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Machine Learning *CRC Press*

Traditional books on machine learning can be divided into two groups- those aimed at advanced undergraduates or early postgraduates with reasonable mathematical knowledge and those that are primers on how to code algorithms. The field is ready for a text that not only demonstrates how to use the algorithms that make up machine learning methods, but

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This book introduces basic-to-advanced deep learning algorithms used in a production environment by AI researchers and principal data scientists; it explains algorithms intuitively, including the underlying math, and shows how to implement them using popular Python-based deep learning libraries such as TensorFlow.

Hands-On Machine Learning with Scikit-Learn and TensorFlow *"O'Reilly Media, Inc."*

Graphics in this book are printed in black and white. Through a series of recent breakthroughs, deep learning has boosted the entire field of machine learning. Now, even programmers who know close to nothing about this technology can use simple, efficient tools to implement programs capable of learning from data. This practical book shows you how. By using concrete examples, minimal theory, and two production-ready Python frameworks—scikit-learn and TensorFlow—author Aurélien Géron helps you gain an intuitive understanding of the concepts and tools for building intelligent systems. You’ll learn a range of techniques, starting with simple linear regression and progressing to deep neural networks. With exercises in each chapter to help you apply what you’ve learned, all you need is programming experience to get started. Explore the machine learning landscape, particularly neural nets Use scikit-learn to track an example machine-learning project end-to-end Explore several training models, including support vector machines, decision trees, random forests, and ensemble methods Use the TensorFlow library to build and train neural nets Dive into neural net architectures, including convolutional nets, recurrent nets, and deep reinforcement learning Learn techniques for training and scaling deep neural nets Apply practical code examples without acquiring excessive machine learning theory or algorithm details

Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow, 2nd Edition

Through a series of recent breakthroughs, deep learning has boosted the entire field of machine learning. Now, even programmers who know close to nothing about this technology can use simple, efficient tools to implement programs capable of learning from data. This practical book shows you how. By using concrete examples, minimal theory, and two production-ready Python frameworks-Scikit-Learn and TensorFlow-author Aurélien Géron

helps you gain an intuitive understanding of the concepts and tools for building intelligent systems. You'll learn a range of techniques, starting with simple linear regression and progressing to deep neural networks. With exercises in each chapter to help you apply what you've learned, all you need is programming experience to get started. Explore the machine learning landscape, particularly neural nets Use Scikit-Learn to track an example machine-learning project end-to-end Explore several training models, including support vector machines, decision trees, random forests, and ensemble methods Use the TensorFlow library to build and train neural nets Dive into neural net architectures, including convolutional nets, recurrent nets, and deep reinforcement learning Learn techniques for training and scaling deep neural nets.

Hands-On Machine Learning for Algorithmic Trading *Packt Publishing Ltd*

Explore effective trading strategies in real-world markets using NumPy, spaCy, pandas, scikit-learn, and Keras Key FeaturesImplement machine learning algorithms to build, train, and validate algorithmic modelsCreate your own algorithmic design process to apply probabilistic machine learning approaches to trading decisionsDevelop neural networks for algorithmic trading to perform time series forecasting and smart analyticsBook Description The explosive growth of digital data has boosted the demand for expertise in trading strategies that use machine learning (ML). This book enables you to use a broad range of supervised and unsupervised algorithms to extract signals from a wide variety of data sources and create powerful investment strategies. This book shows how to access market, fundamental, and alternative data via API or web scraping and offers a framework to evaluate alternative data. You'll practice the ML workflow from model design, loss metric definition, and parameter tuning to performance evaluation in a time series context. You will understand ML algorithms such as Bayesian and ensemble methods and manifold learning, and will know how to train and tune these models using pandas, statsmodels, sklearn, PyMC3, xgboost, lightgbm, and catboost. This book also teaches you how to extract features from text data using spaCy, classify news and assign sentiment scores, and to use gensim to model topics and learn word embeddings from financial reports. You will also build and evaluate neural networks, including RNNs and CNNs, using Keras and PyTorch to exploit unstructured data for sophisticated strategies. Finally, you will apply transfer learning to satellite images to predict economic activity and use reinforcement learning to build agents that learn to trade in the OpenAI Gym. What you will learnImplement machine learning techniques to solve investment and trading problemsLeverage market, fundamental, and alternative data to research alpha factorsDesign and fine-tune supervised, unsupervised, and reinforcement learning modelsOptimize portfolio risk and performance using pandas, NumPy, and scikit-learnIntegrate machine learning models into a live trading strategy on QuantopianEvaluate strategies using reliable backtesting methodologies for time seriesDesign and evaluate deep neural networks using Keras, PyTorch, and TensorFlowWork with reinforcement learning for trading strategies in the OpenAI GymWho this book is for Hands-On Machine Learning for Algorithmic Trading is for data analysts, data scientists, and Python developers, as well as investment analysts and portfolio managers working within the finance and investment industry. If you want to perform efficient algorithmic trading by developing smart investigating strategies using machine learning algorithms, this is the book for you. Some understanding of Python and machine learning techniques is mandatory.

Hands-On Deep Learning with R *Packt Publishing Ltd*

Explore and implement deep learning to solve various real-world problems using modern R libraries such as TensorFlow, MXNet, H2O, and Deepnet Key FeaturesUnderstand deep learning algorithms and architectures using R and determine which algorithm is best suited for a specific problemImprove models using parameter tuning, feature engineering, and ensemblingApply advanced neural network models such as deep autoencoders and generative adversarial networks (GANs) across different domainsBook Description Deep learning enables efficient and accurate learning from a massive amount of data. This book will help you overcome a number of challenges using various deep learning algorithms and architectures with R programming. This book starts with a brief overview of machine learning and deep learning and how to build your first neural network. You'll understand the architecture of various deep learning algorithms and their applicable fields, learn how to build deep learning models, optimize hyperparameters, and evaluate model performance. Various deep learning applications in image processing, natural language processing (NLP), recommendation systems, and predictive analytics will also be covered. Later chapters will show you how to tackle recognition problems such as image recognition and signal detection, programmatically summarize documents, conduct topic modeling, and forecast stock market prices. Toward the end of the book, you will learn the common applications of GANs and how to build a face generation model using them. Finally, you'll get to grips with using reinforcement learning and deep reinforcement learning to solve various real-world problems. By the end of this deep learning book, you will be able to build and deploy your own deep learning applications using appropriate frameworks and algorithms. What you will learnDesign a feedforward neural network to see how the activation function computes an outputCreate an image recognition model using convolutional neural networks (CNNs)Prepare data, decide hidden layers and neurons and train your model with the backpropagation algorithmApply text cleaning techniques to remove uninformative text using NLPBuild, train, and evaluate a GAN model for face generationUnderstand the concept and implementation of reinforcement learning in RWho this book is for This book is for data scientists, machine learning engineers, and deep learning developers who are familiar with machine learning and are looking to enhance their knowledge of deep learning using practical examples. Anyone interested in increasing the efficiency of their machine learning applications and exploring various options in R will also find this book useful. Basic knowledge of machine learning techniques and working knowledge of the R programming language is expected.

Hands-On Machine Learning with C++

This book will help you explore how to implement different well-known machine learning algorithms with various C++ frameworks and libraries. You will cover basic to advanced machine learning concepts with practical and easy to follow examples. By the end of the book, you will be able to build various machine learning models with ease.

Hands-On Machine Learning with ML.NET *Packt Publishing Ltd*

Create, train, and evaluate various machine learning models such as regression, classification, and clustering using ML.NET, Entity Framework, and ASP.NET Core Key FeaturesGet well-versed with the ML.NET framework and its components and APIs using practical examplesLearn how to build, train, and evaluate popular machine learning algorithms with ML.NET offeringsExtend your existing machine learning models by integrating with TensorFlow and other librariesBook Description Machine learning (ML) is widely used in many industries such as science, healthcare, and research and its popularity is only growing. In March 2018, Microsoft introduced ML.NET to help .NET enthusiasts in working with ML. With this book, you'll explore how to build ML.NET applications with the various ML models available using C# code. The book starts by giving you an overview of ML and the types of ML algorithms used, along with covering what ML.NET is and why you need it to build ML apps. You'll then explore the ML.NET framework, its components, and APIs. The book will serve as a practical guide to helping you build smart apps using the ML.NET library. You'll gradually become well versed in how to implement ML algorithms such as regression, classification, and clustering with real-world examples and datasets. Each chapter will cover the practical implementation, showing you how to implement ML within .NET applications. You'll also learn to integrate TensorFlow in ML.NET applications. Later you'll discover how to store the regression model housing price prediction result to the database and display the real-time predicted results from the database on your web application using ASP.NET Core Blazor and SignalR. By the end of this book, you'll have learned how to confidently perform basic to advanced-level machine learning tasks in ML.NET. What you will learnUnderstand the framework, components, and APIs of ML.NET using C#Develop regression models using ML.NET for employee attrition and file classificationEvaluate classification models for sentiment prediction of restaurant reviewsWork with clustering models for file type classificationsUse anomaly detection to find anomalies in both network traffic and login historyWork with ASP.NET Core Blazor to create an ML.NET enabled web applicationIntegrate pre-trained TensorFlow and ONNX models in a WPF ML.NET application for image classification and object detectionWho this book is for If you are a .NET developer who wants to implement machine learning models using ML.NET, then this book is for you. This book will also be beneficial for data scientists and machine learning developers who are looking for effective tools to implement various machine learning algorithms. A basic understanding of C# or .NET is mandatory to grasp the concepts covered in this book effectively.

Machine Learning *John Wiley & Sons*

Dig deep into the data with a hands-on guide to machine learning with updated examples and more! Machine Learning: Hands-On for Developers and Technical Professionals provides hands-on instruction and fully-coded working examples for the most common machine learning techniques used by developers and technical professionals. The book contains a breakdown of each ML variant, explaining how it works and how it is used within certain industries, allowing readers to incorporate the presented techniques into their own work as they follow along. A core tenant of machine learning is a strong focus on data preparation, and a full exploration of the various types of learning algorithms illustrates how the proper tools can help any developer extract information and insights from existing data. The book includes a full complement of Instructor's Materials to facilitate use in the classroom, making this resource useful for students and as a professional reference. At its core, machine learning is a mathematical, algorithm-based technology that forms the basis of historical data mining and modern big data science. Scientific analysis of big data requires a working knowledge of machine learning, which forms predictions based on known properties learned from training data. Machine Learning is an accessible, comprehensive guide for the non-mathematician, providing clear guidance that allows readers to: Learn the languages of machine learning including Hadoop, Mahout, and Weka Understand decision trees, Bayesian networks, and artificial neural networks Implement Association Rule, Real Time, and Batch learning Develop a strategic plan for safe, effective, and efficient machine learning By learning to construct a system that can learn from data, readers can increase their utility across industries. Machine learning sits at the core of deep dive data analysis and visualization, which is increasingly in demand as companies discover the goldmine hiding in their existing data. For the tech professional involved in data science, Machine Learning: Hands-On for Developers and Technical Professionals provides the skills and techniques required to dig deeper.

Hands-On Reinforcement Learning with Python *Packt Publishing Ltd*

Reinforcement learning is a self-evolving type of machine learning that takes us closer to achieving true artificial intelligence. This easy-to-follow guide explains everything from scratch using rich examples written in Python.

Hands-On Reinforcement Learning for Games *Packt Publishing Ltd*

Explore reinforcement learning (RL) techniques to build cutting-edge games using Python libraries such as PyTorch, OpenAI Gym, and TensorFlow Key FeaturesGet to grips with the different reinforcement and DRL algorithms for game developmentLearn how to implement components such as artificial agents, map and level generation, and audio generationGain insights into cutting-edge RL research and understand how it is similar to artificial general researchBook Description With the increased presence of AI in the gaming industry, developers are challenged to create highly responsive and adaptive games by integrating artificial intelligence into their projects. This book is your guide to learning how various reinforcement learning techniques and algorithms play an important role in game development with Python. Starting with the basics, this book will help you build a strong foundation in reinforcement learning for game development. Each chapter will assist you in implementing different reinforcement learning techniques, such as Markov decision processes (MDPs), Q-learning, actor-critic methods, SARSA, and deterministic policy gradient algorithms, to build logical self-learning agents. Learning these techniques will enhance your game development skills and add a variety of features to improve your game agent's productivity. As you advance, you'll understand how deep reinforcement learning (DRL) techniques can be used to devise strategies to help agents learn from their actions and build engaging games. By the end of this book, you'll be ready to apply reinforcement learning techniques to build a variety of projects and contribute to open source applications. What you will learnUnderstand how deep learning can be integrated into an RL agentExplore basic to advanced algorithms commonly used in game developmentBuild agents that can learn and solve problems in all types of environmentsTrain a Deep Q-Network (DQN) agent to solve the CartPole balancing problemDevelop game AI agents by understanding the mechanism behind complex AIIntegrate all the concepts learned into new projects or gaming agentsWho this book is for If you're a game developer looking to

implement AI techniques to build next-generation games from scratch, this book is for you. Machine learning and deep learning practitioners, and RL researchers who want to understand how to use self-learning agents in the game domain will also find this book useful. Knowledge of game development and Python programming experience are required.

Hands-On Deep Learning with TensorFlow *Packt Publishing Ltd*

This book is your guide to exploring the possibilities in the field of deep learning, making use of Google's TensorFlow. You will learn about convolutional neural networks, and logistic regression while training models for deep learning to gain key insights into your data. About This Book Explore various possibilities with deep learning and gain amazing insights from data using Google's brainchild-- TensorFlow Want to learn what more can be done with deep learning? Explore various neural networks with the help of this comprehensive guide Rich in concepts, advanced guide on deep learning that will give you background to innovate in your environment Who This Book Is For If you are a data scientist who performs machine learning on a regular basis, are familiar with deep neural networks, and now want to gain expertise in working with convoluted neural networks, then this book is for you. Some familiarity with C++ or Python is assumed. What You Will Learn Set up your computing environment and install TensorFlow Build simple TensorFlow graphs for everyday computations Apply logistic regression for classification with TensorFlow Design and train a multilayer neural network with TensorFlow Intuitively understand convolutional neural networks for image recognition Bootstrap a neural network from simple to more accurate models See how to use TensorFlow with other types of networks Program networks with SciKit-Flow, a high-level interface to TensorFlow In Detail Dan Van Boxel's Deep Learning with TensorFlow is based on Dan's best-selling TensorFlow video course. With deep learning going mainstream, making sense of data and getting accurate results using deep networks is possible. Dan Van Boxel will be your guide to exploring the possibilities with deep learning; he will enable you to understand data like never before. With the efficiency and simplicity of TensorFlow, you will be able to process your data and gain insights that will change how you look at data. With Dan's guidance, you will dig deeper into the hidden layers of abstraction using raw data. Dan then shows you various complex algorithms for deep learning and various examples that use these deep neural networks. You will also learn how to train your machine to craft new features to make sense of deeper layers of data. In this book, Dan shares his knowledge across topics such as logistic regression, convolutional neural networks, recurrent neural networks, training deep networks, and high level interfaces. With the help of novel practical examples, you will become an ace at advanced multilayer networks, image recognition, and beyond. Style and Approach This book is your go-to guide to becoming a deep learning expert in your organization. Dan helps you evaluate common and not-so-common deep neural networks with the help of insightful examples that you can relate to, and show how they can be exploited in the real world with complex raw data.

Hands-On Machine Learning on Google Cloud Platform *Packt Publishing Ltd*

Unleash Google's Cloud Platform to build, train and optimize machine learning models Key Features Get well versed in GCP pre-existing services to build your own smart models A comprehensive guide covering aspects from data processing, analyzing to building and training ML models A practical approach to produce your trained ML models and port them to your mobile for easy access Book Description Google Cloud Machine Learning Engine combines the services of Google Cloud Platform with the power and flexibility of TensorFlow. With this book, you will not only learn to build and train different complexities of machine learning models at scale but also host them in the cloud to make predictions. This book is focused on making the most of the Google Machine Learning Platform for large datasets and complex problems. You will learn from scratch how to create powerful machine learning based applications for a wide variety of problems by leveraging different data services from the Google Cloud Platform. Applications include NLP, Speech to text, Reinforcement learning, Time series, recommender systems, image classification, video content inference and many other. We will implement a wide variety of deep learning use cases and also make extensive use of data related services comprising the Google Cloud Platform ecosystem such as Firebase, Storage APIs, Datalab and so forth. This will enable you to integrate Machine Learning and data processing features into your web and mobile applications. By the end of this book, you will know the main difficulties that you may encounter and get appropriate strategies to overcome these difficulties and build efficient systems. What you will learn Use Google Cloud Platform to build data-based applications for dashboards, web, and mobile Create, train and optimize deep learning models for various data science problems on big data Learn how to leverage BigQuery to explore big datasets Use Google's pre-trained TensorFlow models for NLP, image, video and much more Create models and architectures for Time series, Reinforcement Learning, and generative models Create, evaluate, and optimize TensorFlow and Keras models for a wide range of applications Who this book is for This book is for data scientists, machine learning developers and AI developers who want to learn Google Cloud Platform services to build machine learning applications. Since the interaction with the Google ML platform is mostly done via the command line, the reader is supposed to have some familiarity with the bash shell and Python scripting. Some understanding of machine learning and data science concepts will be handy

Hands-On Deep Learning with Apache Spark *Packt Publishing Ltd*

Speed up the design and implementation of deep learning solutions using Apache Spark Key FeaturesExplore the world of distributed deep learning with Apache SparkTrain neural networks with deep learning libraries such as BigDL and TensorFlowDevelop Spark deep learning applications to intelligently handle large and complex datasetsBook Description Deep learning is a subset of machine learning where datasets with several layers of complexity can be processed. Hands-On Deep Learning with Apache Spark addresses the sheer complexity of technical and analytical parts and the speed at which deep learning solutions can be implemented on Apache Spark. The book starts with the fundamentals of Apache Spark and deep learning. You will set up Spark for deep learning, learn principles of distributed modeling, and understand different types of neural nets. You will then implement deep learning models, such as convolutional neural networks (CNNs), recurrent neural networks (RNNs), and long short-term memory (LSTM) on Spark. As you progress through the book, you will gain hands-on experience of what it takes to understand the complex datasets you are dealing with. During the course of this book, you will use popular deep learning frameworks, such as TensorFlow, Deeplearning4j, and Keras to train

your distributed models. By the end of this book, you'll have gained experience with the implementation of your models on a variety of use cases. What you will learnUnderstand the basics of deep learningSet up Apache Spark for deep learningUnderstand the principles of distribution modeling and different types of neural networksObtain an understanding of deep learning algorithmsDiscover textual analysis and deep learning with SparkUse popular deep learning frameworks, such as Deeplearning4j, TensorFlow, and KerasExplore popular deep learning algorithms Who this book is for If you are a Scala developer, data scientist, or data analyst who wants to learn how to use Spark for implementing efficient deep learning models, Hands-On Deep Learning with Apache Spark is for you. Knowledge of the core machine learning concepts and some exposure to Spark will be helpful.

Hands-On Deep Learning with Go *Packt Publishing Ltd*

Apply modern deep learning techniques to build and train deep neural networks using Gorgonia Key Features Gain a practical understanding of deep learning using Golang Build complex neural network models using Go libraries and Gorgonia Take your deep learning model from design to deployment with this handy guide Book Description Go is an open source programming language designed by Google for handling large-scale projects efficiently. The Go ecosystem comprises some really powerful deep learning tools such as DQN and CUDA. With this book, you'll be able to use these tools to train and deploy scalable deep learning models from scratch. This deep learning book begins by introducing you to a variety of tools and libraries available in Go. It then takes you through building neural networks, including activation functions and the learning algorithms that make neural networks tick. In addition to this, you'll learn how to build advanced architectures such as autoencoders, restricted Boltzmann machines (RBMs), convolutional neural networks (CNNs), recurrent neural networks (RNNs), and more. You'll also understand how you can scale model deployments on the AWS cloud infrastructure for training and inference. By the end of this book, you'll have mastered the art of building, training, and deploying deep learning models in Go to solve real-world problems. What you will learn Explore the Go ecosystem of libraries and communities for deep learning Get to grips with Neural Networks, their history, and how they work Design and implement Deep Neural Networks in Go Get a strong foundation of concepts such as Backpropagation and Momentum Build Variational Autoencoders and Restricted Boltzmann Machines using Go Build models with CUDA and benchmark CPU and GPU models Who this book is for This book is for data scientists, machine learning engineers, and AI developers who want to build state-of-the-art deep learning models using Go. Familiarity with basic machine learning concepts and Go programming is required to get the best out of this book.

Hands-On Deep Learning Architectures with Python *Packt Publishing Ltd*

Concepts, tools, and techniques to explore deep learning architectures and methodologies Key Features Explore advanced deep learning architectures using various datasets and frameworks Implement deep architectures for neural network models such as CNN, RNN, GAN, and many more Discover design patterns and different challenges for various deep learning architectures Book Description Deep learning architectures are composed of multilevel nonlinear operations that represent high-level abstractions; this allows you to learn useful feature representations from the data. This book will help you learn and implement deep learning architectures to resolve various deep learning research problems. Hands-On Deep Learning Architectures with Python explains the essential learning algorithms used for deep and shallow architectures. Packed with practical implementations and ideas to help you build efficient artificial intelligence systems (AI), this book will help you learn how neural networks play a major role in building deep architectures. You will understand various deep learning architectures (such as AlexNet, VGG Net, GoogleNet) with easy-to-follow code and diagrams. In addition to this, the book will also guide you in building and training various deep architectures such as the Boltzmann mechanism, autoencoders, convolutional neural networks (CNNs), recurrent neural networks (RNNs), natural language processing (NLP), GAN, and more—all with practical implementations. By the end of this book, you will be able to construct deep models using popular frameworks and datasets with the required design patterns for each architecture. You will be ready to explore the potential of deep architectures in today's world. What you will learn Implement CNNs, RNNs, and other commonly used architectures with Python Explore architectures such as VGGNet, AlexNet, and GoogLeNet Build deep learning architectures for AI applications such as face and image recognition, fraud detection, and many more Understand the architectures and applications of Boltzmann machines and autoencoders with concrete examples Master artificial intelligence and neural network concepts and apply them to your architecture Understand deep learning architectures for mobile and embedded systems Who this book is for If you're a data scientist, machine learning developer/engineer, or deep learning practitioner, or are curious about AI and want to upgrade your knowledge of various deep learning architectures, this book will appeal to you. You are expected to have some knowledge of statistics and machine learning algorithms to get the best out of this book

Analytical Skills for AI and Data Science *O'Reilly Media*

While several market-leading companies have successfully transformed their business models by following data- and AI-driven paths, the vast majority have yet to reap the benefits. How can your business and analytics units gain a competitive advantage by capturing the full potential of this predictive revolution? This practical guide presents a battle-tested end-to-end method to help you translate business decisions into tractable prescriptive solutions using data and AI as fundamental inputs. Author Daniel Vaughan shows data scientists, analytics practitioners, and others interested in using AI to transform their businesses not only how to ask the right questions but also how to generate value using modern AI technologies and decision-making principles. You'll explore several use cases common to many enterprises, complete with examples you can apply when working to solve your own issues. Break business decisions into stages that can be tackled using different skills from the analytical toolbox Identify and embrace uncertainty in decision making and protect against common human biases Customize optimal decisions to different customers using predictive and prescriptive methods and technologies Ask business questions that create high value through AI- and data-driven technologies

Deep Reinforcement Learning *Hands-On Packt Publishing Ltd*

This practical guide will teach you how deep learning (DL) can be used to solve complex real-world problems. Key Features Explore deep

reinforcement learning (RL), from the first principles to the latest algorithms Evaluate high-profile RL methods, including value iteration, deep Q-networks, policy gradients, TRPO, PPO, DDPG, D4PG, evolution strategies and genetic algorithms Keep up with the very latest industry developments, including AI-driven chatbots Book Description Recent developments in reinforcement learning (RL), combined with deep learning (DL), have seen unprecedented progress made towards training agents to solve complex problems in a human-like way. Google's use of algorithms to play and defeat the well-known Atari arcade games has propelled the field to prominence, and researchers are generating new ideas at a rapid pace. Deep Reinforcement Learning Hands-On is a comprehensive guide to the very latest DL tools and their limitations. You will evaluate methods including Cross-entropy and policy gradients, before applying them to real-world environments. Take on both the Atari set of virtual games and family favorites such as Connect4. The book provides an introduction to the basics of RL, giving you the know-how to code intelligent learning agents to take on a formidable array of practical tasks. Discover how to implement Q-learning on 'grid world' environments, teach your agent to buy and trade stocks, and find out how natural language models are driving the boom in chatbots. What you will learn Understand the DL context of RL and implement complex DL models Learn the foundation of RL: Markov decision processes Evaluate RL methods including Cross-entropy, DQN, Actor-Critic, TRPO, PPO, DDPG, D4PG and others Discover how to deal with discrete and continuous action spaces in various environments Defeat Atari arcade games using the value iteration method Create your own OpenAI Gym environment to train a stock trading agent Teach your agent to play Connect4 using AlphaGo Zero Explore the very latest deep RL research on topics including AI-driven chatbots Who this book is for Some fluency in Python is assumed. Basic deep learning (DL) approaches should be familiar to readers and some practical experience in DL will be helpful. This book is an introduction to deep reinforcement learning (RL) and requires no background in RL.

Hands-On Unsupervised Learning Using Python "O'Reilly Media, Inc."

Many industry experts consider unsupervised learning the next frontier in artificial intelligence, one that may hold the key to general artificial intelligence. Since the majority of the world's data is unlabeled, conventional supervised learning cannot be applied. Unsupervised learning, on the other hand, can be applied to unlabeled datasets to discover meaningful patterns buried deep in the data, patterns that may be near impossible for humans to uncover. Author Ankur Patel shows you how to apply unsupervised learning using two simple, production-ready Python frameworks: Scikit-learn and TensorFlow using Keras. With code and hands-on examples, data scientists will identify difficult-to-find patterns in data and gain deeper business insight, detect anomalies, perform automatic feature engineering and selection, and generate synthetic datasets. All you need is programming and some machine learning experience to get started. Compare the strengths and weaknesses of the different machine learning approaches: supervised, unsupervised, and reinforcement learning Set up and manage machine learning projects end-to-end Build an anomaly detection system to catch credit card fraud Clusters users into distinct and homogeneous groups Perform semisupervised learning Develop movie recommender systems using restricted Boltzmann machines Generate synthetic images using generative adversarial networks

Hands-On Deep Learning for Images with TensorFlow Packt Publishing Ltd

Explore TensorFlow's capabilities to perform efficient deep learning on images Key Features Discover image processing for machine vision Build an effective image classification system using the power of CNNs Leverage TensorFlow's capabilities to perform efficient deep learning Book Description TensorFlow is Google's popular offering for machine learning and deep learning, quickly becoming a favorite tool for performing fast, efficient, and accurate deep learning tasks. Hands-On Deep Learning for Images with TensorFlow shows you the practical implementations of real-world projects, teaching you how to leverage TensorFlow's capabilities to perform efficient image processing using the power of deep learning. With the help of this book, you will get to grips with the different paradigms of performing deep learning such as deep neural nets and convolutional neural networks, followed by understanding how they can be implemented using TensorFlow. By the end of this book, you will have mastered all the concepts of deep learning and their implementation with TensorFlow and Keras. What you will learn Build machine learning models particularly focused on the MNIST digits Work with Docker and Keras to build an image classifier Understand natural language models to process text and images Prepare your dataset for machine learning Create classical, convolutional, and deep neural networks Create a RESTful image classification server Who this book is for Hands-On Deep Learning for Images with TensorFlow is for you if you are an application developer, data scientist, or machine learning practitioner looking to integrate machine learning into application software and master deep learning by implementing practical projects in TensorFlow. Knowledge of Python programming and basics of deep learning are required to get the best out of this book.

Hands-On Data Science and Python Machine Learning Packt Publishing Ltd

This book covers the fundamentals of machine learning with Python in a concise and dynamic manner. It covers data mining and large-scale machine learning using Apache Spark. About This Book Take your first steps in the world of data science by understanding the tools and techniques of data analysis Train efficient Machine Learning models in Python using the supervised and unsupervised learning methods Learn how to use Apache Spark for processing Big Data efficiently Who This Book Is For If you are a budding data scientist or a data analyst who wants to analyze and gain actionable insights from data using Python, this book is for you. Programmers with some experience in Python who want to enter the lucrative world of Data Science will also find this book to be very useful, but you don't need to be an expert Python coder or mathematician to get the most from this book. What You Will Learn Learn how to clean your data and ready it for analysis Implement the popular clustering and regression methods in Python Train efficient machine learning models using decision trees and random forests Visualize the results of your analysis using Python's Matplotlib library Use Apache Spark's MLlib package to perform machine learning on large datasets In Detail Join Frank Kane, who worked on Amazon and IMDb's machine learning algorithms, as he guides you on your first steps into the world of data science. Hands-On Data Science and Python Machine Learning gives you the tools that you need to understand and explore the core topics in the field, and the confidence and practice to build and analyze your own machine learning models. With the help of interesting and easy-to-follow practical examples, Frank Kane explains potentially complex topics such as Bayesian methods and K-means clustering in a way that anybody can understand them. Based on Frank's successful data science course, Hands-On

Data Science and Python Machine Learning empowers you to conduct data analysis and perform efficient machine learning using Python. Let Frank help you unearth the value in your data using the various data mining and data analysis techniques available in Python, and to develop efficient predictive models to predict future results. You will also learn how to perform large-scale machine learning on Big Data using Apache Spark. The book covers preparing your data for analysis, training machine learning models, and visualizing the final data analysis. Style and approach This comprehensive book is a perfect blend of theory and hands-on code examples in Python which can be used for your reference at any time.

Hands-On Automated Machine Learning Packt Publishing Ltd

Automate data and model pipelines for faster machine learning applications Key Features Build automated modules for different machine learning components Understand each component of a machine learning pipeline in depth Learn to use different open source AutoML and feature engineering platforms Book Description AutoML is designed to automate parts of Machine Learning. Readily available AutoML tools are making data science practitioners' work easy and are received well in the advanced analytics community. Automated Machine Learning covers the necessary foundation needed to create automated machine learning modules and helps you get up to speed with them in the most practical way possible. In this book, you'll learn how to automate different tasks in the machine learning pipeline such as data preprocessing, feature selection, model training, model optimization, and much more. In addition to this, it demonstrates how you can use the available automation libraries, such as auto-sklearn and MLBox, and create and extend your own custom AutoML components for Machine Learning. By the end of this book, you will have a clearer understanding of the different aspects of automated Machine Learning, and you'll be able to incorporate automation tasks using practical datasets. You can leverage your learning from this book to implement Machine Learning in your projects and get a step closer to winning various machine learning competitions. What you will learn Understand the fundamentals of Automated Machine Learning systems Explore auto-sklearn and MLBox for AutoML tasks Automate your preprocessing methods along with feature transformation Enhance feature selection and generation using the Python stack Assemble individual components of ML into a complete AutoML framework Demystify hyperparameter tuning to optimize your ML models Dive into Machine Learning concepts such as neural networks and autoencoders Understand the information costs and trade-offs associated with AutoML Who this book is for If you're a budding data scientist, data analyst, or Machine Learning enthusiast and are new to the concept of automated machine learning, this book is ideal for you. You'll also find this book useful if you're an ML engineer or data professional interested in developing quick machine learning pipelines for your projects. Prior exposure to Python programming will help you get the best out of this book.

Hands-On Machine Learning with Microsoft Excel 2019 Packt Publishing Ltd

A practical guide to getting the most out of Excel, using it for data preparation, applying machine learning models (including cloud services) and understanding the outcome of the data analysis. Key FeaturesUse Microsoft's product Excel to build advanced forecasting models using varied examples Cover range of machine learning tasks such as data mining, data analytics, smart visualization, and more Derive data-driven techniques using Excel plugins and APIs without much code required Book Description We have made huge progress in teaching computers to perform difficult tasks, especially those that are repetitive and time-consuming for humans. Excel users, of all levels, can feel left behind by this innovation wave. The truth is that a large amount of the work needed to develop and use a machine learning model can be done in Excel. The book starts by giving a general introduction to machine learning, making every concept clear and understandable. Then, it shows every step of a machine learning project, from data collection, reading from different data sources, developing models, and visualizing the results using Excel features and offerings. In every chapter, there are several examples and hands-on exercises that will show the reader how to combine Excel functions, add-ins, and connections to databases and to cloud services to reach the desired goal: building a full data analysis flow. Different machine learning models are shown, tailored to the type of data to be analyzed. At the end of the book, the reader is presented with some advanced use cases using Automated Machine Learning, and artificial neural network, which simplifies the analysis task and represents the future of machine learning. What you will learnUse Excel to preview and cleanse datasetsUnderstand correlations between variables and optimize the input to machine learning modelsUse and evaluate different machine learning models from ExcelUnderstand the use of different visualizationsLearn the basic concepts and calculations to understand how artificial neural networks workLearn how to connect Excel to the Microsoft Azure cloudGet beyond proof of concepts and build fully functional data analysis flowsWho this book is for This book is for data analysis, machine learning enthusiasts, project managers, and someone who doesn't want to code much for performing core tasks of machine learning. Each example will help you perform end-to-end smart analytics. Working knowledge of Excel is required.

The Self-Assembling Brain Princeton University Press

"In this book, Peter Robin Hiesinger explores historical and contemporary attempts to understand the information needed to make biological and artificial neural networks. Developmental neurobiologists and computer scientists with an interest in artificial intelligence - driven by the promise and resources of biomedical research on the one hand, and by the promise and advances of computer technology on the other - are trying to understand the fundamental principles that guide the generation of an intelligent system. Yet, though researchers in these disciplines share a common interest, their perspectives and approaches are often quite different. The book makes the case that "the information problem" underlies both fields, driving the questions that are driving forward the frontiers, and aims to encourage cross-disciplinary communication and understanding, to help both fields make progress. The questions that challenge researchers in these fields include the following. How does genetic information unfold during the years-long process of human brain development, and can this be a short-cut to create human-level artificial intelligence? Is the biological brain just messy hardware that can be improved upon by running learning algorithms in computers? Can artificial intelligence bypass evolutionary programming of "grown" networks? These questions are tightly linked, and answering them requires an understanding of how information unfolds algorithmically to generate functional neural networks. Via a series of closely linked "discussions" (fictional dialogues between researchers in different disciplines) and pedagogical "seminars," the author explores the different challenges facing researchers working on neural networks, their different perspectives and

approaches, as well as the common ground and understanding to be found amongst those sharing an interest in the development of biological brains and artificial intelligent systems"--

Machine Learning in Python: Hands on Machine Learning with Python Tools, Concepts and Techniques *Bob Mather*

The ability to crunch data effectively can propel your career or business to great heights. Machine Learning is the most effective data analysis tool. While it is a complex topic, it can be broken down into simpler steps, as show in this book. We are using Python, which is a great programming language for beginners.

Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow *"O'Reilly Media, Inc."*

Through a recent series of breakthroughs, deep learning has boosted the entire field of machine learning. Now, even programmers who know close to nothing about this technology can use simple, efficient tools to implement programs capable of learning from data. This bestselling book uses concrete examples, minimal theory, and production-ready Python frameworks (Scikit-Learn, Keras, and TensorFlow) to help you gain an intuitive understanding of the concepts and tools for building intelligent systems. With this updated third edition, author Aurélien Géron explores a range of techniques, starting with simple linear regression and progressing to deep neural networks. Numerous code examples and exercises throughout the book help you apply what you've learned. Programming experience is all you need to get started. Use Scikit-learn to track an example ML project end to end Explore several models, including support vector machines, decision trees, random forests, and ensemble methods Exploit unsupervised learning techniques such as dimensionality reduction, clustering, and anomaly detection Dive into neural net architectures, including convolutional nets, recurrent nets, generative adversarial networks, autoencoders, diffusion models, and transformers Use TensorFlow and Keras to build and train neural nets for computer vision, natural language processing, generative models, and deep reinforcement learning

Hands-On Deep Learning for Games *Packt Publishing Ltd*

Understand the core concepts of deep learning and deep reinforcement learning by applying them to develop games Key FeaturesApply the power of deep learning to complex reasoning tasks by building a Game AIExploit the most recent developments in machine learning and AI for building smart gamesImplement deep learning models and neural networks with PythonBook Description The number of applications of deep learning and neural networks has multiplied in the last couple of years. Neural nets has enabled significant breakthroughs in everything from computer vision, voice generation, voice recognition and self-driving cars. Game development is also a key area where these techniques are being applied. This book will give an in depth view of the potential of deep learning and neural networks in game development. We will take a look at the foundations of multi-layer perceptron's to using convolutional and recurrent networks. In applications from GANs that create music or textures to self-driving cars and chatbots. Then we introduce deep reinforcement learning through the multi-armed bandit problem and other OpenAI Gym environments. As we progress through the book we will gain insights about DRL techniques such as Motivated Reinforcement Learning with Curiosity and Curriculum Learning. We also take a closer look at deep reinforcement learning and in particular the Unity ML-Agents toolkit. By the end of the book, we will look at how to apply DRL and the ML-Agents toolkit to enhance, test and automate your games or simulations. Finally, we will cover your possible next steps and possible areas for future learning. What you will learnLearn the foundations of neural networks and deep learning.Use advanced neural network architectures in applications to create music, textures, self driving cars and chatbots. Understand the basics of reinforcement and DRL and how to apply it to solve a variety of problems.Working with Unity ML-Agents toolkit and how to install, setup and run the kit.Understand core concepts of DRL and the differences between discrete and continuous action environments.Use several advanced forms of learning in various scenarios from developing agents to testing games.Who this book is for This book is for game developers who wish to create highly interactive games by leveraging the power of machine and deep learning. No prior knowledge of machine learning, deep learning or neural networks is required this book will teach those concepts from scratch. A good understanding of Python is required.

Grokking Deep Learning *Simon and Schuster*

Summary Grokking Deep Learning teaches you to build deep learning neural networks from scratch! In his engaging style, seasoned deep learning expert Andrew Trask shows you the science under the hood, so you grok for yourself every detail of training neural networks. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Technology Deep learning, a branch of artificial intelligence, teaches computers to learn by using neural networks, technology inspired by the human brain. Online text translation, self-driving cars, personalized product recommendations, and virtual voice assistants are just a few of the exciting modern advancements possible thanks to deep learning. About the Book Grokking Deep Learning teaches you to build deep learning neural networks from scratch! In his engaging style, seasoned deep learning expert Andrew Trask shows you the science under the hood, so you grok for yourself every detail of training neural networks. Using only Python and its math-supporting library, NumPy, you'll train your own neural networks to see and understand images, translate text into different languages, and even write like Shakespeare! When you're done, you'll be fully prepared to move on to mastering deep learning frameworks. What's inside The science behind deep learning Building and training your own neural networks Privacy concepts, including federated learning Tips for continuing your pursuit of deep learning About the Reader For readers with high school-level math and intermediate programming skills. About the Author Andrew Trask is a PhD student at Oxford University and a research scientist at DeepMind. Previously, Andrew was a researcher and analytics product manager at Digital Reasoning, where he trained the world's largest artificial neural network and helped guide the analytics roadmap for the Synthesys cognitive computing platform. Table of Contents Introducing deep learning: why you should learn it Fundamental concepts: how do machines learn? Introduction to neural prediction: forward propagation Introduction to neural learning: gradient descent Learning multiple weights at a time: generalizing gradient descent Building your first deep neural network: introduction to backpropagation How to picture neural networks: in your head and on paper Learning signal and ignoring noise:introduction to regularization and batching Modeling probabilities and nonlinearities: activation

functions Neural learning about edges and corners: intro to convolutional neural networks Neural networks that understand language: king - man + woman == ? Neural networks that write like Shakespeare: recurrent layers for variable-length data Introducing automatic optimization: let's build a deep learning framework Learning to write like Shakespeare: long short-term memory Deep learning on unseen data: introducing federated learning Where to go from here: a brief guide

Hands-On Transfer Learning with Python *Packt Publishing Ltd*

Deep learning simplified by taking supervised, unsupervised, and reinforcement learning to the next level using the Python ecosystem Key Features Build deep learning models with transfer learning principles in Python implement transfer learning to solve real-world research problems Perform complex operations such as image captioning neural style transfer Book Description Transfer learning is a machine learning (ML) technique where knowledge gained during training a set of problems can be used to solve other similar problems. The purpose of this book is two-fold; firstly, we focus on detailed coverage of deep learning (DL) and transfer learning, comparing and contrasting the two with easy-to-follow concepts and examples. The second area of focus is real-world examples and research problems using TensorFlow, Keras, and the Python ecosystem with hands-on examples. The book starts with the key essential concepts of ML and DL, followed by depiction and coverage of important DL architectures such as convolutional neural networks (CNNs), deep neural networks (DNNs), recurrent neural networks (RNNs), long short-term memory (LSTM), and capsule networks. Our focus then shifts to transfer learning concepts, such as model freezing, fine-tuning, pre-trained models including VGG, inception, ResNet, and how these systems perform better than DL models with practical examples. In the concluding chapters, we will focus on a multitude of real-world case studies and problems associated with areas such as computer vision, audio analysis and natural language processing (NLP). By the end of this book, you will be able to implement both DL and transfer learning principles in your own systems. What you will learn Set up your own DL environment with graphics processing unit (GPU) and Cloud support Delve into transfer learning principles with ML and DL models Explore various DL architectures, including CNN, LSTM, and capsule networks Learn about data and network representation and loss functions Get to grips with models and strategies in transfer learning Walk through potential challenges in building complex transfer learning models from scratch Explore real-world research problems related to computer vision and audio analysis Understand how transfer learning can be leveraged in NLP Who this book is for Hands-On Transfer Learning with Python is for data scientists, machine learning engineers, analysts and developers with an interest in data and applying state-of-the-art transfer learning methodologies to solve tough real-world problems. Basic proficiency in machine learning and Python is required.

Hands-on Scikit-Learn for Machine Learning Applications *Apress*

Aspiring data science professionals can learn the Scikit-Learn library along with the fundamentals of machine learning with this book. The book combines the Anaconda Python distribution with the popular Scikit-Learn library to demonstrate a wide range of supervised and unsupervised machine learning algorithms. Care is taken to walk you through the principles of machine learning through clear examples written in Python that you can try out and experiment with at home on your own machine. All applied math and programming skills required to master the content are covered in this book. In-depth knowledge of object-oriented programming is not required as working and complete examples are provided and explained. Coding examples are in-depth and complex when necessary. They are also concise, accurate, and complete, and complement the machine learning concepts introduced. Working the examples helps to build the skills necessary to understand and apply complex machine learning algorithms. Hands-on Scikit-Learn for Machine Learning Applications is an excellent starting point for those pursuing a career in machine learning. Students of this book will learn the fundamentals that are a prerequisite to competency. Readers will be exposed to the Anaconda distribution of Python that is designed specifically for data science professionals, and will build skills in the popular Scikit-Learn library that underlies many machine learning applications in the world of Python. What You'll LearnWork with simple and complex datasets common to Scikit-Learn Manipulate data into vectors and matrices for algorithmic processing Become familiar with the Anaconda distribution used in data scienceApply machine learning with Classifiers, Regressors, and Dimensionality Reduction Tune algorithms and find the best algorithms for each dataset Load data from and save to CSV, JSON, Numpy, and Pandas formats Who This Book Is For The aspiring data scientist yearning to break into machine learning through mastering the underlying fundamentals that are sometimes skipped over in the rush to be productive. Some knowledge of object-oriented programming and very basic applied linear algebra will make learning easier, although anyone can benefit from this book.

PyTorch Deep Learning Hands-On *Packt Publishing Ltd*

Hands-on projects cover all the key deep learning methods built step-by-step in PyTorch Key Features Internals and principles of PyTorch Implement key deep learning methods in PyTorch: CNNs, GANs, RNNs, reinforcement learning, and more Build deep learning workflows and take deep learning models from prototyping to production Book Description PyTorch Deep Learning Hands-On is a book for engineers who want a fast-paced guide to doing deep learning work with Pytorch. It is not an academic textbook and does not try to teach deep learning principles. The book will help you most if you want to get your hands dirty and put PyTorch to work quickly. PyTorch Deep Learning Hands-On shows how to implement the major deep learning architectures in PyTorch. It covers neural networks, computer vision, CNNs, natural language processing (RNN), GANs, and reinforcement learning. You will also build deep learning workflows with the PyTorch framework, migrate models built in Python to highly efficient TorchScript, and deploy to production using the most sophisticated available tools. Each chapter focuses on a different area of deep learning. Chapters start with a refresher on how the model works, before sharing the code you need to implement them in PyTorch. This book is ideal if you want to rapidly add PyTorch to your deep learning toolset. What you will learn Use PyTorch to build: Simple Neural Networks – build neural networks the PyTorch way, with high-level functions, optimizers, and more Convolutional Neural Networks – create advanced computer vision systems Recurrent Neural Networks – work with sequential data such as natural language and audio Generative Adversarial Networks – create new content with models including SimpleGAN and CycleGAN Reinforcement Learning – develop systems that can solve complex problems such as driving or game playing Deep Learning workflows – move effectively from ideation to production with proper deep learning workflow using PyTorch and its utility packages

Production-ready models – package your models for high-performance production environments Who this book is for Machine learning engineers who want to put PyTorch to work.

Deep Learning for Coders with fastai and PyTorch "O'Reilly Media, Inc."

Deep learning is often viewed as the exclusive domain of math PhDs and big tech companies. But as this hands-on guide demonstrates, programmers comfortable with Python can achieve impressive results in deep learning with little math background, small amounts of data, and minimal code. How?

With fastai, the first library to provide a consistent interface to the most frequently used deep learning applications. Authors Jeremy Howard and Sylvain Gugger, the creators of fastai, show you how to train a model on a wide range of tasks using fastai and PyTorch. You'll also dive progressively further into deep learning theory to gain a complete understanding of the algorithms behind the scenes. Train models in computer vision, natural language processing, tabular data, and collaborative filtering Learn the latest deep learning techniques that matter most in practice Improve accuracy, speed, and reliability by understanding how deep learning models work Discover how to turn your models into web applications Implement deep learning algorithms from scratch Consider the ethical implications of your work Gain insight from the foreword by PyTorch cofounder, Soumith Chintala