

deep learning kelleher john d

deep learning kelleher john d represents a significant contribution to the field of artificial intelligence and machine learning. John D. Kelleher is renowned for his comprehensive work on deep learning methodologies, providing both theoretical foundations and practical applications. This article explores the fundamental concepts of deep learning as articulated by Kelleher, the evolution of neural networks, and the real-world implications of these technologies. Additionally, it covers the challenges and future directions highlighted in Kelleher's research. Understanding deep learning through the lens of John D. Kelleher's scholarship offers valuable insights for practitioners, researchers, and enthusiasts aiming to grasp the complexities of modern AI systems. The article also delves into key techniques, architectures, and the impact on various industries. The following sections will provide a structured overview of these topics to enhance comprehension.

- Overview of Deep Learning Concepts
- John D. Kelleher's Contributions to Deep Learning
- Core Architectures in Deep Learning
- Applications of Deep Learning
- Challenges and Future Trends in Deep Learning

Overview of Deep Learning Concepts

Deep learning kelleher john d emphasizes the significance of hierarchical learning models that utilize multiple layers of abstraction to interpret data. This approach enables machines to perform complex tasks such as image recognition, natural language processing, and autonomous decision-making. Deep learning models mimic the human brain's neural networks, facilitating the automatic extraction of features from raw data without manual intervention.

At its core, deep learning involves training artificial neural networks with vast amounts of data to identify patterns and make predictions. The depth of these networks, often comprising numerous hidden layers, distinguishes deep learning from traditional machine learning methods.

Fundamentals of Neural Networks

John D. Kelleher's work elucidates the structure of neural networks, which consist of input, hidden, and

output layers. Each neuron in these layers processes input data through weighted connections and activation functions to generate meaningful outputs. The training process adjusts these weights to minimize errors using algorithms like backpropagation.

Understanding these fundamentals is critical to grasping the power and flexibility of deep learning models in handling diverse data types and complex problems.

Learning Algorithms and Training

Deep learning kelleher john d highlights various learning algorithms pivotal to network training, including supervised, unsupervised, and reinforcement learning. Supervised learning relies on labeled datasets, whereas unsupervised learning identifies inherent patterns without explicit labels. Reinforcement learning involves decision-making based on rewards and penalties.

Kelleher stresses the importance of optimization techniques such as stochastic gradient descent and regularization methods to enhance model performance and prevent overfitting.

John D. Kelleher's Contributions to Deep Learning

John D. Kelleher has significantly influenced the deep learning landscape through his scholarly publications and educational resources. His work bridges the gap between theoretical frameworks and practical implementations, making complex concepts accessible to a broader audience.

Kelleher's approach often involves clear explanations of deep learning principles alongside real-world examples, which facilitates better understanding among practitioners and students alike.

Educational Impact and Publications

One of Kelleher's notable contributions is his ability to distill complex deep learning topics into comprehensible material suitable for academic and professional development. His textbooks and articles serve as foundational references for those entering the field.

He covers a range of topics from introductory neural network architectures to advanced topics such as convolutional neural networks (CNNs) and recurrent neural networks (RNNs), providing readers with a broad spectrum of knowledge.

Research and Practical Applications

Kelleher's research often explores the intersection of deep learning techniques with practical applications, offering insights into how these models can be deployed effectively. His work includes case studies in areas like computer vision, speech recognition, and natural language understanding.

By emphasizing both theory and practice, Kelleher's contributions help bridge academic research with industry needs in artificial intelligence.

Core Architectures in Deep Learning

Deep learning kelleher john d extensively discusses the primary architectures that form the backbone of modern AI systems. These architectures enable deep learning models to solve a wide array of problems by adapting to different data types and tasks.

Convolutional Neural Networks (CNNs)

CNNs are specialized for processing grid-like data such as images. Kelleher highlights how CNNs use convolutional layers to automatically detect spatial hierarchies of features, making them highly effective for image classification and object detection tasks.

The architecture includes pooling layers to reduce dimensionality and fully connected layers to perform final classification.

Recurrent Neural Networks (RNNs) and Variants

RNNs are designed to handle sequential data by maintaining a form of memory through cycles in their connections. Kelleher explains their utility in natural language processing and time series analysis. Variants like Long Short-Term Memory (LSTM) and Gated Recurrent Units (GRU) address the problem of vanishing gradients, enhancing long-term dependency learning.

Other Architectures

Besides CNNs and RNNs, Kelleher covers architectures such as Autoencoders, Generative Adversarial Networks (GANs), and Transformer models. These frameworks expand the capability of deep learning to include unsupervised learning, data generation, and highly parallelizable sequence modeling.

- Autoencoders for dimensionality reduction and feature learning
- GANs for realistic data synthesis and augmentation
- Transformers for advanced natural language understanding and generation

Applications of Deep Learning

The practical impact of deep learning kelleher john d is evident across various industries and domains. Deep learning has revolutionized how machines interpret complex data, enabling advancements that were previously unattainable.

Computer Vision

Kelleher's studies emphasize computer vision as a leading application area for deep learning. Techniques such as image classification, object detection, and image segmentation benefit from deep neural networks, particularly CNNs, yielding high accuracy and efficiency.

Natural Language Processing (NLP)

Deep learning models have transformed NLP tasks including language translation, sentiment analysis, and question answering. Kelleher highlights how architectures like RNNs and Transformers have improved machine understanding and generation of human language.

Healthcare and Biomedical Applications

In healthcare, deep learning kelleher john d has enabled breakthroughs in medical image analysis, disease prediction, and drug discovery. The ability of deep models to analyze complex biological data accelerates diagnosis and personalized treatment strategies.

Challenges and Future Trends in Deep Learning

Despite its successes, deep learning kelleher john d acknowledges inherent challenges such as data requirements, interpretability, and computational costs. These issues require ongoing research to ensure the responsible and effective deployment of deep learning systems.

Data and Computational Constraints

Deep learning models often demand large labeled datasets and substantial computational resources. Kelleher discusses strategies to mitigate these demands, including transfer learning, data augmentation, and efficient model architectures.

Model Interpretability and Ethics

Understanding how deep learning models make decisions is critical for trust and accountability. Kelleher highlights the growing focus on explainable AI (XAI) and ethical considerations to address biases and ensure fairness.

Emerging Trends

Looking ahead, Kelleher points to trends like the integration of deep learning with reinforcement learning, advancements in unsupervised learning, and the development of more energy-efficient models. These directions aim to expand the capabilities and accessibility of deep learning technologies.

Frequently Asked Questions

Who is John D. Kelleher in the field of deep learning?

John D. Kelleher is an author and researcher known for his contributions to artificial intelligence and deep learning, particularly through his educational books and work on machine learning methodologies.

What is the book 'Deep Learning' by John D. Kelleher about?

The book 'Deep Learning' by John D. Kelleher provides an accessible introduction to the principles and techniques of deep learning, covering neural networks, architectures, and practical applications.

How does John D. Kelleher's approach to deep learning differ from other authors?

John D. Kelleher emphasizes clear explanations and practical understanding, making deep learning concepts accessible to beginners and practitioners without requiring extensive prior knowledge in mathematics or computer science.

Are there any online resources or courses by John D. Kelleher on deep learning?

Yes, John D. Kelleher has been involved in creating educational content and courses related to artificial intelligence and machine learning, which may include topics on deep learning.

What topics are covered in John D. Kelleher's deep learning materials?

His materials typically cover neural networks, convolutional and recurrent architectures, training techniques, optimization, and real-world applications of deep learning.

Is 'Deep Learning' by John D. Kelleher suitable for beginners?

Yes, the book is designed to be beginner-friendly, providing foundational knowledge and gradually introducing more complex concepts in deep learning.

How can John D. Kelleher's work help practitioners in AI?

Practitioners can benefit from his clear explanations and practical examples, which help in understanding and implementing deep learning models effectively in various AI projects.

Has John D. Kelleher contributed to any research papers in deep learning?

John D. Kelleher has contributed to research in AI and machine learning, though he is primarily known for his educational work rather than original deep learning research papers.

Where can I purchase or access John D. Kelleher's 'Deep Learning' book?

John D. Kelleher's 'Deep Learning' book can be purchased from major online retailers like Amazon, or accessed through academic libraries and platforms that offer technical books.

Additional Resources

1. *Deep Learning* by John D. Kelleher

This book offers a comprehensive introduction to the field of deep learning, covering fundamental concepts and practical applications. It is designed for both beginners and practitioners, providing clear explanations of neural networks, training algorithms, and advanced architectures. The text also includes real-world examples and exercises to reinforce understanding.

2. *Fundamentals of Machine Learning for Predictive Data Analytics: Algorithms, Worked Examples, and Case Studies* by John D. Kelleher, Brian Mac Namee, and Aoife D'Arcy

Although broader than just deep learning, this book lays essential groundwork by exploring machine learning algorithms and their applications. It delves into predictive data analytics using a hands-on approach, making it a valuable resource for those aiming to understand deep learning in the context of wider AI techniques.

3. *Deep Learning with Python* by François Chollet (recommended alongside Kelleher's works)

While not authored by Kelleher, this book complements his teachings by providing an accessible introduction to deep learning using Python and Keras. It bridges theory and practice, making complex concepts approachable through practical coding examples and projects.

4. *Data Science and Machine Learning: Mathematical and Statistical Methods* by John D. Kelleher

This text focuses on the mathematical and statistical foundations behind machine learning and data science, including deep learning techniques. It's particularly useful for readers who want to deepen their theoretical understanding to better grasp how deep learning models operate under the hood.

5. *Deep Learning for Natural Language Processing* by John D. Kelleher

This specialized book examines the application of deep learning models to natural language processing tasks. It covers key architectures such as recurrent neural networks and transformers, illustrating how deep learning has revolutionized language understanding.

6. *Neural Networks and Deep Learning: A Textbook* by Charu C. Aggarwal (recommended alongside Kelleher's work)

This textbook gives a structured and detailed approach to deep learning and neural networks, serving as a solid academic companion to Kelleher's more applied texts. It includes mathematical rigor and a variety of examples useful for serious students of the discipline.

7. *Applied Deep Learning: A Case-Based Approach* by John D. Kelleher

Focusing on practical applications, this book walks readers through case studies that demonstrate the use of deep learning in real-world scenarios. It's ideal for learners who want to see how theories translate into practice across different industries.

8. *Introduction to Artificial Intelligence* by John D. Kelleher

This broader AI text includes significant content on machine learning and deep learning, situating these methods within the larger field of artificial intelligence. It serves as an accessible entry point for those new to AI and interested in deep learning's role within it.

9. *Machine Learning for Data Analytics* by John D. Kelleher

This book provides an overview of machine learning techniques with an emphasis on data analytics applications, including sections on deep learning. It is tailored for data professionals looking to leverage deep learning methods to extract insights from complex datasets.

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deep learning kelleher john d: 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.

deep learning kelleher john d: Deep Learning John D. Kelleher, 2019

deep learning kelleher john d: Data Science John D. Kelleher, Brendan Tierney, 2018-04-13 A concise introduction to the emerging field of data science, explaining its evolution, relation to machine learning, current uses, data infrastructure issues, and ethical challenges. The goal of data science is to improve decision making through the analysis of data. Today data science determines the ads we see online, the books and movies that are recommended to us online, which emails are filtered into our spam folders, and even how much we pay for health insurance. This volume in the MIT Press Essential Knowledge series offers a concise introduction to the emerging field of data science, explaining its evolution, current uses, data infrastructure issues, and ethical challenges. It has never been easier for organizations to gather, store, and process data. Use of data science is driven by the rise of big data and social media, the development of high-performance computing, and the emergence of such powerful methods for data analysis and modeling as deep learning. Data science encompasses a set of principles, problem definitions, algorithms, and processes for extracting non-obvious and useful patterns from large datasets. It is closely related to the fields of data mining and machine learning, but broader in scope. This book offers a brief history of the field, introduces fundamental data concepts, and describes the stages in a data science project. It considers data infrastructure and the challenges posed by integrating data from multiple sources, introduces the basics of machine learning, and discusses how to link machine learning expertise with real-world problems. The book also reviews ethical and legal issues, developments in data regulation, and computational approaches to preserving privacy. Finally, it considers the future impact of data science and offers principles for success in data science projects.

deep learning kelleher john d: Fundamentals of Machine Learning for Predictive Data Analytics, second edition John D. Kelleher, Brian Mac Namee, Aoife D'Arcy, 2020-10-20 The second edition of a comprehensive introduction to machine learning approaches used in predictive data analytics, covering both theory and practice. Machine learning is often used to build predictive models by extracting patterns from large datasets. These models are used in predictive data analytics applications including price prediction, risk assessment, predicting customer behavior, and document classification. This introductory textbook offers a detailed and focused treatment of the most important machine learning approaches used in predictive data analytics, covering both theoretical concepts and practical applications. Technical and mathematical material is augmented with explanatory worked examples, and case studies illustrate the application of these models in the

broader business context. This second edition covers recent developments in machine learning, especially in a new chapter on deep learning, and two new chapters that go beyond predictive analytics to cover unsupervised learning and reinforcement learning.

deep learning kelleher john d: 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.

deep learning kelleher john d: Mathematical Music Nikita Braguinski, 2022-03-13 Mathematical Music offers a concise and easily accessible history of how mathematics was used to create music. The story presented in this short, engaging volume ranges from ratios in antiquity to random combinations in the 17th century, 20th-century statistics, and contemporary artificial intelligence. This book provides a fascinating panorama of the gradual mechanization of thought processes involved in the creation of music. How did Baroque authors envision a composition system based on combinatorics? What was it like to create musical algorithms at the beginning of the 20th century, before the computer became a reality? And how does this all explain today's use of artificial intelligence and machine learning in music? In addition to discussing the history and the present state of mathematical music, Braguinski also takes a look at what possibilities the near future of music AI might hold for listeners, musicians, and the society. Grounded in research findings from musicology and the history of technology, and written for the non-specialist general audience, this book helps both student and professional readers to make sense of today's music AI by situating it in a continuous historical context.

deep learning kelleher john d: AI in the Wild Peter Dauvergne, 2020-09-15 Examining the potential benefits and risks of using artificial intelligence to advance global sustainability. Drones with night vision are tracking elephant and rhino poachers in African wildlife parks and sanctuaries; smart submersibles are saving coral from carnivorous starfish on Australia's Great Barrier Reef; recycled cell phones alert Brazilian forest rangers to the sound of illegal logging. The tools of artificial intelligence are being increasingly deployed in the battle for global sustainability. And yet, warns Peter Dauvergne, we should be cautious in declaring AI the planet's savior. In *AI in the Wild*, Dauvergne avoids the AI industry-powered hype and offers a critical view, exploring both the potential benefits and risks of using artificial intelligence to advance global sustainability.

deep learning kelleher john d: An Introduction to Data Science: Everything About AI, ML and Big Data Rudra Tiwari, 2022-09-18 First Edition of this book is predominantly envisioned for students who want to redefine the way they think about artificial intelligence (AI) and Data Science. Therefore the book, which is organized as a assortment of essentially self-contained articles, comprises both general strategic considerations and some detailed sector-specific material. It shares visions into what it means to work with AI and how to do it more proficiently; how to use AI in detailed industries such as investment or insurance; how AI interrelates with other technologies such as blockchain. Rudra Tiwari

deep learning kelleher john d: Cybersecurity Duane C. Wilson, 2021-09-14 An accessible guide to cybersecurity for the everyday user, covering cryptography and public key infrastructure, malware, blockchain, and other topics. It seems that everything we touch is connected to the

internet, from mobile phones and wearable technology to home appliances and cyber assistants. The more connected our computer systems, the more exposed they are to cyber attacks--attempts to steal data, corrupt software, disrupt operations, and even physically damage hardware and network infrastructures. In this volume of the MIT Press Essential Knowledge series, cybersecurity expert Duane Wilson offers an accessible guide to cybersecurity issues for everyday users, describing risks associated with internet use, modern methods of defense against cyber attacks, and general principles for safer internet use. Wilson describes the principles that underlie all cybersecurity defense: confidentiality, integrity, availability, authentication, authorization, and non-repudiation (validating the source of information). He explains that confidentiality is accomplished by cryptography; examines the different layers of defense; analyzes cyber risks, threats, and vulnerabilities; and breaks down the cyber kill chain and the many forms of malware. He reviews some online applications of cybersecurity, including end-to-end security protection, secure ecommerce transactions, smart devices with built-in protections, and blockchain technology. Finally, Wilson considers the future of cybersecurity, discussing the continuing evolution of cyber defenses as well as research that may alter the overall threat landscape.

deep learning kelleher john d: Gender(s) Kathryn Bond Stockton, 2021-08-31 Why gender is strange, even when it's played straight, and how race and money are two of its most dramatic ingredients. In this volume in the MIT Press Essential Knowledge series, Kathryn Bond Stockton explores the fascinating, fraught, intimate, morphing matter of gender. Stockton argues for gender's strangeness, no matter how normal the concept seems; gender is queer for everyone, she claims, even when it's played quite straight. And she explains how race and money dramatically shape everybody's gender, even in sometimes surprising ways. Playful but serious, erudite and witty, Stockton marshals an impressive array of exhibits to consider, including dolls and their new gendering, the thrust of Jane Austen and Lil Nas X, gender identities according to women's colleges, gay and transgender ballroom scenes, and much more. Stockton also examines gender in light of biology's own strange ways, its out-of-syncness with male and female, explaining attempts to fortify gender with clothing, language, labor, and hair. She investigates gender as a concept--its concerning history, its bewitching pleasures and falsifications--by meeting the moment of where we are, with its many genders and counters-to-gender. This compelling background propels the question that drives this book and foregrounds race: what is the opposite sex, after all? If there is no opposite, doesn't the male/female duo undergirding gender come undone?

deep learning kelleher john d: 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.

deep learning kelleher john d: Language Machines Leif Weatherby, 2025-06-24 How generative AI systems capture a core function of language Looking at the emergence of generative AI, Language Machines presents a new theory of meaning in language and computation, arguing

that humanistic scholarship misconstrues how large language models (LLMs) function. Seeing LLMs as a convergence of computation and language, Leif Weatherby contends that AI does not simulate cognition, as widely believed, but rather creates culture. This evolution in language, he finds, is one that we are ill-prepared to evaluate, as what he terms “remainder humanism” counterproductively divides the human from the machine without drawing on established theories of representation that include both. To determine the consequences of using AI for language generation, Weatherby reads linguistic theory in conjunction with the algorithmic architecture of LLMs. He finds that generative AI captures the ways in which language is at first complex, cultural, and poetic, and only later referential, functional, and cognitive. This process is the semiotic hinge on which an emergent AI culture depends. Weatherby calls for a “general poetics” of computational cultural forms under the formal conditions of the algorithmic reproducibility of language. Locating the output of LLMs on a spectrum from poetry to ideology, *Language Machines* concludes that literary theory must be the backbone of a new rhetorical training for our linguistic-computational culture.

deep learning kelleher john d: Calculus for Machine Learning Jason Brownlee, Stefania Cristina, Mehreen Saeed, 2022-02-23 Calculus seems to be obscure, but it is everywhere. In machine learning, while we rarely write code on differentiation or integration, the algorithms we use have theoretical roots in calculus. If you ever wondered how to understand the calculus part when you listen to people explaining the theory behind a machine learning algorithm, this new Ebook, in the friendly Machine Learning Mastery style that you’re used to, is all you need. Using clear explanations and step-by-step tutorial lessons, you will understand the concept of calculus, how it is relates to machine learning, what it can help us on, and much more.

deep learning kelleher john d: Applied Artificial Intelligence Swati V. Shinde, Varsha Bendre, D. Jude Hemanth, M.A. Balafar, 2023-09-29 This book explores the advancements and future challenges in biomedical application developments using breakthrough technologies like Artificial Intelligence (AI), Internet of Things (IoT), and Signal Processing. It will also contribute to biosensors and secure systems, and related research. *Applied Artificial Intelligence: A Biomedical Perspective* begins by detailing recent trends and challenges of applied artificial intelligence in biomedical systems. Part I of the book presents the technological background of the book in terms of applied artificial intelligence in the biomedical domain. Part II demonstrates the recent advancements in automated medical image analysis that have opened ample research opportunities in the applications of deep learning to different diseases. Part III focuses on the use of cyberphysical systems that facilitates computing anywhere by using medical IoT and biosensors and the numerous applications of this technology in the healthcare domain. Part IV describes the different signal processing applications in the healthcare domain. It also includes the prediction of some human diseases based on the inputs in signal format. Part V highlights the scope and applications of biosensors and security aspects of biomedical images. The book will be beneficial to the researchers, industry persons, faculty, and students working in biomedical applications of computer science and electronics engineering. It will also be a useful resource for teaching courses like AI/ML, medical IoT, signal processing, biomedical engineering, and medical image analysis.

deep learning kelleher john d: AI-ML for Decision and Risk Analysis Louis Anthony Cox Jr., 2023-07-05 This book explains and illustrates recent developments and advances in decision-making and risk analysis. It demonstrates how artificial intelligence (AI) and machine learning (ML) have not only benefitted from classical decision analysis concepts such as expected utility maximization but have also contributed to making normative decision theory more useful by forcing it to confront realistic complexities. These include skill acquisition, uncertain and time-consuming implementation of intended actions, open-world uncertainties about what might happen next and what consequences actions can have, and learning to cope effectively with uncertain and changing environments. The result is a more robust and implementable technology for AI/ML-assisted decision-making. The book is intended to inform a wide audience in related applied areas and to provide a fun and stimulating resource for students, researchers, and academics in data science and AI-ML, decision analysis, and other closely linked academic fields. It will also appeal to managers, analysts, decision-makers, and

policymakers in financial, health and safety, environmental, business, engineering, and security risk management.

deep learning kelleher john d: Biofabrication Ritu Raman, 2021-09-14 How engineered materials and machines powered by living biological cells can tackle technological challenges in medicine, agriculture, and global security. You are a biological machine whose movement is powered by skeletal muscle, just as a car is a machine whose movement is powered by an engine. If you can be built from the bottom up with biological materials, other machines can be as well. This is the conceptual starting point for biofabrication, the act of building with living cells--building with biology in the same way we build with synthetic materials. In this volume in the MIT Press Essential Knowledge series, Ritu Raman offers an accessible introduction to biofabrication, arguing that it can address some of our greatest technological challenges. After presenting the background information needed to understand the emergence and evolution of biofabrication and describing the fundamental technology that enables building with biology, Raman takes deep dives into four biofabrication applications that have the potential to affect our daily lives: tissue engineering, organs-on-a-chip, lab-grown meat and leather, and biohybrid machines. Organs-on-a-chip (devices composed of miniature model tissues), for example, could be used to test new medicine and therapies, and lab-grown meat could alleviate environmental damage done by animal farming. She shows that biological materials have abilities synthetic materials do not, including the ability to adapt dynamically to their environments. Exploring the principles of biofabrication, Raman tells us, should help us appreciate the beauty, adaptiveness, and persistence of the biological machinery that drives our bodies and our world.

deep learning kelleher john d: Nuclear Weapons Mark Wolverton, 2022-02-01 A primer on nuclear weapons, from the science of fission and fusion to the pursuit of mutual assured destruction, the SALT treaties, and the Bomb in pop culture. Although the world's attention has shifted to drone-controlled bombing and cyberwarfare, the threat of nuclear war still exists. There are now fourteen thousand nuclear weapons in the hands of the nine declared nuclear powers. Even though the world survived the Cold War, we need to understand what it means to live with nuclear weapons. In this volume in the MIT Press Essential Knowledge series, Mark Wolverton offers a primer on nuclear weapons, from the science of fission and fusion to the pursuit of mutual assured destruction, the SALT and START agreements, and the Bomb in pop culture. Wolverton explains the basic scientific facts, offers historical perspective, and provides a nuanced view of the unique political, social, and moral dilemmas posed by nuclear weapons. He describes the birth of the Bomb in 1945 and its use against the Japanese cities of Hiroshima and Nagasaki; explains how a nuclear bomb works; recounts episodes when the world came close to waging nuclear war, including the Cuban missile crisis in 1962; discusses nuclear policy and nuclear treaties; and traces the influence of such films as *On the Beach*, *Dr. Strangelove*, and *The Day After*.

deep learning kelleher john d: *The Internet of Things, revised and updated edition* Samuel Greengard, 2021-08-24 A guided tour of the rapidly evolving networked world of connected devices, objects, and people that is changing the way we live and work. Since the publication of the original edition of this volume in the MIT Press Essential Knowledge series, the Internet of Things (IoT) has evolved from a novelty (look! my phone connects to my lamp!) to a mainstream technology framework that we rely on every day to accomplish many tasks. This revised and updated edition reports on the latest developments in this rapidly evolving networked world of connected devices, objects, and people that is changing the way we live and work. Business and technology writer Samuel Greengard takes us on a guided tour of the IoT, describing smart lightbulbs, sensors in phones that trigger earthquake warnings, 3D headsets that connect users to business expos through completely immersive virtual reality environments, and more. He offers a clear explanation of the technology that builds and manages the IoT and examines the growing array of consumer devices now available, from smart door locks to augmented reality fitting rooms. Greengard also shows how the IoT is part of the Fourth Industrial Revolution, which is transforming business through smart manufacturing, end-to-end supply chain visibility, integrated artificial intelligence, and much more.

He considers risks associated with the IoT, including threats to free speech, growing inequality, and an increase in cybercrime. Finally, he takes a look at the future of a hyperconnected world and what it means to people and human interaction.

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