, much more!

Hunting Convolutional Neural Networks Jun 27 2019 This book deals with one of the hot topic in artificial intelligence, Computer vision which has grown a lot in recent years due to what is known as Convolution Neural Networks. Which will be discussed throughout the book. The book assumes that you are familiar with the traditional neural networks and with prior experience in python programming.Skills You will learn: -Convolution Neural Networks-Creating a dataset from scratch-Tensorflow-Keras-Fastai-Resnets-Neural Style Transfer

Rough Sets and Knowledge Technology Aug 10 2020 This book constitutes the thoroughly refereed conference proceedings of the 9th International Conference on Rough Sets and Knowledge Technology, RSKT 2014, held in Shanghai, China, in October 2014. The 70 papers presented were carefully reviewed and selected from 162 submissions. The papers in this volume cover topics such as foundations and generalizations of rough sets, attribute reduction and feature selection, applications of rough sets, intelligent systems and applications, knowledge technology, domain-oriented data-driven data mining, uncertainty in granular computing, advances in granular computing, big data to wise decisions, rough set theory, and three-way decisions, uncertainty, and granular computing.

Deep Learning and Convolutional Neural Networks for Medical Imaging and Clinical Informatics Sep 22 2021 This book reviews the state of the art in deep learning approaches to high-performance robust disease detection, robust and accurate organ segmentation in medical image computing (radiological and pathological imaging modalities), and the construction and mining of large-scale radiology databases. It particularly focuses on the application of convolutional neural networks, and on recurrent neural networks like LSTM, using numerous practical examples to complement the theory. The book's chief features are as follows: It highlights how deep neural networks can be used to address new questions and protocols, and to tackle current challenges in medical image computing; presents a comprehensive review of the latest research and literature; and describes a range of different methods that employ deep learning for object or landmark detection tasks in 2D and 3D medical imaging. In addition, the book examines a broad selection of techniques for semantic segmentation using deep learning principles in medical imaging; introduces a novel approach to text and image deep embedding for a large-scale chest x-ray image database; and discusses how deep learning relational graphs can be used to organize a sizable collection of radiology findings from real clinical practice, allowing semantic similarity-based retrieval. The intended reader of this edited book is a professional engineer, scientist or a graduate student who is able to comprehend general concepts of image processing, computer vision and medical image analysis. They can apply computer science and mathematical principles into problem solving practices. It may be necessary to have a certain level of familiarity with a number of more advanced subjects: image formation and enhancement, image understanding, visual recognition in medical applications, statistical learning, deep neural networks, structured prediction and image segmentation.

Design and Implementation of a Convolutional Neural Network Using Tensor-train Decomposition Feb 02 2020 Neural networks show state-of-the-art performance in different fields. However, this technique suffers a memory consumption issue as we are handling high-dimensional data more and more often. In this thesis, we introduce a new formulation of the convolutional layer and verify a new training algorithm using Bayesian inference. Here we refer to any neural networks with any tensor-train-layers and trained by Bayesian training algorithm as a Bayesian TensorNet (BTN). The BTN provides a compressed network size and simplifies the operation in the neural network forward computation. We developed a novel tensor-train formulation of a convolutional neural network and trained it with a Bayesian training algorithm for a plant classification problem. We used the idea of representing the fully connected layer given by Novikov, and our novel tensor-train representation for the convolutional layer which is more general and straight than the tensor-train representation given by Garipov. We tested our BTN with a Bayesian training algorithm, which is an algorithm completely different than the backpropagation training algorithm where we do not need to compute any gradient of the network's weights. The training of our BTN was done with a dataset of plant images from the TerraByte project, an academic agriculture project focusing on machine learning application development in modern digital agriculture. We have tested the training result by achieving a 67% accuracy in the plant classification problem. Currently, the BTN developed here is still computationally expensive. It could benefit from further optimization, graphics processing unit (GPU) acceleration support and new development of neural network architectures. Suggested future work includes the exploration of another numerical integration method and a fair comparison to the backpropagation training algorithm.

Face Image Analysis with Convolutional Neural Networks Sep 30 2019 Doctoral Thesis / Dissertation from the year 2008 in the subject Computer Science - Applied, grade: 1, University of Freiburg (Lehrstuhl für Mustererkennung und Bildverarbeitung), language: English, abstract: In this work, we present the problem of automatic appearance-based facial analysis with machine learning techniques and describe common specific sub-problems like face detection, facial feature detection and face recognition which are the crucial parts of many applications in the context of indexation, surveillance, access-control or human-computer interaction. To tackle this problem, we particularly focus on a technique called Convolutional Neural Network (CNN) which is inspired by biological evidence found in the visual cortex of mammalian brains and which has already been applied to many different classification problems. Existing CNN-based methods, like the face detection system proposed by Garcia and Delakis, show that this can be a very effective, efficient and robust approach to non-linear image processing tasks. An important step in many automatic facial analysis applications, e.g. face recognition, is face alignment which tries to translate, scale and rotate the face image such that specific facial features are roughly at predefined positions in the image. We propose an efficient approach to this problem using CNNs and experimentally show its very good performance on difficult test images. We further present a CNN-based method for automatic facial feature detection. The proposed system employs a hierarchical procedure which first roughly localizes the eyes, the nose and the mouth and then refines the result by detecting 10 different facial feature points. The detection rate of this method is 96% for the AR database and 87% for the BioID database tolerating an error of 10% of the inter-ocular distance. Finally, we propose a novel face recognition approach based on a specific CNN architecture learning a non-linear mapping of the image space into a lower-dim

Neural Networks and Deep Learning Jun 19 2021 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.

Hands-On Convolutional Neural Networks with TensorFlow May 31 2022 Learn how to apply TensorFlow to a wide range of deep learning and Machine Learning problems with this practical guide on training CNNs for image classification, image recognition, object detection and many computer vision challenges. Key Features Learn the fundamentals of Convolutional Neural Networks Harness Python and TensorFlow to train CNNs Build scalable deep learning models that can process millions of items Book Description Convolutional Neural Networks (CNN) are one of the most popular architectures used in computer vision apps. This book is an introduction to CNNs through solving real-world problems in deep learning while teaching you their implementation in popular Python library - TensorFlow. By the end of the book, you will be training CNNs in no time! We start with an overview of popular machine learning and deep learning models, and then get you set up with a TensorFlow development environment. This environment is the basis for implementing and training deep learning models in later chapters. Then, you will use Convolutional Neural Networks to work on problems such as image classification, object detection, and semantic segmentation. After that, you will use transfer learning to see how these models can solve other deep learning problems. You will also get a taste of implementing generative models such as autoencoders and generative adversarial networks. Later on, you will see useful tips on machine learning best practices and troubleshooting. Finally, you will learn how to apply your models on large datasets of millions of images. What you will learn Train machine learning models with TensorFlow Create systems that can evolve and scale during their life cycle Use CNNs in image recognition and classification Use TensorFlow for building deep learning models Train popular deep learning models Fine-tune a neural network to improve the quality of results with transfer learning Build TensorFlow models that can scale to large datasets and systems Who this book is for This book is for Software Engineers, Data Scientists, or Machine Learning practitioners who want to use CNNs for solving real-world problems. Knowledge of basic machine learning concepts, linear algebra and Python will help.

Tree-Based Convolutional Neural Networks Jan 27 2022 This book proposes a novel neural architecture, tree-based convolutional neural networks (TBCNNs), for processing tree-structured data. TBCNNs are related to existing convolutional neural networks (CNNs) and recursive neural networks (RNNs), but they combine the merits of both: thanks to their short propagation path, they are as efficient in learning as CNNs; yet they are also as structure-sensitive as RNNs. In this book, readers will also find a comprehensive literature review of related work, detailed descriptions of TBCNNs and their variants, and experiments applied to program analysis and natural language processing tasks. It is also an enjoyable read for all those with a general interest in deep learning.