

kelleher 2019 deep learning

kelleher 2019 deep learning represents a significant contribution to the field of artificial intelligence, particularly within the domain of neural networks and deep learning methodologies. This work, authored by John D. Kelleher, provides an extensive overview of deep learning concepts, architectures, and applications, making it a critical resource for researchers, practitioners, and students alike. The 2019 publication delves into the theoretical foundations of deep learning, practical implementations, and emerging trends shaping the future of machine learning. It addresses key challenges such as model training, optimization, and interpretability while emphasizing the importance of large-scale data and computational power. This article explores the core themes and insights presented in kelleher 2019 deep learning, offering a structured analysis that highlights its impact on AI development. The following sections will cover the book's foundational concepts, neural network architectures, training methodologies, and real-world applications.

- Foundations of Deep Learning
- Neural Network Architectures
- Training and Optimization Techniques
- Applications of Deep Learning
- Challenges and Future Directions

Foundations of Deep Learning

The foundation of deep learning as presented in kelleher 2019 deep learning is built upon the principles of artificial neural networks and their ability to model complex patterns in data. This section introduces essential concepts such as perceptrons, multilayer networks, and the role of activation functions. It emphasizes the transition from shallow learning models to deep architectures that enable hierarchical feature extraction and representation learning.

Historical Context and Evolution

Kelleher traces the evolution of deep learning from early neural network models to modern deep learning frameworks. The historical perspective highlights significant breakthroughs such as backpropagation, convolutional networks, and recurrent architectures. This context provides an understanding of how deep learning has matured into a dominant paradigm in machine learning.

Key Concepts and Terminology

Fundamental terms like neurons, layers, weights, biases, and loss functions

are clearly defined to establish a common language. The book elaborates on how these components interact within a network and introduces concepts like gradient descent and overfitting, which are critical to understanding model training and evaluation.

Neural Network Architectures

A core focus of Kelleher 2019 deep learning is the variety of neural network architectures that have been developed to tackle different types of problems. The book categorizes architectures based on their structure and application domain, providing detailed explanations and comparisons.

Feedforward Neural Networks

Feedforward networks are presented as the simplest form of deep learning models, where information flows in one direction through layers. The text explains their design, advantages, and limitations, setting the stage for more complex architectures.

Convolutional Neural Networks (CNNs)

CNNs are explored extensively due to their success in image and spatial data processing. Kelleher discusses the convolutional layers, pooling mechanisms, and how CNNs achieve translation invariance. The importance of CNNs in computer vision tasks is emphasized.

Recurrent Neural Networks (RNNs)

RNNs are introduced as architectures suited for sequential data such as time series and natural language. The book explains the challenges of training RNNs, including vanishing gradients, and describes advanced variants like Long Short-Term Memory (LSTM) and Gated Recurrent Units (GRUs).

Other Architectures

Kelleher also covers emerging and specialized architectures such as autoencoders for unsupervised learning, generative adversarial networks (GANs) for data generation, and transformer models that have revolutionized natural language processing.

Training and Optimization Techniques

Effective training and optimization are critical themes in Kelleher 2019 deep learning. This section outlines the methodologies used to train deep neural networks efficiently and accurately while avoiding common pitfalls.

Backpropagation and Gradient Descent

The book details the backpropagation algorithm as the backbone of deep learning training, explaining how gradients are computed and used to update model parameters. Different variants of gradient descent, including stochastic and mini-batch, are discussed for their impact on convergence speed and accuracy.

Regularization Methods

To prevent overfitting, kelleher highlights regularization techniques such as L1 and L2 penalties, dropout, and early stopping. These methods help improve model generalization to unseen data.

Hyperparameter Tuning

Hyperparameters like learning rate, batch size, and network depth are crucial for successful training. The text covers strategies for tuning these parameters, including grid search, random search, and automated optimization techniques.

Computational Considerations

Given the resource-intensive nature of deep learning, kelleher discusses the importance of hardware accelerators such as GPUs and TPUs. The book also addresses software frameworks that streamline model development and deployment.

Applications of Deep Learning

Kelleher 2019 deep learning showcases a wide range of applications where deep learning has driven remarkable advances. This section surveys key industries and problem domains benefiting from these technologies.

Computer Vision

Deep learning has transformed computer vision tasks such as image classification, object detection, and facial recognition. The book presents case studies and performance metrics demonstrating these improvements.

Natural Language Processing (NLP)

In NLP, deep learning enables advanced language modeling, machine translation, sentiment analysis, and question answering. Kelleher explains how architectures like transformers have pushed the boundaries of what automated systems can understand and generate.

Healthcare and Bioinformatics

Applications in medical imaging, disease diagnosis, and genomics are highlighted, illustrating the potential of deep learning to enhance healthcare outcomes through accurate prediction and analysis.

Autonomous Systems

Deep learning's role in robotics, self-driving cars, and smart assistants is examined, showcasing its ability to process sensory data and make real-time decisions.

Additional Applications

- Speech recognition and audio processing
- Financial modeling and fraud detection
- Recommendation systems and personalization
- Gaming and reinforcement learning

Challenges and Future Directions

Despite its successes, Kelleher 2019 deep learning addresses ongoing challenges and areas for future research. This section discusses the limitations and potential enhancements in the field.

Interpretability and Explainability

Understanding how deep networks arrive at their decisions remains a critical concern. The book explores methods to improve model transparency and trustworthiness.

Data Requirements and Bias

Deep learning models require large, high-quality datasets, which can be difficult to obtain. Issues related to data bias and fairness are also discussed as important ethical considerations.

Computational Efficiency

The demand for computational resources motivates research into more efficient architectures, pruning techniques, and hardware innovations.

Integration with Other AI Paradigms

Kelleher highlights the potential for combining deep learning with symbolic AI, reinforcement learning, and causal inference to create more robust and generalizable systems.

Emerging Trends

- Self-supervised and unsupervised learning
- Neural architecture search
- Federated and distributed learning
- Quantum machine learning

Frequently Asked Questions

What is the main focus of Kelleher's 2019 work on deep learning?

Kelleher's 2019 work primarily focuses on introducing deep learning concepts, explaining neural network architectures, and discussing their applications and challenges in modern AI.

How does Kelleher 2019 explain the architecture of deep neural networks?

Kelleher 2019 breaks down deep neural network architecture into layers such as input, hidden, and output layers, detailing how neurons and activation functions work together to model complex data patterns.

What are some key challenges in deep learning highlighted by Kelleher in 2019?

Key challenges discussed include the need for large datasets, computational resource demands, overfitting, and difficulties in interpreting deep learning models.

Does Kelleher 2019 cover practical applications of deep learning?

Yes, Kelleher 2019 covers practical applications including image recognition, natural language processing, and speech recognition, illustrating how deep learning transforms these fields.

What learning techniques in deep learning are emphasized in Kelleher's 2019 publication?

Kelleher emphasizes supervised learning, unsupervised learning, and reinforcement learning as foundational techniques within deep learning frameworks.

How does Kelleher 2019 address the future directions of deep learning research?

Kelleher discusses future directions such as improving model interpretability, reducing data and computational requirements, and advancing unsupervised and transfer learning methods.

Additional Resources

1. *Deep Learning for the Life Sciences: Applying Deep Learning to Genomics, Microscopy, Drug Discovery, and More*

This book offers a practical introduction to applying deep learning techniques within the life sciences domain. It covers key concepts from neural networks to advanced architectures and demonstrates their use in genomics, microscopy, and drug discovery. Readers gain hands-on experience through real-world examples and case studies, making complex ideas accessible for practitioners in biology and medicine.

2. *Deep Learning with Python* by François Chollet

Written by the creator of Keras, this book provides a comprehensive guide to deep learning using Python. It covers foundational concepts, including neural networks, convolutional networks, and recurrent networks, accompanied by clear code examples. The book emphasizes intuitive understanding and practical implementation, making it an excellent resource for both beginners and experienced practitioners.

3. *Neural Networks and Deep Learning: A Textbook* by Charu C. Aggarwal

This textbook presents a detailed introduction to the theory and practice of neural networks and deep learning. It covers essential algorithms, optimization methods, and architectures, supported by mathematical rigor and practical insights. Ideal for graduate students and professionals, it bridges the gap between theoretical foundations and real-world applications.

4. *Deep Learning* by Ian Goodfellow, Yoshua Bengio, and Aaron Courville

Considered a seminal text in the field, this book thoroughly explores deep learning concepts, including supervised and unsupervised learning, deep architectures, and optimization techniques. It balances theoretical underpinnings with practical aspects, covering topics from fundamentals to cutting-edge research. The book serves as a comprehensive reference for students and researchers alike.

5. *Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow* by Aurélien Géron

This practical guide introduces machine learning and deep learning techniques using popular Python libraries. It covers data preprocessing, model training, and deployment, emphasizing hands-on projects and real-world datasets. The book helps readers build and fine-tune deep learning models, making it suitable for practitioners aiming to apply deep learning effectively.

6. *Deep Learning for Computer Vision* by Rajalingappaa Shanmugamani
Focusing on computer vision applications, this book explores deep learning architectures such as CNNs and GANs. It provides insights into image classification, object detection, and image generation, supported by practical code implementations. The book is tailored for developers and researchers interested in leveraging deep learning for visual data.

7. *Probabilistic Deep Learning: With Python, Keras and TensorFlow Probability* by Oliver Duerr, Alexander G. de G. Matthews, and Zoubin Ghahramani
This book introduces probabilistic approaches to deep learning, combining Bayesian methods with neural networks. It covers uncertainty estimation, Bayesian neural networks, and probabilistic modeling, supported by Python implementations. Suitable for researchers and practitioners, it expands the deep learning toolkit with probabilistic reasoning.

8. *Deep Reinforcement Learning Hands-On* by Maxim Lapan
This book provides an accessible introduction to deep reinforcement learning (DRL) techniques and applications. It covers core DRL algorithms, policy gradients, and value-based methods, with practical examples using PyTorch. The book enables readers to build intelligent agents capable of learning from interaction with environments.

9. *Natural Language Processing with Deep Learning* by Thushan Ganegedara
This text explores the intersection of deep learning and natural language processing (NLP). It covers word embeddings, sequence models, attention mechanisms, and transformer architectures, with hands-on projects. Designed for NLP practitioners, it offers insights into building state-of-the-art language models and applications.

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kelleher 2019 deep learning: Deep Learning John D. Kelleher, 2019-09-10 An accessible introduction to the artificial intelligence technology that enables computer vision, speech recognition, machine translation, and driverless cars. Deep learning is an artificial intelligence technology that enables computer vision, speech recognition in mobile phones, machine translation, AI games, driverless cars, and other applications. When we use consumer products from Google, Microsoft, Facebook, Apple, or Baidu, we are often interacting with a deep learning system. In this volume in the MIT Press Essential Knowledge series, computer scientist John Kelleher offers an accessible and concise but comprehensive introduction to the fundamental technology at the heart of the artificial intelligence revolution. Kelleher explains that deep learning enables data-driven decisions by identifying and extracting patterns from large datasets; its ability to learn from complex data makes deep learning ideally suited to take advantage of the rapid growth in big data and computational power. Kelleher also explains some of the basic concepts in deep learning, presents a history of advances in the field, and discusses the current state of the art. He describes the most important deep learning architectures, including autoencoders, recurrent neural networks, and long short-term networks, as well as such recent developments as Generative Adversarial Networks and

capsule networks. He also provides a comprehensive (and comprehensible) introduction to the two fundamental algorithms in deep learning: gradient descent and backpropagation. Finally, Kelleher considers the future of deep learning—major trends, possible developments, and significant challenges.

kelleher 2019 deep learning: Applications of Game Theory in Deep Learning Tanmoy Hazra, Kushal Anjaria, Aditi Bajpai, Akshara Kumari, 2024-03-19 This book aims to unravel the complex tapestry that interweaves strategic decision-making models with the forefront of deep learning techniques. Applications of Game Theory in Deep Learning provides an extensive and insightful exploration of game theory in deep learning, diving deep into both the theoretical foundations and the real-world applications that showcase this intriguing intersection of fields. Starting with the essential foundations for comprehending both game theory and deep learning, delving into the individual significance of each field, the book culminates in a nuanced examination of Game Theory's pivotal role in augmenting and shaping the development of Deep Learning algorithms. By elucidating the theoretical underpinnings and practical applications of this synergistic relationship, we equip the reader with a comprehensive understanding of their combined potential. In our digital age, where algorithms and autonomous agents are becoming more common, the combination of game theory and deep learning has opened a new frontier of exploration. The combination of these two disciplines opens new and exciting avenues. We observe how artificial agents can think strategically, adapt to ever-shifting environments, and make decisions that are consistent with their goals and the dynamics of their surroundings. This book presents case studies, methodologies, and real-world applications.

kelleher 2019 deep learning: Mechanisms and the Contingency of Social Causality Alexei Anisin, 2022-08-04 Mechanisms are frequently brought up across the natural and social sciences as supplements to laws and empirical regularities. Recent decades have seen an explosion in mechanistic explanations in which philosophers of science, natural scientists, and social scientists have advocated, debated, and criticized the usage of mechanisms in their respective disciplines. As the intensity of these debates has increased, our understanding of the historical origin of mechanisms remains incomplete. Of the explanations that have been put forward, it has been argued that the roots of mechanisms are to be found in mechanical philosophy. This book demonstrates that an important set of factors have been overlooked in our understanding of the ontology of mechanisms. In shifting attention to a never-before-explored terrain in the etymological and semantic evolution of what arguably is the most commonly used scientific term, “the mechanism,” this text discovers that the origin of mechanisms is to be witnessed in ideas about social causality that arose within Ancient Greek tragedy and theater. It takes readers on a journey through socio-cultural settings and changes in Ancient Greece, early Christianity, the Roman Empire, and the Middle Ages, as well as the rise of science and modernity, and finishes in our current era of digital technology. As such, the book reveals how understandings of mechanisms have changed and evolved across time.

kelleher 2019 deep learning: AI and Data Analytics Applications in Organizational Management Merlo, Tereza Raquel, 2024-02-07 Within information sciences and organizational management, a pressing challenge emerges; How can we harness the transformative power of artificial intelligence (AI) and data analytics? As industries grapple with a deluge of data and the imperative to make informed decisions swiftly, the gap between data collection and actionable insights widens. Professionals in various sectors are in a race to unlock AI's full potential to drive operational efficiency, enhance decision-making, and gain a competitive edge. However, navigating this intricate terrain, laden with ethical considerations and interdisciplinary complexity, has proven to be a formidable undertaking. AI and Data Analytics Applications in Organizational Management, combines rigorous scholarship with practicality. It traverses the spectrum from theoretical foundations to real-world applications, making it indispensable for those seeking to implement AI-driven data analytics in their organizations. Moreover, it delves into the ethical and societal dimensions of this revolution, ensuring that the journey toward innovation is paved with responsible

considerations. For researchers, scholars, and practitioners yearning to unleash the potential of AI in organizational management, this book is the key to not only understanding the landscape but also charting a course toward transformative change.

kelleher 2019 deep learning: Artificial Intelligence in e-Health Framework, Volume 1 Sudip Paul, Jasjit S. Suri, 2025-01-24 Artificial Intelligence in e-health Framework, Volume One: AI, Classification, Wearable Devices, and Computer-Aided Diagnosis presents a variety of AI techniques and applications for solving issues in the healthcare industry. As Artificial Intelligence is increasingly incorporated into medical systems and methods, it is critical to understand the formulations and basics of machine and deep learning as well as how to implement these advances into practice. This book specifically explores Artificial Intelligence developments in disease diagnosis, health monitoring, medical image recognition, and diagnostics, as well as e-health records management. This is a valuable resource for health professionals, scientists, researchers, students, and all who wish to broaden their knowledge in this advancing technology. - Provides an in-depth introduction to Artificial Intelligence in e-health framework - Reviews theoretical and application information to develop understanding of AI advances in diagnostics, health monitoring, and records management - Discusses advanced AI techniques in both machine learning and deep learning for solving healthcare industry issues

kelleher 2019 deep learning: *Legal Theory and Interpretation in a Dynamic Society* Alexander Bruns, Yuanshi Bu, Hanno Merkt, Sonja Meier, Michael Pawlik, Eiji Takahashi, Silja Vöneky, Jan von Hein, 2021-07-02 Der Band versammelt Beiträge, die anlässlich des 7. Seoul-Freiburger Rechtswissenschaftlichen Symposiums im September 2019 in Seoul gehalten wurden. Die Zusammenarbeit und der akademische Austausch zwischen den juristischen Fakultäten der Seoul National University (SNU) und der Albert-Ludwigs-Universität Freiburg hat eine alte und wertvolle Tradition der engen Beziehungen zwischen dem koreanischen und dem deutschen Recht lebendig gehalten. Das 7. Symposium war dem Thema Rechtstheorie und -auslegung in einer dynamischen Gesellschaft gewidmet und deckte ein breites Spektrum an Themen ab, die in sechs Sektionen unterteilt waren: I. Rechtstheorie und -auslegung, II. Unternehmensrecht, III. Internationales Privatrecht und Zivilprozessrecht, IV. Recht der künstlichen Intelligenz, Eigentumsrecht und Strafrecht. V. Vertragsrecht, und VI. das Verhältnis von supranationalem und innerstaatlichem Verfassungsrecht. Die meisten der auf dem Symposium gehaltenen Vorträge sind in diesem Band versammelt.

kelleher 2019 deep learning: Artificial Neural Networks and Machine Learning - ICANN 2023 Lazaros Iliadis, Antonios Papaleonidas, Plamen Angelov, Chrisina Jayne, 2023-09-21 The 10-volume set LNCS 14254-14263 constitutes the proceedings of the 32nd International Conference on Artificial Neural Networks and Machine Learning, ICANN 2023, which took place in Heraklion, Crete, Greece, during September 26-29, 2023. The 426 full papers and 9 short papers included in these proceedings were carefully reviewed and selected from 947 submissions. ICANN is a dual-track conference, featuring tracks in brain inspired computing on the one hand, and machine learning on the other, with strong cross-disciplinary interactions and applications.

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kelleher 2019 deep learning: Artificial Intelligence Models for the Dark Universe Ariel Fernández, 2024-08-20 The dark universe contains matter and energy unidentifiable with current physical models, accounting for 95% of all the matter and energetic equivalent in the universe. The enormous surplus brings up daunting enigmas, such as the cosmological constant problem and the apparent distortions in the dynamics of deep space, and so coming to grips with the invisible universe has become a scientific imperative. This book addresses this need, reckoning that no cogent physical model of the dark universe can be implemented without first addressing the

metaphysical hurdles along the way. The foremost problem is identifying the topology of the universe which, as argued in the book, is highly relevant to unveil the secrets of the dark universe. Artificial Intelligence (AI) is a valuable tool in this effort since it can reconcile conflicting data from deep space with the extant laws of physics by building models to decipher the dark universe. This book explores the applications of AI and how it can be used to embark on a metaphysical quest to identify the topology of the universe as a prerequisite to implement a physical model of the dark sector that enables a meaningful extrapolation into the visible sector. The book is intended for a broad readership, but a background in college-level physics and computer science is essential. The book will be a valuable guide for graduate students as well as researchers in physics, astrophysics, and computer science focusing on AI applications to elucidate the nature of the dark universe. Key Features: · Provides readers with an intellectual toolbox to understand physical arguments on dark matter and energy. · Up to date with the latest cutting-edge research. · Authored by an expert on artificial intelligence and mathematical physics.

kelleher 2019 deep learning: A Biologist's Guide to Artificial Intelligence Ambreen Hamadani, Nazir A Ganai, Hamadani Henna, J Bashir, 2024-02-29 A Biologist's Guide to Artificial Intelligence: Building the Foundations of Artificial Intelligence and Machine Learning for Achieving Advancements in Life Sciences provides an overview of the basics of Artificial Intelligence for life science biologists. In 14 chapters/sections, readers will find an introduction to Artificial Intelligence from a biologist's perspective, including coverage of AI in precision medicine, disease detection, and drug development. The book also gives insights into the AI techniques used in biology and the applications of AI in food, and in environmental, evolutionary, agricultural, and bioinformatic sciences. Final chapters cover ethical issues surrounding AI and the impact of AI on the future. This book covers an interdisciplinary area and is therefore is an important subject matter resource and reference for researchers in biology and students pursuing their degrees in all areas of Life Sciences. It is also a useful title for the industry sector and computer scientists who would gain a better understanding of the needs and requirements of biological sciences and thus better tune the algorithms. - Helps biologists succeed in understanding the concepts of Artificial Intelligence and machine learning - Equips with new data mining strategies an easy interface into the world of Artificial Intelligence - Enables researchers to enhance their own sphere of researching Artificial Intelligence

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kelleher 2019 deep learning: Applications of Artificial Intelligence in Healthcare and Biomedicine Abdulhamit Subasi, 2024-03-10 Applications of Artificial Intelligence in Healthcare and Biomedicine provides updated knowledge on the applications of artificial intelligence in medical image analysis. The book starts with an introduction to Artificial Intelligence techniques for Healthcare and Biomedicine. In 16 chapters it presents artificial applications in Electrocardiogram

(ECG), Electroencephalogram (EEG) and Electromyography (EMG), signal analysis, Computed Tomography (CT), Magnetic Resonance Imaging (MR) and Ultrasound image analysis. It equips researchers with tools for early breast cancer detection from mammograms using artificial intelligence (AI), AI models to detect lung cancer using histopathological images and a deep learning-based approach to get a proper and faster diagnosis of the Optical Coherence Tomography (OCT) images. It also presents present 3D medical image analysis using 3D Convolutional Neural Networks (CNNs). Applications of Artificial Intelligence in Healthcare and Biomedicine closes with a chapter on AI-based approach to forecast diabetes patients' hospital re-admissions. This is a valuable resource for clinicians, researchers and healthcare professionals who are interested in learning more about the applications of Artificial Intelligence and its impact in medical/biomedical image analysis. - Provides knowledge on Artificial Intelligence algorithms for clinical data analysis - Gives insights into both AI applications in biomedical signal analysis, biomedical image analysis, and applications in healthcare, including drug discovery - Equips researchers with tools for early breast cancer detection

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kelleher 2019 deep learning: *Leveraging AI-Powered Marketing in the Experience-Driven Economy* Dulloo, Rhytheema, Kurian, Anand, Bolesnikov, Minja, Struweg, Ilse, Mathiyazhagan, Kaliyan, 2025-04-18 Emerging cutting-edge technologies, particularly artificial intelligence (AI), present a shift in the marketing landscape, ushering in Marketing 5.0. It drastically reshapes the way brands engage with customers, and in the Marketing 5.0 era, where experiences are key, businesses must rise above conventional marketing practices to meet consumer demands. By embracing AI-driven technologies and the principles of the consumer experience economy, businesses can emerge as beacons of innovation and creativity, offering personalized experiences over simple goods or services. Leveraging AI-Powered Marketing in the Experience-Driven Economy explores the disruptive potential of AI in marketing and its groundbreaking impact on immersive and meaningful consumer experiences. The strategic frameworks and best practices needed to demystify AI's leading-edge prowess and drive innovation across the entire experience cycle offer a roadmap to current marketing professionals. Covering topics such as in-store experiences, neuromarketing, and online visibility, this book is an excellent resource for marketing professionals, social media managers, economists, business owners, researchers, academicians, and more.

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doctrines. The main question to be answered is whether the foundations and general principles of private law and criminal law offer a functional and adaptive legal framework for the “autonomous systems” phenomena. The main purpose of this book is to identify and explore possible trajectories for the development of civil and criminal liability; for our understanding of the attribution link to autonomous systems; and, in particular, for the punishment of unlawful conduct in connection with their operation. AI decision-making processes – including judicial sentencing – also warrant close attention in this regard. Since AI is moving faster than the process of regulatory recalibration, this book provides valuable insights on its redesign and on the harmonization, at the European level, of the current regulatory frameworks, in order to keep pace with technological changes. Providing a broader and more comprehensive picture of the legal challenges posed by autonomous systems, this book covers a wide range of topics, including the regulation of autonomous vehicles, data protection and governance, personality rights, intellectual property, corporate governance, and contract conclusion and termination issues arising from automated decisions, blockchain technology and AI applications, particularly in the banking and finance sectors. The authors are legal experts from around the world with extensive academic and/or practical experience in these areas.

kelleher 2019 deep learning: What People Leave Behind Francesca Comunello, Fabrizio Martire, Lorenzo Sabetta, 2022-10-11 This open access book focuses on a particular but significant topic in the social sciences: the concepts of “footprint” and “trace”. It associates these concepts with hotly debated topics such as surveillance capitalism and knowledge society. The editors and authors discuss the concept footprints and traces as unintended by-products of other (differently focused and oriented) actions that remain empirically imprinted in virtual and real spaces. The volume therefore opens new scenarios for social theory and applied social research in asking what the stakes, risks and potential of this approach are. It systematically raises and addresses these questions within a consistent framework, bringing together a heterogeneous group of international social scientists. Given the multifaceted objectives involved in exploring footprints and traces, the volume discusses heuristic aspects and ethical dimensions, scientific analyses and political considerations, empirical perspectives and theoretical foundations. At the same time, it brings together perspectives from cultural analysis and social theory, communication and Internet studies, big-data informed research and computational social science. This innovative volume is of interest to a broad interdisciplinary readership: sociologists, communication researchers, Internet scholars, anthropologists, cognitive and behavioral scientists, historians, and epistemologists, among others.

kelleher 2019 deep learning: Cognitive Systems and Signal Processing in Image Processing Yu-Dong Zhang, Arun Kumar Sangaiah, 2021-11-28 Cognitive Systems and Signal Processing in Image Processing presents different frameworks and applications of cognitive signal processing methods in image processing. This book provides an overview of recent applications in image processing by cognitive signal processing methods in the context of Big Data and Cognitive AI. It presents the amalgamation of cognitive systems and signal processing in the context of image processing approaches in solving various real-world application domains. This book reports the latest progress in cognitive big data and sustainable computing. Various real-time case studies and implemented works are discussed for better understanding and more clarity to readers. The combined model of cognitive data intelligence with learning methods can be used to analyze emerging patterns, spot business opportunities, and take care of critical process-centric issues for computer vision in real-time. - Presents cognitive signal processing methodologies that are related to challenging image processing application domains - Provides the state-of-the-art in cognitive signal processing approaches in the area of big-data image processing - Focuses on other technical aspects and alternatives to traditional tools, algorithms and methodologies - Discusses various real-time case studies and implemented works

kelleher 2019 deep learning: Thinking About Statistics Jun Otsuka, 2022-12-30 Simply stated, this book bridges the gap between statistics and philosophy. It does this by delineating the conceptual cores of various statistical methodologies (Bayesian/frequentist statistics, model selection, machine learning, causal inference, etc.) and drawing out their philosophical implications.

Portraying statistical inference as an epistemic endeavor to justify hypotheses about a probabilistic model of a given empirical problem, the book explains the role of ontological, semantic, and epistemological assumptions that make such inductive inference possible. From this perspective, various statistical methodologies are characterized by their epistemological nature: Bayesian statistics by internalist epistemology, classical statistics by externalist epistemology, model selection by pragmatist epistemology, and deep learning by virtue epistemology. Another highlight of the book is its analysis of the ontological assumptions that underpin statistical reasoning, such as the uniformity of nature, natural kinds, real patterns, possible worlds, causal structures, etc. Moreover, recent developments in deep learning indicate that machines are carving out their own ontology (representations) from data, and better understanding this—a key objective of the book—is crucial for improving these machines' performance and intelligibility. Key Features Without assuming any prior knowledge of statistics, discusses philosophical aspects of traditional as well as cutting-edge statistical methodologies. Draws parallels between various methods of statistics and philosophical epistemology, revealing previously ignored connections between the two disciplines. Written for students, researchers, and professionals in a wide range of fields, including philosophy, biology, medicine, statistics and other social sciences, and business. Originally published in Japanese with widespread success, has been translated into English by the author.

kelleher 2019 deep learning: Social Media Graham Meikle, 2024-04-30 From Facebook and YouTube to TikTok and WeChat, this accessible book explores the relationships between public and personal communication on social media to understand their impacts on users' everyday lives. Social media have made possible new kinds of relationships, entertainment, and politics, and enabled billions of people to experience new forms of communication, community, and communion. But social media are also profit-driven, data-mining corporations, and their core business model is often built around targeted surveillance that enables the commercial exploitation of their users' everyday lives. Graham Meikle explores the tensions between these different dimensions of social media, engaging with questions of communication, data, remix, news, visibility, citizenship, and regulation. This second edition has been substantially revised: more than half of the text is entirely new to this edition, and those sections that remain have been completely updated. This new edition includes analysis of the data-driven business models of major social media firms, and of how these firms are expanding into new areas such as AI. It also includes discussion of major developments in news, surveillance, and activism on social media, as well as a new chapter on regulation. This book is an ideal critical introduction to social media in all their complexity.

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