

Metadata The Mit Press Essential Knowledge Series

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Foundations of Machine Learning

For book publishers large and small: the #1 guide to creating and distributing metadata for maximum sales. The Metadata Handbook shows how metadata works, enhancing findability, discoverability, and, of course, book sales. It introduces industry standards (think ONIX!) and best practices, and outlines the essential components for successful metadata creation and distribution. This handbook is a must for every publisher, both for print books and for ebooks. The new second edition is fully updated and expanded to include the most recent information on metadata standards, practices, and use in the publishing industry.

Java Precisely

How to be a great online searcher, demonstrated with step-by-step searches for answers to a series of intriguing questions (for example, “Is that plant poisonous?”). We all know how to look up something online by typing words into a search engine. We do this so often that we have made the most famous search engine a verb: we Google it—“Japan population” or “Nobel Peace Prize” or “poison ivy” or whatever we want to know. But knowing how to Google something doesn't make us search experts; there's much more we can do to access the massive collective knowledge available online. In *The Joy of Search*, Daniel Russell shows us how to be great online researchers. We don't have to be computer geeks or a scholar searching out obscure facts; we just need to know some basic methods. Russell demonstrates these methods with step-by-step searches for answers to a series of intriguing questions—from “what is the wrong side of a towel?” to “what is the most likely way you will die?” Along the way, readers will discover essential tools for effective online searches—and learn some fascinating facts and interesting stories. Russell explains how to frame search queries so they will yield information and describes the best ways to use such resources as Google Earth, Google Scholar, Wikipedia, and Wikimedia. He shows when to put search terms in double quotes, how to use the operator (*), why metadata is important, and how to triangulate information from multiple sources. By the end of this engaging journey of discovering, readers will have the definitive answer to why the best online

searches involve more than typing a few words into Google.

Waves

An accessible synthesis of ethical issues raised by artificial intelligence that moves beyond hype and nightmare scenarios to address concrete questions. Artificial intelligence powers Google's search engine, enables Facebook to target advertising, and allows Alexa and Siri to do their jobs. AI is also behind self-driving cars, predictive policing, and autonomous weapons that can kill without human intervention. These and other AI applications raise complex ethical issues that are the subject of ongoing debate. This volume in the MIT Press Essential Knowledge series offers an accessible synthesis of these issues. Written by a philosopher of technology, AI Ethics goes beyond the usual hype and nightmare scenarios to address concrete questions. Mark Coeckelbergh describes influential AI narratives, ranging from Frankenstein's monster to transhumanism and the technological singularity. He surveys relevant philosophical discussions: questions about the fundamental differences between humans and machines and debates over the moral status of AI. He explains the technology of AI, describing different approaches and focusing on machine learning and data science. He offers an overview of important ethical issues, including privacy concerns, responsibility and the delegation of decision making, transparency, and bias as it arises at all stages of data science processes. He also considers the future of work in an AI economy. Finally, he analyzes a range of policy proposals and discusses challenges for policymakers. He argues for ethical practices that embed values in design, translate democratic values into practices and include a vision of the good life and the good society.

Metadata

A concise and accessible guide to techniques for detecting doctored and fake images in photographs and digital media. Stalin, Mao, Hitler, Mussolini, and other dictators routinely doctored photographs so that the images aligned with their messages. They erased people who were there, added people who were not, and manipulated backgrounds. They knew if they changed the visual record, they could change history. Once, altering images required hours in the darkroom; today, it can be done with a keyboard and mouse. Because photographs are so easily faked, fake photos are everywhere—supermarket tabloids, fashion magazines, political ads, and social media. How can we tell if an image is real or false? In this volume in the MIT Press Essential Knowledge series, Hany Farid offers a concise and accessible guide to techniques for detecting doctored and fake images in photographs and digital media. Farid, an expert in photo forensics, has spent two decades developing techniques for authenticating digital images. These techniques model the entire image-creation process in order to find the digital disruption introduced by manipulation of the image. Each section of the book describes a different technique for analyzing an image, beginning with those requiring minimal technical expertise and advancing to those at intermediate and higher levels. There are techniques for, among other things, reverse image searches, metadata analysis, finding image imperfections introduced by JPEG compression, image cloning, tracing pixel patterns, and detecting images that are computer generated. In each section, Farid describes the techniques, explains when they should be

applied, and offers examples of image analysis.

Business Metadata: Capturing Enterprise Knowledge

A concise and accessible examination of sustainability in a range of contemporary contexts, from economic development to government policy. The word “sustainability” has been connected to everything from a certain kind of economic development to corporate promises about improved supply sourcing. But despite the apparent ubiquity of the term, the concept of sustainability has come to mean a number of specific things. In this accessible guide to the meanings of sustainability, Kent Portney describes the evolution of the idea and examines its application in a variety of contemporary contexts—from economic growth and consumption to government policy and urban planning. Portney takes as his starting point the 1987 definition by the World Commission on Environment and Development of sustainability as economic development activity that “meets the needs of the present without compromising the ability of future generations to meet their own needs.” At its heart, Portney explains, sustainability focuses on the use and depletion of natural resources. It is not the same as environmental protection or natural resource conservation; it is more about finding some sort of steady state so that the earth can support both human population and economic growth. Portney looks at political opposition to the promotion of sustainability, which usually questions the need for sustainability or calls its costs unacceptable; collective and individual consumption of material goods and resources and to what extent they must be curtailed to achieve sustainability; the role of the private sector, and the co-opting of sustainability by corporations; government policy on sustainability at the international, national, and subnational levels; and how cities could become models for sustainability action.

Introduction to Machine Learning

How the planet's two largest greenhouse gas emitters navigate climate policy. The United States and China together account for a disproportionate 45 percent of global carbon dioxide emissions. In 2014, then-President Obama and Chinese President Xi Jinping announced complementary efforts to limit emissions, paving the way for the Paris Agreement. And yet, with President Trump's planned withdrawal from the Paris accords and Xi's consolidation of power—as well as mutual mistrust fueled by misunderstanding—the climate future is uncertain. In *Titans of the Climate*, Kelly Sims Gallagher and Xiaowei Xuan examine how the planet's two largest greenhouse gas emitters develop and implement climate policy. Through dispassionate analysis, the authors aim to help readers understand the challenges, constraints, and opportunities in each country. Gallagher—a former U.S. climate policymaker—and Xuan—a member of a Chinese policy think tank—describe the specific drivers—political, economic, and social—of climate policies in both countries and map the differences between policy outcomes. They characterize the U.S. approach as “deliberative incrementalism”; the Chinese, meanwhile, engage in “strategic pragmatism.” Comparing the policy processes of the two countries, Gallagher and Xuan make the case that if each country understands more about the other's goals and constraints, climate policy cooperation is more likely to succeed.

Metadata Fundamentals for All Librarians

How a flexible and creative approach to intellectual property can help an organization accomplish goals ranging from building market share to expanding an industry. Most managers leave intellectual property issues to the legal department, unaware that an organization's intellectual property can help accomplish a range of management goals, from accessing new markets to improving existing products to generating new revenue streams. In this book, intellectual property expert and Harvard Law School professor John Palfrey offers a short briefing on intellectual property strategy for corporate managers and nonprofit administrators. Palfrey argues for strategies that go beyond the traditional highly restrictive "sword and shield" approach, suggesting that flexibility and creativity are essential to a profitable long-term intellectual property strategy--especially in an era of changing attitudes about media. Intellectual property, writes Palfrey, should be considered a key strategic asset class. Almost every organization has an intellectual property portfolio of some value and therefore the need for an intellectual property strategy. A brand, for example, is an important form of intellectual property, as is any information managed and produced by an organization. Palfrey identifies the essential areas of intellectual property--patent, copyright, trademark, and trade secret--and describes strategic approaches to each in a variety of organizational contexts, based on four basic steps. The most innovative organizations employ multiple intellectual property approaches, depending on the situation, asking hard, context-specific questions. By doing so, they achieve both short- and long-term benefits while positioning themselves for success in the global information economy.

The Book

A guide to information as the transformative tool of modern business. While we have been preoccupied with the latest i-gadget from Apple and with Google's ongoing expansion, we may have missed something: the fundamental transformation of whole firms and industries into giant information-processing machines. Today, more than eighty percent of workers collect and analyze information (often in digital form) in the course of doing their jobs. This book offers a guide to the role of information in modern business, mapping the use of information within work processes and tracing flows of information across supply-chain management, product development, customer relations, and sales. The emphasis is on information itself, not on information technology. Information, overshadowed for a while by the glamour and novelty of IT, is the fundamental component of the modern corporation. In *Information and the Modern Corporation*, longtime IBM manager and consultant James Cortada clarifies the differences among data, facts, information, and knowledge and describes how the art of analytics has all but eliminated decision making based on gut feeling, replacing it with fact-based decisions. He describes the working style of "road warriors," whose offices are anywhere their laptops and cell phones are and whose deep knowledge of a given topic becomes their medium of exchange. Information is the core of the modern enterprise, and the use of information defines the activities of a firm. This essential guide shows managers and employees better ways to leverage information—by design and not by accident.

Information and the Modern Corporation

The real story of how our brains and nervous systems change throughout our lifetimes—with or without “brain training.” Fifty years ago, neuroscientists thought that a mature brain was fixed like a fly in amber, unable to change. Today, we know that our brains and nervous systems change throughout our lifetimes. This concept of neuroplasticity has captured the imagination of a public eager for self-improvement—and has inspired countless Internet entrepreneurs who peddle dubious “brain training” games and apps. In this book, Moheb Costandi offers a concise and engaging overview of neuroplasticity for the general reader, describing how our brains change continuously in response to our actions and experiences. Costandi discusses key experimental findings, and describes how our thinking about the brain has evolved over time. He explains how the brain changes during development, and the “synaptic pruning” that takes place before brain maturity. He shows that adult brains can grow new cells (citing, among many other studies, research showing that sexually mature male canaries learn a new song every year). He describes the kind of brain training that can bring about improvement in brain function. It's not gadgets and games that promise to “rewire your brain” but such sustained cognitive tasks as learning a musical instrument or a new language. (Costandi also notes that London cabbies increase their gray matter after rigorous training in their city's complicated streets.) He tells how brains compensate after stroke or injury; describes addiction and pain as maladaptive forms of neuroplasticity; and considers brain changes that accompany childhood, adolescence, parenthood, and aging. Each of our brains is custom-built. Neuroplasticity is at the heart of what makes us human.

The Metadata Handbook

A new way of thinking about data science and data ethics that is informed by the ideas of intersectional feminism. Today, data science is a form of power. It has been used to expose injustice, improve health outcomes, and topple governments. But it has also been used to discriminate, police, and surveil. This potential for good, on the one hand, and harm, on the other, makes it essential to ask: Data science by whom? Data science for whom? Data science with whose interests in mind? The narratives around big data and data science are overwhelmingly white, male, and techno-heroic. In *Data Feminism*, Catherine D'Ignazio and Lauren Klein present a new way of thinking about data science and data ethics—one that is informed by intersectional feminist thought. Illustrating data feminism in action, D'Ignazio and Klein show how challenges to the male/female binary can help challenge other hierarchical (and empirically wrong) classification systems. They explain how, for example, an understanding of emotion can expand our ideas about effective data visualization, and how the concept of invisible labor can expose the significant human efforts required by our automated systems. And they show why the data never, ever “speak for themselves.” *Data Feminism* offers strategies for data scientists seeking to learn how feminism can help them work toward justice, and for feminists who want to focus their efforts on the growing field of data science. But *Data Feminism* is about much more than gender. It is about power, about who has it and who doesn't, and about how those differentials of power can be challenged and changed.

Cloud Computing

Everything you always wanted to know about MOOCs: an account of massive open online courses and what they might mean for the future of higher education.

Intellectual Property Strategy

Metadata is used to organize and access information in an effective way. This is a comprehensive description of the various forms of metadata, its applications, and how librarians can use it. Both descriptive and nondescriptive forms of metadata are defined and applied to library functions.

Open Access

In *Engineering Philosophy*, the author explores how the concerns of philosophers are relevant to engineering thought and practice in negotiating tradeoffs in diagnosing failure, in constructing adequate models and simulations, and in teaching.

AI Ethics

Metadata Essentials: Proven Techniques for Book Marketing and Discovery provides clear and easy-to-implement recommendations so you can focus your efforts on the industry's most relevant metadata. Based on direct feedback from retailers and librarians, *Metadata Essentials* unlocks insights into the value and real-life uses of the metadata you spend so many precious hours editing and curating. Because it does matter. Enhance the metadata that yields proven results Boost title discovery Increase online conversion rates Save time and money

Titans of the Climate

What beliefs are, what they do for us, how we come to hold them, and how to evaluate them. Our beliefs constitute a large part of our knowledge of the world. We have beliefs about objects, about culture, about the past, and about the future. We have beliefs about other people, and we believe that they have beliefs as well. We use beliefs to predict, to explain, to create, to console, to entertain. Some of our beliefs we call theories, and we are extraordinarily creative at constructing them. Theories of quantum mechanics, evolution, and relativity are examples. But so are theories about astrology, alien abduction, guardian angels, and reincarnation. All are products (with varying degrees of credibility) of fertile minds trying to find explanations for observed phenomena. In this book, Nils Nilsson examines beliefs: what they do for us, how we come to hold them, and how to evaluate them. We should evaluate our beliefs carefully, Nilsson points out, because they influence so many of our actions and decisions. Some of our beliefs are more strongly held than others, but all should be considered tentative and changeable. Nilsson shows that beliefs can be quantified by probability, and he describes networks of beliefs in which the probabilities of some beliefs affect the probabilities of others. He argues that we can evaluate our beliefs by adapting some of the practices of the scientific method and by consulting expert opinion.

And he warns us about “belief traps”—holding onto beliefs that wouldn't survive critical evaluation. The best way to escape belief traps, he writes, is to expose our beliefs to the reasoned criticism of others.

Understanding Beliefs

A concise history of GPS, from its military origins to its commercial applications and ubiquity in everyday life. GPS is ubiquitous in everyday life. GPS mapping is standard equipment in many new cars and geolocation services are embedded in smart phones. GPS makes Uber and Lyft possible; driverless cars won't be able to drive without it. In this volume in the MIT Press Essential Knowledge series, Paul Ceruzzi offers a concise history of GPS, explaining how a once-obscure space technology became an invisible piece of our infrastructure, as essential to modern life as electric power or clean water. GPS relays precise time and positioning information from orbiting satellites to receivers on the ground, at sea, and in the air. It operates worldwide, and its basic signals are free, although private companies can commodify the data provided. Ceruzzi recounts the origins of GPS and its predecessor technologies, including early aircraft navigation systems and satellites. He describes the invention of GPS as a space technology in the post-Apollo, pre-Space Shuttle years and its first military and commercial uses. Ceruzzi explains how the convergence of three major technological developments—the microprocessor, the Internet, and cellular telephony—enabled the development and application of GPS technology. Recognizing the importance of satellite positioning systems in a shifting geopolitical landscape—and perhaps doubting U.S. assurances of perpetual GPS availability—other countries are now building or have already developed their own systems, and Ceruzzi reports on these efforts in the European Union, Russia, India, China, and Japan.

The Technological Singularity

This graduate-level textbook introduces fundamental concepts and methods in machine learning. It describes several important modern algorithms, provides the theoretical underpinnings of these algorithms, and illustrates key aspects for their application. The authors aim to present novel theoretical tools and concepts while giving concise proofs even for relatively advanced topics. Foundations of Machine Learning fills the need for a general textbook that also offers theoretical details and an emphasis on proofs. Certain topics that are often treated with insufficient attention are discussed in more detail here; for example, entire chapters are devoted to regression, multi-class classification, and ranking. The first three chapters lay the theoretical foundation for what follows, but each remaining chapter is mostly self-contained. The appendix offers a concise probability review, a short introduction to convex optimization, tools for concentration bounds, and several basic properties of matrices and norms used in the book. The book is intended for graduate students and researchers in machine learning, statistics, and related areas; it can be used either as a textbook or as a reference text for a research seminar.

Smart Cities

Taking “Gangnam Style” seriously: what Internet memes can tell us about digital culture. In December 2012, the exuberant video “Gangnam Style” became the first YouTube clip to be viewed more than one billion times. Thousands of its viewers responded by creating and posting their own variations of the video—“Mitt Romney Style,” “NASA Johnson Style,” “Egyptian Style,” and many others. “Gangnam Style” (and its attendant parodies, imitations, and derivations) is one of the most famous examples of an Internet meme: a piece of digital content that spreads quickly around the web in various iterations and becomes a shared cultural experience. In this book, Limor Shifman investigates Internet memes and what they tell us about digital culture. Shifman discusses a series of well-known Internet memes—including “Leave Britney Alone,” the pepper-spraying cop, LOLCats, Scumbag Steve, and Occupy Wall Street’s “We Are the 99 Percent.” She offers a novel definition of Internet memes: digital content units with common characteristics, created with awareness of each other, and circulated, imitated, and transformed via the Internet by many users. She differentiates memes from virals; analyzes what makes memes and virals successful; describes popular meme genres; discusses memes as new modes of political participation in democratic and nondemocratic regimes; and examines memes as agents of globalization. Memes, Shifman argues, encapsulate some of the most fundamental aspects of the Internet in general and of the participatory Web 2.0 culture in particular. Internet memes may be entertaining, but in this book Limor Shifman makes a compelling argument for taking them seriously.

Engineering Philosophy

As if John Berger’s *Ways of Seeing* was re-written for the 21st century, Alexis L. Boylan crafts a guide for navigating the complexities of visual culture in this concise introduction. The visual surrounds us, some of it invited, most of it not. In this visual environment, everything we see—art, color, the moon, a skyscraper, a stop sign, a political poster, rising sea levels, a photograph of Kim Kardashian West—somehow becomes legible, normalized, accessible. How does this happen? How do we live and move in our visual environments? This volume offers a guide for navigating the complexities of visual culture, outlining strategies for thinking about what it means to look and see—and what is at stake in doing so.

The Joy of Search

A rigorous, pathbreaking analysis demonstrating that a country’s prosperity is directly related in the long run to the skills of its population.

GPS

An argument that qualitative representations—symbolic representations that carve continuous phenomena into meaningful units—are central to human cognition. In this book, Kenneth Forbus proposes that qualitative representations hold the key to one of the deepest mysteries of cognitive science: how we reason and learn about the continuous phenomena surrounding us. Forbus argues that qualitative representations—symbolic representations that carve continuous phenomena into meaningful units—are central to human cognition. Qualitative representations

provide a basis for commonsense reasoning, because they enable practical reasoning with very little data; this makes qualitative representations a useful component of natural language semantics. Qualitative representations also provide a foundation for expert reasoning in science and engineering by making explicit the broad categories of things that might happen and enabling causal models that help guide the application of more quantitative knowledge as needed. Qualitative representations are important for creating more human-like artificial intelligence systems with capabilities for spatial reasoning, vision, question answering, and understanding natural language. Forbus discusses, among other topics, basic ideas of knowledge representation and reasoning; qualitative process theory; qualitative simulation and reasoning about change; compositional modeling; qualitative spatial reasoning; and learning and conceptual change. His argument is notable both for presenting an approach to qualitative reasoning in which analogical reasoning and learning play crucial roles and for marshaling a wide variety of evidence, including the performance of AI systems. Cognitive scientists will find Forbus's account of qualitative representations illuminating; AI scientists will value Forbus's new approach to qualitative representations and the overview he offers.

Introduction to Metadata

How the concept of critical thinking emerged, how it has been defined, and how critical thinking skills can be taught. Critical thinking is regularly cited as an essential twenty-first century skill, the key to success in school and work. Given our propensity to believe fake news, draw incorrect conclusions, and make decisions based on emotion rather than reason, it might even be said that critical thinking is vital to the survival of a democratic society. But what, exactly, is critical thinking? In this volume in the MIT Press Essential Knowledge series, Jonathan Haber explains how the concept of critical thinking emerged, how it has been defined, and how critical thinking skills can be taught and assessed. Haber describes the term's origins in such disciplines as philosophy, psychology, and science. He examines the components of critical thinking, including structured thinking, language skills, background knowledge, and information literacy, along with such necessary intellectual traits as intellectual humility, empathy, and open-mindedness. He discusses how research has defined critical thinking, how elements of critical thinking have been taught for centuries, and how educators can teach critical thinking skills now. Haber argues that the most important critical thinking issue today is that not enough people are doing enough of it. Fortunately, critical thinking can be taught, practiced, and evaluated. This book offers a guide for teachers, students, and aspiring critical thinkers everywhere, including advice for educational leaders and policy makers on how to make the teaching and learning of critical thinking an educational priority and practical reality.

Memes in Digital Culture

Today, people use technology to self-track: hours slept, steps taken, calories consumed, medications administered. In this book, Gina Neff and Dawn Nafus describe what it means when people turn their everyday experience into data.

Sustainability

Imagining a future in which humans fundamentally reshape the natural world using nanotechnology, synthetic biology, de-extinction, and climate engineering. We have all heard that there are no longer any places left on Earth untouched by humans. The significance of this goes beyond statistics documenting melting glaciers and shrinking species counts. It signals a new geological epoch. In *The Synthetic Age*, Christopher Preston argues that what is most startling about this coming epoch is not only how much impact humans have had but, more important, how much deliberate shaping they will start to do. Emerging technologies promise to give us the power to take over some of Nature's most basic operations. It is not just that we are exiting the Holocene and entering the Anthropocene; it is that we are leaving behind the time in which planetary change is just the unintended consequence of unbridled industrialism. A world designed by engineers and technicians means the birth of the planet's first Synthetic Age. Preston describes a range of technologies that will reconfigure Earth's very metabolism: nanotechnologies that can restructure natural forms of matter; "molecular manufacturing" that offers unlimited repurposing; synthetic biology's potential to build, not just read, a genome; "biological mini-machines" that can outdesign evolution; the relocation and resurrection of species; and climate engineering attempts to manage solar radiation by synthesizing a volcanic haze, cool surface temperatures by increasing the brightness of clouds, and remove carbon from the atmosphere with artificial trees that capture carbon from the breeze. What does it mean when humans shift from being caretakers of the Earth to being shapers of it? And in whom should we trust to decide the contours of our synthetic future? These questions are too important to be left to the engineers.

Self-Tracking

The third edition of *Java Precisely* provides a concise description of the Java programming language, version 8.0. It offers a quick reference for the reader who has already learned (or is learning) Java from a standard textbook and who wants to know the language in more detail. The book presents the entire Java programming language and essential parts of the class libraries: the collection classes, the input-output classes, the stream libraries and Java 8's facilities for parallel programming, and the functional interfaces used for that. Written informally, the book describes the language in detail and offers many examples. For clarity, most of the general rules appear on left-hand pages with the relevant examples directly opposite on the right-hand pages. All examples are fragments of legal Java programs. The complete ready-to-run example programs are available on the book's website. This third edition adds material about functional parallel processing of arrays; default and static methods on interfaces; a brief description of the memory model and visibility across concurrent threads; lambda expressions, method reference expressions, and the related functional interfaces; and stream processing, including parallel programming and collectors. -- Provided by publisher.

Metadata Essentials

Key concepts, definitions, examples, and historical contexts for understanding smart cities, along with discussions of both drawbacks and benefits of this approach to urban problems. Over the past ten years, urban planners, technology companies, and governments have promoted smart cities with a somewhat utopian

vision of urban life made knowable and manageable through data collection and analysis. Emerging smart cities have become both crucibles and showrooms for the practical application of the Internet of Things, cloud computing, and the integration of big data into everyday life. Are smart cities optimized, sustainable, digitally networked solutions to urban problems? Or are they neoliberal, corporate-controlled, undemocratic non-places? This volume in the MIT Press Essential Knowledge series offers a concise introduction to smart cities, presenting key concepts, definitions, examples, and historical contexts, along with discussions of both the drawbacks and the benefits of this approach to urban life. After reviewing current terminology and justifications employed by technology designers, journalists, and researchers, the book describes three models for smart city development—smart-from-the-start cities, retrofitted cities, and social cities—and offers examples of each. It covers technologies and methods, including sensors, public wi-fi, big data, and smartphone apps, and discusses how developers conceive of interactions among the built environment, technological and urban infrastructures, citizens, and citizen engagement. Throughout, the author—who has studied smart cities around the world—argues that smart city developers should work more closely with local communities, recognizing their preexisting relationship to urban place and realizing the limits of technological fixes. Smartness is a means to an end: improving the quality of urban life.

MOOCs

The idea of technological singularity, and what it would mean if ordinary human intelligence were enhanced or overtaken by artificial intelligence. The idea that human history is approaching a “singularity”—that ordinary humans will someday be overtaken by artificially intelligent machines or cognitively enhanced biological intelligence, or both—has moved from the realm of science fiction to serious debate. Some singularity theorists predict that if the field of artificial intelligence (AI) continues to develop at its current dizzying rate, the singularity could come about in the middle of the present century. Murray Shanahan offers an introduction to the idea of the singularity and considers the ramifications of such a potentially seismic event. Shanahan's aim is not to make predictions but rather to investigate a range of scenarios. Whether we believe that singularity is near or far, likely or impossible, apocalypse or utopia, the very idea raises crucial philosophical and pragmatic questions, forcing us to think seriously about what we want as a species. Shanahan describes technological advances in AI, both biologically inspired and engineered from scratch. Once human-level AI—theoretically possible, but difficult to accomplish—has been achieved, he explains, the transition to superintelligent AI could be very rapid. Shanahan considers what the existence of superintelligent machines could mean for such matters as personhood, responsibility, rights, and identity. Some superhuman AI agents might be created to benefit humankind; some might go rogue. (Is Siri the template, or HAL?) The singularity presents both an existential threat to humanity and an existential opportunity for humanity to transcend its limitations. Shanahan makes it clear that we need to imagine both possibilities if we want to bring about the better outcome.

Visual Studio Code

Introduction -- Definitions -- Descriptive metadata -- Administrative metadata -- Use

metadata -- Enabling technologies for metadata -- The Semantic Web -- The future of metadata

The Synthetic Age

The goal of machine learning is to program computers to use example data or past experience to solve a given problem. Many successful applications of machine learning exist already, including systems that analyze past sales data to predict customer behavior, optimize robot behavior so that a task can be completed using minimum resources, and extract knowledge from bioinformatics data. Introduction to Machine Learning is a comprehensive textbook on the subject, covering a broad array of topics not usually included in introductory machine learning texts. Subjects include supervised learning; Bayesian decision theory; parametric, semi-parametric, and nonparametric methods; multivariate analysis; hidden Markov models; reinforcement learning; kernel machines; graphical models; Bayesian estimation; and statistical testing. Machine learning is rapidly becoming a skill that computer science students must master before graduation. The third edition of Introduction to Machine Learning reflects this shift, with added support for beginners, including selected solutions for exercises and additional example data sets (with code available online). Other substantial changes include discussions of outlier detection; ranking algorithms for perceptrons and support vector machines; matrix decomposition and spectral methods; distance estimation; new kernel algorithms; deep learning in multilayered perceptrons; and the nonparametric approach to Bayesian methods. All learning algorithms are explained so that students can easily move from the equations in the book to a computer program. The book can be used by both advanced undergraduates and graduate students. It will also be of interest to professionals who are concerned with the application of machine learning methods.

Fake Photos

Expert guidance on using Visual Studio Code for editing and debugging your web development projects Visual Studio Code, a free, open source, cross-compatible source code editor, is one of the most popular choices for web developers. It is fast, lightweight, customizable, and contains built-in support for JavaScript, Typescript, and Node.js extensions for other languages, including C++, Python, and PHP. Features such as debugging capability, embedded Git control, syntax highlighting, code snippets, and IntelliSense intelligent code completion support—several of which set it apart from the competition—help make Visual Studio Code an impressive, out-of-the-box solution. Visual Studio Code: End-to-End Editing and Debugging Tools for Web Developers helps readers to become familiar with and productive in Visual Studio Code. This up-to-date guide covers all of the essential components of the software, including the editing features of the workspace, advanced functionality such as code refactoring and key binding, and integration with Grunt, Gulp, NPM, and other external tools. New users, experienced developers, and those considering moving from another developer tool will benefit from this book's detailed, yet easy-to-follow information on Visual Studio Code. This book: Teaches readers how to use Visual Studio Code to do full-stack development Explains the steps to install Visual Studio Code on Windows, Mac and Linux platforms Provides a foundation for non-users considering moving to

Visual Studio Code Helps current users expand their knowledge of the tool and its available extensions Describes how to open a .NET Core project and get end-to-end execution and debugging functionality Visual Studio Code: End-to-End Editing and Debugging Tools for Web Developers is an invaluable guide for both professional and hobbyist web developers seeking immediately-useful information on Visual Studio Code.

Data Science

What is open access? -- Motivation -- Varieties -- Policies -- Scope -- Copyright -- Economics -- Casualties -- Future -- Self-help.

Data Feminism

In this new, authoritative textbook, internationally recognized metadata experts Zeng and Qin have created a comprehensive primer for advanced undergraduate, graduate, or continuing education courses in information organization, information technology, cataloging, digital libraries, electronic archives, and, of course, metadata. Instructors seeking a text that covers the theory as well as the how-to's of application design, implementation, and evaluation will find it here. An outcome-based approach lets learners with different orientations adapt their new knowledge and skills to any domain. Examples and practice problems focus on tasks typical to all metadata application projects. Other useful features include sample problems with solutions, quizzes, hands-on tutorials, and a recommended reading list at the end of each chapter. A companion digital library on CD-ROM for instructors includes quizzes, answer keys, and additional exercises. An ideal classroom tool, this book works equally well for self-guided study. Individual modules can stand alone, for reference on an as-needed basis, when transitioning from traditional cataloging to compilations of metadata for locally created resources and websites, for example. Or you can study metadata systematically, module by module. Regardless of your approach, this book is the ideal guide to metadata for both students and working information professionals.

Metadata

A historical and ethnographic study of the conflict between global transportation and rural development as the two intersect at the Panama Canal. In this innovative book, Ashley Carse traces the water that flows into and out from the Panama Canal to explain how global shipping is entangled with Panama's cultural and physical landscapes. By following container ships as they travel downstream along maritime routes and tracing rivers upstream across the populated watershed that feeds the canal, he explores the politics of environmental management around a waterway that links faraway ports and markets to nearby farms, forests, cities, and rural communities. Carse draws on a wide range of ethnographic and archival material to show the social and ecological implications of transportation across Panama. The Canal moves ships over an aquatic staircase of locks that demand an enormous amount of fresh water from the surrounding region. Each passing ship drains 52 million gallons out to sea—a volume comparable to the daily water use of half a million Panamanians. Infrastructures like the Panama Canal, Carse argues,

do not simply conquer nature; they rework ecologies in ways that serve specific political and economic priorities. Interweaving histories that range from the depopulation of the U.S. Canal Zone a century ago to road construction conflicts and water hyacinth invasions in canal waters, the book illuminates the human and nonhuman actors that have come together at the margins of the famous trade route. 2014 marks the 100th anniversary of the Panama Canal. *Beyond the Big Ditch* calls us to consider how infrastructures are materially embedded in place, producing environments with winners and losers.

Critical Thinking

Business Metadata: Capturing Enterprise Knowledge is the first book that helps businesses capture corporate (human) knowledge and unstructured data, and offer solutions for codifying it for use in IT and management. Written by Bill Inmon, one of the fathers of the data warehouse and well-known author, the book is filled with war stories, examples, and cases from current projects. It includes a complete metadata acquisition methodology and project plan to guide readers every step of the way, and sample unstructured metadata for use in self-testing and developing skills. This book is recommended for IT professionals, including those in consulting, working on systems that will deliver better knowledge management capability. This includes people in these positions: data architects, data analysts, SOA architects, metadata analysts, repository (metadata data warehouse) managers as well as vendors that have a metadata component as part of their systems or tools. First book that helps businesses capture corporate (human) knowledge and unstructured data, and offer solutions for codifying it for use in IT and management. Written by Bill Inmon, one of the fathers of the data warehouse and well-known author, and filled with war stories, examples, and cases from current projects. Very practical, includes a complete metadata acquisition methodology and project plan to guide readers every step of the way. Includes sample unstructured metadata for use in self-testing and developing skills.

Neuroplasticity

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.

Information and Society

Why cloud computing represents a paradigm shift for business, and how business users can best take advantage of cloud services. Most of the information available on cloud computing is either highly technical, with details that are irrelevant to non-technologists, or pure marketing hype, in which the cloud is simply a selling point. This book, however, explains the cloud from the user's viewpoint—the business user's in particular. Nayan Ruparelia explains what the cloud is, when to use it (and when not to), how to select a cloud service, how to integrate it with other technologies, and what the best practices are for using cloud computing. Cutting through the hype, Ruparelia cites the simple and basic definition of cloud computing from the National Institute of Science and Technology: a model enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources. Thus with cloud computing, businesses can harness information technology resources usually available only to large enterprises. And this, Ruparelia demonstrates, represents a paradigm shift for business. It will ease funding for startups, alter business plans, and allow big businesses greater agility. Ruparelia discusses the key issues for any organization considering cloud computing: service level agreements, business service delivery and consumption, finance, legal jurisdiction, security, and social responsibility. He introduces novel concepts made possible by cloud computing: cloud cells, or specialist clouds for specific uses; the personal cloud; the cloud of things; and cloud service exchanges. He examines use case patterns in terms of infrastructure and platform, software information, and business process; and he explains how to transition to a cloud service. Current and future users will find this book an indispensable guide to the cloud.

The Knowledge Capital of Nations

A guide to ocean waves traces their evolution from wind-wave generation to coastal effects. Sitting on the beach on a sunny summer day, we enjoy the steady advance and retreat of the waves. In the water, enthusiastic waders jump and shriek with pleasure when a wave hits them. But where do these waves come from? How are they formed and why do they break on the shore? In *Waves*, Fredric Raichlen traces the evolution of waves, from their generation in the deep ocean to their effects on the coast. He explains, in a way that is readily understandable to nonscientists, both the science of waves themselves and the technology that can be used to protect us against their more extreme forms, including hurricanes and tsunamis. After offering a basic definition of waves and explaining the mechanics of wind-wave generation, Raichlen describes how waves travel, how they shoal (rise), how they break, and how they transform in other ways. He goes on to describe, among other things, the complicated sun-Earth-moon combinations that create astronomical tides (the high and low tides that occur daily and predictably);

the effects of waves on the beach, including rip currents and beach erosion, and on harbors and shipping; and the building of breakwaters to protect harbors and bays. He discusses hurricanes, storm surges, and hurricane-generated waves. He offers a brief history of tsunamis, including Sumatra's in 2004 and Japan's in 2011, and explains the mechanisms that generate them (including earthquakes, landslides, and volcanoes). Waves can be little ripples that lap peacefully at the shore or monstrous tsunamis that destroy everything in their paths. Describing the science underlying this astonishing variety, *Waves* offers a different kind of beach reading.

Beyond the Big Ditch

A short, informal account of our ever-increasing dependence on a complex multiplicity of messages, records, documents, and data. We live in an information society, or so we are often told. But what does that mean? This volume in the MIT Press Essential Knowledge series offers a concise, informal account of the ways in which information and society are related and of our ever-increasing dependence on a complex multiplicity of messages, records, documents, and data. Using information in its everyday, nonspecialized sense, Michael Buckland explores the influence of information on what we know, the role of communication and recorded information in our daily lives, and the difficulty (or ease) of finding information. He shows that all this involves human perception, social behavior, changing technologies, and issues of trust. Buckland argues that every society is an “information society”; a “non-information society” would be a contradiction in terms. But the shift from oral and gestural communication to documents, and the wider use of documents facilitated by new technologies, have made our society particularly information intensive. Buckland describes the rising flood of data, documents, and records, outlines the dramatic long-term growth of documents, and traces the rise of techniques to cope with them. He examines the physical manifestation of information as documents, the emergence of data sets, and how documents and data are discovered and used. He explores what individuals and societies do with information; offers a basic summary of how collected documents are arranged and described; considers the nature of naming; explains the uses of metadata; and evaluates selection methods, considering relevance, recall, and precision.

Qualitative Representations

The book as object, as content, as idea, as interface. What is the book in a digital age? Is it a physical object containing pages encased in covers? Is it a portable device that gives us access to entire libraries? The codex, the book as bound paper sheets, emerged around 150 CE. It was preceded by clay tablets and papyrus scrolls. Are those books? In this volume in the MIT Press Essential Knowledge series, Amaranth Borsuk considers the history of the book, the future of the book, and the idea of the book. Tracing the interrelationship of form and content in the book's development, she bridges book history, book arts, and electronic literature to expand our definition of an object we thought we knew intimately. Contrary to the many reports of its death (which has been blamed at various times on newspapers, television, and e-readers), the book is alive. Despite nostalgic paeans to the codex and its printed pages, Borsuk reminds us, the term “book” commonly refers to both medium and content. And the medium has proved to be malleable.

Rather than pinning our notion of the book to a single form, Borsuk argues, we should remember its long history of transformation. Considering the book as object, content, idea, and interface, she shows that the physical form of the book has always been the site of experimentation and play. Rather than creating a false dichotomy between print and digital media, we should appreciate their continuities.

Visual Culture

Metadata provides a means of indexing, accessing, preserving, and discovering digital resources. The volume of digital information available over electronic networks has created a pressing need for standards that assist in locating, retrieving, and managing this vast and complex universe. This revised edition of "Introduction to Metadata," first published in 1998 and updated in an online version in 2000, provides an overview of metadata--its types, roles, and characteristics; a discussion of metadata as it relates to Web resources; a description of methods, tools, standards, and protocols for publishing and disseminating digital collections; and a handy glossary. Newly added to this edition are an essay on the importance of standards-based rights metadata for cultural institutions; and a section entitled "Practical Principles for Metadata Creation and Maintenance."

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