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established machine learning algorithms

Archaeology, Anthropology, and Interstellar Communication National Aeronautics Administration 2014-09-06 Addressing a field that has been dominated by astronomers, physicists, engineers, and computer scientists, the contributors to this collection raise questions that may have been overlooked by physical scientists about the ease of establishing meaningful communication with an extraterrestrial intelligence. These scholars are grappling with some of the enormous challenges that will face humanity if an information-rich signal emanating from another world is detected. By drawing on issues at the core of contemporary archaeology and anthropology, we can be much better prepared for contact with an extraterrestrial civilization, should that day ever come.

Deep Learning on Graphs Yao Ma 2021-09-23 A comprehensive text on foundations and techniques of graph neural networks with applications in NLP, data mining, vision and healthcare.
Photon-Counting Image Sensors Eric R. Fossum 2018-07-06 This book is a printed edition of the Special Issue "Photon-Counting Image Sensors" that was published in Sensors
Simulation Modeling and Analysis Averill M. Law 2007 Since the publication of the first edition in 1982, the goal of Simulation Modeling and Analysis has always been to provide a comprehensive, state-of-the-art, and technically correct treatment of all important aspects of a simulation study. The book strives to make this material understandable by the use of intuition and numerous figures, examples, and problems. It is equally well suited for use in university courses, simulation practice, and self study. The book is widely regarded as the "bible" of simulation and now has more than 100,000 copies in print. The book can serve as the primary text for a variety of courses; for example: *A first course in simulation at the junior, senior, or beginning-graduate-student level in engineering, manufacturing, business, or computer science (Chaps. 1 through 4, and parts of Chaps. 5 through 9). At the end of such a course, the students will be prepared to carry out complete and effective simulation studies, and to take advanced simulation courses. *A second course in simulation for graduate students in any of the above disciplines (most of Chaps. 5 through 12). After completing this course, the student should be familiar with the more advanced methodological issues involved in a simulation study, and should be prepared to understand and conduct simulation research. *An introduction to simulation as part of a general course in operations research or management science (part of Chaps. 1, 3, 5, 6, and 9).

Climate Smart Agriculture Leslie Lipper 2017-10-20 This book is open access under a CC BY-NC-SA 3.0 IGO license. The book uses an economic lens to identify the main features of climate-smart agriculture (CSA), its likely impact, and the challenges associated with its implementation. Drawing upon theory and concepts from agricultural development, institutional, and resource economics, this book expands and formalizes the conceptual foundations of CSA. Focusing on the adaptation/resilience dimension of CSA, the text embraces a mixture of conceptual analyses, including theory, empirical and policy analysis, and case studies, to look at adaptation and resilience through three possible avenues: ex-ante reduction of vulnerability, increasing adaptive capacity, and ex-post risk coping. The book is divided into three sections. The first section provides conceptual framing, giving an overview of the CSA concept and grounding it in core economic principles. The second section is devoted to a set of case studies illustrating the economic basis of CSA in terms of reducing vulnerability, increasing adaptive capacity and ex-post risk coping. The final section address policy issues related to climate change. Providing information on this new and important field in an approachable way, this book helps make sense of CSA and fills intellectual and policy gaps by defining the concept and placing it within an economic decision-making framework. This book will be of interest to agricultural, environmental, and natural resource economists, development economists, and scholars of development studies, climate change, and agriculture. It will also appeal to policy-makers, development practitioners, and members of governmental and non-governmental organizations interested in agriculture, food security and climate change.

Artificial Neuronal Networks Sovan Lek 2012-12-06 In this book, an easily understandable account of modelling methods with artificial neuronal networks for practical applications in ecology and evolution is provided. Special features include examples of applications using both supervised and unsupervised training, comparative analysis of artificial neural networks and conventional statistical methods, and proposals to deal with poor datasets. Extensive references and a large range of topics make this book a useful guide for ecologists, evolutionary ecologists and population geneticists.

Machine Learning Kevin P. Murphy 2012-08-24 A comprehensive introduction to machine learning that uses probabilistic models and inference as a unifying approach. Today's Web-enabled deluge of electronic data calls for automated methods of data analysis. Machine learning provides these, developing methods that can automatically detect patterns in data and then use the uncovered patterns to predict future data. This textbook offers a comprehensive and self-contained introduction to the field of machine learning, based on a unified, probabilistic approach. The coverage combines breadth and depth, offering necessary background material on such topics as probability, optimization, and linear algebra as well as discussion of recent developments in the field, including conditional random fields, L1 regularization, and deep learning. The book is written in an informal, accessible style, complete with pseudo-code for the most important algorithms. All topics are copiously illustrated with color images and worked examples drawn from such application domains as biology, text processing, computer vision, and robotics. Rather than providing a cookbook of different heuristic methods, the book stresses a principled model-based approach, often using the language of graphical models to specify models in a concise and intuitive way. Almost all the models described have been implemented in a MATLAB software package—PMTK (probabilistic modeling toolkit)—that is freely available online. The book is suitable for upper-level undergraduates with an introductory-level college math background and beginning graduate students.

Advances in Artificial Intelligence Enrique Alba 2021-09-13 This book constitutes the refereed proceedings of the 19th Conference of the Spanish Association for Artificial Intelligence, CAEPIA 2020, which was cancelled due to the COVID-19 pandemic, amalgamated with CAEPIA 2021, and held in Malaga, Spain, during September 2021. The 25 full papers presented were carefully selected from 40 submissions. The Conference of the Spanish Association of Artificial Intelligence (CAEPIA) is a biennial forum open to researchers from all over the world to present and discuss their latest scientific and technological advances in Artificial Intelligence (AI). The book is subdivided into the following topical headings: machine learning, optimization and search, and real-world applications. It covers such themes as ambient intelligence and smart environments; computer vision and robotics; constraints, search and planning; creativity and A.I.; education and A.I.; explainable and responsible A.I.; foundation, models and applications of AI, and others.

Neural Network Design Martin T. Hagan 2003

An Introduction to Variational Autoencoders Diederik P. Kingma 2019-11-12 An Introduction to Variational Autoencoders provides a quick summary for the of a topic that has become an important tool in modern-day deep learning techniques.

Formal Power Series and Algebraic Combinatorics Daniel Kröb 2013-03-09 This book contains the extended abstracts presented at the 12th International Conference on Power Series and Algebraic Combinatorics (FPSAC '00) that took place at Moscow State University, June 26-30, 2000. These proceedings cover the most recent trends in algebraic and bijective combinatorics, including classical combinatorics, combinatorial computer algebra, combinatorial identities, combinatorics of classical groups, Lie algebra and quantum groups, enumeration, symmetric functions, young tableaux etc...

New Worlds, New Horizons in Astronomy and Astrophysics National Research Council 2011-02-04 Driven by discoveries, and enabled by leaps in technology and imagination, our understanding of the universe has changed dramatically during the course of the last few decades. The fields of astronomy and astrophysics are making new connections to physics, chemistry, biology, and computer science. Based on a broad and comprehensive survey of scientific opportunities, infrastructure, and organization in a national and international context, New Worlds, New Horizons in Astronomy and Astrophysics outlines a plan for ground- and space- based astronomy and astrophysics for the decade of the 2010's. Realizing these scientific opportunities is contingent upon maintaining and strengthening the foundations of the research enterprise including technological development, theory, computation and data handling, laboratory experiments, and human resources. New Worlds, New Horizons in Astronomy and Astrophysics proposes enhancing innovative but moderate-cost programs in space and on the ground that will enable the community to respond rapidly and flexibly to new scientific discoveries. The book recommends beginning construction on survey telescopes in space and on the ground to investigate the nature of dark energy, as well as the next generation of large ground-based giant optical telescopes and a new class of space-based gravitational observatory to observe the merging of distant black holes and precisely test theories of gravity. New Worlds, New Horizons in Astronomy and Astrophysics recommends a balanced and executable program that will support research surrounding the most profound questions about the cosmos. The discoveries ahead will facilitate the search for habitable planets, shed light on dark energy and dark matter, and aid our understanding of the history of the universe and how the earliest stars and galaxies formed. The book is a useful resource for agencies supporting the field of astronomy and astrophysics, the Congressional committees with jurisdiction over those agencies, the scientific community, and the public.

Middle Atmosphere PLUMB 2013-11-21 PAGEOPH, stratosphere, these differences provide us with new evidence, interpretation of which can materially help to advance our understanding of stratospheric dynamics in general. It is now well established that smaller-scale motions-in particular gravity waves and turbulence-are of fundamental importance in the general circulation of the mesosphere; they seem to be similarly, if less spectularly, significant in the troposphere, and probably also in the stratosphere. Our understanding of these motions, their effects on the mean circulation and their mutual interactions is progressing rapidly, as is well illustrated by the papers in this issue; there are reports of observational studies, especially with new instruments such as the Japanese MV radar, reviews of the state of theory, a laboratory study and an analysis of gravity waves and their effects in the high resolution "SKYHI" general circulation model. There are good reasons to suspect that gravity waves may be of crucial significance in making the stratospheric circulation the way it is (modeling experience being one suggestive piece of evidence for this). Direct observational proof has thus far been prevented by the difficulty of making observations of such scales of motion in this region; in one study reported here, falling sphere observations are used to obtain information on the structure and intensity of waves in the upper stratosphere.

Dive Into Deep Learning Joanne Quinn 2019-07-15 The leading experts in system change and learning, with their school-based partners around the world, have created this essential companion to their runaway best-seller, Deep Learning: Engage the World Change the World. This hands-on guide provides a roadmap for building capacity in teachers, schools, districts, and systems to design deep learning, measure progress, and assess conditions needed to activate and sustain innovation. Dive Into Deep Learning: Tools for Engagement is rich with resources educators need to construct and drive meaningful deep learning experiences in order to develop the kind of mindset and know-how that is crucial to becoming a problem-solving change agent in our global society. Designed in full color, this easy-to-use guide is loaded with tools, tips, protocols, and real-world examples. It includes:
• A framework for deep learning that provides a pathway to develop the six global competencies needed to flourish in a complex world – character, citizenship, collaboration, communication, creativity, and critical thinking.
• Learning progressions to help educators analyze student work and measure progress.
• Learning design rubrics, templates and examples for incorporating the four elements of learning design: learning partnerships, pedagogical practices, learning environments, and leveraging digital.
• Conditions rubrics, teacher self-assessment tools, and planning guides to help educators build, mobilize, and sustain deep learning in schools and districts. Learn about, improve, and expand your world of learning. Put the joy back into learning for students and adults alike. Dive into deep learning to create learning experiences that give purpose, unleash student potential, and transform not only learning, but life itself.

The Age of Surveillance Capitalism Shoshana Zuboff 2019-01-15 The challenges to humanity posed by the digital future, the first detailed examination of the unprecedented form of power called "surveillance capitalism," and the quest by powerful corporations to predict and control our behavior. In this masterwork of original thinking and research, Shoshana Zuboff provides startling insights into the phenomenon that she has named surveillance capitalism. The stakes could not be higher: a global architecture of behavior modification threatens human nature in the twenty-first century just as industrial capitalism disfigured the natural world in the twentieth. Zuboff vividly brings to life the consequences as surveillance capitalism advances from Silicon Valley into every economic sector. Vast wealth and power are accumulated in ominous new "behavioral futures markets," where predictions about our behavior are bought and sold, and the production of goods and services is subordinated to a new "means of behavioral modification." The threat has shifted from a totalitarian Big Brother state to a ubiquitous digital architecture: a "Big Other" operating in the interests of surveillance capital. Here is the crucible of an unprecedented form of power marked by extreme concentrations of knowledge and free from democratic oversight. Zuboff's comprehensive and moving analysis lays bare the threats to twenty-first century society: a controlled "hive" of total connection that seduces with promises of total certainty for maximum profit – at the expense of democracy, freedom, and our human future. With little resistance from law or society, surveillance capitalism is on the verge of dominating the social order and shaping the digital future -- if we let it.

Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results (rev. Ed.) Barry N. Taylor 2009-11 Results of measurements and conclusions derived from them constitute much of the technical information produced by the National Institute of Standards and Technology (NIST). In July 1992, the Director of NIST appointed an Ad Hoc Committee on Uncertainty Statements and charged it with recommending a policy on this important topic. The Committee concluded that the CIPM approach could be used to provide quantitative expression of measurement that would satisfy NIST’s customers’ requirements. NIST initially published a Technical Note on this issue in Jan. 1993. This 1994 edition addresses the most important questions raised by recipients concerning some of the points it addressed and some it did not. Illustrations.

Interpretable Machine Learning Christoph Molnar 2020 This book is about making machine learning models and their decisions interpretable. After exploring the concepts of interpretability, you will learn about simple, interpretable models such as decision trees, decision rules and linear regression. Later chapters focus on general model-agnostic methods for interpreting black box models like feature importance and accumulated local effects and explaining individual predictions with Shapley values and LIME. All interpretation methods are explained in depth and discussed critically. How do they work under the hood? What are their strengths and weaknesses? How can their outputs be interpreted? This book will enable you to select and correctly apply the interpretation method that is most suitable for your machine learning project.

Fundamentals of Spacecraft Attitude Determination and Control F. Landis Markley 2014-05-31 This book explores topics that are central to the field of spacecraft attitude determination and control. The authors provide rigorous theoretical derivations of significant algorithms accompanied by a generous amount of qualitative discussions of the subject matter. The book documents the development of the important concepts and methods in a manner accessible to practicing engineers, graduate-level engineering students and applied mathematicians. It includes detailed examples from actual mission designs to help ease the transition from theory to practice and also provides prototype algorithms that are readily available on the author’s website. Subject matter includes both theoretical derivations and practical implementation of spacecraft attitude determination and control systems. It provides detailed derivations for attitude kinematics and dynamics and provides detailed description of the most widely used attitude parameterization, the quaternion. This title also provides a thorough treatise of attitude dynamics including Jacobian elliptical functions. It is the first known book to provide detailed derivations and explanations of state attitude determination and gives readers real-world examples from actual working spacecraft missions. The subject matter is chosen to fill the void of existing textbooks and treatises, especially in state and dynamics attitude determination. MATLAB code of all examples will be provided through an external website.

Introduction to Applied Linear Algebra Stephen Boyd 2018-06-07 A groundbreaking introduction to vectors, matrices, and least squares for engineering applications, offering a wealth of practical examples.

Protostars and Planets VI Henrik Beuther 2014-12-18 The revolutionary discovery of thousands of confirmed and candidate planets beyond the solar system brings forth the most fundamental question: How do planets and their host stars form and evolve? Protostars and Planets VI brings together more than 250 contributing authors at the forefront of their field, conveying the latest results in this research area and establishing a new foundation for advancing our understanding of stellar and planetary formation. Continuing the tradition of the Protostars and Planets series, this latest volume uniquely integrates the cross-disciplinary aspects of this broad field. Covering an extremely wide range of scales, from the formation of large clouds in our Milky Way galaxy down to small chondrules in our solar system, Protostars and Planets VI takes an encompassing view with the goal of not only highlighting what we know but, most importantly, emphasizing the frontiers of what we do not know. As a vehicle for propelling forward new discoveries on stars, planets, and their origins, this latest volume in the Space

Science Series is an indispensable resource for both current scientists and new students in astronomy, astrophysics, planetary science, and the study of meteorites.

Explaining the Success of Nearest Neighbor Methods in Prediction George H. Chen 2018-05-30 Explains the success of Nearest Neighbor Methods in Prediction, both in theory and in practice.

Autonomous Horizons Greg Zacharias 2019-04-05 Dr. Greg Zacharias, former Chief Scientist of the United States Air Force (2015-18), explores next steps in autonomous systems (AS) development, fielding, and training.

Rapid advances in AS development and artificial intelligence (AI) research will change how we think about machines, whether they are individual vehicle platforms or networked enterprises. The payoff will be considerable, affording the US military significant protection for aviators, greater effectiveness in employment, and unlimited opportunities for novel and disruptive concepts of operations. Autonomous Horizons: The Way Forward identifies issues and makes recommendations for the Air Force to take full advantage of this transformational technology.

Explainable AI: Interpreting, Explaining and Visualizing Deep Learning Wojciech Samek 2019-09-10 The development of “intelligent” systems that can take decisions and perform autonomously might lead to faster and more consistent decisions. A limiting factor for a broader adoption of AI technology is the inherent risks that come with giving up human control and oversight to “intelligent” machines. For sensitive tasks involving critical infrastructures and affecting human well-being or health, it is crucial to limit the possibility of improper, non-robust and unsafe decisions and actions. Before deploying an AI system, we see a strong need to validate its behavior, and thus establish guarantees that it will continue to perform as expected when deployed in a real-world environment. In pursuit of that objective, ways for humans to verify the agreement between the AI decision structure and their own ground-truth knowledge have been explored. Explainable AI (XAI) has developed as a subfield of AI, focused on exposing complex AI models to humans in a systematic and interpretable manner. The 22 chapters included in this book provide a timely snapshot of algorithms, theory, and applications of interpretable and explainable AI and AI techniques that have been proposed recently reflecting the current discourse in this field and providing directions of future development. The book is organized in six parts: towards AI transparency; methods for interpreting AI systems; explaining the decisions of AI systems; evaluating interpretability and explanations; applications of explainable AI; and software for explainable AI.

Artificial Neural Networks - ICANN 2010 Konstantinos Diamantaras 2010-09-03 This three volume set LNCS 6352, LNCS 6353, and LNCS 6354 constitutes the refereed proceedings of the 20th International Conference on

Artificial Neural Networks, ICANN 2010, held in Thessaloniki, Greece, in September 2010. The 102 revised full papers, 68 short papers and 29 posters presented were carefully reviewed and selected from 241 submissions.

The second volume is divided in topical sections on Kernel algorithms - support vector machines, knowledge engineering and decision making, recurrent ANN, reinforcement learning, robotics, self organizing ANN, adaptive algorithms - systems, and optimization.

Turn Down the Heat A Report for the World Bank by the Potsdam Institute for Climate Impact Research and Analytics. 2013-06-19 This report focuses on the risks of climate change to development in Sub-Saharan Africa, South East Asia and South Asia. Building on the 2012 report, Turn Down the Heat: Why a 4°C Warmer World Must be Avoided, this new scientific analysis examines the likely impacts of present day, 2°C and 4°C warming on agricultural production, water resources, and coastal vulnerability. It finds many significant climate and development impacts are already being felt in some regions, and that as warming increases from present day (0.8°C) to 2°C and 4°C, multiple threats of increasing extreme heat waves, sea-level rise, more severe storms, droughts and floods are expected to have further severe negative implications for the poorest and most vulnerable. The report finds that agricultural yields will be affected across the three regions, with repercussions for food security, economic growth, and poverty reduction. In addition, urban areas have been identified as new clusters of vulnerability with urban dwellers, particularly the urban poor, facing significant vulnerability to climate change. In Sub-Saharan Africa, under 3°C global warming, savannas are projected to decrease from their current levels to approximately one-seventh of total land area and threaten pastoral livelihoods. Under 4°C warming, total hyper-arid and arid areas are projected to expand by 10 percent. In South East Asia, under 2°C warming, heat extremes that are virtually absent today would cover nearly 60-70 percent of total land area in northern-hemisphere summer, adversely impacting ecosystems. Under 4°C warming, rural populations would face mounting pressures from sea-level rise, increased tropical cyclone intensity, storm surges, saltwater intrusions, and loss of marine ecosystem services. In South Asia, the potential sudden onset of disturbances to the monsoon system and rising peak temperatures would put water and food resources at severe risk. Well before 2°C warming occurs, substantial reductions in the frequency of low snow years is projected to cause substantial reductions in dry season flow, threatening agriculture. Many of the worst climate impacts could still be avoided by holding warming below 2°C, but the window for action is closing rapidly. Urgent action is also needed to build resilience to a rapidly warming world that will pose significant risks to agriculture, water resources, coastal infrastructure, and human health.