Cs224n Natural Language Processing With Deep Learning

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Artificial Neural Networks and Machine Learning – ICANN 2018 - V□ ra K□ rkov□ 2018-10-02 This three-volume set LNCS 11139-11141 constitutes the refereed proceedings of the 27th International Conference on Artificial Neural Networks, ICANN 2018, held in Rhodes, Greece, in October 2018. The papers presented in these volumes was carefully reviewed and selected from total of 360 submissions. They are related to the following thematic topics: AI and Bioinformatics, Bayesian and Echo State Networks, Brain Inspired Computing, Chaotic Complex Models, Clustering, Mining, Exploratory Analysis, Coding Architectures, Complex Firing Patterns, Convolutional Neural Networks, Deep Learning (DL), DL in Real Time Systems, DL and Big Data Analytics, DL and Big Data, DL and Forensics, DL and Cybersecurity, DL and Social Networks, Evolving Systems – Optimization, Extreme Learning Machines, From Neurons to Neuromorphism, From Sensation to Perception, From Single Neurons to Networks, Fuzzy Modeling, Hierarchical ANN, Inference and

Recognition, Information and Optimization, Interacting with The Brain, Machine Learning (ML), ML for Bio Medical systems, ML and Video-Image Processing, ML and Forensics, ML and Cybersecurity, ML and Social Media, ML in Engineering, Movement and Motion Detection, Multilayer Perceptrons and Kernel Networks, Natural Language, Object and Face Recognition, Recurrent Neural Networks and Reservoir Computing, Reinforcement Learning, Reservoir Computing, Self-Organizing Maps, Spiking Dynamics/Spiking ANN, Support Vector Machines, Swarm Intelligence and Decision-Making, Text Mining, Theoretical Neural Computation, Time Series and Forecasting, Training and Learning.

Statistical Machine Translation - Philipp Koehn 2010

The dream of automatic language translation is now closer thanks to recent advances in the techniques that underpin statistical machine translation. This class-tested textbook from an active researcher in the field, provides a clear and careful introduction to the latest methods and explains how to build machine translation systems for any two languages. It introduces the subject's building blocks from linguistics and probability, then covers the major models for machine translation: word-based, phrase-based, and tree-based, as well as machine translation evaluation, language modeling, discriminative training and advanced methods to integrate linguistic annotation. The book also reports the latest research, presents the major outstanding challenges, and enables novices as well as experienced researchers to make novel contributions to this exciting area. Ideal for students at undergraduate and graduate level, or for anyone interested in the latest developments in machine translation.

Advanced Computational Methods for Knowledge Engineering - Hoai An Le Thi 2015-05-04

This volume contains the extended versions of papers presented at the 3rd International Conference on Computer Science, Applied Mathematics and Applications (ICCSAMA 2015) held on 11-13 May, 2015 in Metz, France. The book contains 5 parts: 1. Mathematical programming and optimization: theory, methods and software, Operational research and decision making, Machine learning, data security, and bioinformatics, Knowledge information system, Software engineering. All chapters in the book discuss theoretical and algorithmic as well as practical issues connected with computation methods & optimization methods for knowledge engineering and

machine learning techniques.

Introduction to Deep Learning - Eugene Charniak 2019-01-29

A project-based guide to the basics of deep learning. This concise, project-driven guide to deep learning takes readers through a series of program-writing tasks that introduce them to the use of deep learning in such areas of artificial intelligence as computer vision, natural-language processing, and reinforcement learning. The author, a longtime artificial intelligence researcher specializing in natural-language processing, covers feed-forward neural nets, convolutional neural nets, word embeddings, recurrent neural nets, sequence-to-sequence learning, deep reinforcement learning, unsupervised models, and other fundamental concepts and techniques. Students and practitioners learn the basics of deep learning by working through programs in Tensorflow, an open-source machine learning framework. "I find I learn computer science material best by sitting down and writing programs," the author writes, and the book reflects this approach. Each chapter includes a programming project, exercises, and references for further reading. An early chapter is devoted to Tensorflow and its interface with Python, the widely used programming language. Familiarity with linear algebra, multivariate calculus, and probability and statistics is required, as is a rudimentary knowledge of programming in Python. The book can be used in both undergraduate and graduate courses; practitioners will find it an essential reference.

Web, Artificial Intelligence and Network Applications - Leonard Barolli 2019-03-14

The aim of the book is to provide latest research findings, innovative research results, methods and development techniques from both theoretical and practical perspectives related to the emerging areas of Web Computing, Intelligent Systems and Internet Computing. As the Web has become a major source of information, techniques and methodologies that extract quality information are of paramount importance for many Web and Internet applications. Data mining and knowledge discovery play key roles in many of today's prominent Web applications such as e-commerce and computer security. Moreover, the outcome of Web services delivers a new platform for enabling service-oriented systems. The emergence of large scale distributed computing paradigms, such as Cloud Computing and Mobile Computing Systems, has opened many opportunities for

collaboration services, which are at the core of any Information System. Artificial Intelligence (AI) is an area of computer science that build intelligent systems and algorithms that work and react like humans. The AI techniques and computational intelligence are powerful tools for learning, adaptation, reasoning and planning. They have the potential to become enabling technologies for the future intelligent networks. Recent research in the field of intelligent systems, robotics, neuroscience, artificial intelligence and cognitive sciences are very important for the future development and innovation of Web and Internet applications.

Deep Learning for Coders with fastai and PyTorch - Jeremy Howard 2020-06-29

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

Learning Deep Learning - Magnus Ekman 2021-08

NVIDIA's Full-Color Guide to Deep Learning: All StudentsNeed to Get Started and Get Results Learning Deep Learning is a complete guide to DL.Illuminating both the core concepts and the hands-on programming techniquesneeded to succeed, this book suits seasoned developers, data scientists, analysts, but also those with no prior machine learning or statisticsexperience. After introducing the essential building blocks of deep neural networks, such as artificial neurons and fully connected, convolutional, and recurrent layers, Magnus Ekman shows how to use them to

build advanced architectures, includingthe Transformer. He describes how these concepts are used to build modernnetworks for computer vision and natural language processing (NLP), includingMask R-CNN, GPT, and BERT. And he explains how a natural language translatorand a system generating natural language descriptions of images. Throughout, Ekman provides concise, well-annotated code examples usingTensorFlow with Keras. Corresponding PyTorch examples are provided online, andthe book thereby covers the two dominating Python libraries for DL used inindustry and academia. He concludes with an introduction to neural architectureSearch (NAS), exploring important ethical issues and providing resources forfurther learning. Exploreand master core concepts: perceptrons, gradient-based learning, sigmoidneurons, and back propagation See how DL frameworks make it easier to developmore complicated and useful neural networks Discover how convolutional neuralnetworks (CNNs) revolutionize image classification and analysis Apply recurrentneural networks (RNNs) and long short-term memory (LSTM) to text and othervariable-length sequences Master NLP with sequence-to-sequence networks and theTransformer architecture Build applications for natural language translation andimage captioning

Deep Learning with PyTorch - Luca Pietro Giovanni Antiga
2020-07-01

"We finally have the definitive treatise on PyTorch! It covers the basics and abstractions in great detail. I hope this book becomes your extended reference document." —Soumith Chintala, co-creator of PyTorch Key Features Written by PyTorch's creator and key contributors Develop deep learning models in a familiar Pythonic way Use PyTorch to build an image classifier for cancer detection Diagnose problems with your neural network and improve training with data augmentation Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About The Book Every other day we hear about new ways to put deep learning to good use: improved medical imaging, accurate credit card fraud detection, long range weather forecasting, and more. PyTorch puts these superpowers in your hands. Instantly familiar to anyone who knows Python data tools like NumPy and Scikit-learn, PyTorch simplifies deep learning without sacrificing advanced features. It's great for building quick models, and it scales

smoothly from laptop to enterprise. Deep Learning with PyTorch teaches you to create deep learning and neural network systems with PyTorch. This practical book gets you to work right away building a tumor image classifier from scratch. After covering the basics, you'll learn best practices for the entire deep learning pipeline, tackling advanced projects as your PyTorch skills become more sophisticated. All code samples are easy to explore in downloadable Jupyter notebooks. What You Will Learn Understanding deep learning data structures such as tensors and neural networks Best practices for the PyTorch Tensor API, loading data in Python, and visualizing results Implementing modules and loss functions Utilizing pretrained models from PyTorch Hub Methods for training networks with limited inputs Sifting through unreliable results to diagnose and fix problems in your neural network Improve your results with augmented data, better model architecture, and fine tuning This Book Is Written For For Python programmers with an interest in machine learning. No experience with PyTorch or other deep learning frameworks is required. About The Authors Eli Stevens has worked in Silicon Valley for the past 15 years as a software engineer, and the past 7 years as Chief Technical Officer of a startup making medical device software. Luca Antiga is co-founder and CEO of an AI engineering company located in Bergamo, Italy, and a regular contributor to PyTorch. Thomas Viehmann is a Machine Learning and PyTorch speciality trainer and consultant based in Munich, Germany and a PyTorch core developer. Table of Contents PART 1 - CORE PYTORCH 1 Introducing deep learning and the PyTorch Library 2 Pretrained networks 3 It starts with a tensor 4 Real-world data representation using tensors 5 The mechanics of learning 6 Using a neural network to fit the data 7 Telling birds from airplanes: Learning from images 8 Using convolutions to generalize PART 2 - LEARNING FROM IMAGES IN THE REAL WORLD: EARLY DETECTION OF LUNG CANCER 9 Using PyTorch to fight cancer 10 Combining data sources into a unified dataset 11 Training a classification model to detect suspected tumors 12 Improving training with metrics and augmentation 13 Using segmentation to find suspected nodules 14 End-to-end nodule analysis, and where to go next PART 3 - DEPLOYMENT 15 Deploying to production

Algorithmic Aspects of Machine Learning - Ankur Moitra

2018-09-27

Introduces cutting-edge research on machine learning theory and practice, providing an accessible, modern algorithmic toolkit.

Statistical Methods for Speech Recognition - Frederick Jelinek 1998-01-15

This book reflects decades of important research on the mathematical foundations of speech recognition. It focuses on underlying statistical techniques such as hidden Markov models, decision trees, the expectation-maximization algorithm, information theoretic goodness criteria, maximum entropy probability estimation, parameter and data clustering, and smoothing of probability distributions. The author's goal is to present these principles clearly in the simplest setting, to show the advantages of self-organization from real data, and to enable the reader to apply the techniques.

Deep Learning for Natural Language Processing - Jason Brownlee 2017-11-21

Deep learning methods are achieving state-of-the-art results on challenging machine learning problems such as describing photos and translating text from one language to another. In this new laser-focused Ebook, finally cut through the math, research papers and patchwork descriptions about natural language processing. Using clear explanations, standard Python libraries and step-by-step tutorial lessons you will discover what natural language processing is, the promise of deep learning in the field, how to clean and prepare text data for modeling, and how to develop deep learning models for your own natural language processing projects.

Text Analytics with Python - Dipanjan Sarkar 2019-05-21

Leverage Natural Language Processing (NLP) in Python and learn how to set up your own robust environment for performing text analytics. This second edition has gone through a major revamp and introduces several significant changes and new topics based on the recent trends in NLP. You'll see how to use the latest state-of-the-art frameworks in NLP, coupled with machine learning and deep learning models for supervised sentiment analysis powered by Python to solve actual case studies. Start by reviewing Python for NLP fundamentals on strings and text data and move on to engineering representation methods for text data, including both traditional statistical models and newer deep learning-based embedding models. Improved techniques and new methods around parsing and processing text are discussed as well. Text

summarization and topic models have been overhauled so the book showcases how to build, tune, and interpret topic models in the context of an interest dataset on NIPS conference papers. Additionally, the book covers text similarity techniques with a real-world example of movie recommenders, along with sentiment analysis using supervised and unsupervised techniques. There is also a chapter dedicated to semantic analysis where you'll see how to build your own named entity recognition (NER) system from scratch. While the overall structure of the book remains the same, the entire code base, modules, and chapters has been updated to the latest Python 3.x release. What You'll Learn • Understand NLP and text syntax, semantics and structure• Discover text cleaning and feature engineering• Review text classification and text clustering • Assess text summarization and topic models• Study deep learning for NLP Who This Book Is For IT professionals, data analysts, developers, linguistic experts, data scientists and engineers and basically anyone with a keen interest in linguistics, analytics and generating insights from textual data.

Supervised Machine Learning for Text Analysis in R - Emil Hvitfeldt 2021-10-22

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

preprocessing and feature engineering steps like tokenization and word embeddings from the ground up. These steps influence model results in ways we can measure, both in terms of model metrics and other tangible consequences such as how fair or appropriate model results are.

Combating Fake News with Computational Intelligence Techniques - Mohamed Lahby 2021-12-15

This book presents the latest cutting-edge research, theoretical methods, and novel applications in the field of computational intelligence techniques and methods for combating fake news. Fake news is everywhere. Despite the efforts of major social network players such as Facebook and Twitter to fight disinformation, miracle cures and conspiracy theories continue to rain down on the net. Artificial intelligence can be a bulwark against the diversity of fake news on the Internet and social networks. This book discusses new models, practical solutions, and technological advances related to detecting and analyzing fake news based on computational intelligence models and techniques, to help decision-makers, managers, professionals, and researchers design new paradigms considering the unique opportunities associated with computational intelligence techniques. Further, the book helps readers understand computational intelligence techniques combating fake news in a systematic and straightforward way.

Computing with Data - Guy Lebanon 2018-11-28

This book introduces basic computing skills designed for industry professionals without a strong computer science background. Written in an easily accessible manner, and accompanied by a user-friendly website, it serves as a self-study guide to survey data science and data engineering for those who aspire to start a computing career, or expand on their current roles, in areas such as applied statistics, big data, machine learning, data mining, and informatics. The authors draw from their combined experience working at software and social network companies, on big data products at several major online retailers, as well as their experience building big data systems for an AI startup. Spanning from the basic inner workings of a computer to advanced data manipulation techniques, this book opens doors for readers to quickly explore and enhance their computing knowledge. Computing with Data comprises a wide range of computational topics essential for data scientists, analysts, and engineers, providing them with the necessary

tools to be successful in any role that involves computing with data. The introduction is self-contained, and chapters progress from basic hardware concepts to operating systems, programming languages, graphing and processing data, testing and programming tools, big data frameworks, and cloud computing. The book is fashioned with several audiences in mind. Readers without a strong educational background in CS--or those who need a refresher--will find the chapters on hardware, operating systems, and programming languages particularly useful. Readers with a strong educational background in CS, but without significant industry background, will find the following chapters especially beneficial: learning R, testing, programming, visualizing and processing data in Python and R, system design for big data, data stores, and software craftsmanship.

Graphical Models, Exponential Families, and Variational Inference - Martin J. Wainwright 2008

The core of this paper is a general set of variational principles for the problems of computing marginal probabilities and modes, applicable to multivariate statistical models in the exponential family.

Deep Learning in Natural Language Processing - Li Deng 2018-05-23

In recent years, deep learning has fundamentally changed the landscapes of a number of areas in artificial intelligence, including speech, vision, natural language, robotics, and game playing. In particular, the striking success of deep learning in a wide variety of natural language processing (NLP) applications has served as a benchmark for the advances in one of the most important tasks in artificial intelligence. This book reviews the state of the art of deep learning research and its successful applications to major NLP tasks, including speech recognition and understanding, dialogue systems, lexical analysis, parsing, knowledge graphs, machine translation, question answering, sentiment analysis, social computing, and natural language generation from images. Outlining and analyzing various research frontiers of NLP in the deep learning era, it features self-contained, comprehensive chapters written by leading researchers in the field. A glossary of technical terms and commonly used acronyms in the intersection of deep learning and NLP is also provided. The book appeals to advanced undergraduate and graduate students, post-doctoral researchers, lecturers and industrial researchers, as well as anyone interested in deep learning and natural language

processing.

Deep Learning for NLP and Speech Recognition - Uday Kamath 2019-06-10

This textbook explains Deep Learning Architecture, with applications to various NLP Tasks, including Document Classification, Machine Translation, Language Modeling, and Speech Recognition. With the widespread adoption of deep learning, natural language processing (NLP),and speech applications in many areas (including Finance, Healthcare, and Government) there is a growing need for one comprehensive resource that maps deep learning techniques to NLP and speech and provides insights into using the tools and libraries for real-world applications. Deep Learning for NLP and Speech Recognition explains recent deep learning methods applicable to NLP and speech, provides state-of-the-art approaches, and offers real-world case studies with code to provide hands-on experience. Many books focus on deep learning theory or deep learning for NLP-specific tasks while others are cookbooks for tools and libraries, but the constant flux of new algorithms, tools, frameworks, and libraries in a rapidly evolving landscape means that there are few available texts that offer the material in this book. The book is organized into three parts, aligning to different groups of readers and their expertise. The three parts are: Machine Learning, NLP, and Speech Introduction The first part has three chapters that introduce readers to the fields of NLP, speech recognition, deep learning and machine learning with basic theory and hands-on case studies using Python-based tools and libraries. Deep Learning Basics The five chapters in the second part introduce deep learning and various topics that are crucial for speech and text processing, including word embeddings, convolutional neural networks, recurrent neural networks and speech recognition basics. Theory, practical tips, state-of-the-art methods, experimentations and analysis in using the methods discussed in theory on real-world tasks. Advanced Deep Learning Techniques for Text and Speech The third part has five chapters that discuss the latest and cutting-edge research in the areas of deep learning that intersect with NLP and speech. Topics including attention mechanisms, memory augmented networks, transfer learning, multi-task learning, domain adaptation, reinforcement learning, and end-to-end deep learning for speech recognition are covered using case studies.

Natural Language Processing with

Python - Steven Bird 2009-06-12
This book offers a highly accessible introduction to natural language processing, the field that supports a variety of language technologies, from predictive text and email filtering to automatic summarization and translation. With it, you'll learn how to write Python programs that work with large collections of unstructured text. You'll access richly annotated datasets using a comprehensive range of linguistic data structures, and you'll understand the main algorithms for analyzing the content and structure of written communication. Packed with examples and exercises, Natural Language Processing with Python will help you: Extract information from unstructured text, either to guess the topic or identify "named entities" Analyze linguistic structure in text, including parsing and semantic analysis Access popular linguistic databases, including WordNet and treebanks Integrate techniques drawn from fields as diverse as linguistics and artificial intelligence This book will help you gain practical skills in natural language processing using the Python programming language and the Natural Language Toolkit (NLTK) open source library. If you're interested in developing web applications, analyzing multilingual news sources, or documenting endangered languages -- or if you're simply curious to have a programmer's perspective on how human language works -- you'll find Natural Language Processing with Python both fascinating and immensely useful.
Deep Learning for Vision Systems - Mohamed Elgendy 2020-11-10
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 intuition. You'll understand how to use deep learning architectures to build vision system applications for image generation and facial recognition. What's inside Image classification and object detection Advanced deep learning architectures Transfer learning and generative adversarial networks DeepDream and neural style transfer Visual embeddings and image search About the reader For intermediate Python programmers. About the author Mohamed Elgendy is the VP of Engineering at Rakuten. A seasoned AI expert, he has previously built and managed AI products at Amazon and Twilio. Table of Contents PART 1 - DEEP LEARNING FOUNDATION 1 Welcome to computer vision 2 Deep learning and neural networks 3 Convolutional neural networks 4 Structuring DL projects and hyperparameter tuning PART 2 - IMAGE CLASSIFICATION AND DETECTION 5 Advanced CNN architectures 6 Transfer learning 7 Object detection with R-CNN, SSD, and YOLO PART 3 - GENERATIVE MODELS AND VISUAL EMBEDDINGS 8 Generative adversarial networks (GANs) 9 DeepDream and neural style transfer 10 Visual embeddings

IRC-SET 2020 - Huaqun Guo 2021-05-11

This book highlights leading-edge research in multi-disciplinary areas in Physics, Engineering, Medicine, and Health care, from the 6th IRC Conference on Science, Engineering and Technology (IRC-SET 2020) held in July 2020 at Singapore. The papers were shortlisted after extensive rounds of reviews by a panel of esteemed individuals who are pioneers in their domains. The book also contains excerpts of the speeches by eminent personalities who graced the

occasion, thereby providing written documentation of the event.

Natural Language Processing with Transformers - Lewis Tunstall 2022-01-26

Since their introduction in 2017, transformers have quickly become the dominant architecture for achieving state-of-the-art results on a variety of natural language processing tasks. If you're a data scientist or coder, this practical book shows you how to train and scale these large models using Hugging Face Transformers, a Python-based deep learning library. Transformers have been used to write realistic news stories, improve Google Search queries, and even create chatbots that tell corny jokes. In this guide, authors Lewis Tunstall, Leandro von Werra, and Thomas Wolf, among the creators of Hugging Face Transformers, use a hands-on approach to teach you how transformers work and how to integrate them in your applications. You'll quickly learn a variety of tasks they can help you solve. Build, debug, and optimize transformer models for core NLP tasks, such as text classification, named entity recognition, and question answering Learn how transformers can be used for cross-lingual transfer learning Apply transformers in real-world scenarios where labeled data is scarce Make transformer models efficient for deployment using techniques such as distillation, pruning, and quantization Train transformers from scratch and learn how to scale to multiple GPUs and distributed environments

Natural Language Processing in Action - Hannes Hapke 2019-03-16

Summary Natural Language Processing in Action is your guide to creating machines that understand human language using the power of Python with its ecosystem of packages dedicated to NLP and AI. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Technology Recent advances in deep learning empower applications to understand text and speech with extreme accuracy. The result? Chatbots that can imitate real people, meaningful resume-to-job matches, superb predictive search, and automatically generated document summaries—all at a low cost. New techniques, along with accessible tools like Keras and TensorFlow, make professional-quality NLP easier than ever before. About the Book Natural Language Processing in Action is your guide to building machines that can read and interpret human

language. In it, you'll use readily available Python packages to capture the meaning in text and react accordingly. The book expands traditional NLP approaches to include neural networks, modern deep learning algorithms, and generative techniques as you tackle real-world problems like extracting dates and names, composing text, and answering free-form questions. What's inside Some sentences in this book were written by NLP! Can you guess which ones? Working with Keras, TensorFlow, gensim, and scikit-learn Rule-based and data-based NLP Scalable pipelines About the Reader This book requires a basic understanding of deep learning and intermediate Python skills. About the Author Hobson Lane, Cole Howard, and Hannes Max Hapke are experienced NLP engineers who use these techniques in production. Table of Contents PART 1 - WORDY MACHINES Packets of thought (NLP overview) Build your vocabulary (word tokenization) Math with words (TF-IDF vectors) Finding meaning in word counts (semantic analysis) PART 2 - DEEPER LEARNING (NEURAL NETWORKS) Baby steps with neural networks (perceptrons and backpropagation) Reasoning with word vectors (Word2vec) Getting words in order with convolutional neural networks (CNNs) Loopy (recurrent) neural networks (RNNs) Improving retention with long short-term memory networks Sequence-to-sequence models and attention PART 3 - GETTING REAL (REAL-WORLD NLP CHALLENGES) Information extraction (named entity extraction and question answering) Getting chatty (dialog engines) Scaling up (optimization, parallelization, and batch processing)

Dependency Parsing - Sandra Kubler 2022-05-31

Dependency-based methods for syntactic parsing have become increasingly popular in natural language processing in recent years. This book gives a thorough introduction to the methods that are most widely used today. After an introduction to dependency grammar and dependency parsing, followed by a formal characterization of the dependency parsing problem, the book surveys the three major classes of parsing models that are in current use: transition-based, graph-based, and grammar-based models. It continues with a chapter on evaluation and one on the comparison of different methods, and it closes with a few words on current trends and future prospects of dependency parsing. The book presupposes a knowledge of basic concepts in linguistics and computer science, as well as some

knowledge of parsing methods for constituency-based representations. Table of Contents: Introduction / Dependency Parsing / Transition-Based Parsing / Graph-Based Parsing / Grammar-Based Parsing / Evaluation / Comparison / Final Thoughts

Introduction to Natural Language Processing - Jacob Eisenstein 2019-10-01

A survey of computational methods for understanding, generating, and manipulating human language, which offers a synthesis of classical representations and algorithms with contemporary machine learning techniques. This textbook provides a technical perspective on natural language processing—methods for building computer software that understands, generates, and manipulates human language. It emphasizes contemporary data-driven approaches, focusing on techniques from supervised and unsupervised machine learning. The first section establishes a foundation in machine learning by building a set of tools that will be used throughout the book and applying them to word-based textual analysis. The second section introduces structured representations of language, including sequences, trees, and graphs. The third section explores different approaches to the representation and analysis of linguistic meaning, ranging from formal logic to neural word embeddings. The final section offers chapter-length treatments of three transformative applications of natural language processing: information extraction, machine translation, and text generation. End-of-chapter exercises include both paper-and-pencil analysis and software implementation. The text synthesizes and distills a broad and diverse research literature, linking contemporary machine learning techniques with the field's linguistic and computational foundations. It is suitable for use in advanced undergraduate and graduate-level courses and as a reference for software engineers and data scientists. Readers should have a background in computer programming and college-level mathematics. After mastering the material presented, students will have the technical skill to build and analyze novel natural language processing systems and to understand the latest research in the field.

Transformers for Machine Learning - Uday Kamath 2022-05-24

Transformers are becoming a core part of many neural network architectures, employed in a wide range of applications such as NLP, Speech Recognition, Time Series, and Computer Vision. Transformers have gone through many

adaptations and alterations, resulting in newer techniques and methods. Transformers for Machine Learning: A Deep Dive is the first comprehensive book on transformers. Key Features: A comprehensive reference book for detailed explanations for every algorithm and techniques related to the transformers. 60+ transformer architectures covered in a comprehensive manner. A book for understanding how to apply the transformer techniques in speech, text, time series, and computer vision. Practical tips and tricks for each architecture and how to use it in the real world. Hands-on case studies and code snippets for theory and practical real-world analysis using the tools and libraries, all ready to run in Google Colab. The theoretical explanations of the state-of-the-art transformer architectures will appeal to postgraduate students and researchers (academic and industry) as it will provide a single entry point with deep discussions of a quickly moving field. The practical hands-on case studies and code will appeal to undergraduate students, practitioners, and professionals as it allows for quick experimentation and lowers the barrier to entry into the field.

Neural Networks and Deep Learning - Charu C. Aggarwal

2018-08-25

This book covers both classical and modern models in deep learning. The primary focus is on the theory and algorithms of deep learning. The theory and algorithms of neural networks are particularly important for understanding important concepts, so that one can understand the important design concepts of neural architectures in different applications. Why do neural networks work? When do they work better than off-the-shelf machine-learning models? When is depth useful? Why is training neural networks so hard? What are the pitfalls? The book is also rich in discussing different applications in order to give the practitioner a flavor of how neural architectures are designed for different types of problems. Applications associated with many different areas like recommender systems, machine translation, image captioning, image classification, reinforcement-learning based gaming, and text analytics are covered. The chapters of this book span three categories: The basics of neural networks: Many traditional machine learning models can be understood as special cases of neural networks. An emphasis is placed in the first two chapters on understanding the relationship between traditional machine

learning and neural networks. Support vector machines, linear/logistic regression, singular value decomposition, matrix factorization, and recommender systems are shown to be special cases of neural networks. These methods are studied together with recent feature engineering methods like word2vec. Fundamentals of neural networks: A detailed discussion of training and regularization is provided in Chapters 3 and 4. Chapters 5 and 6 present radial-basis function (RBF) networks and restricted Boltzmann machines. Advanced topics in neural networks: Chapters 7 and 8 discuss recurrent neural networks and convolutional neural networks. Several advanced topics like deep reinforcement learning, neural Turing machines, Kohonen self-organizing maps, and generative adversarial networks are introduced in Chapters 9 and 10. The book is written for graduate students, researchers, and practitioners. Numerous exercises are available along with a solution manual to aid in classroom teaching. Where possible, an application-centric view is highlighted in order to provide an understanding of the practical uses of each class of techniques.

The Principles of Deep Learning Theory - Daniel A. Roberts 2022-05-26

This volume develops an effective theory approach to understanding deep neural networks of practical relevance.

Linguistic Fundamentals for Natural Language Processing - Emily M. Bender 2013-06-01

Many NLP tasks have at their core a subtask of extracting the dependencies—who did what to whom—from natural language sentences. This task can be understood as the inverse of the problem solved in different ways by diverse human languages, namely, how to indicate the relationship between different parts of a sentence. Understanding how languages solve the problem can be extremely useful in both feature design and error analysis in the application of machine learning to NLP. Likewise, understanding cross-linguistic variation can be important for the design of MT systems and other multilingual applications. The purpose of this book is to present in a succinct and accessible fashion information about the morphological and syntactic structure of human languages that can be useful in creating more linguistically sophisticated, more language-independent, and thus more successful NLP systems. Table of Contents: Acknowledgments / Introduction/motivation /

Morphology: Introduction / Morphophonology / Morphosyntax / Syntax: Introduction / Parts of speech / Heads, arguments, and adjuncts / Argument types and grammatical functions / Mismatches between syntactic position and semantic roles / Resources / Bibliography / Author's Biography / General Index / Index of Languages

Reinforcement Learning, second edition - Richard S. Sutton 2018-11-13

The significantly expanded and updated new edition of a widely used text on reinforcement learning, one of the most active research areas in artificial intelligence. Reinforcement learning, one of the most active research areas in artificial intelligence, is a computational approach to learning whereby an agent tries to maximize the total amount of reward it receives while interacting with a complex, uncertain environment. In Reinforcement Learning, Richard Sutton and Andrew Barto provide a clear and simple account of the field's key ideas and algorithms. This second edition has been significantly expanded and updated, presenting new topics and updating coverage of other topics. Like the first edition, this second edition focuses on core online learning algorithms, with the more mathematical material set off in shaded boxes. Part I covers as much of reinforcement learning as possible without going beyond the tabular case for which exact solutions can be found. Many algorithms presented in this part are new to the second edition, including UCB, Expected Sarsa, and Double Learning. Part II extends these ideas to function approximation, with new sections on such topics as artificial neural networks and the Fourier basis, and offers expanded treatment of off-policy learning and policy-gradient methods. Part III has new chapters on reinforcement learning's relationships to psychology and neuroscience, as well as an updated case-studies chapter including AlphaGo and AlphaGo Zero, Atari game playing, and IBM Watson's wagering strategy. The final chapter discusses the future societal impacts of reinforcement learning.

Introduction to Information Retrieval - Christopher D. Manning 2008-07-07

Class-tested and coherent, this textbook teaches classical and web information retrieval, including web search and the related areas of text classification and text clustering from basic concepts. It gives an up-to-date treatment of all aspects of the design and implementation of systems for gathering, indexing, and searching documents; methods

for evaluating systems; and an introduction to the use of machine learning methods on text collections. All the important ideas are explained using examples and figures, making it perfect for introductory courses in information retrieval for advanced undergraduates and graduate students in computer science. Based on feedback from extensive classroom experience, the book has been carefully structured in order to make teaching more natural and effective. Slides and additional exercises (with solutions for lecturers) are also available through the book's supporting website to help course instructors prepare their lectures.

Time, Space, Matter in Translation - Pamela Beattie 2022-09-14

Time, Space, Matter in Translation considers time, space, and materiality as legitimate habitats of translation. By offering a linked series of interdisciplinary case studies that show translation in action beyond languages and texts, this book provides a capacious and innovative understanding of what translation is, what it does, how, and where. The volume uses translation as a means through which to interrogate processes of knowledge transfer and creation, interpretation and reading, communication and relationship building—but it does so in ways that refuse to privilege one discipline over another, denying any one of them an entitled perspective. The result is a book that is grounded in the disciplines of the authors and simultaneously groundbreaking in how its contributors incorporate translation studies into their work. This is key reading for students in comparative literature—and in the humanities at large—and for scholars interested in seeing how expanding intellectual conversations can develop beyond traditional questions and methods.

Deep Learning for Natural Language Processing - Palash Goyal 2018-06-26

Discover the concepts of deep learning used for natural language processing (NLP), with full-fledged examples of neural network models such as recurrent neural networks, long short-term memory networks, and sequence-2-sequence models. You'll start by covering the mathematical prerequisites and the fundamentals of deep learning and NLP with practical examples. The first three chapters of the book cover the basics of NLP, starting with word-vector representation before moving onto advanced algorithms. The final chapters focus entirely on implementation, and deal with sophisticated architectures such as RNN, LSTM, and Seq2seq, using

Python tools: TensorFlow, and Keras. Deep Learning for Natural Language Processing follows a progressive approach and combines all the knowledge you have gained to build a question-answer chatbot system. This book is a good starting point for people who want to get started in deep learning for NLP. All the code presented in the book will be available in the form of IPython notebooks and scripts, which allow you to try out the examples and extend them in interesting ways. What You Will Learn Gain the fundamentals of deep learning and its mathematical prerequisites Discover deep learning frameworks in Python Develop a chatbot Implement a research paper on sentiment classification Who This Book Is For Software developers who are curious to try out deep learning with NLP.

Document Analysis and Recognition – ICDAR 2021 - Josep Lladós 2021-09-04

This four-volume set of LNCS 12821, LNCS 12822, LNCS 12823 and LNCS 12824, constitutes the refereed proceedings of the 16th International Conference on Document Analysis and Recognition, ICDAR 2021, held in Lausanne, Switzerland in September 2021. The 182 full papers were carefully reviewed and selected from 340 submissions, and are presented with 13 competition reports. The papers are organized into the following topical sections: document analysis for literature search, document summarization and translation, multimedia document analysis, mobile text recognition, document analysis for social good, indexing and retrieval of documents, physical and logical layout analysis, recognition of tables and formulas, and natural language processing (NLP) for document understanding.

Foundations of Statistical Natural Language Processing - Christopher Manning 1999-05-28

Statistical approaches to processing natural language text have become dominant in recent years. This foundational text is the first comprehensive introduction to statistical natural language processing (NLP) to appear. The book contains all the theory and algorithms needed for building NLP tools. It provides broad but rigorous coverage of mathematical and linguistic foundations, as well as detailed discussion of statistical methods, allowing students and researchers to construct their own implementations. The book covers collocation finding, word sense disambiguation, probabilistic parsing, information retrieval, and

other applications.

Multimodal Sentiment Analysis - Soujanya Poria 2018-10-24

This latest volume in the series, Socio-Affective Computing, presents a set of novel approaches to analyze opinionated videos and to extract sentiments and emotions. Textual sentiment analysis framework as discussed in this book contains a novel way of doing sentiment analysis by merging linguistics with machine learning. Fusing textual information with audio and visual cues is found to be extremely useful which improves text, audio and visual based unimodal sentiment analyzer. This volume covers the three main topics of: textual preprocessing and sentiment analysis methods; frameworks to process audio and visual data; and methods of textual, audio and visual features fusion. The inclusion of key visualization and case studies will enable readers to understand better these approaches. Aimed at the Natural Language Processing, Affective Computing and Artificial Intelligence audiences, this comprehensive volume will appeal to a wide readership and will help readers to understand key details on multimodal sentiment analysis.

Speech & Language Processing - Dan Jurafsky 2000-09

Natural Language Processing with PyTorch - Delip Rao 2019-01-22

Natural Language Processing (NLP) provides boundless opportunities for solving problems in artificial intelligence, making products such as Amazon Alexa and Google Translate possible. If you're a developer or data scientist new to NLP and deep learning, this practical guide shows you how to apply these methods using PyTorch, a Python-based deep learning library. Authors Delip Rao and Brian McMahon provide you with a solid grounding in NLP and deep learning algorithms and demonstrate how to use PyTorch to build applications involving rich representations of text specific to the problems you face. Each chapter includes several code examples and illustrations. Explore computational graphs and the supervised learning paradigm Master the basics of the PyTorch optimized tensor manipulation library Get an overview of traditional NLP concepts and methods Learn the basic ideas involved in building neural networks Use embeddings to represent words, sentences, documents, and other features Explore sequence prediction and generate sequence-to-sequence models Learn design patterns for building production NLP systems

Neural Network Methods in Natural Language Processing - Yoav Goldberg 2017-04-17

Neural networks are a family of powerful machine learning models and this book focuses on their application to natural language data. The first half of the book (Parts I and II) covers the basics of supervised machine learning and feed-forward neural networks, the basics of working with machine learning over language data, and the use of vector-based rather than symbolic representations for words. It also covers the computation-graph abstraction, which allows to easily define and train arbitrary neural networks, and is the basis behind the design of contemporary neural network software libraries. The second part of the book (Parts III and IV) introduces more specialized neural network architectures, including 1D convolutional neural networks, recurrent neural networks, conditioned-generation models, and attention-based models. These architectures and techniques are the driving force behind state-of-the-art algorithms for machine translation, syntactic parsing, and many other applications. Finally, we also discuss tree-shaped networks, structured prediction, and the prospects of multi-task learning.

- Patrick Juola 2008

Authorship Attribution surveys the history and present state of the discipline, presenting some comparative results where available. It also provides a theoretical and empirically-tested basis for further work. Many modern techniques are described and evaluated, along with some insights for application for novices and experts alike.

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