

Process Mining Data Science In Action

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Business Process Management Cases - Jan vom Brocke 2017-08-10

This book is the first to present a rich selection of over 30 real-world cases of how leading organizations conduct Business Process Management (BPM). The cases stem from a diverse set of industry sectors and countries on different continents, reporting on best practices and lessons learned. The book showcases how BPM can contribute to both exploitation and exploration in a digital world. All cases are presented using a uniform structure in order to provide valuable insights and essential guidance for students and practitioners.

Conformance Checking - Josep Carmona 2018-11-11

This book introduces readers to the field of conformance checking as a whole and outlines the fundamental relation between modelled and recorded behaviour. Conformance checking interrelates the modelled and recorded behaviour of a given process and provides techniques and methods for comparing and analysing observed instances of a process in the presence of a model, independent of the model's origin. Its goal is to provide an overview of the essential techniques and methods in this field at an intuitive level, together with precise formalisations of its underlying principles. The book is divided into three parts, that are meant to cover different perspectives of the field of conformance checking. Part I presents a comprehensive yet accessible

overview of the essential concepts used to interrelate modelled and recorded behaviour. It also serves as a reference for assessing how conformance checking efforts could be applied in specific domains. Next, Part II provides readers with detailed insights into algorithms for conformance checking, including the most commonly used formal notions and their instantiation for specific analysis questions. Lastly, Part III highlights applications that help to make sense of conformance checking results, thereby providing a necessary next step to increase the value of a given process model. They help to interpret the outcomes of conformance checking and incorporate them by means of enhancement and repair techniques. Providing the core building blocks of conformance checking and describing its main applications, this book mainly addresses students specializing in business process management, researchers entering process mining and conformance checking for the first time, and advanced professionals whose work involves process evaluation, modelling and optimization.

The Robotic Process Automation Handbook - Tom Taulli 2020-02-28

While Robotic Process Automation (RPA) has been around for about 20 years, it has hit an inflection point because of the convergence of cloud computing, big data and AI. This book shows you how to leverage RPA effectively in

your company to automate repetitive and rules-based processes, such as scheduling, inputting/transferring data, cut and paste, filling out forms, and search. Using practical aspects of implementing the technology (based on case studies and industry best practices), you'll see how companies have been able to realize substantial ROI (Return On Investment) with their implementations, such as by lessening the need for hiring or outsourcing. By understanding the core concepts of RPA, you'll also see that the technology significantly increases compliance – leading to fewer issues with regulations – and minimizes costly errors. RPA software revenues have recently soared by over 60 percent, which is the fastest ramp in the tech industry, and they are expected to exceed \$1 billion by the end of 2019. It is generally seamless with legacy IT environments, making it easier for companies to pursue a strategy of digital transformation and can even be a gateway to AI. The Robotic Process Automation Handbook puts everything you need to know into one place to be a part of this wave. What You'll Learn Develop the right strategy and plan Deal with resistance and fears from employees Take an in-depth look at the leading RPA systems, including where they are most effective, the risks and the costs Evaluate an RPA system Who This Book Is For IT specialists and managers at mid-to-large companies

Temporal Information Systems in Medicine - Carlo Combi 2010-05-25

Temporal Information Systems in Medicine introduces the engineering of information systems for medically-related problems and applications. The chapters are organized into four parts; fundamentals, temporal reasoning & maintenance in medicine, time in clinical tasks, and the display of time-oriented clinical information. The chapters are self-contained with pointers to other relevant chapters or sections in this book when necessary. Time is of central importance and is a key component of the engineering process for information systems. This book is designed as a secondary text or reference book for upper -undergraduate level students and graduate level students

concentrating on computer science, biomedicine and engineering. Industry professionals and researchers working in health care management, information systems in medicine, medical informatics, database management and AI will also find this book a valuable asset.

A Primer on Process Mining - Diogo R. Ferreira 2017-06-19

The main goal of this book is to explain the core ideas of process mining, and to demonstrate how they can be implemented using just some basic tools that are available to any computer scientist or data scientist. It describes how to analyze event logs in order to discover the behavior of real-world business processes. The end result can often be visualized as a graph, and the book explains how to use Python and Graphviz to render these graphs intuitively. Overall, it enables the reader to implement process mining techniques on his or her own, independently of any specific process mining tool. An introduction to two popular process mining tools, namely Disco and ProM, is also provided. The book will be especially valuable for self-study or as a precursor to a more advanced text. Practitioners and students will be able to follow along on their own, even if they have no prior knowledge of the topic. After reading this book, they will be able to more confidently proceed to the research literature if needed.

Modeling Business Processes - Wil Van Der Aalst, M.P. 2011-05-27

An introduction to the modeling of business information systems, with processes formally modeled using Petri nets. This comprehensive introduction to modeling business-information systems focuses on business processes. It describes and demonstrates the formal modeling of processes in terms of Petri nets, using a well-established theory for capturing and analyzing models with concurrency. The precise semantics of this formal method offers a distinct advantage for modeling processes over the industrial modeling languages found in other books on the subject. Moreover, the simplicity and expressiveness of the Petri nets concept make it an ideal language for

explaining foundational concepts and constructing exercises. After an overview of business information systems, the book introduces the modeling of processes in terms of classical Petri nets. This is then extended with data, time, and hierarchy to model all aspects of a process. Finally, the book explores analysis of Petri net models to detect design flaws and errors in the design process. The text, accessible to a broad audience of professionals and students, keeps technicalities to a minimum and offers numerous examples to illustrate the concepts covered. Exercises at different levels of difficulty make the book ideal for independent study or classroom use.

An Introduction to Data - Francesco Corea 2018-11-27

This book reflects the author's years of hands-on experience as an academic and practitioner. It is primarily intended for executives, managers and practitioners who want to redefine the way they think about artificial intelligence (AI) and other exponential technologies. Accordingly the book, which is structured as a collection of largely self-contained articles, includes both general strategic reflections and detailed sector-specific information. More concretely, it shares insights into what it means to work with AI and how to do it more efficiently; what it means to hire a data scientist and what new roles there are in the field; how to use AI in specific industries such as finance or insurance; how AI interacts with other technologies such as blockchain; and, in closing, a review of the use of AI in venture capital, as well as a snapshot of acceleration programs for AI companies.

Fundamentals of Clinical Data Science - Pieter Kubben 2018-12-21

This open access book comprehensively covers the fundamentals of clinical data science, focusing on data collection, modelling and clinical applications. Topics covered in the first section on data collection include: data sources, data at scale (big data), data stewardship (FAIR data) and related privacy concerns. Aspects of predictive modelling using techniques such as classification, regression or clustering, and prediction model validation will be covered in

the second section. The third section covers aspects of (mobile) clinical decision support systems, operational excellence and value-based healthcare.

Fundamentals of Clinical Data Science is an essential resource for healthcare professionals and IT consultants intending to develop and refine their skills in personalized medicine, using solutions based on large datasets from electronic health records or telemonitoring programmes. The book's promise is "no math, no code" and will explain the topics in a style that is optimized for a healthcare audience.

Encyclopedia of Big Data Technologies - Sherif Sakr 2019-03-01

The Encyclopedia of Big Data Technologies provides researchers, educators, students and industry professionals with a comprehensive authority over the most relevant Big Data Technology concepts. With over 300 articles written by worldwide subject matter experts from both industry and academia, the encyclopedia covers topics such as big data storage systems, NoSQL database, cloud computing, distributed systems, data processing, data management, machine learning and social technologies, data science. Each peer-reviewed, highly structured entry provides the reader with basic terminology, subject overviews, key research results, application examples, future directions, cross references and a bibliography. The entries are expository and tutorial, making this reference a practical resource for students, academics, or professionals. In addition, the distinguished, international editorial board of the encyclopedia consists of well-respected scholars, each developing topics based upon their expertise.

Workflow Patterns - Nick Russell 2016-02-12

A comprehensive guide to well-known workflow patterns: recurrent, generic business process constructs, described from the control-flow, data, and resource perspectives. The study of business processes has emerged as a highly effective approach to coordinating an organization's complex service- and knowledge-based activities. The growing field of business process

management (BPM) focuses on methods and tools for designing, enacting, and analyzing business processes. This volume offers a definitive guide to the use of patterns, which synthesize the wide range of approaches to modeling business processes. It provides a unique and comprehensive introduction to the well-known workflow patterns collection—recurrent, generic constructs describing common business process modeling and execution scenarios, presented in the form of problem-solution dialectics. The underlying principles of the patterns approach ensure that they are independent of any specific enabling technology, representational formalism, or modeling approach, and thus broadly applicable across the business process modeling and business process technology domains. The authors, drawing on extensive research done by the Workflow Patterns Initiative, offer a detailed introduction to the fundamentals of business process modeling and management; describe three major pattern catalogs, presented from control-flow, data, and resource perspectives; and survey related BPM patterns. The book, a companion to the authoritative Workflow Patterns website, will be an essential resource for both academics and practitioners working in business process modeling and business process management.

Process Mining in Healthcare - Ronny S. Mans 2015-03-12

What are the possibilities for process mining in hospitals? In this book the authors provide an answer to this question by presenting a healthcare reference model that outlines all the different classes of data that are potentially available for process mining in healthcare and the relationships between them. Subsequently, based on this reference model, they explain the application opportunities for process mining in this domain and discuss the various kinds of analyses that can be performed. They focus on organizational healthcare processes rather than medical treatment processes. The combination of event data and process mining techniques allows them to analyze the operational processes within a hospital based on facts, thus providing a solid

basis for managing and improving processes within hospitals. To this end, they also explicitly elaborate on data quality issues that are relevant for the data aspects of the healthcare reference model. This book mainly targets advanced professionals involved in areas related to business process management, business intelligence, data mining, and business process redesign for healthcare systems as well as graduate students specializing in healthcare information systems and process analysis.

Process Querying Methods - Artem Polyvyanyy 2022-05-27

This book presents a framework for developing as well as a comprehensive collection of state-of-the-art process querying methods. Process querying combines concepts from Big Data and Process Modeling and Analysis with Business Process Intelligence and Process Analytics to study techniques for retrieving and manipulating models of real-world and envisioned processes to organize and extract process-related information for subsequent systematic use. The book comprises sixteen contributed chapters distributed over four parts and two auxiliary chapters. The auxiliary chapters by the editor provide an introduction to the area of process querying and a summary of the presented methods, techniques, and applications for process querying. The introductory chapter also examines a process querying framework. The contributed chapters present various process querying methods, including discussions on how they instantiate the framework components, thus supporting the comparison of the methods. The four parts are due to the distinctive features of the methods they include. The first three are devoted to querying event logs generated by IT-systems that support business processes at organizations, querying process designs captured in process models, and methods that address querying both event logs and process models. The methods in these three parts usually define a language for specifying process queries. The fourth part discusses methods that operate over inputs other than event logs and process models, e.g., streams of process

events, or do not develop dedicated languages for specifying queries, e.g., methods for assessing process model similarity. This book is mainly intended for researchers. All the chapters in this book are contributed by active researchers in the research disciplines of business process management, process mining, and process querying. They describe state-of-the-art methods for process querying, discuss use cases of process querying, and suggest directions for future work for advancing the field. Yet, also other groups like business or data scientists and other professionals, lecturers, graduate students, and tool vendors will find relevant information for their distinctive needs. Chapter "Celonis PQL: A Query Language for Process Mining" is available open access under a Creative Commons Attribution 4.0 International License via link.springer.com.

Production Engineering - Manfred Weck 2013-10-22

Production Engineering: The Competitive Edge describes the applications of advanced manufacturing technologies and their environmental impact. This book contains four chapters that explore particularly the implementation of high-performance integrated system in production engineering. The first chapter deals with the association between product design, market, and manufacturing requirements, followed by a review of production management and economic and human oriented operation of production systems. The second chapter tackles the principles of the so-called "Intelligent Technologies", the potential of material-adapted machines, and environmental responsibility of manufacturing technologies. The third chapter highlights the design and realization of manufacturing equipment. This chapter also looks into the problem of interfacing in material flow in integrated systems, the concept of shop floor techniques, and the reduction of initial operation and standstill times of complex manufacturing machines. The fourth chapter considers quality assurance methods, including quality control loops, network, and optoelectronic measurements. This book will prove useful to workers in

the fields of development, engineering design, operations scheduling, manufacturing, assembly, quality assurance, personnel management, and accounting departments.

Predictive Analytics and Data Mining - Vijay Kotu 2014-11-27

Put Predictive Analytics into Action Learn the basics of Predictive Analysis and Data Mining through an easy to understand conceptual framework and immediately practice the concepts learned using the open source RapidMiner tool. Whether you are brand new to Data Mining or working on your tenth project, this book will show you how to analyze data, uncover hidden patterns and relationships to aid important decisions and predictions. Data Mining has become an essential tool for any enterprise that collects, stores and processes data as part of its operations. This book is ideal for business users, data analysts, business analysts, business intelligence and data warehousing professionals and for anyone who wants to learn Data Mining. You'll be able to: 1. Gain the necessary knowledge of different data mining techniques, so that you can select the right technique for a given data problem and create a general purpose analytics process. 2. Get up and running fast with more than two dozen commonly used powerful algorithms for predictive analytics using practical use cases. 3. Implement a simple step-by-step process for predicting an outcome or discovering hidden relationships from the data using RapidMiner, an open source GUI based data mining tool Predictive analytics and Data Mining techniques covered: Exploratory Data Analysis, Visualization, Decision trees, Rule induction, k-Nearest Neighbors, Naïve Bayesian, Artificial Neural Networks, Support Vector machines, Ensemble models, Bagging, Boosting, Random Forests, Linear regression, Logistic regression, Association analysis using Apriori and FP Growth, K-Means clustering, Density based clustering, Self Organizing Maps, Text Mining, Time series forecasting, Anomaly detection and Feature selection. Implementation files can be downloaded from the book companion site at

www.LearnPredictiveAnalytics.com Demystifies data mining concepts with easy to understand language Shows how to get up and running fast with 20 commonly used powerful techniques for predictive analysis Explains the process of using open source RapidMiner tools Discusses a simple 5 step process for implementing algorithms that can be used for performing predictive analytics Includes practical use cases and examples

Encyclopedia of Data Science and Machine Learning - John Wang 2022

"This book examines current, state-of-the-art research in the areas of data science, machine learning, data mining, optimization, artificial intelligence, statistics, and the interactions, linkages, and applications of knowledge-based business with information systems"--

Conformance Checking and Diagnosis in Process Mining - Jorge Munoz-Gama 2016-11-22

Process mining techniques can be used to discover, analyze and improve real processes, by extracting models from observed behavior. The aim of this book is conformance checking, one of the main areas of process mining. In conformance checking, existing process models are compared with actual observations of the process in order to assess their quality. Conformance checking techniques are a way to visualize the differences between assumed process represented in the model and the real process in the event log, pinpointing possible problems to address, and the business process management results that rely on these models. This book combines both application and research perspectives. It provides concrete use cases that illustrate the problems addressed by the techniques in the book, but at the same time, it contains complete conceptualization and formalization of the problem and the techniques, and through evaluations on the quality and the performance of the proposed techniques. Hence, this book brings the opportunity for business analysts willing to improve their organization processes, and also data scientists interested on the topic of process-oriented

data science.

Process Mining - Wil M. P. van der Aalst 2018-04-22

This is the second edition of Wil van der Aalst's seminal book on process mining, which now discusses the field also in the broader context of data science and big data approaches. It includes several additions and updates, e.g. on inductive mining techniques, the notion of alignments, a considerably expanded section on software tools and a completely new chapter of process mining in the large. It is self-contained, while at the same time covering the entire process-mining spectrum from process discovery to predictive analytics. After a general introduction to data science and process mining in Part I, Part II provides the basics of business process modeling and data mining necessary to understand the remainder of the book. Next, Part III focuses on process discovery as the most important process mining task, while Part IV moves beyond discovering the control flow of processes, highlighting conformance checking, and organizational and time perspectives. Part V offers a guide to successfully applying process mining in practice, including an introduction to the widely used open-source tool ProM and several commercial products. Lastly, Part VI takes a step back, reflecting on the material presented and the key open challenges. Overall, this book provides a comprehensive overview of the state of the art in process mining. It is intended for business process analysts, business consultants, process managers, graduate students, and BPM researchers.

Workflow Management - Kees Van Hee 2004-01-30

This book offers a comprehensive introduction to workflow management, the management of business processes with information technology. By defining, analyzing, and redesigning an organization's resources and operations, workflow management systems ensure that the right information reaches the right person or computer application at the right time. The book provides a basic overview of workflow terminology and organization, as well as detailed

coverage of workflow modeling with Petri nets. Because Petri nets make definitions easier to understand for nonexperts, they facilitate communication between designers and users. The book includes a chapter of case studies, review exercises, and a glossary. A special Web site developed by the authors, www.workflowcourse.com, features animation, interactive examples, lecture materials, exercises and solutions, relevant links, and other valuable resources for the classroom.

Graph Algorithms - Mark Needham 2019-05-16

Discover how graph algorithms can help you leverage the relationships within your data to develop more intelligent solutions and enhance your machine learning models. You'll learn how graph analytics are uniquely suited to unfold complex structures and reveal difficult-to-find patterns lurking in your data. Whether you are trying to build dynamic network models or forecast real-world behavior, this book illustrates how graph algorithms deliver value—from finding vulnerabilities and bottlenecks to detecting communities and improving machine learning predictions. This practical book walks you through hands-on examples of how to use graph algorithms in Apache Spark and Neo4j—two of the most common choices for graph analytics. Also included: sample code and tips for over 20 practical graph algorithms that cover optimal pathfinding, importance through centrality, and community detection. Learn how graph analytics vary from conventional statistical analysis Understand how classic graph algorithms work, and how they are applied Get guidance on which algorithms to use for different types of questions Explore algorithm examples with working code and sample datasets from Spark and Neo4j See how connected feature extraction can increase machine learning accuracy and precision Walk through creating an ML workflow for link prediction combining Neo4j and Spark

Discovering Knowledge in Data - Daniel T. Larose 2005-01-28

Learn Data Mining by doing data mining Data mining can be revolutionary-

but only when it's done right. The powerful black box data mining software now available can produce disastrously misleading results unless applied by a skilled and knowledgeable analyst. *Discovering Knowledge in Data: An Introduction to Data Mining* provides both the practical experience and the theoretical insight needed to reveal valuable information hidden in large data sets. Employing a "white box" methodology and with real-world case studies, this step-by-step guide walks readers through the various algorithms and statistical structures that underlie the software and presents examples of their operation on actual large data sets. Principal topics include: * Data preprocessing and classification * Exploratory analysis * Decision trees * Neural and Kohonen networks * Hierarchical and k-means clustering * Association rules * Model evaluation techniques Complete with scores of screenshots and diagrams to encourage graphical learning, *Discovering Knowledge in Data: An Introduction to Data Mining* gives students in Business, Computer Science, and Statistics as well as professionals in the field the power to turn any data warehouse into actionable knowledge. An Instructor's Manual presenting detailed solutions to all the problems in the book is available online.

Data Mining for the Masses, Third Edition - Matthew North 2018-09-05

Some say we live in the Information Age; others, the Social Age; and still others, the Big Data Age. Regardless of what name we give it, we live in an age that generates monumental amounts of data-in all different kinds of formats. In business, and in our personal lives, we use smartphones and tablets, web sites and watches; with apps and interfaces to shop, learn, entertain and inform. Businesses increasingly use technology to interact with consumers to provide marketing, customer service, product information and more. All of this technological activity generates data, and we're increasingly good at gathering, storing and analyzing it. Data mining can help to identify interesting patterns and messages that exist in data, often hidden beneath the surface. In this modern age of information systems, it is easier than ever

before to extract meaning from data. From classification to prediction, data mining can help. In *Data Mining for the Masses*, Third Edition, professor Matt North—a former risk analyst and software engineer at eBay—uses simple examples and clear explanations with free, powerful software tools to teach you the basics of data mining. In this Third Edition, implementations of these examples are offered in current versions of the RapidMiner software, and in the increasingly popular R Statistical Package. You've got more data than ever before and you know it's got value, if only you can figure out how to get to it. This book can show you how. Let's start digging!

Internet of Things. Information Processing in an Increasingly Connected

World - Leon Strous 2019-03-19

This open access book constitutes the refereed post-conference proceedings of the First IFIP International Cross-Domain Conference on Internet of Things, IFIP IoT 2018, held at the 24th IFIP World Computer Congress, WCC 2018, in Poznan, Poland, in September 2018. The 12 full papers presented were carefully reviewed and selected from 24 submissions. Also included in this volume are 4 WCC 2018 plenary contributions, an invited talk and a position paper from the IFIP domain committee on IoT. The papers cover a wide range of topics from a technology to a business perspective and include among others hardware, software and management aspects, process innovation, privacy, power consumption, architecture, applications.

Data Science for Healthcare - Sergio Consoli 2019-02-23

This book seeks to promote the exploitation of data science in healthcare systems. The focus is on advancing the automated analytical methods used to extract new knowledge from data for healthcare applications. To do so, the book draws on several interrelated disciplines, including machine learning, big data analytics, statistics, pattern recognition, computer vision, and Semantic Web technologies, and focuses on their direct application to healthcare. Building on three tutorial-like chapters on data science in healthcare, the

following eleven chapters highlight success stories on the application of data science in healthcare, where data science and artificial intelligence technologies have proven to be very promising. This book is primarily intended for data scientists involved in the healthcare or medical sector. By reading this book, they will gain essential insights into the modern data science technologies needed to advance innovation for both healthcare businesses and patients. A basic grasp of data science is recommended in order to fully benefit from this book.

Data Science - Vijay Kotu 2018-11-27

Learn the basics of Data Science through an easy to understand conceptual framework and immediately practice using RapidMiner platform. Whether you are brand new to data science or working on your tenth project, this book will show you how to analyze data, uncover hidden patterns and relationships to aid important decisions and predictions. Data Science has become an essential tool to extract value from data for any organization that collects, stores and processes data as part of its operations. This book is ideal for business users, data analysts, business analysts, engineers, and analytics professionals and for anyone who works with data. You'll be able to: Gain the necessary knowledge of different data science techniques to extract value from data. Master the concepts and inner workings of 30 commonly used powerful data science algorithms. Implement step-by-step data science process using using RapidMiner, an open source GUI based data science platform. Data Science techniques covered: Exploratory data analysis, Visualization, Decision trees, Rule induction, k-nearest neighbors, Naïve Bayesian classifiers, Artificial neural networks, Deep learning, Support vector machines, Ensemble models, Random forests, Regression, Recommendation engines, Association analysis, K-Means and Density based clustering, Self organizing maps, Text mining, Time series forecasting, Anomaly detection, Feature selection and more... Contains fully updated content on data science, including tactics on how to

mine business data for information Presents simple explanations for over twenty powerful data science techniques Enables the practical use of data science algorithms without the need for programming Demonstrates processes with practical use cases Introduces each algorithm or technique and explains the workings of a data science algorithm in plain language Describes the commonly used setup options for the open source tool RapidMiner

Process Mining - Wil van der Aalst 2014-10-07

More and more information about business processes is recorded by information systems in the form of so-called “event logs”. Despite the omnipresence of such data, most organizations diagnose problems based on fiction rather than facts. Process mining is an emerging discipline based on process model-driven approaches and data mining. It not only allows organizations to fully benefit from the information stored in their systems, but it can also be used to check the conformance of processes, detect bottlenecks, and predict execution problems. Wil van der Aalst delivers the first book on process mining. It aims to be self-contained while covering the entire process mining spectrum from process discovery to operational support. In Part I, the author provides the basics of business process modeling and data mining necessary to understand the remainder of the book. Part II focuses on process discovery as the most important process mining task. Part III moves beyond discovering the control flow of processes and highlights conformance checking, and organizational and time perspectives. Part IV guides the reader in successfully applying process mining in practice, including an introduction to the widely used open-source tool ProM. Finally, Part V takes a step back, reflecting on the material presented and the key open challenges. Overall, this book provides a comprehensive overview of the state of the art in process mining. It is intended for business process analysts, business consultants, process managers, graduate students, and BPM researchers.

Life Science Data Mining -

MASTERING DATA MINING: THE ART AND SCIENCE OF CUSTOMER RELATIONSHIP MANAGEMENT - Michael J. A. Berry 2008-09-01

Special Features: · Best-in-class data mining techniques for solving critical problems in all areas of business· Explains how to pick the right data mining techniques for specific problems· Shows how to perform analysis and evaluate results· Features real-world examples from across various industry sectors· Companion Web site with updates on data mining products and service providers About The Book: Companies have invested in building data warehouses to capture vast amounts of customer information. The payoff comes with mining or getting access to the data within this information gold mine to make better business decisions. Readers and reviewers loved Berry and Linoff's first book, *Data Mining Techniques*, because the authors so clearly illustrate practical techniques with real benefits for improved marketing and sales. *Mastering Data Mining* takes off from there-assuming readers know the basic techniques covered in the first book, the authors focus on how to best apply these techniques to real business cases. They start with simple applications and work up to the most powerful and sophisticated examples over the course of about 20 cases. (Ralph Kimball used this same approach in his highly successful *Data Warehouse Toolkit*). As with their first book, *Mastering Data Mining* is sufficiently technical for database analysts, but is accessible to technically savvy business and marketing managers. It should also appeal to a new breed of database marketing managers.

Foundations of Data Science - Avrim Blum 2020-01-23

This book provides an introduction to the mathematical and algorithmic foundations of data science, including machine learning, high-dimensional geometry, and analysis of large networks. Topics include the counterintuitive nature of data in high dimensions, important linear algebraic techniques such as singular value decomposition, the theory of random walks and Markov chains, the fundamentals of and important algorithms for machine learning,

algorithms and analysis for clustering, probabilistic models for large networks, representation learning including topic modelling and non-negative matrix factorization, wavelets and compressed sensing. Important probabilistic techniques are developed including the law of large numbers, tail inequalities, analysis of random projections, generalization guarantees in machine learning, and moment methods for analysis of phase transitions in large random graphs. Additionally, important structural and complexity measures are discussed such as matrix norms and VC-dimension. This book is suitable for both undergraduate and graduate courses in the design and analysis of algorithms for data.

[Business Process Management Workshops](#) - Adela Del Río Ortega 2021-01-18

This book constitutes revised papers from the International Workshops held at the 18th International Conference on Business Process Management, BPM 2020, during September 13-18, 2020. The conference was planned to take place in Seville, Spain, but changed to an online format due to the COVID-19 pandemic. Papers from the following workshops are included: Workshop on Security and Privacy-Enhanced Business Process Management (SPBP 2020) Workshop on Social and Human Aspects of Business Process Management (BPMS2 2020) Workshop on Business Processes Meet the Internet-of Things (BP-Meet-IoT 2020) Workshop on Artificial Intelligence for Business Process Management (AI4BPM 2020) Workshop BPM in the Era of Digital Innovation and Transformation (BPMInDIT 2020) Workshop on Business Process Intelligence (BPI 2020) Workshop on Declarative, Decision and Hybrid Approaches to Processes (DEC2H 2020) Each of the seven workshops focused on particular aspects of business process management, either from a technical or from a domain perspective. Overall, after a thorough review process there were 28 full and 1 short paper selected from 53 submissions.

Introducing Data Science - Davy Cielen 2016-05-02

Summary Introducing Data Science teaches you how to accomplish the

fundamental tasks that occupy data scientists. Using the Python language and common Python libraries, you'll experience firsthand the challenges of dealing with data at scale and gain a solid foundation in data science. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Technology Many companies need developers with data science skills to work on projects ranging from social media marketing to machine learning. Discovering what you need to learn to begin a career as a data scientist can seem bewildering. This book is designed to help you get started. About the Book Introducing Data Science Introducing Data Science explains vital data science concepts and teaches you how to accomplish the fundamental tasks that occupy data scientists. You'll explore data visualization, graph databases, the use of NoSQL, and the data science process. You'll use the Python language and common Python libraries as you experience firsthand the challenges of dealing with data at scale. Discover how Python allows you to gain insights from data sets so big that they need to be stored on multiple machines, or from data moving so quickly that no single machine can handle it. This book gives you hands-on experience with the most popular Python data science libraries, Scikit-learn and StatsModels. After reading this book, you'll have the solid foundation you need to start a career in data science. What's Inside Handling large data Introduction to machine learning Using Python to work with data Writing data science algorithms About the Reader This book assumes you're comfortable reading code in Python or a similar language, such as C, Ruby, or JavaScript. No prior experience with data science is required. About the Authors Davy Cielen, Arno D. B. Meysman, and Mohamed Ali are the founders and managing partners of Optimately and Maiton, where they focus on developing data science projects and solutions in various sectors. Table of Contents Data science in a big data world The data science process Machine learning Handling large data on a single computer First steps in big data Join the NoSQL movement

The rise of graph databases Text mining and text analytics Data visualization to the end user

Process Mining Techniques in Business Environments - Andrea Burattin
2015-05-12

After a brief presentation of the state of the art of process-mining techniques, Andrea Burratin proposes different scenarios for the deployment of process-mining projects, and in particular a characterization of companies in terms of their process awareness. The approaches proposed in this book belong to two different computational paradigms: first to classic "batch process mining," and second to more recent "online process mining." The book encompasses a revised version of the author's PhD thesis, which won the "Best Process Mining Dissertation Award" in 2014, awarded by the IEEE Task Force on Process Mining.

Data Science for Business - Foster Provost 2013-07-27

Written by renowned data science experts Foster Provost and Tom Fawcett, *Data Science for Business* introduces the fundamental principles of data science, and walks you through the "data-analytic thinking" necessary for extracting useful knowledge and business value from the data you collect. This guide also helps you understand the many data-mining techniques in use today. Based on an MBA course Provost has taught at New York University over the past ten years, *Data Science for Business* provides examples of real-world business problems to illustrate these principles. You'll not only learn how to improve communication between business stakeholders and data scientists, but also how participate intelligently in your company's data science projects. You'll also discover how to think data-analytically, and fully appreciate how data science methods can support business decision-making. Understand how data science fits in your organization—and how you can use it for competitive advantage Treat data as a business asset that requires careful investment if you're to gain real value Approach business problems data-

analytically, using the data-mining process to gather good data in the most appropriate way Learn general concepts for actually extracting knowledge from data Apply data science principles when interviewing data science job candidates

Practical Process Automation - Bernd Ruecker 2021-03-16

In today's IT architectures, microservices and serverless functions play increasingly important roles in process automation. But how do you create meaningful, comprehensive, and connected business solutions when the individual components are decoupled and independent by design? Targeted at developers and architects, this book presents a framework through examples, practical advice, and use cases to help you design and automate complex processes. As systems are more distributed, asynchronous, and reactive, process automation requires state handling to deal with long-running interactions. Author Bernd Ruecker demonstrates how to leverage process automation technology like workflow engines to orchestrate software, humans, decisions, or bots. Learn how modern process automation compares to business process management, service-oriented architecture, batch processing, event streaming, and data pipeline solutions Understand how to use workflow engines and executable process models with BPMN Understand the difference between orchestration and choreography and how to balance both
Transactions on Petri Nets and Other Models of Concurrency II - Wil van der Aalst 2009-03-27

Transactions on Petri Nets and Other Models of Concurrency (ToPNoC) II
These Transactions publish archival papers in the broad area of Petri nets and other models of concurrency, ranging from theoretical work to tool support and industrial applications. ToPNoC issues are published as LNCS volumes, and hence are widely distributed and indexed. This Journal has its own Editorial Board which selects papers based on a rigorous two-stage refereeing process. ToPNoC contains: - Revised versions of a selection of the best papers

from workshops and tutorials at the annual Petri net conferences - Special sections/issues within particular subareas (similar to those published in the Advances in Petri Nets series) - Other papers invited for publication in ToPNoC - Papers submitted directly to ToPNoC by their authors The second volume of ToPNoC focuses on Concurrency in Process-Aware Information Systems. Although the topic of business process management using information technology has been addressed by consultants and software developers in depth, more fundamental approaches towards such Process-Aware Information Systems (PAISs) have been rather uncommon. It wasn't until the 1990s that researchers started to work on the foundations of PAISs. Clearly, concurrency theory is an essential ingredient in these foundations as business processes are highly concurrent involving all types of routing logic and resource allocation mechanisms. The 16 papers in this special issue of ToPNoC cover topics ranging from the formal (mostly Petri-net based) foundations of PAISs to more applied topics such as flexibility and process mining. Thus, this volume gives a good overview of the state of the art in PAIS research.

Process Mining in Action - Lars Reinkemeyer 2020-03-14

This book describes process mining use cases and business impact along the value chain, from corporate to local applications, representing the state of the art in domain know-how. Providing a set of industrial case studies and best practices, it complements academic publications on the topic. Further the book reveals the challenges and failures in order to offer readers practical insights and guidance on how to avoid the pitfalls and ensure successful operational deployment. The book is divided into three parts: Part I provides an introduction to the topic from fundamental principles to key success factors, and an overview of operational use cases. As a holistic description of process mining in a business environment, this part is particularly useful for readers not yet familiar with the topic. Part II presents detailed use cases written by

contributors from a variety of functions and industries. Lastly, Part III provides a brief overview of the future of process mining, both from academic and operational perspectives. Based on a solid academic foundation, process mining has received increasing interest from operational businesses, with many companies already reaping the benefits. As the first book to present an overview of successful industrial applications, it is of particular interest to professionals who want to learn more about the possibilities and opportunities this new technology offers. It is also a valuable resource for researchers looking for empirical results when considering requirements for enhancements and further developments.

PMML in Action - Alex Guazzelli 2012-01-31

The data mining community has derived a broad foundation of statistical algorithms and software solutions that has allowed predictive analytics to become a standard approach used in science and industry. For many years, much emphasis has been placed on the development of predictive models. As a consequence, the market place offers a range of powerful tools, many open-source, for effective model building. However, once we turn to the operational deployment and practical application of predictive solutions within an existing IT infrastructure, we face a much more limited choice of options. Often it takes months for models to be integrated and deployed via custom code or proprietary processes. The Predictive Model Markup Language (PMML) standard has reached a significant stage of maturity and has obtained broad industry support, allowing users to develop predictive solutions within one application and use another to execute them. Previously, this was very difficult, but with PMML, the exchange of predictive solutions between compliant applications is now straightforward. The aim of this book is to present PMML from a practical perspective. It contains a variety of code snippets so that concepts are made clear through the use of examples. Readers are assumed to have a basic knowledge of predictive analytics and its

techniques and so the book is intended for data mining movers and shakers: anyone interested in moving predictive analytic solutions between applications, including students and scientists. PMML in Action is a great way to learn how to represent your predictive solutions through a mature and refined open standard. For the 2nd edition, the book has been completely revised for PMML 4.1, the latest version of PMML. It includes new chapters and an expanded description of how to represent multiple models in PMML, including model ensemble, segmentation, chaining, and composition. The book is divided into six parts, taking you in a PMML journey in which language elements and attributes are used to represent not only modeling techniques but also data pre- and post-processing. With PMML, users benefit from a single and concise standard to represent predictive models, thus avoiding the need for custom code and proprietary solutions. You too can join the PMML movement! Unleash the power of predictive analytics and data mining today

Process Mining - Wil M. P. van der Aalst 2016-04-15

This is the second edition of Wil van der Aalst's seminal book on process mining, which now discusses the field also in the broader context of data science and big data approaches. It includes several additions and updates, e.g. on inductive mining techniques, the notion of alignments, a considerably expanded section on software tools and a completely new chapter of process mining in the large. It is self-contained, while at the same time covering the entire process-mining spectrum from process discovery to predictive analytics. After a general introduction to data science and process mining in Part I, Part II provides the basics of business process modeling and data mining necessary to understand the remainder of the book. Next, Part III focuses on process discovery as the most important process mining task, while Part IV moves beyond discovering the control flow of processes, highlighting conformance checking, and organizational and time perspectives. Part V offers

a guide to successfully applying process mining in practice, including an introduction to the widely used open-source tool ProM and several commercial products. Lastly, Part VI takes a step back, reflecting on the material presented and the key open challenges. Overall, this book provides a comprehensive overview of the state of the art in process mining. It is intended for business process analysts, business consultants, process managers, graduate students, and BPM researchers.

The Data Science Design Manual - Steven S. Skiena 2017-07-01

This engaging and clearly written textbook/reference provides a must-have introduction to the rapidly emerging interdisciplinary field of data science. It focuses on the principles fundamental to becoming a good data scientist and the key skills needed to build systems for collecting, analyzing, and interpreting data. The Data Science Design Manual is a source of practical insights that highlights what really matters in analyzing data, and provides an intuitive understanding of how these core concepts can be used. The book does not emphasize any particular programming language or suite of data-analysis tools, focusing instead on high-level discussion of important design principles. This easy-to-read text ideally serves the needs of undergraduate and early graduate students embarking on an "Introduction to Data Science" course. It reveals how this discipline sits at the intersection of statistics, computer science, and machine learning, with a distinct heft and character of its own. Practitioners in these and related fields will find this book perfect for self-study as well. Additional learning tools: Contains "War Stories," offering perspectives on how data science applies in the real world Includes "Homework Problems," providing a wide range of exercises and projects for self-study Provides a complete set of lecture slides and online video lectures at www.data-manual.com Provides "Take-Home Lessons," emphasizing the big-picture concepts to learn from each chapter Recommends exciting "Kaggle Challenges" from the online platform Kaggle Highlights "False Starts,"

revealing the subtle reasons why certain approaches fail Offers examples taken from the data science television show “The Quant Shop” (www.quant-shop.com)

Interactive Process Mining in Healthcare - Carlos Fernandez-Llatas 2020-10-28

This book provides a practically applicable guide to the methodologies and technologies for the application of interactive process mining paradigm. Case studies are presented where this paradigm has been successfully applied in emergency medicine, surgery processes, human behavior modelling, strokes and outpatients’ services, enabling the reader to develop a deep understanding of how to apply process mining technologies in healthcare to support them in inferring new knowledge from past actions, and providing accurate and personalized knowledge to improve their future clinical decision-making.

Interactive Process Mining in Healthcare comprehensively covers how machine learning algorithms can be utilized to create real scientific evidence to improve daily healthcare protocols, and is a valuable resource for a variety of health professionals seeking to develop new methods to improve their clinical decision-making.

Process Analytics - Seyed-Mehdi-Reza Beheshti 2016-03-28

This book starts with an introduction to process modeling and process paradigms, then explains how to query and analyze process models, and how to analyze the process execution data. In this way, readers receive a comprehensive overview of what is needed to identify, understand and

improve business processes. The book chiefly focuses on concepts, techniques and methods. It covers a large body of knowledge on process analytics – including process data querying, analysis, matching and correlating process data and models – to help practitioners and researchers understand the underlying concepts, problems, methods, tools and techniques involved in modern process analytics. Following an introduction to basic business process and process analytics concepts, it describes the state of the art in this area before examining different analytics techniques in detail. In this regard, the book covers analytics over different levels of process abstractions, from process execution data and methods for linking and correlating process execution data, to inferring process models, querying process execution data and process models, and scalable process data analytics methods. In addition, it provides a review of commercial process analytics tools and their practical applications. The book is intended for a broad readership interested in business process management and process analytics. It provides researchers with an introduction to these fields by comprehensively classifying the current state of research, by describing in-depth techniques and methods, and by highlighting future research directions. Lecturers will find a wealth of material to choose from for a variety of courses, ranging from undergraduate courses in business process management to graduate courses in business process analytics. Lastly, it offers professionals a reference guide to the state of the art in commercial tools and techniques, complemented by many real-world use case scenarios.