Distributed Deep Neural Networks Over The Cloud The Edge

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Next-Generation Machine Learning with Spark
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Build and deploy distributed deep learning applications on Apache Spark
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Ultra-Low-Latency Distributed Deep Neural Network Over Hierarchical Mobile Networks
Pièces de Nivière-Chol, ci-devant maire de Lyon. Exposition et justification de sa conduite, particulièrement dans les événements de février 1793. En marge de la première pièce : Renvoyé au Comité de sûreté générale par celui des pétitions et correspondances Signé : St-Prix, président
Technical Basis and Clinical Applications
Discovery Science
Over 80 recipes that streamline deep learning in a distributed environment with Apache Spark
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Efficient Processing of Deep Neural Networks
Parallel and Distributed Approaches
Scaling Up Machine Learning
Opportunities and Challenges
2020 57th ACM IEEE Design Automation Conference (DAC)
Deep Learning with MATLAB
Deep Neural Networks for Multimodal Imaging and Biomedical Applications
Artificial Intelligence and Security
Data Science and Security
Apache Spark Deep Learning Cookbook
Optimization, Deep Learning, and Applications
Mobile Edge Computing
Second EAI International Conference, 5GWN 2019, Changsha, China, February 23-24, 2019, Proceedings
Algorithms and Architectures for Parallel Processing
5G for Future Wireless Networks
21st International Conference, ICA3PP 2021, Virtual Event, December 3–5, 2021, Proceedings, Part II
ICWE 2021 International Workshops, BECS and Invited Papers, Biarritz, France, May 18–21, 2021, Revised Selected Papers
Privacy-Preserving Deep Learning
5th International Conference, ICAIS 2019, New York, NY, USA, July 26-28, 2019, Proceedings, Part I
Embedded Computer Systems: Architectures, Modeling, and Simulation
Deep Learning for Robot Perception and Cognition
Edge Intelligence in the Making

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Springer Nature

With the explosive growth of mobile computing and Internet of Things (IoT) applications, as exemplified by AR/VR, smart city, and video/audio surveillance, billions of mobile and IoT devices are being connected to the Internet, generating zillions of bytes of data at the network edge. Driven by this trend, there is an urgent need to push the frontiers of artificial intelligence (AI) to the network edge to fully unleash the potential of IoT big data. Indeed, the marriage of edge computing and AI has resulted in innovative solutions, namely edge intelligence or edge AI. Nevertheless, research and practice on this emerging inter-disciplinary field is still in its infancy stage. To facilitate the dissemination of the recent advances in edge intelligence in both academia and industry, this book conducts a comprehensive and detailed survey of the recent research efforts and also showcases the authors' own research progress on edge intelligence. Specifically, the book first reviews the background and present motivation for AI running at the network edge. Next, it provides an overview of the overarching architectures, frameworks, and emerging key technologies for deep learning models toward training/inference at the network edge. To illustrate the research problems for edge intelligence, the book also showcases four of the authors' own research projects on edge intelligence, ranging from rigorous theoretical analysis to studies based on realistic implementation. Finally, it discusses the applications, marketplace, and future research opportunities of edge intelligence. This emerging interdisciplinary field offers many open problems and yet also tremendous opportunities, and this book only touches the tip of iceberg. Hopefully, this book will elicit escalating attention, stimulate fruitful discussions, and open new directions on edge intelligence.

State of the Art Springer
Cluster Computing, Grid Computing, Edge Computing, Cloud Computing, Parallel Computing, Distributed Computing
Next-Generation Machine Learning with Spark Cambridge University Press
The world s premier EDA and semiconductor design conference and exhibition DAC features over 60 sessions on design methodologies and EDA tool developments, keynotes, panels, plus the NEW User Track presentations A diverse worldwide community representing more than 1,000 organizations attends each year, from system designers and architects, logic and circuit designers, validation engineers, CAD managers, senior managers and executives to researchers and academicians from leading universities
Edge Computing and IoT: Systems, Management and Security Packt Publishing Ltd
This integrated collection covers a range of parallelization platforms, concurrent programming frameworks and machine learning settings, with case studies.
Distributed Deep Neural Networks Springer Nature
This book presents the best-selected papers presented at the International Conference on Data Science, Computation and Security (IDSCS-2021), organized by the Department of Data Science, CHRIST (Deemed to be University), Pune Lavasa Campus, India, during April 16–17, 2021. The proceeding is targeting the current research works in the areas of data science, data security, data analytics, artificial intelligence, machine learning, computer vision, algorithms design, computer networking, data mining, big data, text mining, knowledge representation, soft computing, and cloud computing.
Deep Learning and Parallel Computing Environment for Bioengineering Systems Morgan & Claypool Publishers
This book constitutes the proceedings of the Second International Conference on 5G for Future Wireless Networks, 5GWN 2019, held in Changsa, China, in February 2019. The 13 full papers were selected from 34 submissions and present the state of the art and practical applications of 5G technologies. The papers are arranged thematically on optimization theory and applications, intelligent computing technology for 5G applications, resource allocation and management, and security and privacy in emerging 5G applications.
Build and deploy distributed deep learning applications on Apache Spark Manning
Build, implement and scale distributed deep learning models for large-scale datasets About This Book Get to grips with the deep learning concepts and set up Hadoop to put them to use Implement and parallelize deep learning models on Hadoop's YARN framework A comprehensive tutorial to distributed deep learning with Hadoop Who This Book Is For If you are a data scientist who wants to learn how to perform deep learning on Hadoop, this is the book for you. Knowledge of the basic machine learning concepts and some understanding of Hadoop is required to make the best use of this book. What You Will Learn Explore Deep Learning and various models associated with it Understand the challenges of implementing distributed deep learning with Hadoop and how to overcome it Implement Convolutional Neural Network (CNN) with deeplearning4j Delve into the implementation of Restricted Boltzmann Machines (RBM) Understand the mathematical explanation for implementing Recurrent Neural Networks (RNN) Get hands on practice of deep learning and their implementation with Hadoop. In Detail This book will teach you how to deploy large-scale dataset in deep neural networks with Hadoop for optimal performance. Starting with understanding what deep learning is, and what the various models associated with deep neural networks are, this book will then show you how to set up the Hadoop environment for deep learning. In this book, you will also learn how to overcome the challenges that you face while implementing distributed deep learning with large-scale unstructured datasets. The book will also show you how you can implement and parallelize the widely used deep learning models such as Deep Belief Networks, Convolutional Neural Networks, Recurrent Neural Networks, Restricted Boltzmann Machines and autoencoder using the popular deep learning library deeplearning4j. Get in-depth mathematical explanations and visual representations to help you understand the design and implementations of Recurrent Neural network and Denoising AutoEncoders with deeplearning4j. To give you a more practical perspective, the book will also teach you the implementation of large-scale video processing, image processing and natural language processing on Hadoop. By the end of this book, you will know how to deploy various deep neural networks in distributed systems using Hadoop. Style and approach This book takes a comprehensive, step-by-step approach to implement efficient deep learning models on Hadoop. It starts from the basics and builds the readers' knowledge as they strengthen their understanding of the concepts. Practical examples are included in every step of the way to supplement the theory.
Large-Scale Scientific Computing Cambridge University Press
Deep Learning is a subset of Machine Learning where data sets with several layers of complexity can be processed. This book teaches you the different techniques using which deep learning solutions can be implemented at scale, on Apache Spark. This will help you gain experience of implementing your deep learning models in many real-world use cases.
8th Latin American Conference, CARLA 2021, Guadalajara, Mexico, October 6–8, 2021, Revised Selected Papers Springer
Shaping Future 6G Networks Discover the societal and technology drivers contributing to build the next generation of wireless telecommunication networks Shaping Future 6G Networks: Needs, Impacts, and Technologies is a holistic snapshot on the evolution of 5G technologies towards 6G. With contributions from international key players in industry and academia, the book presents the hype versus the realistic capabilities of 6G technologies, and delivers cutting-edge business and technological insights into the future wireless telecommunications landscape. You'll learn about: Forthcoming demand for post 5G networks, including new requirements coming from small and large businesses, manufacturing, logistics, and automotive industry Societal implications of 6G, including digital sustainability, strategies for increasing energy efficiency, as well as future open networking ecosystems Impacts of integrating non-terrestrial networks to build the 6G architecture Opportunities for emerging THz radio access technologies in future integrated communications, positioning, and sensing capabilities in 6G Design of highly modular and distributed 6G core networks driven by the ongoing RAN-Core integration and the benefits of AI/ML-based control and management Disruptive architectural considerations influenced by the Post-Shannon Theory The insights in Shaping Future 6G Networks will greatly benefit IT engineers and managers focused on the future of networking, as well as undergraduate and graduate engineering students focusing on the design, implementation, and management of mobile networks and applications.
Ridge Functions Springer Nature
Deep neural networks have become popular for solving machine learning problems in the field of computer vision. Although computers have reached parity in the task of image classification in machine learning competitions, the task of mining massive

training data often takes expensive hardware a long time to process. Distributed protocol for model training can be attractive because less powerful distributed nodes are cheaper to operate than specialized high-performance cluster. Stochastic gradient descent (SGD) is a popular optimizer at the heart of many deep learning systems. To investigate the performance of distributed asynchronous SGD, Tensorflow deep learning framework was tested with Downpour SGD and Delay Compensated SGD to see effect of model training in typical commercial environments. Experimental results show that both Downpour and Delay Compensated SGD are viable protocols for distributed deep learning.

24th International Conference, DS 2021, Halifax, NS, Canada, October 11–13, 2021, Proceedings Springer Nature

This book provides a comprehensive introduction to current state-of-the-art auto-segmentation approaches used in radiation oncology for auto-delineation of organs-of-risk for thoracic radiation treatment planning. Containing the latest, cutting edge technologies and treatments, it explores deep-learning methods, multi-atlas-based methods, and model-based methods that are currently being developed for clinical radiation oncology applications. Each chapter focuses on a specific aspect of algorithm choices and discusses the impact of the different algorithm modules to the algorithm performance as well as the implementation issues for clinical use (including data curation challenges and auto-contour evaluations). This book is an ideal guide for radiation oncology centers looking to learn more about potential auto-segmentation tools for their clinic in addition to medical physicists commissioning auto-segmentation for clinical use. Features: Up-to-date with the latest technologies in the field Edited by leading authorities in the area, with chapter contributions from subject area specialists All approaches presented in this book are validated using a standard benchmark dataset established by the Thoracic Auto-segmentation Challenge held as an event of the 2017 Annual Meeting of American Association of Physicists in Medicine

Ultra-Low-Latency Distributed Deep Neural Network Over Hierarchical Mobile Networks IGI Global

Deep Learning and Parallel Computing Environment for Bioengineering Systems delivers a significant forum for the technical advancement of deep learning in parallel computing environment across bio-engineering diversified domains and its applications. Pursuing an interdisciplinary approach, it focuses on methods used to identify and acquire valid, potentially useful knowledge sources. Managing the gathered knowledge and applying it to multiple domains including health care, social networks, mining, recommendation systems, image processing, pattern recognition and predictions using deep learning paradigms is the major strength of this book. This book integrates the core ideas of deep learning and its applications in bio engineering application domains, to be accessible to all scholars and academicians. The proposed techniques and concepts in this book can be extended in future to accommodate changing business organizations' needs as well as practitioners' innovative ideas. Presents novel, in-depth research contributions from a methodological/application perspective in understanding the fusion of deep machine learning paradigms and their capabilities in solving a diverse range of problems Illustrates the state-of-the-art and recent developments in the new theories and applications of deep learning approaches applied to parallel computing environment in bioengineering systems Provides concepts and technologies that are successfully used in the implementation of today's intelligent data-centric critical systems and multi-media Cloud-Big data

Pièces de Nivière-Chol, ci-devant maire de Lyon. Exposition et justification de sa conduite, particulièrement dans les événements de février 1793. En marge de la première pièce : Renvoyé au Comité de sûreté générale par celui des pétitions et correspondances Signé : St-Prix, président John Wiley & Sons

Distributed Deep Neural Networks

Technical Basis and Clinical Applications Independently Published

The treatment of large data requires the use of computational structures that implement parallelism and distributed computing. The Big Data structures are responsible for providing these characteristics to computing. The treatment of large data requires the use of computational structures that implement parallelism and distributed computing. The Big Data structures are responsible for providing these characteristics to computing. You can train a convolutional neural network (CNN, ConvNet) or long short-term memory networks (LSTM or BiLSTM networks) using the trainNetwork function. You can choose the execution environment (CPU, GPU, multi-GPU, and parallel) using trainingOptions. Training in parallel, or on a GPU, requires Parallel Computing Toolbox.Neural networks are inherently parallel algorithms. Multicore CPUs, graphical processing units (GPUs), and clusters of computers with multiple CPUs and GPUs can take advantage of this parallelism. Parallel Computing Toolbox, when used in conjunction with Deep Learning Toolbox, enables neural network training and simulation to take advantage of each mode of parallelism. Distributed and GPU computing can be combined to run calculations across multiple CPUs and/or GPUs on a single computer, or on a cluster with MATLAB Distributed Computing Server.Parallel Computing Toolbox allows neural network training and simulation to run acrossmultiple CPU cores on a single PC, or across multiple CPUs on multiple computers on anetwork using MATLAB Distributed Computing Server.Using multiple cores can speed calculations. Using multiple computers can allow you tosolve problems using data sets too big to fi in the RAM of a single computer. The onlylimit to problem size is the total quantity of RAM available across all computers.To manage cluster configurations use the Cluster Profil Manager. You can train a convolutional neural network (CNN, ConvNet) or long short-term memory networks (LSTM or BiLSTM networks) using the trainNetwork function. You can choose the execution environment (CPU, GPU, multi-GPU, and parallel) using trainingOptions. Training in parallel, or on a GPU, requires Parallel Computing Toolbox.Neural networks are inherently parallel algorithms. Multicore CPUs, graphical processing units (GPUs), and clusters of computers with multiple CPUs and GPUs can take advantage of this parallelism. Parallel Computing Toolbox, when used in conjunction with Deep Learning Toolbox, enables neural network training and simulation to take advantage of each mode of parallelism. Distributed and GPU computing can be combined to run calculations across multiple CPUs and/or GPUs on a single computer, or on a cluster with MATLAB Distributed Computing Server. Parallel Computing Toolbox allows neural network training and simulation to run acrossmultiple CPU cores on a single PC, or across multiple CPUs on multiple computers on anetwork using MATLAB Distributed Computing Server.Using multiple cores can speed calculations. Using multiple computers can allow you tosolve problems using data sets too big to fi in the RAM of a single computer. The onlylimit to problem size is the total quantity of RAM available across all computers.To manage cluster configurations use the Cluster Profil Manager.

Discovery Science Springer Nature

Mobile Edge Artificial Intelligence: Opportunities and Challenges presents recent advances in wireless technologies and nonconvex optimization techniques for designing efficient edge AI systems. The book includes comprehensive coverage on modeling, algorithm design and theoretical analysis. Through

typical examples, the powerfulness of this set of systems and algorithms is demonstrated, along with their abilities to make low-latency, reliable and private intelligent decisions at network edge. With the availability of massive datasets, high performance computing platforms, sophisticated algorithms and software toolkits, AI has achieved remarkable success in many application domains. As such, intelligent wireless networks will be designed to leverage advanced wireless communications and mobile computing technologies to support AI-enabled applications at various edge mobile devices with limited communication, computation, hardware and energy resources. Presents advanced key enabling techniques, including model compression, wireless MapReduce and wireless cooperative transmission Provides advanced 6G wireless techniques, including over-the-air computation and reconfigurable intelligent surface Includes principles for designing communication-efficient edge inference systems, communication-efficient training systems, and communication-efficient optimization algorithms for edge machine learning

Over 80 recipes that streamline deep learning in a distributed environment with Apache Spark Academic Press
The three volume set LNCS 13155, 13156, and 13157 constitutes the refereed proceedings of the 21st International Conference on Algorithms and Architectures for Parallel Processing, ICA3PP 2021, which was held online during December 3-5, 2021. The total of 145 full papers included in these proceedings were carefully reviewed and selected from 403 submissions. They cover the many dimensions of parallel algorithms and architectures including fundamental theoretical approaches, practical experimental projects, and commercial components and systems. The papers were organized in topical sections as follows: Part I, LNCS 13155: Deep learning models and applications; software systems and efficient algorithms; edge computing and edge intelligence; service dependability and security algorithms; data science; Part II, LNCS 13156: Software systems and efficient algorithms; parallel and distributed algorithms and applications; data science; edge computing and edge intelligence; blockchain systems; deept learning models and applications; IoT; Part III, LNCS 13157: Blockchain systems; data science; distributed and network-based computing; edge computing and edge intelligence; service dependability and security algorithms; software systems and efficient algorithms.

Edge Computing for Distributed Deep Neural Network Inference Distributed Deep Neural NetworksDeep neural networks have become popular for solving machine learning problems in the field of computer vision. Although computers have reached parity in the task of image classification in machine learning competitions, the task of mining massive training data often takes expensive hardware a long time to process. Distributed protocol for model training can be attractive because less powerful distributed nodes are cheaper to operate than specialized high-performance cluster. Stochastic gradient descent (SGD) is a popular optimizer at the heart of many deep learning systems. To investigate the performance of distributed asynchronous SGD, Tensorflow deep learning framework was tested with Downpour SGD and Delay Compensated SGD to see effect of model training in typical commercial environments. Experimental results show that both Downpour and Delay Compensated SGD are viable protocols for distributed deep learning.Ultra-Low-Latency Distributed Deep Neural Network Over Hierarchical Mobile NetworksDistributed Deep Learning with Apache Spark"Deep learning is a subfield of Artificial Intelligence and Machine Learning where a huge amount of data is processed in complex layers of neural networks. It has solved tons of interesting real-world problems in recent years. Distributed deep learning (DL) involves training a deep neural network in parallel across multiple machines. In this course, you will get started with implementing Deep Learning solutions easily with the help of Apache Spark. You will begin with a short introduction on Deep Learning and Apache Spark and the principles of distributed modeling. With the help of real-world examples, you will investigate different types of neural network and work with DL libraries such as BigDL, Deeplearning4j, and the Deep Learning pipelines library to implement DL models and distributed computing on Spark. You will see how you can easily use a large dataset to implement efficient DL solutions to simplify real-world examples. You will also learn how to distribute the computationally heavy parts of DL into processes with the help of Apache Spark. By the end of this course, you'll have gained experience in implementing Distributed Deep Learning for your models at work. Our examples will be based on real-world problems from the banking industry."--Resource description page.Efficient Processing of Deep Neural Networks

Access real-world documentation and examples for the Spark platform for building large-scale, enterprise-grade machine learning applications. The past decade has seen an astonishing series of advances in machine learning. These breakthroughs are disrupting our everyday life and making an impact across every industry. Next-Generation Machine Learning with Spark provides a gentle introduction to Spark and Spark MLlib and advances to more powerful, third-party machine learning algorithms and libraries beyond what is available in the standard Spark MLlib library. By the end of this book, you will be able to apply your knowledge to real-world use cases through dozens of practical examples and insightful explanations. What You Will Learn Be introduced to machine learning, Spark, and Spark MLlib 2.4.x Achieve lightning-fast gradient boosting on Spark with the XGBoost4J-Spark and LightGBM libraries Detect anomalies with the Isolation Forest algorithm for Spark Use the Spark NLP and Stanford CoreNLP libraries that support multiple languages Optimize your ML workload with the Alluxio in-memory data accelerator for Spark Use GraphX and GraphFrames for Graph Analysis Perform image recognition using convolutional neural networks Utilize the Keras framework and distributed deep learning libraries with Spark Who This Book Is For Data scientists and machine learning engineers who want to take their knowledge to the next level and use Spark and more powerful, next-generation algorithms and libraries beyond what is available in the standard Spark MLlib library; also serves as a primer for aspiring data scientists and engineers who need an introduction to machine learning, Spark, and Spark MLlib.

Applying Distributed Learning of Deep Neural Networks to Improve Their Classification Accuracy on Radio-Frequency Datasets Springer

As an important enabler for changing people’s lives, advances in artificial intelligence (AI)-based applications and services are on the rise, despite being hindered by efficiency and latency issues. By focusing on deep learning as the most representative technique of AI, this book provides a comprehensive overview of how AI services are being applied to the network edge near the data sources, and demonstrates how AI and edge computing can be mutually beneficial. To do so, it introduces and discusses: 1) edge intelligence and intelligent edge; and 2) their implementation methods and enabling technologies, namely AI training and inference in the customized edge computing framework. Gathering essential information previously scattered across the communication, networking, and AI areas, the book can help readers to understand the connections between key enabling technologies, e.g. a) AI applications in edge; b) AI inference in edge; c) AI training for edge; d) edge computing for

AI; and e) using AI to optimize edge. After identifying these five aspects, which are essential for the fusion of edge computing and AI, it discusses current challenges and outlines future trends in achieving more pervasive and fine-grained intelligence with the aid of edge computing.

Efficient Processing of Deep Neural Networks Springer Nature This book presents the proceedings of the Computing Conference 2019, providing a comprehensive collection of chapters focusing on core areas of computing and their real-world applications. Computing is an extremely broad discipline, encompassing a range of specialized fields, each focusing on particular areas of technology and types of application, and the conference offered pioneering researchers, scientists, industrial engineers, and students from around the globe a platform to share new ideas and development experiences. Providing state-of-the-art intelligent methods and techniques for solving real- world problems, the book inspires further research and technological advances in this important area.

Parallel and Distributed Approaches Springer Nature Artificial Intelligence Medicine: Technical Basis and Clinical Applications presents a comprehensive overview of the field, ranging from its history and technical foundations, to specific clinical applications and finally to prospects. Artificial Intelligence (AI) is expanding across all domains at a breakneck speed. Medicine, with the availability of large multidimensional datasets, lends itself to strong potential advancement with the appropriate harnessing of AI. The integration of AI can occur throughout the continuum of medicine: from basic laboratory discovery to clinical application and healthcare delivery. Integrating AI within medicine has been met with both excitement and scepticism. By understanding how AI works, and developing an appreciation for both limitations and strengths, clinicians can harness its computational power to streamline workflow and improve patient care. It also provides the opportunity to improve upon research methodologies beyond what is currently available using traditional statistical approaches. On the other hand, computers scientists and data analysts can provide solutions, but often lack easy access to clinical insight that may help focus their efforts. This book provides vital background knowledge to help bring these two groups together, and to engage in more streamlined dialogue to yield productive collaborative solutions in the field of medicine. Provides history and overview of artificial intelligence, as narrated by pioneers in the field Discusses broad and deep background and updates on recent advances in both medicine and artificial intelligence that enabled the application of artificial intelligence Addresses the ever-expanding application of this novel technology and discusses some of the unique challenges associated with such an approach