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Introduction to Mathematics for Understanding Deep Learning

This book presents the proceedings of the 24th European Conference on Artificial Intelligence (ECAI 2020), held in Santiago de Compostela, Spain, from 29 August to 8 September 2020. The conference was postponed from June, and much of it conducted online due to the COVID-19 restrictions. The conference is one of the principal occasions for researchers and practitioners of AI to meet and discuss the latest trends and challenges in all fields of AI and to demonstrate innovative applications and uses of advanced AI technology. The book also includes the proceedings of the 10th Conference on Prestigious Applications of Artificial Intelligence (PAIS 2020) held at the same time. A record number of more than 1,700 submissions was received for ECAI 2020, of which 1,443 were reviewed. Of these, 361 full papers were accepted (an acceptance rate of 36% for full-papers and 45% for highlight papers). The book is divided into three sections: ECAI full papers; ECAI highlight papers; and PAIS papers. The topics of these papers cover all aspects of AI, including Agent-based and Multi-agent Systems; Computational Intelligence; Constraints and Satisfiability; Games and Virtual Environments; Heuristic Search; Human Aspects in AI; Information Retrieval and Filtering; Knowledge Representation and Reasoning; Machine Learning; Multidisciplinary Topics and Applications; Natural Language Processing; Planning and Scheduling; Robotics; Safe, Explainable, and Trustworthy AI; Semantic Technologies; Uncertainty in AI; and Vision. The book will be of interest to all those whose work involves the use of AI technology.

Deep Learning: Concepts and Architectures

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Guide to Convolutional Neural Networks

Think of deep learning as an art of cooking. One way to cook is to follow a recipe. But when we learn how the food, the spices, and the fire behave, we make our creation. And an understanding of the “how” transcends the creation. Likewise, an understanding of the “how” transcends deep learning. In this spirit, this book will teach you about deep learning constructs, their fundamentals, and how they behave. Baseline models are developed alongside, and concepts to improve them are exemplified.

Topics covered in the book include:
- Multilayer Perceptrons
- Long- and short-term Memory Networks
- Convolutional Neural Networks
- Autoencoders

Every topic is thoroughly explained and illustrated graphically. Moreover, implementations in TensorFlow are given for developing a complete understanding.

Deep Learning with Python Math for Deep Learning provides the essential math you need to understand deep learning discussions, explore more complex implementations, and better use the deep learning toolkits. With Math for Deep Learning, you'll learn the essential mathematics used by and as a background for deep learning. You'll work through Python examples to learn key deep learning related topics in probability, statistics, linear algebra, differential calculus, and matrix calculus as well as how to implement data flow in a neural network.

In addition, you'll find coverage of gradient descent including variations commonly used by the deep learning community: SGD, Adam, RMSprop, and Adagrad/Adadelta.

Deep Learning Conceptualizing deep learning in computer vision applications using PyTorch and Python libraries. KEY FEATURES
- Covers a variety of computer vision projects, including face recognition and object recognition such as Yolo, Faster R-CNN.
- Includes graphical representations and illustrations of neural networks and teaches how to program them.
- Includes deep learning techniques and architectures introduced by Microsoft, Google, and the University of Oxford.

DESCRIPTION Elements of Deep Learning for Computer Vision gives a thorough understanding of deep learning and provides highly accurate computer vision solutions while using libraries like PyTorch. This book introduces you to Deep Learning and explains all the concepts required to understand the basic working, development, and tuning of a neural network using Pytorch. The book then addresses the field of computer vision using two libraries, including the Python wrapper/version of OpenCV and PIL. After establishing and understanding both the primary concepts, the book addresses them together by explaining Convolutional Neural Networks (CNNs). CNNs are further elaborated using top industry standards and research to explain how they provide complicated Object Detection in images and videos, while also explaining their evaluation. Towards the end, the book explains how to develop a fully functional object detection model, including its deployment over APIs. By the end of this book, you are well-equipped with the role of deep learning in the field of computer vision along with a guided process to design deep learning solutions. WHAT YOU WILL LEARN
- Get to know the mechanism of deep learning and how neural networks operate.
- Learn to develop a highly accurate neural network model.
- Access to rich Python libraries to address computer vision challenges.
- Build deep learning models using PyTorch and learn how to deploy using the API.
- Learn to develop Object Detection and Face Recognition models along with their deployment. WHO THIS BOOK IS FOR
This book is for the readers who aspire to gain a strong fundamental understanding of how to infuse deep learning into computer vision and image processing applications. Readers are expected to have intermediate Python skills. No previous knowledge of PyTorch and Computer Vision is required.

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10. Faster R-CNN with PyTorch and YoloV4 with Darknet
11. Comparing Algorithms and API Deployment with Flask

Applications in Real World

ECAI 2020 Ready to crank up a neural network to get your self-driving car pick up the kids from school? Want to add ‘Deep Learning’ to your LinkedIn profile? Well, hold on there before you embark on your epic journey into the world of deep learning, there is basic theory to march through first! Take a step-by-step journey through the basics of Neural Networks and Deep Learning, made so simple that even your grananny could understand it! What you will gain from this book:
- A deep understanding of how a Neural Network and Deep Learning work
- A basic comprehension on how to build a Deep Neural Network from scratch
- Who this book is for: Beginners who want to approach the topic, but are too afraid of complex math to start
- What's Inside?
- A brief introduction to Machine Learning
- Two main types of Machine Learning Algorithms
- A practical example of Unsupervised Learning
- What are Neural Networks?
- McCulloch-Pitts's Neuron
- Types of activation functions
- Types of neural network architectures
- Learning process
- Advantages and disadvantages
- Let us give a memory to our Neural Network
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- Deep learning: the ability of learning to learn
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- Models for Deep Learning
- Probabilistic graphic models
- Restricted Boltzmann Machines
- Deep Belief Networks
- Available Frameworks and Libraries
- TensorFlow

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Introduction to Deep Learning for Business Applications for Developers

This book provides a structured treatment of the key principles and techniques for enabling efficient processing of deep neural networks (DNNs). DNNs are currently widely used for many artificial intelligence (AI) applications, including computer vision, speech recognition, and robotics. While DNNs deliver state-of-the-art results on many AI tasks, it costs at the scale of high computational complexity. Therefore, techniques that enable efficient processing of deep neural networks to improve metrics—such as energy-efficiency, throughput, and latency—without improving accuracy or increasing hardware costs are critical to enabling the wide deployment of DNNs in AI systems. The book includes background on DNNs and processing; a description and taxonomy of hardware architectural approaches for designing DNN accelerators; and metrics for evaluating and comparing different designs. The book also presents a new methodology for analyzing the output of DNNs and for identifying potential opportunities for implementing architectural innovations.
Deep Learning is the heart of Artificial Intelligence and will become a major field in Data Science in the near future. Deep Learning has attracted much attention recently. It is usually carried out by gradient descent methods, which are not always easy to understand for beginners. When one starts studying Deep Learning first hurdles are (1) how to choose the learning rate (2) how to avoid being trapped by local minima (3) what is a deep meaning of the minibatch. In this book I plan to offer intuitive answers to these questions within my understandings. As a matter of course, when beginners study Deep Learning some mathematical knowledge from Calculus, Linear Algebra, Statistics and Information are required. In the book I gave minimum knowledge required for understanding Deep learning. After reading the book, readers are encouraged to challenge advanced books of Deep Learning (or Artificial Intelligence).

Deep Learning and Convolutional Neural Networks for Medical Imaging and Clinical Informatics 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.

Deep Learning in Mining of Visual Content Two volume set LNCS 10630, LNCS 10631, LNCS 10632, LNCS 10633, LNCS 10634, and LNCS 10635 constitute the proceedings of the 24rd International Conference on Neural Information Processing, ICONIP 2017, held in Guangzhou, China, in November 2017. The 563 full papers presented were carefully reviewed and selected from 856 submissions. The 6 volumes are organized in topical sections on Machine Learning, Reinforcement Learning, Big Data Analysis, Deep Learning, Brain-Computer Interface, Computational Finance, Image/Video, Neurophysiology, Sensor and Decision Making, Computational Intelligence, Neural Data Analysis, Biomedical Engineering, Emotion and Bayesian Networks, Data Mining, Time-Series Analysis, Social Networks, Bioinformatics, Information and Social Cognition, Robotics and Control, Pattern Recognition, Neuroromorphic Hardware and Speech Processing.

Deep Learning 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

Deep Learning for Computer Vision 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.

Fundamentals of Deep Learning and Computer Vision This book introduces readers to the fundamental concepts of deep learning and offers practical insights into how this learning paradigm supports automatic mechanisms of structural knowledge representation. It discusses a number of multilayer architectures giving rise to tangible and functionally meaningful pieces of knowledge, and shows how the structural developments have become essential to the successful delivery of competitive practical solutions to real-world problems. The book also demonstrates how the architectural developments, which arise in the setting of deep learning, support detailed learning and refinements to the system design. Featuring detailed descriptions of the current trends in the design and analysis of deep learning topologies, the book offers practical guidelines and presents competitive solutions to various areas of language modeling, graph representation, and forecasting.

Understanding Deep Neural Networks from the Perspective of Piecewise Linear Property 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.

Deep Learning What's Inside? This includes 3 manuscripts: Book 1: Neural Networks & Deep Learning: Deep Learning explained to your granny - A visual introduction for beginners who want to make their own Deep Learning Neural Network What you will gain from this book: * A deep understanding of how Deep Learning works * A basics comprehension on how to build a Deep Neural Network from scratch Who this book is for: * Beginners who want to approach the topic, but are too afraid of complex math to start! * Two main Types of Machine Learning Algorithms * A practical example of Unsupervised Learning * What are Neural Networks? * McCulloch-Pitts'S Neuron * Types of activation function * Types of network architectures * Learning processes * Advantages and disadvantages * Let us give a memory to our Neural Network * The example of book writing Software * Deep learning: the ability of learning to learn * How does Deep learning work? * Main architectures and algorithms * Main types of DNN * Available Frameworks and libraries * Convolutional Neural Networks * Tunnel Vision * Convolution * The right Architecture for a Neural Network * Test your Neural Network * A general overview of Deep Learning * What are the limits of Deep Learning? * Deep Learning: the basics * Layers, Learning paradigms, Training, Validation * Main architectures and algorithms * Models for Deep Learning * Probabilistic graphic models * Restricted Boltzmann Machines * Deep Belief Networks Book2: Deep Learning: Deep Learning explained to your granny - A guide for Beginners Who's Inside? * A general overview of Deep Learning * What are the limits of Deep Learning? * Deep Learning: the basics * Layers, Learning paradigms, Training, Validation * Main architectures and algorithms * Convolutional Neural Networks * Models for Deep Learning * Probabilistic graphic models * Restricted Boltzmann Machines * Deep Belief Networks * Available Frameworks and libraries * TensorFlow Book 3: Big Data: The revolution that is transforming our work, market and world "Within 2 days we produce the same amount of data generated by at the beginning of the civilization until 2003," said Eric Schmidt in 2016. According to FBM, by 2020 the world will have generated a mass of data on the order of 46 zettabyte (1021Byte). Just think, for example, of digital content such as photos, videos, blogs, posts, and everything that revolves around social networks; only Facebook marks 30 billion pieces of content each month shared by its users. The explosion of social networks, combined with the emergence of smartphones, justifies the fact that one of the recurring terms of recent years in the field of innovation, marketing and IT is "Big Data." The term Big Data indicates data produced in massive quantities, with remarkable rapidity and in the most diverse formats, which require technologies and resources that go far beyond conventional data management and storage systems. In order to obtain from the use of this data the maximum results in the shortest possible time or even in real time, specific tools with high computing capabilities are necessary. But what does the Big Data phenomenon mean? Is the proliferation of data simply the sign of an increasingly invasive world? Or is there something more to it? Pat Nakamoto will guide you through the discovery of the world of Big data, which, according to experts, in the near future could become the new gold or oil, in what is a real Data Driven economy.

Math for Deep Learning This textbook establishes a theoretical framework for understanding deep learning models of practical relevance. With an approach that borrows from theoretical physics, Roberts and Yaida provide clear and pedagogical explanations of how realistic deep neural networks actually work. To make results from the theoretical forefront accessible, the authors eschew the subject’s traditional emphasis on intimidating formality without sacrificing accuracy. Straightforward and approachable, this volume balances detailed first-principle derivations of novel results with insight and intuition for theorists and practitioners alike. This self-contained textbook is ideal for students and researchers interested in artificial intelligence with minimal prerequisites of linear algebra, calculus, and informal probability theory, and it can easily fill a semester-long course on deep learning theory. For the first time, the exciting practical advances in modern artificial intelligence capabilities can be matched with a set of effective principles, providing a timeless blueprint for theoretical research in deep learning.
TensorFlow for Deep Learning 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.

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

Neural Networks and Deep Learning

Neural Networks and Deep Learning This book doesn’t have any superpowers or magic formula to help you master the art of neural networks and deep learning. We believe that such learning is all in your heart. You need to learn a concept by heart and then brainstore its different possibilities. I don’t claim that after reading this book you will become an expert in Python and Deep Learning Neural Networks. Instead, you will, for sure, have a basic understanding of deep learning and its implications and real-life applications. Most of the time, what confuses us is the application of a certain thing in our lives. Once we know that, we can relate the subject to that particular thing and learn. An interesting thing is that neural networks also learn the same way. This makes it easier to learn about them when we know the basics. Let’s take a look at what this book has to offer: ● The basics of Python including data types, operators and numbers. ● Advanced programming in Python with Python expressions, types and much more. ● A comprehensive overview of deep learning and its link to the smart systems that we are now building. ● An overview of how artificial neural networks work in real life. ● An overview of PyTorch. ● An overview of TensorFlow. ● An overview of Keras. ● How to create a convolutional neural network. ● A comprehensive understanding of deep learning applications and its ethical implications, including in the present and future. This book offers you the basic knowledge about Python and Deep Learning Neural Networks that you will need to lay the foundation for future studies. This book will start you on the road to mastering the art of deep learning neural networks. When I say that I don’t have the magic formula to make you learn, I mean it. My point is that you should learn Python coding and Python libraries to build neural networks by practicing hard. The more you practice, the better it is for your skills. It is only after thorough and in-depth practice that you will be able to create your own programs. Unlike other books, I don’t claim that this book will make you a master of deep learning after a single read. That’s not realistic, in fact, it’s even a bit absurd. What I claim is that you will definitely learn about the basics. The rest is practice. The more you practice the better you code.


Advanced Applied Deep Learning Although interest in machine learning has reached a high point, lofty expectations often scuttle projects before they get very far. How can machine learning—especially deep neural networks—make a real difference in your organization? This hands-on guide not only provides the most practical information available on the subject, but also helps you get started building efficient deep learning networks. Authors Adam Gibson and Josh Patterson provide theory on deep learning before introducing their open-source Deeplearning4j (DL4J) library for developing production-class workflows. Through real-world examples, you'll learn how to fuse deep network architectures and running deep learning workflows on Spark and Hadoop with DL4J. Dive into machine learning concepts in general, as well as deep learning in particular Understand how deep networks evolved from neural network fundamentals Explore the major deep network architectures, including Convolutional and Recurrent Learn how to map specific deep networks to the right problem Walk through the fundamentals of tuning general neural networks and specific deep network architectures Use vectorization techniques for different

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Explainable AI: Interpreting, Explaining and Visualizing Deep Learning Master Computer Vision concepts using Deep Learning with easy-to-follow steps DESCRIPTION This book starts with setting up a Python virtual environment with the deep learning framework TensorFlow and then introduces the fundamental concepts of TensorFlow. Before moving on to Computer Vision, you will learn about neural networks and related aspects such as loss functions, gradient descent optimization, activation functions and how backpropagation works for training multi-layer perceptrons. To understand how the Convolutional Neural Network (CNN) is used for computer vision problems, you will learn about the basic convolution operation. You will learn how CNN is different from a multi-layer perceptron along with a thorough discussion on the different building blocks of the CNN architecture such as kernel size, stride, padding, and pooling and finally learn how to build a small CNN model. Next, you will learn about different popular CNN architectures such as AlexNet, VGGNet, Inception, and ResNets along with different object detection algorithms such as R-CNN, SSD, and YOLO. The book concludes with a chapter on sequential models where you will learn about RNN, GRU, and LSTMs and their architectures and understand their applications in machine translation, image/video captioning and video classification. KEY FEATURES Setting up the Python and TensorFlow environment Learn core TensorFlow concepts with the latest TF version 2.0 Learn Deep Learning for computer vision applications Understand different computer vision concepts and use-cases Understand different state-of-the-art CNN architectures Build deep neural networks with transfer learning using features from pre-trained CNN models Apply computer vision concepts with easy-to-follow code in Jupyter Notebook WHAT WILL YOU LEARN This book will help the readers to understand and apply the latest Deep Learning technologies to different interesting computer vision applications without any prior domain knowledge of image processing. Thus, helping the users to acquire new skills specific to Computer Vision and Deep Learning and build solutions to real-life problems such as Image Classification and Object Detection. This book will serve as a basic guide for all the beginners to master Deep Learning and Computer Vision with lucid and intuitive explanations using basic mathematical concepts. It also explores these concepts with popular the deep learning framework TensorFlow. WHO THIS BOOK IS FOR This book is for all the Data Science enthusiasts and practitioners who intend to learn and master Computer Vision concepts and their applications using Deep Learning. This book assumes a basic Python understanding with hands-on experience. A basic senior secondary level understanding of Mathematics will help the reader to make the best out of this book. Table of Contents 1. Introduction to TensorFlow 2. Introduction to Neural Networks 3. Convolutional Neural Network 4. CNN Architectures 5. Sequential Models Deep Learning with Python, Second Edition Ready to crank up a neural network to get your self-driving car pick up the kids from school? Want to add ‘Deep Learning’ to your LinkedIn profile? Well, hold on there Before you embark on your epic journey into the world of deep learning, there is basic theory to march through first! Take a step-by-step journey through the basics of Neural Networks and Deep Learning, made so simple that even your granny could understand it! What you will gain from this book: * A deep understanding of how a Neural Network and Deep Learning work * A good comprehension on how to build a Deep Neural Network from scratch Who this book is for: * Beginners who want to approach the topic, but are too afraid of complex math to start! What’s Inside? * A brief introduction to Machine Learning * Two main Types of Machine Learning Algorithms * A practical example of Unsupervised Learning * What are Neural Networks? * McCulloch-Pitts’s Neuron * Types of activation function * Types of network architectures * Learning processes * Advantages and disadvantages * Let us give a memory to our Neural Network * The example of book writing Software * Deep learning: the ability of learning to learn * How does Deep Learning work? * Main architectures and algorithms * Main types of DNN * Available Frameworks and libraries * Convolutional Neural Networks * Tunnel Vision * Convolution * The right Architecture for a Neural Network * Test your Neural Network Hit download. Now! Convolutional Neural Networks in Visual Computing In recent years, deep learning models have been widely used and are behind major breakthroughs across many fields. Deep learning models are usually considered to be black boxes due to their large model structures and complicated hierarchical nonlinear transformations. As deep learning technology continues to develop, the understanding of deep learning models is raising concerns, such as the understanding of the training and prediction behaviors and the internal mechanism of models. In this thesis, we study the model understanding problem of deep neural networks from the perspective of piecewise linear property. First, we introduce the piecewise linear property. Next, we review the role and process of deep learning understanding from the perspective of the piecewise linear property. The piecewise linear property reveals that deep neural networks with piecewise linear activation functions can generally divide the input space into a number of small disjointed regions that correspond to a local linear function within each region. Next, we investigate two typical understanding problems, namely model interpretation, and model complexity. In particular, we provide a series of derivations and analyses of the piecewise linear property of deep neural networks with piecewise linear activation functions. We propose an approach for interpreting the predictions given by such models based on the piecewise linear property. Next, we propose a method to provide local interpretation to a black box deep model by mimicking a piecewise linear approximation from the deep model. Then, we study deep neural networks with curve activation functions with the aim of providing piecewise linear approximations for these networks that would let them benefit from the piecewise linear property. After proposing a piecewise linear approximation framework, we investigate model complexity and model interpretation using the approximation. The thesis concludes by discussing future directions for understanding deep neural networks from the perspective of the piecewise linear property. Efficient Processing of Deep Neural Networks Unlock the groundbreaking advances of deep learning with this extensively revised edition of the bestselling original. Learn directly from the creator of Keras and master practical Python deep learning techniques that are easy to apply in the real world. In Deep Learning with Python, Second Edition you will learn: Deep learning from first principles Image classification & image segmentation Timeseries forecasting Text classification and machine translation Text generation, neural style transfer, and image generation Deep Learning with Python has taught thousands of readers how to put the full capabilities of deep learning into action. This extensively revised second edition introduces deep learning using Python and Keras, and is loaded with insights for both novice and experienced ML practitioners. You’ll learn practical techniques that are easy to apply in the real world, and important theory for perfecting neural networks. Purchase of the print book includes a free eBook in PDF, Kindle, and...
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ePub formats from Manning Publications. About the technology Recent innovations in deep learning unlock exciting new software capabilities like automated language translation, image recognition, and more. Deep learning is becoming essential knowledge for every software developer, and modern tools like Keras and Tensorflow put it within your reach, even if you have no background in mathematics or data science. About the book Deep Learning with Python, Second Edition introduces the field of deep learning using Python and the powerful Keras library. In this new edition, Keras creator François Chollet offers insights for both novice and experienced machine learning practitioners. As you move through this book, you’ll build your understanding through intuitive explanations, crisp illustrations, and clear examples. You’ll pick up the skills to start developing deep-learning applications. What’s inside Deep learning from first principles Image classification and image segmentation Time series forecasting Text classification and machine translation Text generation, neural style transfer, and image generation About the reader For readers with intermediate Python skills. No previous experience with Keras, Tensorflow, or machine learning is required. About the author François Chollet is a software engineer at Google and creator of the Keras deep-learning library. Table of Contents Introduction 1 What is deep learning? 2 The mathematical building blocks of neural networks 3 Introduction to Keras and TensorFlow 4 Getting started with neural networks: Classification and regression 5 Fundamentals of learning The universal works of Keras 6 Advanced deep learning for computer vision 7 Deep learning for timeseries 8 Deep learning for text 9 Generative deep learning 10 Best practices for the real world 11 Conclusions

Applied Deep Learning 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 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!

Neural Networks and Deep Learning Master the practical aspects of implementing deep learning solutions with PyTorch, using a hands-on approach to understanding both theory and practice. This updated edition will prepare you for applying deep learning to real world problems with a sound theoretical foundation and practical knowledge with PyTorch, a platform developed by Facebook’s Artificial Intelligence Research Group. You’ll start with a perspective on how and why deep learning with PyTorch has emerged as an path-breaking framework with a set of tools and techniques to solve real-world problems. Next, the book will ground you with the mathematical fundamentals of linear algebra, vector calculus, probability and optimization. Having established this foundation, you’ll move on to key concepts and functionality of PyTorch including layers, loss functions and optimization algorithms. You’ll also gain an understanding of Graphical Processing Unit (GPU) based computation, which is essential for training deep learning models. All the key architectures in deep learning are covered, including feedforward networks, convolution neural networks, recurrent neural networks, long short-term memory networks, autoencoders and generative adversarial networks. Backed by a number of tricks of the trade for training and optimizing deep learning models, this edition of Deep Learning with Python explains the best practices in taking your models to production with PyTorch. What You’ll Learn Review machine learning fundamentals like overfitting, underfitting, and regularization. Understand deep learning fundamentals such as feed-forward networks, convolution neural networks, recurrent neural networks, automatic differentiation, and stochastic gradient descent. Apply in-depth linear algebra with PyTorch Explore PyTorch fundamentals and its building blocks Work with tuning and optimizing models Who This Book Is For Beginners with a working knowledge of Python who want to understand Deep Learning in a practical, hands-on manner.

Geometry of Deep Learning The development of “intelligent” systems that can take decisions and perform autonomously might lead to faster and more consistent decisions. A limiting factor for a broader adoption of AI technology is the inherent risks that come with giving up human control and oversight to “intelligent” machines. For sensitive tasks involving critical infrastructures and affecting human well-being or health, it is crucial to limit the possibility of improper, non-robust and unsafe decisions and actions. Before deploying an AI system, when and how should a designer validate it? How should it be guaranteed that it will continue to perform adequately throughout a real-world environment? In pursuit of that objective, ways for humans to verify the agreement between the AI decision structure and their own ground-truth knowledge have been explored. Explainable AI (XAI) has developed as a subfield of AI, focused on exposing complex AI models to humans in a systematic and interpretable manner. The 22 chapters included in this book provide a timely snapshot of algorithms, theory, and applications of interpretable and explainable AI and AI techniques that have been proposed recently reflecting the
current discourse in this field and providing directions of future development. The book is organized in six parts: towards AI transparency; methods for interpreting AI systems; explaining the decisions of AI systems; evaluating interpretability and explanations; applications of explainable AI; and software for explainable AI.

Deep Learning for Beginners Ready to crank up a deep neural network to get your self-driving car pick up the kids from school? Want to add 'Neural Networks' and 'Deep Learning' to your LinkedIn profile? Well, hold on there Before you embark on your epic journey into the world of deep learning, there is basic theory to march through first! Check out this exceptional bundle of 3 books! This bundle contains 3 books: Book 1: Neural Networks & Deep Learning: Deep Learning explained to your grandson - A visual introduction for beginners who want to make their own Deep Learning Network What you will gain from this book: * A deep understanding of how Deep Learning works * A basics comprehension on how to build a Deep Neural Network from scratch Who this book is for: * Beginners who want to approach the topic, but are too afraid of complex math to start! * Two main Types of Machine Learning Algorithms * A practical example of Unsupervised Learning * What are Neural Networks? * McCulloch-Pitts's Neuron * Types of activation function * Types of network architectures * Learning process * Let us give a memory to our Neural Network * The example of book writing Software * Deep learning: the ability of learning to learn * How does Deep Learning work? * Main architectures and algorithms * Main types of DNN * Available Frameworks and Libraries * Convolutional Neural Networks * Tunnel Vision * Convolution * The right Architecture for a Neural Network * Test your Neural Network * A general overview of Deep Learning * What are the limits of Deep Learning? * Deep Learning: the basics * Layers, Learning paradigms, Training, Validation * Main architectures and algorithms * Models for Deep Learning * Probabilistic graphic models * Restricted Boltzmann Machines * Deep Belief Networks Book2: Deep Learning: Deep Learning explained to your grandson - A guide for Beginners What's Inside? * A general overview of Deep Learning * What are the limits of Deep Learning? * Deep Learning: the basics * Layers, Learning paradigms, Training, Validation * Main architectures and algorithms * Convolutional Neural Networks * Models for Deep Learning * Probabilistic graphic models * Restricted Boltzmann Machines * Deep Belief Networks Available Frameworks and libraries * TensorFlow Book 3: Blockchain Blueprint: The ultimate guide to understanding blockchain, cryptocurrencies, smart contracts and the future of money. The current emerging innovation of this decade may be the connected world of computing relying on blockchain encryption. The attention given to this technology by global giant players suggests that it will become the operational philosophy of the economic system of the future. Ranging across many industries, blockchain can become the solution we needed for speeding up the economy and transactions in order to keep up with our multi-device connected world. In this book, high tech expert Pat Nakamoto answers your questions concerning the future of blockchain technology along with addressing different major developments linked to it, like Smart Contracts, Fintech and Ethereum. Hit download. Now! Neural Networks and Deep Learning 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.

Elements of Deep Learning for Computer Vision This book provides the reader with the fundamental knowledge in the area of deep learning with application to visual content mining. The authors give a fresh view on Deep Learning approaches both from the point of view of image understanding and supervised machine learning. It contains chapters which introduce theoretical and mathematical foundations of neural networks and related optimization methods. Then it discusses some very popular and important architectures used in the domain: convolutional neural networks and recurrent neural networks. Deep Learning is currently at the heart of most cutting edge technologies. It is in the core of the recent advances in Artificial Intelligence. Visual information in Digital form is constantly growing in volume. In such active domains as Computer Vision and Robotics visual information understanding is based on the use of deep learning. Other chapters present applications of deep learning for visual content mining. These include attention mechanisms in deep neural networks and application to digital cultural content mining. An additional application field is also discussed, and illustrates how deep learning can be of very high interest to computer-aided diagnostics of Alzheimer's disease on multimodal imaging. This book targets advanced-level students studying computer science including computer vision, data analytics and multimedia. Researchers and professionals working in computer science, signal and image processing may also be interested in this book.

Applied Deep Learning with Python The proceedings set LNCS 11727, 11728, 11729, 11730, and 11731 constitute the proceedings of the 28th International Conference on Artificial Neural Networks, ICANN 2019, held in Munich, Germany, in September 2019. The total of 277 full papers and 43 short papers presented in these proceedings was carefully reviewed and selected from 494 submissions. They were organized in 5 volumes focusing on theoretical neural computation; deep learning; image processing; text and time series; and workshop and special sessions.

A Guide to Convolutional Neural Networks for Computer Vision How does the computer learn to understand what it sees? Deep Learning for Vision Systems answers that by applying deep learning to computer vision. Using only high school algebra, this book illuminates the concepts behind visual intuition. You’ll understand how to use deep learning
architectures to build vision system applications for image generation and facial recognition. Summary Computer vision is central to many leading-edge innovations, including self-driving cars, drones, augmented reality, facial recognition, and much, much more. Amazing new computer vision applications are developed every day, thanks to rapid advances in AI and deep learning (DL). Deep Learning for Vision Systems teaches you the concepts and tools for building intelligent, scalable computer vision systems that can identify and react to objects in images, videos, and real life. With author Mohamed Elgendy’s expert instruction and illustration of real-world projects, you’ll finally grok state-of-the-art deep learning techniques so you can build, contribute to, and lead in the exciting realm of computer vision! Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the technology How much has computer vision advanced? One ride in a Tesla is the only answer you’ll need. Deep learning techniques have led to exciting breakthroughs in facial recognition, interactive simulations, and medical imaging, but nothing beats seeing a car respond to real-world stimuli while speeding down the highway. About the book How does the computer learn to understand what it sees? Deep Learning for Vision Systems answers that by applying deep learning to computer vision. using only high school algebra, this book illuminates the concepts behind visual intu...
implementing state-of-the-art automatic speech recognition systems. His LinkedIn Profile: https://www.linkedin.com/in/parasahuja

Neural Information Processing ★★The Best Deep Learning Book for Beginners★☆ If you are looking for a complete beginners guide to learn deep learning with examples, in just a few hours, then you need to continue reading. This book delves into the basics of deep learning for those who are enthusiasts concerning all things machine learning and artificial intelligence. For those who have seen movies which show computer systems taking over the world like, Terminator, or benevolent systems that watch over the population, i.e. Person of Interest, this should be right up your alley. This book will give you the basics of what deep learning entails. That means frameworks used by coders and significant components and tools used in deep learning, that enable facial recognition, speech recognition, and virtual assistance. Yes, deep learning provides the tools through which systems like Siri became possible. Grab your copy today and learn • Deep learning utilizes frameworks which allow people to develop tools which are able to offer better abstraction, along with simplification of hard programming issues. TensorFlow is the most popular tool and is used by corporate giants such as Airbus, Twitter, and even Google. ♦ The book illustrates TensorFlow and Caffe2 as the prime frameworks that are used for development by Google and Facebook. Facebook illustrates Caffe2 as one of the lightweight and modular deep learning frameworks, though TensorFlow is the most popular one, considering it has a lot of popularity, and thus, a big forum, which allows for assistance on main problems. • The book considers several components and tools of deep learning such as the neural networks; CNNs, RNNs, GANs, and auto-encoders. These algorithms create the building blocks which propel deep learning and advance it. • The book also considers several applications, including chatbots and virtual assistants, which have become the main focus for deep learning into the future, as they represent the next frontier in information gathering and connectivity. The Internet of Things is also represented here, as deep learning allows for the integration of various systems via an artificial intelligence system, which is already being used for the home and car functions. • And much more The use of data science adds a lot of value to businesses, and we will continue to see the need for data scientists grow. This book is probably one of the best books for beginners. It’s a step-by-step guide for any person who wants to start learning deep learning and artificial intelligence from scratch. When data science can reduce spending costs by billions of dollars in the healthcare industry, why wait to jump in? If you want to get started on deep learning and the concepts that run artificial technologies, don’t wait any longer. Scroll up and click the buy now button to get this book today!