

Deep Reinforcement Learning That Matters Arxiv

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Information Retrieval - Yi Chang 2023-02-02

This book constitutes the refereed proceedings of the 28th China Conference on Information Retrieval, CCIR 2022, held in Chongqing, China, in September 2022. Information retrieval aims to meet the demand of human on the Internet to obtain information quickly and accurately. The 8 full papers presented were carefully reviewed and selected from numerous submissions. The papers provide a wide range of research results in information retrieval area.

Intelligent Environments 2021 - M. Luštrek 2021-07

Intelligent environments (IE) combine physical spaces with ICT and pervasive technology to improve a user's awareness of their surroundings, empower them to carry out tasks, enrich their experience, and enhance their ability to manage such environments. A growing community, from academia to practitioners, is working to bring intelligent environments to life. This work is driven by the innovative ideas and technological progress that are making the sensors and computing devices required for intelligent environments more affordable and energy-efficient. This book presents papers from Workshops held during the 17th International Conference on Intelligent Environments, IE2021. The conference was due to take place in Dubai, UAE, but was held as a virtual event from 21 to 24 June 2021 due to the restrictions associated with the Covid-19 pandemic. Included here are the proceedings of the 10th International Workshop on the Reliability of Intelligent Environments (WoRIE'21), the 3rd International Workshop on Intelligent Environments and Buildings (IEB'21), the 1st International Workshop on Self-Learning in Intelligent Environments (SeLIE'21), and the 1st International Workshop on Artificial Intelligence and Machine Learning for Emerging Topics (ALLEGET'21). The contributions to these workshops reflect the multi-disciplinary and transversal aspects of intelligent environments, and cover the latest research and development in intelligent environments and related areas, focusing on pushing the boundaries and contributing to the establishment of intelligent environments in the real world. Offering a state-of-the-art overview of current progress, the book will be of particular interest to all those working in the field of intelligent environments.

Reinforcement Learning - Phil Winder Ph.D. 2020-11-06

Reinforcement learning (RL) will deliver one of the biggest breakthroughs in AI over the next decade, enabling algorithms to learn from their environment to achieve arbitrary goals. This exciting development avoids constraints found in traditional machine learning (ML) algorithms. This practical book shows data science and AI professionals how to learn by reinforcement and enable a machine to learn by itself. Author Phil Winder of Winder Research covers everything from basic building blocks to state-of-the-art practices. You'll explore the current state of RL, focus on industrial applications, learn numerous algorithms, and benefit from dedicated chapters on deploying RL solutions to production. This is no cookbook; doesn't shy away from math and expects familiarity with ML. Learn what RL is and how the algorithms help solve problems Become grounded in RL fundamentals including Markov decision processes, dynamic programming, and temporal difference learning Dive deep into a range of value and policy gradient methods Apply advanced RL solutions such as meta learning, hierarchical learning, multi-agent, and imitation learning Understand cutting-edge deep RL algorithms including Rainbow, PPO, TD3, SAC, and more Get practical examples through the accompanying website

Machine Learning and Pattern Recognition Methods in Chemistry from

Multivariate and Data Driven Modeling - Jahan B. Ghasemi 2022-11-01

Machine Learning and Pattern Recognition Methods in Chemistry from Multivariate and Data Driven Modeling outlines key knowledge in this area, combining critical introductory approaches with the latest advanced techniques. Beginning with an introduction of univariate and multivariate statistical analysis, the book then explores multivariate calibration and validation methods. Soft modeling in chemical data analysis, hyperspectral data analysis, and autoencoder applications in analytical chemistry are then discussed, providing useful examples of the techniques in chemistry applications. Drawing on the knowledge of a global team of researchers, this book will be a helpful guide for chemists interested in developing their skills in multivariate data and error analysis. Provides an introductory overview of statistical methods for the analysis and interpretation of chemical data Discusses the use of machine learning for recognizing patterns in multidimensional chemical data Identifies common sources of

multivariate errors

Neural Information Processing - Haiqin Yang 2020-11-18

The two-volume set CCIS 1332 and 1333 constitutes thoroughly refereed contributions presented at the 27th International Conference on Neural Information Processing, ICONIP 2020, held in Bangkok, Thailand, in November 2020.* For ICONIP 2020 a total of 378 papers was carefully reviewed and selected for publication out of 618 submissions. The 191 papers included in this volume set were organized in topical sections as follows: data mining; healthcare analytics-improving healthcare outcomes using big data analytics; human activity recognition; image processing and computer vision; natural language processing; recommender systems; the 13th international workshop on artificial intelligence and cybersecurity; computational intelligence; machine learning; neural network models; robotics and control; and time series analysis. * The conference was held virtually due to the COVID-19 pandemic.

Leveraging Applications of Formal Methods, Verification and Validation.

Verification Principles - Tiziana Margaria 2022-10-19

This four-volume set LNCS 13701-13704 constitutes contributions of the associated events held at the 11th International Symposium on Leveraging Applications of Formal Methods, ISoLA 2022, which took place in Rhodes, Greece, in October/November 2022. The contributions in the four-volume set are organized according to the following topical sections: specify this - bridging gaps between program specification paradigms; x-by-construction meets runtime verification; verification and validation of concurrent and distributed heterogeneous systems; programming - what is next: the role of documentation; automated software re-engineering; DIME day; rigorous engineering of collective adaptive systems; formal methods meet machine learning; digital twin engineering; digital thread in smart manufacturing; formal methods for distributed computing in future railway systems; industrial day.

Intelligent Computing Theories and Application - De-Shuang Huang 2022-08-14

This two-volume set of LNCS 13393 and LNCS 13394 constitutes - in conjunction with the volume LNAI 13395 - the refereed proceedings of the 18th International Conference on Intelligent Computing, ICIC 2022, held in Xi'an, China, in August 2022. The 209 full papers of the three proceedings volumes were carefully reviewed and selected from 449 submissions. This year, the conference concentrated mainly on the theories and methodologies as well as the emerging applications of intelligent computing. Its aim was to unify the picture of contemporary intelligent computing techniques as an integral concept that highlights the trends in advanced computational intelligence and bridges theoretical research with applications. Therefore, the theme for this conference was "Advanced Intelligent Computing Technology and Applications". Papers focused on this theme were solicited, addressing theories, methodologies, and applications in science and technology.

Deep Learning - Ian Goodfellow 2016-11-10

An introduction to a broad range of topics in deep learning, covering mathematical and conceptual background, deep learning techniques used in industry, and research perspectives. "Written by three experts in the field, Deep Learning is the only comprehensive book on the subject."

—Elon Musk, cochair of OpenAI; cofounder and CEO of Tesla and SpaceX

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

Deep Learning for Internet of Things Infrastructure - Uttam Ghosh 2021-09-30

This book promotes and facilitates exchanges of research knowledge and findings across different disciplines on the design and investigation of deep learning (DL)-based data analytics of IoT (Internet of Things) infrastructures. Deep Learning for Internet of Things Infrastructure addresses emerging trends and issues on IoT systems and services across various application domains. The book investigates the challenges posed by the implementation of deep learning on IoT networking models and services. It provides fundamental theory, model, and methodology in interpreting, aggregating, processing, and analyzing data for intelligent DL-enabled IoT. The book also explores new functions and technologies to provide adaptive services and intelligent applications for different end users. FEATURES Promotes and facilitates exchanges of research knowledge and findings across different disciplines on the design and investigation of DL-based data analytics of IoT infrastructures Addresses

emerging trends and issues on IoT systems and services across various application domains Investigates the challenges posed by the implementation of deep learning on IoT networking models and services Provides fundamental theory, model, and methodology in interpreting, aggregating, processing, and analyzing data for intelligent DL-enabled IoT Explores new functions and technologies to provide adaptive services and intelligent applications for different end users Uttam Ghosh is an Assistant Professor in the Department of Electrical Engineering and Computer Science, Vanderbilt University, Nashville, Tennessee, USA. Mamoun Alazab is an Associate Professor in the College of Engineering, IT and Environment at Charles Darwin University, Australia. Ali Kashif Bashir is a Senior Lecturer/Associate Professor and Program Leader of BSc (H) Computer Forensics and Security at the Department of Computing and Mathematics, Manchester Metropolitan University, United Kingdom. Al-Sakib Khan Pathan is an Adjunct Professor of Computer Science and Engineering at the Independent University, Bangladesh.

Encyclopedia of Machine Learning - Claude Sammut 2011-03-28

This comprehensive encyclopedia, in A-Z format, provides easy access to relevant information for those seeking entry into any aspect within the broad field of Machine Learning. Most of the entries in this preeminent work include useful literature references.

Doing AI - Richard Heimann 2021-12-14

Artificial intelligence (AI) has captured our imaginations—and become a distraction. Too many leaders embrace the oversized narratives of artificial minds outpacing human intelligence and lose sight of the original problems they were meant to solve. When businesses try to “do AI,” they place an abstract solution before problems and customers without fully considering whether it is wise, whether the hype is true, or how AI will impact their organization in the long term. Often absent is sound reasoning for why they should go down this path in the first place. *Doing AI* explores AI for what it actually is—and what it is not— and the problems it can truly solve. In these pages, author Richard Heimann unravels the tricky relationship between problems and high-tech solutions, exploring the pitfalls in solution-centric thinking and explaining how businesses should rethink AI in a way that aligns with their cultures, goals, and values. As the Chief AI Officer at Cybraics Inc., Richard Heimann knows from experience that AI-specific strategies are often bad for business. *Doing AI* is his comprehensive guide that will help readers understand AI, avoid common pitfalls, and identify beneficial applications for their companies. This book is a must-read for anyone looking for clarity and practical guidance for identifying problems and effectively solving them, rather than getting sidetracked by a shiny new “solution” that doesn’t solve anything.

Learning to Play - Aske Plaat 2020-12-23

In this textbook the author takes as inspiration recent breakthroughs in game playing to explain how and why deep reinforcement learning works. In particular he shows why two-person games of tactics and strategy

fascinate scientists, programmers, and game enthusiasts and unite them in a common goal: to create artificial intelligence (AI). After an introduction to the core concepts, environment, and communities of intelligence and games, the book is organized into chapters on reinforcement learning, heuristic planning, adaptive sampling, function approximation, and self-play. The author takes a hands-on approach throughout, with Python code examples and exercises that help the reader understand how AI learns to play. He also supports the main text with detailed pointers to online machine learning frameworks, technical details for AlphaGo, notes on how to play and program Go and chess, and a comprehensive bibliography. The content is class-tested and suitable for advanced undergraduate and graduate courses on artificial intelligence and games. It's also appropriate for self-study by professionals engaged with applications of machine learning and with games development. Finally it's valuable for any reader engaged with the philosophical implications of artificial and general intelligence, games represent a modern Turing test of the power and limitations of AI.

Deep Learning for Unmanned Systems - Anis Koubaa 2021-10-01

This book is used at the graduate or advanced undergraduate level and many others. Manned and unmanned ground, aerial and marine vehicles enable many promising and revolutionary civilian and military applications that will change our life in the near future. These applications include, but are not limited to, surveillance, search and rescue, environment monitoring, infrastructure monitoring, self-driving cars, contactless last-mile delivery vehicles, autonomous ships, precision agriculture and transmission line inspection to name just a few. These vehicles will benefit from advances of deep learning as a subfield of machine learning able to endow these vehicles with different capability such as perception, situation awareness, planning and intelligent control. Deep learning models also have the ability to generate actionable insights into the complex structures of large data sets. In recent years, deep learning research has received an increasing amount of attention from researchers in academia, government laboratories and industry. These research activities have borne some fruit in tackling some of the challenging problems of manned and unmanned ground, aerial and marine vehicles that are still open. Moreover, deep learning methods have been recently actively developed in other areas of machine learning, including reinforcement training and transfer/meta-learning, whereas standard, deep learning methods such as recent neural network (RNN) and coevolutionary neural networks (CNN). The book is primarily meant for researchers from academia and industry, who are working on in the research areas such as engineering, control engineering, robotics, mechatronics, biomedical engineering, mechanical engineering and computer science. The book chapters deal with the recent research problems in the areas of reinforcement learning-based control of UAVs and deep learning for unmanned aerial systems (UAS) The book chapters present various techniques of deep learning for robotic applications. The

book chapters contain a good literature survey with a long list of references. The book chapters are well written with a good exposition of the research problem, methodology, block diagrams and mathematical techniques. The book chapters are lucidly illustrated with numerical examples and simulations. The book chapters discuss details of applications and future research areas.

Bayesian Reinforcement Learning - Mohammad Ghavamzadeh 2015-11-18

Bayesian methods for machine learning have been widely investigated, yielding principled methods for incorporating prior information into inference algorithms. This monograph provides the reader with an in-depth review of the role of Bayesian methods for the reinforcement learning (RL) paradigm. The major incentives for incorporating Bayesian reasoning in RL are that it provides an elegant approach to action-selection (exploration/exploitation) as a function of the uncertainty in learning, and it provides a machinery to incorporate prior knowledge into the algorithms.

Bayesian Reinforcement Learning: A Survey first discusses models and methods for Bayesian inference in the simple single-step Bandit model. It then reviews the extensive recent literature on Bayesian methods for model-based RL, where prior information can be expressed on the parameters of the Markov model. It also presents Bayesian methods for model-free RL, where priors are expressed over the value function or policy class. Bayesian Reinforcement Learning: A Survey is a comprehensive reference for students and researchers with an interest in Bayesian RL algorithms and their theoretical and empirical properties.

Artificial Intelligence - Martin Atzmueller 2019-09-24

This book contains a selection of the best papers of the 30th Benelux Conference on Artificial Intelligence, BNAIC 2018, held in 's-Hertogenbosch, The Netherlands, in November 2018. The 9 full papers and 3 short papers presented in this volume were carefully reviewed and selected from 31 submissions. They address various aspects of artificial intelligence such as natural language processing, agent technology, game theory, problem solving, machine learning, human-agent interaction, AI and education, and data analysis.

An Introduction to Deep Reinforcement Learning - Vincent Francois-Lavet 2018-12-20

Deep reinforcement learning is the combination of reinforcement learning (RL) and deep learning. This field of research has recently been able to solve a wide range of complex decision-making tasks that were previously out of reach for a machine. Deep RL opens up many new applications in domains such as healthcare, robotics, smart grids, finance, and many more. This book provides the reader with a starting point for understanding the topic. Although written at a research level it provides a comprehensive and accessible introduction to deep reinforcement learning models, algorithms and techniques. Particular focus is on the aspects related to generalization and how deep RL can be used for practical applications. Written by recognized experts, this book is an important introduction to

Deep Reinforcement Learning for practitioners, researchers and students alike.

Machine Learning and Knowledge Discovery in Databases - Massih-Reza Amini 2023-03-16

The multi-volume set LNAI 13713 until 13718 constitutes the refereed proceedings of the European Conference on Machine Learning and Knowledge Discovery in Databases, ECML PKDD 2022, which took place in Grenoble, France, in September 2022. The 236 full papers presented in these proceedings were carefully reviewed and selected from a total of 1060 submissions. In addition, the proceedings include 17 Demo Track contributions. The volumes are organized in topical sections as follows: Part I: Clustering and dimensionality reduction; anomaly detection; interpretability and explainability; ranking and recommender systems; transfer and multitask learning; Part II: Networks and graphs; knowledge graphs; social network analysis; graph neural networks; natural language processing and text mining; conversational systems; Part III: Deep learning; robust and adversarial machine learning; generative models; computer vision; meta-learning, neural architecture search; Part IV: Reinforcement learning; multi-agent reinforcement learning; bandits and online learning; active and semi-supervised learning; private and federated learning; Part V: Supervised learning; probabilistic inference; optimal transport; optimization; quantum, hardware; sustainability; Part VI: Time series; financial machine learning; applications; applications: transportation; demo track.

Recommender Systems Handbook - Francesco Ricci 2015-11-17

This second edition of a well-received text, with 20 new chapters, presents a coherent and unified repository of recommender systems' major concepts, theories, methodologies, trends, and challenges. A variety of real-world applications and detailed case studies are included. In addition to wholesale revision of the existing chapters, this edition includes new topics including: decision making and recommender systems, reciprocal recommender systems, recommender systems in social networks, mobile recommender systems, explanations for recommender systems, music recommender systems, cross-domain recommendations, privacy in recommender systems, and semantic-based recommender systems. This multi-disciplinary handbook involves world-wide experts from diverse fields such as artificial intelligence, human-computer interaction, information retrieval, data mining, mathematics, statistics, adaptive user interfaces, decision support systems, psychology, marketing, and consumer behavior. Theoreticians and practitioners from these fields will find this reference to be an invaluable source of ideas, methods and techniques for developing more efficient, cost-effective and accurate recommender systems.

Advances in Neural Networks – ISNN 2019 - Huchuan Lu 2019-06-26

This two-volume set LNCS 11554 and 11555 constitutes the refereed proceedings of the 16th International Symposium on Neural Networks, ISNN 2019, held in Moscow, Russia, in July 2019. The 111 papers

presented in the two volumes were carefully reviewed and selected from numerous submissions. The papers were organized in topical sections named: Learning System, Graph Model, and Adversarial Learning; Time Series Analysis, Dynamic Prediction, and Uncertain Estimation; Model Optimization, Bayesian Learning, and Clustering; Game Theory, Stability Analysis, and Control Method; Signal Processing, Industrial Application, and Data Generation; Image Recognition, Scene Understanding, and Video Analysis; Bio-signal, Biomedical Engineering, and Hardware.

RoboCup 2006: Robot Soccer World Cup X - Gerhard Lakemeyer

2007-09-04

This book constitutes the 10th official archival publication devoted to RoboCup. It documents the achievements presented at the RoboCup 2006 International Symposium, held in Bremen, Germany, in June 2006, in conjunction with the RoboCup Competition. It serves as a valuable source of reference and inspiration for those interested in robotics or distributed intelligence.

Deep Reinforcement Learning - Aske Plaat 2022-06-10

Deep reinforcement learning has attracted considerable attention recently. Impressive results have been achieved in such diverse fields as autonomous driving, game playing, molecular recombination, and robotics. In all these fields, computer programs have taught themselves to understand problems that were previously considered to be very difficult. In the game of Go, the program AlphaGo has even learned to outmatch three of the world's leading players. Deep reinforcement learning takes its inspiration from the fields of biology and psychology. Biology has inspired the creation of artificial neural networks and deep learning, while psychology studies how animals and humans learn, and how subjects' desired behavior can be reinforced with positive and negative stimuli. When we see how reinforcement learning teaches a simulated robot to walk, we are reminded of how children learn, through playful exploration. Techniques that are inspired by biology and psychology work amazingly well in computers: animal behavior and the structure of the brain as new blueprints for science and engineering. In fact, computers truly seem to possess aspects of human behavior; as such, this field goes to the heart of the dream of artificial intelligence. These research advances have not gone unnoticed by educators. Many universities have begun offering courses on the subject of deep reinforcement learning. The aim of this book is to provide an overview of the field, at the proper level of detail for a graduate course in artificial intelligence. It covers the complete field, from the basic algorithms of Deep Q-learning, to advanced topics such as multi-agent reinforcement learning and meta learning.

Applications of Evolutionary Computation - Pedro A. Castillo 2021-05-02

This book constitutes the refereed proceedings of the 24th International Conference on Applications of Evolutionary Computation, EvoApplications 2021, held as part of Evo*2021, as Virtual Event, in April 2021, co-located with the Evo*2021 events EuroGP, EvoCOP, and EvoMUSART. The 51

revised full papers presented in this book were carefully reviewed and selected from 78 submissions. The papers cover a wide spectrum of topics, ranging from applications of evolutionary computation; applications of deep bioinspired algorithms; soft computing applied to games; machine learning and AI in digital healthcare and personalized medicine; evolutionary computation in image analysis, signal processing and pattern recognition; evolutionary machine learning; parallel and distributed systems; and applications of nature inspired computing for sustainability and development.

Deep Reinforcement Learning - Hao Dong 2020-06-29

Deep reinforcement learning (DRL) is the combination of reinforcement learning (RL) and deep learning. It has been able to solve a wide range of complex decision-making tasks that were previously out of reach for a machine, and famously contributed to the success of AlphaGo.

Furthermore, it opens up numerous new applications in domains such as healthcare, robotics, smart grids and finance. Divided into three main parts, this book provides a comprehensive and self-contained introduction to DRL. The first part introduces the foundations of deep learning, reinforcement learning (RL) and widely used deep RL methods and discusses their implementation. The second part covers selected DRL research topics, which are useful for those wanting to specialize in DRL research. To help readers gain a deep understanding of DRL and quickly apply the techniques in practice, the third part presents mass applications, such as the intelligent transportation system and learning to run, with detailed explanations. The book is intended for computer science students, both undergraduate and postgraduate, who would like to learn DRL from scratch, practice its implementation, and explore the research topics. It also appeals to engineers and practitioners who do not have strong machine learning background, but want to quickly understand how DRL works and use the techniques in their applications.

Lifelong Machine Learning, Second Edition - Zhiyuan Sun 2022-06-01

Lifelong Machine Learning, Second Edition is an introduction to an advanced machine learning paradigm that continuously learns by accumulating past knowledge that it then uses in future learning and problem solving. In contrast, the current dominant machine learning paradigm learns in isolation: given a training dataset, it runs a machine learning algorithm on the dataset to produce a model that is then used in its intended application. It makes no attempt to retain the learned knowledge and use it in subsequent learning. Unlike this isolated system, humans learn effectively with only a few examples precisely because our learning is very knowledge-driven: the knowledge learned in the past helps us learn new things with little data or effort. Lifelong learning aims to emulate this capability, because without it, an AI system cannot be considered truly intelligent. Research in lifelong learning has developed significantly in the relatively short time since the first edition of this book was published. The purpose of this second edition is to expand the

definition of lifelong learning, update the content of several chapters, and add a new chapter about continual learning in deep neural networks—which has been actively researched over the past two or three years. A few chapters have also been reorganized to make each of them more coherent for the reader. Moreover, the authors want to propose a unified framework for the research area. Currently, there are several research topics in machine learning that are closely related to lifelong learning—most notably, multi-task learning, transfer learning, and meta-learning—because they also employ the idea of knowledge sharing and transfer. This book brings all these topics under one roof and discusses their similarities and differences. Its goal is to introduce this emerging machine learning paradigm and present a comprehensive survey and review of the important research results and latest ideas in the area. This book is thus suitable for students, researchers, and practitioners who are interested in machine learning, data mining, natural language processing, or pattern recognition. Lecturers can readily use the book for courses in any of these related fields.

Intelligent Systems - André Britto 2021-11-27

The two-volume set LNAI 13073 and 13074 constitutes the proceedings of the 10th Brazilian Conference on Intelligent Systems, BRACIS 2021, held in São Paulo, Brazil, in November-December 2021. The total of 77 papers presented in these two volumes was carefully reviewed and selected from 192 submissions. The contributions are organized in the following topical sections: Part I: Agent and Multi-Agent Systems, Planning and Reinforcement Learning; Evolutionary Computation, Metaheuristics, Constraints and Search, Combinatorial and Numerical Optimization, Knowledge Representation, Logic and Fuzzy Systems; Machine Learning and Data Mining. Part II: Multidisciplinary Artificial and Computational Intelligence and Applications; Neural Networks, Deep Learning and Computer Vision; Text Mining and Natural Language Processing. Due to the COVID-2019 pandemic, BRACIS 2021 was held as a virtual event.

Insights in Neurorobotics: 2021 - Florian Röhrbein 2022-11-16

Python Reinforcement Learning Projects - Sean Saito 2018-09-29

Implement state-of-the-art deep reinforcement learning algorithms using Python and its powerful libraries Key Features Implement Q-learning and Markov models with Python and OpenAI Explore the power of TensorFlow to build self-learning models Eight AI projects to gain confidence in building self-trained applications Book Description Reinforcement learning is one of the most exciting and rapidly growing fields in machine learning. This is due to the many novel algorithms developed and incredible results published in recent years. In this book, you will learn about the core concepts of RL including Q-learning, policy gradients, Monte Carlo processes, and several deep reinforcement learning algorithms. As you make your way through the book, you'll work on projects with datasets of various modalities including image, text, and video. You will gain

experience in several domains, including gaming, image processing, and physical simulations. You'll explore technologies such as TensorFlow and OpenAI Gym to implement deep learning reinforcement learning algorithms that also predict stock prices, generate natural language, and even build other neural networks. By the end of this book, you will have hands-on experience with eight reinforcement learning projects, each addressing different topics and/or algorithms. We hope these practical exercises will provide you with better intuition and insight about the field of reinforcement learning and how to apply its algorithms to various problems in real life. What you will learn Train and evaluate neural networks built using TensorFlow for RL Use RL algorithms in Python and TensorFlow to solve CartPole balancing Create deep reinforcement learning algorithms to play Atari games Deploy RL algorithms using OpenAI Universe Develop an agent to chat with humans Implement basic actor-critic algorithms for continuous control Apply advanced deep RL algorithms to games such as Minecraft Auto-generate an image classifier using RL Who this book is for Python Reinforcement Learning Projects is for data analysts, data scientists, and machine learning professionals, who have working knowledge of machine learning techniques and are looking to build better performing, automated, and optimized deep learning models. Individuals who want to work on self-learning model projects will also find this book useful.

Computer Vision – ECCV 2016 Workshops - Gang Hua 2016-11-23

The three-volume set LNCS 9913, LNCS 9914, and LNCS 9915 comprises the refereed proceedings of the Workshops that took place in conjunction with the 14th European Conference on Computer Vision, ECCV 2016, held in Amsterdam, The Netherlands, in October 2016. The three-volume set LNCS 9913, LNCS 9914, and LNCS 9915 comprises the refereed proceedings of the Workshops that took place in conjunction with the 14th European Conference on Computer Vision, ECCV 2016, held in Amsterdam, The Netherlands, in October 2016. 27 workshops from 44 workshops proposals were selected for inclusion in the proceedings.

These address the following themes: Datasets and Performance Analysis in Early Vision; Visual Analysis of Sketches; Biological and Artificial Vision; Brave New Ideas for Motion Representations; Joint ImageNet and MS COCO Visual Recognition Challenge; Geometry Meets Deep Learning; Action and Anticipation for Visual Learning; Computer Vision for Road Scene Understanding and Autonomous Driving; Challenge on Automatic Personality Analysis; BioImage Computing; Benchmarking Multi-Target Tracking: MOT Challenge; Assistive Computer Vision and Robotics; Transferring and Adapting Source Knowledge in Computer Vision; Recovering 6D Object Pose; Robust Reading; 3D Face Alignment in the Wild and Challenge; Egocentric Perception, Interaction and Computing; Local Features: State of the Art, Open Problems and Performance Evaluation; Crowd Understanding; Video Segmentation; The Visual Object Tracking Challenge Workshop; Web-scale Vision and Social Media;

Computer Vision for Audio-visual Media; Computer VISION for ART Analysis; Virtual/Augmented Reality for Visual Artificial Intelligence; Joint Workshop on Storytelling with Images and Videos and Large Scale Movie Description and Understanding Challenge.

Applications of Evolutionary Computation - Paul Kaufmann 2019-04-10

This book constitutes the refereed proceedings of the 22nd International Conference on Applications of Evolutionary Computation, EvoApplications 2019, held in Leipzig, Germany, in April 2019, co-located with the Evo*2019 events EuroGP, EvoCOP and EvoMUSART. The 44 revised full papers presented were carefully reviewed and selected from 66 submissions. They were organized in topical sections named: Engineering and Real World Applications; Games; General; Image and Signal Processing; Life Sciences; Networks and Distributed Systems; Neuroevolution and Data Analytics; Numerical Optimization: Theory, Benchmarks, and Applications; Robotics.

Big Data, Cloud Computing, and Data Science Engineering - Roger Lee 2019-07-30

This edited book presents the scientific outcomes of the 4th IEEE/ACIS International Conference on Big Data, Cloud Computing, Data Science & Engineering (BCD 2019) which was held on May 29–31, 2019 in Honolulu, Hawaii. The aim of the conference was to bring together researchers and scientists, businessmen and entrepreneurs, teachers, engineers, computer users and students to discuss the numerous fields of computer science and to share their experiences and exchange new ideas and information in a meaningful way. Presenting 15 of the conference's most promising papers, the book discusses all aspects (theory, applications and tools) of computer and information science, the practical challenges encountered along the way, and the solutions adopted to solve them.

Recent Advances in Reinforcement Learning - Leslie Pack Kaelbling 2007-08-28

Recent Advances in Reinforcement Learning addresses current research in an exciting area that is gaining a great deal of popularity in the Artificial Intelligence and Neural Network communities. Reinforcement learning has become a primary paradigm of machine learning. It applies to problems in which an agent (such as a robot, a process controller, or an information-retrieval engine) has to learn how to behave given only information about the success of its current actions. This book is a collection of important papers that address topics including the theoretical foundations of dynamic programming approaches, the role of prior knowledge, and methods for improving performance of reinforcement-learning techniques. These papers build on previous work and will form an important resource for students and researchers in the area. Recent Advances in Reinforcement Learning is an edited volume of peer-reviewed original research comprising twelve invited contributions by leading researchers. This research work has also been published as a special issue of Machine Learning (Volume 22, Numbers 1, 2 and 3).

Automated Machine Learning and Meta-Learning for Multimedia - Wenwu Zhu 2022-01-01

This book disseminates and promotes the recent research progress and frontier development on AutoML and meta-learning as well as their applications on computer vision, natural language processing, multimedia and data mining related fields. These are exciting and fast-growing research directions in the general field of machine learning. The authors advocate novel, high-quality research findings, and innovative solutions to the challenging problems in AutoML and meta-learning. This topic is at the core of the scope of artificial intelligence, and is attractive to audience from both academia and industry. This book is highly accessible to the whole machine learning community, including: researchers, students and practitioners who are interested in AutoML, meta-learning, and their applications in multimedia, computer vision, natural language processing and data mining related tasks. The book is self-contained and designed for introductory and intermediate audiences. No special prerequisite knowledge is required to read this book.

Neural Information Processing - Long Cheng 2018-12-03

The seven-volume set of LNCS 11301-11307, constitutes the proceedings of the 25th International Conference on Neural Information Processing, ICONIP 2018, held in Siem Reap, Cambodia, in December 2018. The 401 full papers presented were carefully reviewed and selected from 575 submissions. The papers address the emerging topics of theoretical research, empirical studies, and applications of neural information processing techniques across different domains. The third volume, LNCS 11303, is organized in topical sections on embedded learning, transfer learning, reinforcement learning, and other learning approaches.

The NIPS '17 Competition: Building Intelligent Systems - Sergio Escalera 2018-09-27

This book summarizes the organized competitions held during the first NIPS competition track. It provides both theory and applications of hot topics in machine learning, such as adversarial learning, conversational intelligence, and deep reinforcement learning. Rigorous competition evaluation was based on the quality of data, problem interest and impact, promoting the design of new models, and a proper schedule and management procedure. This book contains the chapters from organizers on competition design and from top-ranked participants on their proposed solutions for the five accepted competitions: The Conversational Intelligence Challenge, Classifying Clinically Actionable Genetic Mutations, Learning to Run, Human-Computer Question Answering Competition, and Adversarial Attacks and Defenses.

The Theory of Perfect Learning - Nonvikan Karl-Augustt Alahassa 2021-08-17

The perfect learning exists. We mean a learning model that can be generalized, and moreover, that can always fit perfectly the test data, as well as the training data. We have performed in this thesis many

experiments that validate this concept in many ways. The tools are given through the chapters that contain our developments. The classical Multilayer Feedforward model has been re-considered and a novel N_k -architecture is proposed to fit any multivariate regression task. This model can easily be augmented to thousands of possible layers without loss of predictive power, and has the potential to overcome our difficulties simultaneously in building a model that has a good fit on the test data, and don't overfit. Its hyper-parameters, the learning rate, the batch size, the number of training times (epochs), the size of each layer, the number of hidden layers, all can be chosen experimentally with cross-validation methods. There is a great advantage to build a more powerful model using mixture models properties. They can self-classify many high dimensional data in a few numbers of mixture components. This is also the case of the Shallow Gibbs Network model that we built as a Random Gibbs Network Forest to reach the performance of the Multilayer feedforward Neural Network in a few numbers of parameters, and fewer backpropagation iterations. To make it happens, we propose a novel optimization framework for our Bayesian Shallow Network, called the {Double Backpropagation Scheme} (DBS) that can also fit perfectly the data with appropriate learning rate, and which is convergent and universally applicable to any Bayesian neural network problem. The contribution of this model is broad. First, it integrates all the advantages of the Potts Model, which is a very rich random partitions model, that we have also modified to propose its Complete Shrinkage version using agglomerative clustering techniques. The model takes also an advantage of Gibbs Fields for its weights precision matrix structure, mainly through Markov Random Fields, and even has five (5) variants structures at the end: the Full-Gibbs, the Sparse-Gibbs, the Between layer Sparse Gibbs which is the B-Sparse Gibbs in a short, the Compound Symmetry Gibbs (CS-Gibbs in short), and the Sparse Compound Symmetry Gibbs (Sparse-CS-Gibbs) model. The Full-Gibbs is mainly to remind fully-connected models, and the other structures are useful to show how the model can be reduced in terms of complexity with sparsity and parsimony. All those models have been experimented, and the results arouse interest in those structures, in a sense that different structures help to reach different results in terms of Mean Squared Error (MSE) and Relative Root Mean Squared Error (RRMSE). For the Shallow Gibbs Network model, we have found the perfect learning framework : it is the $(l_1, \boldsymbol{\zeta}, \epsilon_{\text{DBS}})$ configuration, which is a combination of the {Universal Approximation Theorem}, and the DBS optimization, coupled with the {dist}-Nearest Neighbor-(h)-Taylor Series-Perfect Multivariate Interpolation (dist)-NN-(h)-TS-PMI) model [which in turn is a combination of the research of the Nearest Neighborhood for a good Train-Test association, the Taylor Approximation Theorem, and finally the Multivariate Interpolation Method]. It indicates that, with an appropriate number l_1 of neurons on the hidden layer, an optimal number ζ

of DBS updates, an optimal DBS learning rate ϵ_{DBS} , an optimal distance dist_{opt} in the research of the nearest neighbor in the training dataset for each test data x_i^{test} , an optimal order h_{opt} of the Taylor approximation for the Perfect Multivariate Interpolation (dist)-NN-(h)-TS-PMI) model once the {series DBS} has overfitted the training dataset, the train and the test error converge to zero (0). As the Potts Models and many random Partitions are based on a similarity measure, we open the door to find {sufficient} invariants descriptors in any recognition problem for complex objects such as image; using {metric} learning and invariance descriptor tools, to always reach 100% accuracy. This is also possible with invariant networks that are also universal approximators. Our work closes the gap between the theory and the practice in artificial intelligence, in a sense that it confirms that it is possible to learn with very small error allowed.

The NeurIPS '18 Competition - Sergio Escalera 2019-11-29

This volume presents the results of the Neural Information Processing Systems Competition track at the 2018 NeurIPS conference. The competition follows the same format as the 2017 competition track for NIPS. Out of 21 submitted proposals, eight competition proposals were selected, spanning the area of Robotics, Health, Computer Vision, Natural Language Processing, Systems and Physics. Competitions have become an integral part of advancing state-of-the-art in artificial intelligence (AI). They exhibit one important difference to benchmarks: Competitions test a system end-to-end rather than evaluating only a single component; they assess the practicability of an algorithmic solution in addition to assessing feasibility. The eight run competitions aim at advancing the state of the art in deep reinforcement learning, adversarial learning, and auto machine learning, among others, including new applications for intelligent agents in gaming and conversational settings, energy physics, and prosthetics.

First Congress of Greek Mathematicians - Ioannis Emmanouil 2020-03-23

This interesting collection of up-to-date survey articles on various topics of current mathematical research presents extended versions of the plenary talks given by important Greek mathematicians at the congress held in Athens, Greece, on occasion of the celebration for the 100 years of the Hellenic Mathematical Society.

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.

Computer Vision – ECCV 2022 - Shai Avidan 2022-10-22

The 39-volume set, comprising the LNCS books 13661 until 13699, constitutes the refereed proceedings of the 17th European Conference on Computer Vision, ECCV 2022, held in Tel Aviv, Israel, during October 23–27, 2022. The 1645 papers presented in these proceedings were carefully reviewed and selected from a total of 5804 submissions. The papers deal with topics such as computer vision; machine learning; deep

neural networks; reinforcement learning; object recognition; image classification; image processing; object detection; semantic segmentation; human pose estimation; 3d reconstruction; stereo vision; computational photography; neural networks; image coding; image reconstruction; object recognition; motion estimation.

Explainable AI and Other Applications of Fuzzy Techniques - Julia Rayz 2021-07-27

This book focuses on an overview of the AI techniques, their foundations, their applications, and remaining challenges and open problems. Many artificial intelligence (AI) techniques do not explain their recommendations. Providing natural-language explanations for numerical AI recommendations is one of the main challenges of modern AI. To provide such explanations, a natural idea is to use techniques specifically designed to relate numerical recommendations and natural-language descriptions, namely fuzzy techniques. This book is of interest to practitioners who want to use fuzzy techniques to make AI applications explainable, to researchers who may want to extend the ideas from these papers to new application areas, and to graduate students who are interested in the state-of-the-art of fuzzy techniques and of explainable AI—in short, to anyone who is interested in problems involving fuzziness and AI in general.