

Predictive Analytics With Matlab Mathworks

Learn the fundamental aspects of the business statistics, data mining, and machine learning techniques required to understand the huge amount of data generated by your organization. This book explains practical business analytics through examples, covers the steps involved in using it correctly, and shows you the context in which a particular technique does not make sense. Further, Practical Business Analytics using R helps you understand specific issues faced by organizations and how the solutions to these issues can be facilitated by business analytics. This book will discuss and explore the following through examples and case studies: An introduction to R: data management and R functions The architecture, framework, and life cycle of a business analytics project Descriptive analytics using R: descriptive statistics and data cleaning Data mining: classification, association rules, and clustering Predictive analytics: simple regression, multiple regression, and logistic regression This book includes case studies on important business analytic techniques, such as classification, association, clustering, and regression. The R language is the statistical tool used to demonstrate the concepts throughout the book. What You Will Learn • Write R programs to handle data • Build analytical models and draw useful inferences from them • Discover the basic concepts of data mining and machine learning • Carry out predictive modeling • Define a business issue as an analytical problem Who This Book Is For Beginners who want to understand and learn the fundamentals of analytics using R. Students, managers, executives, strategy and planning professionals, software professionals, and BI/DW professionals.

Information technology is revolutionizing healthcare, and the uptake of health information technologies is rising, but scientific research and industrial and governmental support will be needed if these technologies are to be implemented effectively to build capacity at regional, national and global levels. This book, "Improving Usability, Safety and Patient Outcomes with Health Information Technology", presents papers from the Information Technology and Communications in Health conference, ITCH 2019, held in Victoria, Canada from 14 to 17 February 2019. The conference takes a multi-perspective view of what is needed to move technology forward to sustained and widespread use by transitioning research findings and approaches into practice. Topics range from improvements in usability and training and the need for new and improved designs for information systems, user interfaces and interoperable solutions, to governmental policy, mandates, initiatives and the need for regulation. The knowledge and insights gained from the ITCH 2019 conference will surely stimulate fruitful discussions and collaboration to bridge research and practice and improve usability, safety and patient outcomes, and the book will be of interest to all those associated with the development, implementation and delivery of health IT solutions.

This book acquaints readers with a range of techniques to help them effectively identify, record, map, analyze and report on patterns in various dimensions of human development (HD) with spatial scales down to the village level. It is impossible to capture HD at the local and global scale with only a single index, because differences in HD at the international scale are caused by 'general' factors, whereas local-scale differences are influenced by 'specific' factors. This book offers a variety of methods for scientifically mapping HD at any spatial scale. It covers how to rationally select variables; how to test the models; how to validate the results, and how to analyze them. For this purpose, it employs a case study on an Indian district. The socio-economic factors regulating the patterns of HD are now more complex than they were only a few decades ago, making it essential to incorporate newer models in order to successfully 'replicate' the real-world situation. Accordingly, the book offers essential methodological tools & techniques for mapping HD. It sheds new light on a handful of statistical multivariate analysis and machine learning algorithms that are rarely used in the social sciences when dealing with HD, yet have sound mathematical and statistical bases. These techniques can be successfully used for predictive analysis in the earth & natural sciences, decision sciences and management disciplines, and are equally effective in terms of capturing, predicting and projecting the composite HD 'landscape.' This book will especially benefit two groups of readers: firstly, HD practitioners who want to find out 'why some areas are doing better than others' by exploring the complex interactions of spatially linked variables with different HD parameters. And secondly, practitioners in other branches of the social sciences who are not concerned with HD but are looking for 'hands-on training' with techniques they can apply in their respective field of spatial investigations.

MATLAB is an indispensable asset for scientists, researchers, and engineers. The richness of the MATLAB computational environment combined with an integrated development environment (IDE) and straightforward interface, toolkits, and simulation and modeling capabilities, creates a research and development tool that has no equal. From quick code prototyping to full blown deployable applications, MATLAB stands as a de facto development language and environment serving the technical needs of a wide range of users. As a collection of diverse applications, each book chapter presents a novel application and use of MATLAB for a specific result.

This book is about Data Analytics. In that respect, it is like others. What distinguishes it from the rest is the variety of open-source tool applications. This book incorporates the use of R Studio, Python, SAS Studio (University Edition), and KNIME. This book is also about manipulating Big Data. Apache Hadoop on Hortonworks Sandbox is introduced and we manage, move, handle, and transform data using Apache Hive, Apache Spark, MapReduce and TEZ, with terminal shell commands and Ambari. We show you how to set up a virtual machine in Microsoft Azure. We then use the data in later chapters for modeling. We cover Descriptive Modeling and Predictive. The content includes Support Vector Machines, Decision Tree learning, Random Forests, Naive and Empirical Bayes, Gradient Boosting, Cluster Modeling, Generalized Linear Models, Logistic Regression, and Artificial Neural Networks. Every chapter includes completely worked examples using one or more open-source tools.

Due to the growing use of web applications and communication devices, the use of data has increased throughout various industries. It is necessary to develop new techniques for managing data in order to ensure adequate usage. The

Handbook of Research on Pattern Engineering System Development for Big Data Analytics is a critical scholarly resource that examines the incorporation of pattern management in business technologies as well as decision making and prediction process through the use of data management and analysis. Featuring coverage on a broad range of topics such as business intelligence, feature extraction, and data collection, this publication is geared towards professionals, academicians, practitioners, and researchers seeking current research on the development of pattern management systems for business applications.

This book constitutes the refereed proceedings of the 5th International Conference on Future Data and Security Engineering, FDSE 2018, held in Ho Chi Minh City, Vietnam, in November 2018. The 28 revised full papers and 7 short papers presented together with two papers of keynote speeches were carefully reviewed and selected from 122 submissions. The selected papers are organized into the following topical headings: security and privacy engineering; authentication and access control; big data analytics and applications; advanced studies in machine learning; deep learning and applications; data analytics and recommendation systems; Internet of Things and applications; smart city: data analytics and security; and emerging data management systems and applications.

This book includes state-of-the-art discussions on various issues and aspects of the implementation, testing, validation, and application of big data in the context of healthcare. The concept of big data is revolutionary, both from a technological and societal well-being standpoint. This book provides a comprehensive reference guide for engineers, scientists, and students studying/involved in the development of big data tools in the areas of healthcare and medicine. It also features a multifaceted and state-of-the-art literature review on healthcare data, its modalities, complexities, and methodologies, along with mathematical formulations. The book is divided into two main sections, the first of which discusses the challenges and opportunities associated with the implementation of big data in the healthcare sector. In turn, the second addresses the mathematical modeling of healthcare problems, as well as current and potential future big data applications and platforms.

This research monograph is highly contextual in the present era of spatial/spatio-temporal data explosion. The overall text contains many interesting results that are worth applying in practice, while it is also a source of intriguing and motivating questions for advanced research on spatial data science. The monograph is primarily prepared for graduate students of Computer Science, who wish to employ probabilistic graphical models, especially Bayesian networks (BNs), for applied research on spatial/spatio-temporal data. Students of any other discipline of engineering, science, and technology, will also find this monograph useful. Research students looking for a suitable problem for their MS or PhD thesis will also find this monograph beneficial. The open research problems as discussed with sufficient references in Chapter-8 and Chapter-9 can immensely help graduate researchers to identify topics of their own choice. The various illustrations and proofs presented throughout the monograph may help them to better understand the working principles of the models. The present monograph, containing sufficient description of the parameter learning and inference generation process for each enhanced BN model, can also serve as an algorithmic cookbook for the relevant system developers.

Big data analytics examines large amounts of data to uncover hidden patterns, correlations and other insights. With today's technology, it's possible to analyze your data and get answers from it almost immediately - an effort that's slower and less efficient with more traditional business intelligence solutions. MATLAB has the tools to work with large datasets and apply the necessary data analysis techniques. Parallel computing allows you to carry out many calculations simultaneously. Large problems can often be split into smaller ones, which are then solved at the same time. The main reasons to consider parallel computing are to: - Save time by distributing tasks and executing these simultaneously - Solve big data problems by distributing data - Take advantage of your desktop computer resources and scale up to clusters and cloud computing Parallel Computing Toolbox provides you with tools for a local cluster of workers on your client machine. MATLAB Distributed Computing Server software allows you to run as many MATLAB workers on a remote cluster of computers as your licensing allows. Most MathWorks products enable you to run applications in parallel. For example, Simulink models can run simultaneously in parallel. MATLAB Compiler and MATLAB Compiler SDK software let you build and deploy parallel applications. Several MathWorks products now offer built-in support for the parallel computing products, without requiring extra coding. Many applications involve multiple segments of code, some of which are repetitive. Often you can use for-loops to solve these cases. The ability to execute code in parallel, on one computer or on a cluster of computers, can significantly improve performance in many cases. Parallel Computing Toolbox software improves the performance of such loop execution by allowing several MATLAB workers to execute individual loop iterations simultaneously. Even running local workers all on the same machine as the client, you might see significant performance improvement on a multicore/multiprocessor machine. So whether your loop takes a long time to run because it has many iterations or because each iteration takes a long time, you can improve your loop speed by distributing iterations to MATLAB workers. When working interactively in a MATLAB session, you can offload work to a MATLAB worker session to run as a batch job. The command to perform this job is asynchronous, which means that your client MATLAB session is not blocked, and you can continue your own interactive session while the MATLAB worker is busy evaluating your code. The MATLAB worker can run either on the same machine as the client, or if using MATLAB Distributed Computing Server, on a remote cluster machine. If you have an array that is too large for your computer's memory, it cannot be easily handled in a single MATLAB session. Parallel Computing Toolbox software allows you to distribute that array among multiple MATLAB workers, so that each worker contains only a part of the array. Yet you can operate on the entire array as a single entity. Each worker operates only on its part of the array, and workers automatically transfer data between themselves when necessary, as, for example, in matrix multiplication. A large number of matrix operations and functions have been enhanced to work directly with these arrays without further modification. When writing code for Parallel Computing Toolbox software, you should advance one step at a time in the complexity of your application. Verifying your program at each step prevents your having to debug several potential problems simultaneously. If you run into any problems at any step along the way, back up to the previous step and reverify your code.

Medical informatics has revolutionized healthcare in recent years, and one of the major challenges now faced by health professionals everywhere is the further improvement of healthcare by making more effective use of the data from biomedical informatics, not least for education and decision support. This book presents the 52 full papers (accepted from 95 initial

submissions) delivered at the Special Topic Conference of the European Federation for Medical Informatics (EFMI STC 2018), held in Zagreb, Croatia, on 15 and 16 October 2018. The EFMI STC is one of Europe's leading conferences for the sharing of current professional and scientific knowledge in health informatics processes, and the topics covered here have been broadly divided into two sections; decision support and education. Offering an overview of current medical informatics research, this book will undoubtedly prove invaluable for the professional development of healthcare practitioners, as well as contributing to knowledge sustainability within the field of medical informatics.

MATLAB® Primer for Speech-Language Pathology and Audiology provides training and access to MATLAB®, the computational language developed by MathWorks®. While there are MATLAB® textbooks and manuals written for the field of engineering, there are no textbooks targeting allied health disciplines, particularly speech-language pathology and audiology. Research and practice in this field can greatly benefit from quantification and automation in data management, a domain that is increasingly labor-intensive. The text anticipates and promotes increased reliance on quantification and automation in the fields of speech-language pathology and audiology. This book is intended for students, practitioners, and researchers in speech-language pathology and audiology who wish to increase their productivity by incorporating and automating common research procedures and data-analysis calculations, or who wish to develop new tools and methods for their own paradigms and data processing. It assumes no prior knowledge of programming, but requires the reader to have a grasp of basic computer skills, such as managing folders, moving files, and navigating file paths and folder structures. Content and style are chosen so as to lower the threshold for an audience who has limited training in computer science. Concepts are presented in a personalized writing style (almost a dialogue with the reader), along with a didactic format similar to programmed instruction, using applications and work assignments that are concrete and manageable. Key features include: * A comprehensive introduction for the user in an effort to limit background knowledge needed to understand the content * Several mathematical review appendices * Exercises for the student to apply skills learned in laboratory and clinical applications Disclaimer: Please note that ancillary content (such documents, audio, and video) may not be included as published in the original print version of this book.

Graduate from Excel to MATLAB® to keep up with the evolution of finance data Foundations of Computational Finance with MATLAB® is an introductory text for both finance professionals looking to branch out from the spreadsheet, and for programmers who wish to learn more about finance. As financial data grows in volume and complexity, its very nature has changed to the extent that traditional financial calculators and spreadsheet programs are simply no longer enough. Today's analysts need more powerful data solutions with more customization and visualization capabilities, and MATLAB provides all of this and more in an easy-to-learn skillset. This book walks you through the basics, and then shows you how to stretch your new skills to create customized solutions. Part I demonstrates MATLAB's capabilities as they apply to traditional finance concepts, and PART II shows you how to create interactive and reusable code, link with external data sources, communicate graphically, and more. Master MATLAB's basic operations including matrices, arrays, and flexible data structures Learn how to build your own customized solutions when the built-ins just won't do Learn how to handle financial data and industry-specific variables including risk and uncertainty Adopt more accurate modeling practices for portfolios, options, time series, and more MATLAB is an integrated development environment that includes everything you need in one well-designed user interface. Available Toolboxes provide tested algorithms that save you hours of code, and the skills you learn using MATLAB make it easier to learn additional languages if you choose to do so. Financial firms are catching up to universities in MATLAB usage, so this is skill set that will follow you throughout your career. When you're ready to step into the new age of finance, Foundations of Computational Finance with MATLAB provides the expert instruction you need to get started quickly.

This illuminating text/reference surveys the state of the art in data science, and provides practical guidance on big data analytics. Expert perspectives are provided by authoritative researchers and practitioners from around the world, discussing research developments and emerging trends, presenting case studies on helpful frameworks and innovative methodologies, and suggesting best practices for efficient and effective data analytics. Features: reviews a framework for fast data applications, a technique for complex event processing, and agglomerative approaches for the partitioning of networks; introduces a unified approach to data modeling and management, and a distributed computing perspective on interfacing physical and cyber worlds; presents techniques for machine learning for big data, and identifying duplicate records in data repositories; examines enabling technologies and tools for data mining; proposes frameworks for data extraction, and adaptive decision making and social media analysis.

Advances in digital and information technology have meant that medical informatics and its associated fields are of ever-increasing importance in the modern healthcare environment. This book presents selected papers from the 63rd annual conference of the German Society of Medical Information Sciences, Biometry, and Epidemiology, GMDS 2018, held in Osnabrück, Germany, in September 2018. The society encompasses not only medical informatics, biometry and epidemiology, but also medical bioinformatics, systems biology and health data management. The title of this year's conference is "The Learning Health System: Research Based, Innovative, Connecting", and 38 full papers of the 164 oral presentations and 65 posters delivered at the conference are included here. A wide variety of scientific topics are covered, including standards to enable the interoperable interchange of information; metadata management; record linkage; IT issues for health care networks; interprofessional teaching and training; eHealth legislation; analysis of miRNAs and RNA-Seq data, among others. The contributors are all specialists in their field, and this book disseminates some of the innovative ideas which are urgently needed to meet the challenges facing a constantly developing digital healthcare environment.

This book considers the challenges related to the effective implementation of artificial intelligence (AI) and machine learning (ML) technologies to the cultural heritage digitization process. Particular focus is placed on improvements to the data acquisition stage, as well as the data enrichment and curation stages, using advanced artificial intelligence techniques and tools. An emphasis is placed on recent applications related to deep learning for visual recognition, generative models, natural language processing, and super resolution. The book is a valuable reference for researchers working in the multidisciplinary field of cultural heritage and AI, as well as professional experts in the art and culture domains, such as museums, libraries, and historic sites and buildings. Reports on techniques and methods that leverage AI and machine learning and their impact on the digitization of cultural heritage; Addresses challenges of improving data acquisition, enrichment and management processes; Highlights contributions from international researchers from diverse fields and subject areas.

This book provides a comprehensive overview of the incredible advances achieved in the study of in vitro neuronal networks for use in basic and applied research. These cultures of dissociated neurons offer a perfect trade-off between complex experimental models and theoretical modeling approaches giving new opportunities for experimental design but also providing new challenges in data management and interpretation. Topics include culturing methodologies, neuroengineering techniques, stem cell derived neuronal networks, techniques for measuring network activity, and recent improvements in large-scale data analysis. The book ends with a series of case studies examining potential applications of these technologies.

This book highlights some of the most fascinating current uses, thought-provoking changes, and biggest challenges that Big Data means for our society. The explosive growth of data and advances in Big Data analytics have created a new frontier for innovation, competition, productivity, and well-being in almost every sector of our society, as well as a source of immense economic and societal value. From the derivation of customer feedback-based insights to fraud detection and preserving privacy; better medical treatments; agriculture and food management; and establishing low-voltage networks – many innovations for the greater good can stem from Big Data. Given the insights it provides, this book will be of interest to both researchers in the field of Big Data, and practitioners from various fields who intend to apply Big Data technologies to improve their strategic and operational decision-making processes.

This contributed volume explores how data mining, machine learning, and similar statistical techniques can analyze the types of problems arising from Traditional Chinese Medicine (TCM) research. The book focuses on the study of clinical data and the analysis of herbal data. Challenges addressed include diagnosis, prescription analysis, ingredient discoveries, network based mechanism deciphering, pattern-activity relationships, and medical informatics. Each author demonstrates how they made use of machine learning, data mining, statistics and other analytic techniques to resolve their research challenges, how successful if these techniques were applied, any insight noted and how these insights define the most appropriate future work to be carried out. Readers are given an opportunity to understand the complexity of diagnosis and treatment decision, the difficulty of modeling of efficacy in terms of herbs, the identification of constituent compounds in an herb, the relationship between these compounds and biological outcome so that evidence-based predictions can be made. Drawing on a wide range of experienced contributors, Data Analytics for Traditional Chinese Medicine Research is a valuable reference for professionals and researchers working in health informatics and data mining. The techniques are also useful for biostatisticians and health practitioners interested in traditional medicine and data analytics.

Implementing Analytics demystifies the concept, technology and application of analytics and breaks its implementation down to repeatable and manageable steps, making it possible for widespread adoption across all functions of an organization. Implementing Analytics simplifies and helps democratize a very specialized discipline to foster business efficiency and innovation without investing in multi-million dollar technology and manpower. A technology agnostic methodology that breaks down complex tasks like model design and tuning and emphasizes business decisions rather than the technology behind analytics. Simplifies the understanding of analytics from a technical and functional perspective and shows a wide array of problems that can be tackled using existing technology Provides a detailed step by step approach to identify opportunities, extract requirements, design variables and build and test models. It further explains the business decision strategies to use analytics models and provides an overview for governance and tuning Helps formalize analytics projects from staffing, technology and implementation perspectives Emphasizes machine learning and data mining over statistics and shows how the role of a Data Scientist can be broken down and still deliver the value by building a robust development process

This book highlights state-of-the-art research on big data and the Internet of Things (IoT), along with related areas to ensure efficient and Internet-compatible IoT systems. It not only discusses big data security and privacy challenges, but also energy-efficient approaches to improving virtual machine placement in cloud computing environments. Big data and the Internet of Things (IoT) are ultimately two sides of the same coin, yet extracting, analyzing and managing IoT data poses a serious challenge. Accordingly, proper analytics infrastructures/platforms should be used to analyze IoT data. Information technology (IT) allows people to upload, retrieve, store and collect information, which ultimately forms big data. The use of big data analytics has grown tremendously in just the past few years. At the same time, the IoT has entered the public consciousness, sparking people's imaginations as to what a fully connected world can offer. Further, the book discusses the analysis of real-time big data to derive actionable intelligence in enterprise applications in several domains, such as in industry and agriculture. It explores possible automated solutions in daily life, including structures for smart cities and automated home systems based on IoT technology, as well as health care systems that manage large amounts of data (big data) to improve clinical decisions. The book addresses the security and privacy of the IoT and big data technologies, while also revealing the impact of IoT technologies on several scenarios in smart cities design. Intended as a comprehensive introduction, it offers in-depth analysis and provides scientists, engineers and professionals the latest techniques, frameworks and strategies used in IoT and big data technologies.

Access real-world documentation and examples for the Spark platform for building large-scale, enterprise-grade machine learning applications. The past decade has seen an astonishing series of advances in machine learning. These breakthroughs are disrupting our everyday life and making an impact across every industry. Next-Generation Machine Learning with Spark provides a gentle introduction to Spark and Spark MLlib and advances to more powerful, third-party machine learning algorithms and libraries beyond what is available in the standard Spark MLlib library. By the end of this book, you will be able to apply your knowledge to real-world use cases through dozens of practical examples and insightful explanations. What You Will Learn Be introduced to machine learning, Spark, and Spark MLlib 2.4.x Achieve lightning-fast gradient boosting on Spark with the XGBoost4J-Spark and LightGBM libraries Detect anomalies with the

Isolation Forest algorithm for Spark Use the Spark NLP and Stanford CoreNLP libraries that support multiple languages Optimize your ML workload with the Alluxio in-memory data accelerator for Spark Use GraphX and GraphFrames for Graph Analysis Perform image recognition using convolutional neural networks Utilize the Keras framework and distributed deep learning libraries with Spark Who This Book Is For Data scientists and machine learning engineers who want to take their knowledge to the next level and use Spark and more powerful, next-generation algorithms and libraries beyond what is available in the standard Spark MLlib library; also serves as a primer for aspiring data scientists and engineers who need an introduction to machine learning, Spark, and Spark MLlib.

Big data and artificial intelligence (AI) are at the forefront of technological advances that represent a potential transformational mega-trend—a new multipolar and innovative disruption. These technologies, and their associated management paradigm, are already rapidly impacting many industries and occupations, but in some sectors, the change is just beginning. Innovating ahead of emerging technologies is the new imperative for any organization that aspires to succeed in the next decade. Faced with the power of this AI movement, it is imperative to understand the dynamics and new codes required by the disruption and to adapt accordingly. AI and Big Data's Potential for Disruptive Innovation provides emerging research exploring the theoretical and practical aspects of successfully implementing new and innovative technologies in a variety of sectors including business, transportation, and healthcare. Featuring coverage on a broad range of topics such as semantic mapping, ethics in AI, and big data governance, this book is ideally designed for IT specialists, industry professionals, managers, executives, researchers, scientists, and engineers seeking current research on the production of new and innovative mechanization and its disruptions.

Open data and policy implications coming from data-aware planning entail collection and pre- and postprocessing as operations of primary interest. Before these steps, making data available to people and their decision-makers is a crucial point. Referring to the relationship between data and energy, public administrations, governments, and research bodies are promoting the construction of reliable and robust datasets to pursue policies coherent with the Sustainable Development Goals, as well as to allow citizens to make informed choices. Energy engineers and planners must provide the simplest and most robust tools to collect, process, and analyze data in order to offer solid data-based evidence for future projections in building, district, and regional systems planning. This Special Issue aims at providing the state-of-the-art on open-energy data analytics; its availability in the different contexts, i.e., country peculiarities; and its availability at different scales, i.e., building, district, and regional for data-aware planning and policy-making. For all the aforementioned reasons, we encourage researchers to share their original works on the field of open data and energy analytics. Topics of primary interest include but are not limited to the following: 1. Open data and energy sustainability; 2. Open data science and energy planning; 3. Open science and open governance for sustainable development goals; 4. Key performance indicators of data-aware energy modelling, planning, and policy; 5. Energy, water, and sustainability database for building, district, and regional systems; 6. Best practices and case studies.

The book is a collection of high-quality peer-reviewed research papers presented at International Conference on Frontiers of Intelligent Computing: Theory and applications (FICTA 2016) held at School of Computer Engineering, KIIT University, Bhubaneswar, India during 16 – 17 September 2016. The book presents theories, methodologies, new ideas, experiences and applications in all areas of intelligent computing and its applications to various engineering disciplines like computer science, electronics, electrical and mechanical engineering. Introduces readers to the state of the art of omics platforms and all aspects of omics approaches for clinical applications This book presents different high throughput omics platforms used to analyze tissue, plasma, and urine. The reader is introduced to state of the art analytical approaches (sample preparation and instrumentation) related to proteomics, peptidomics, transcriptomics, and metabolomics. In addition, the book highlights innovative approaches using bioinformatics, urine miRNAs, and MALDI tissue imaging in the context of clinical applications. Particular emphasis is put on integration of data generated from these different platforms in order to uncover the molecular landscape of diseases. The relevance of each approach to the clinical setting is explained and future applications for patient monitoring or treatment are discussed. Integration of omics Approaches and Systems Biology for Clinical Applications presents an overview of state of the art omics techniques. These methods are employed in order to obtain the comprehensive molecular profile of biological specimens. In addition, computational tools are used for organizing and integrating these multi-source data towards developing molecular models that reflect the pathophysiology of diseases. Investigation of chronic kidney disease (CKD) and bladder cancer are used as test cases. These represent multi-factorial, highly heterogeneous diseases, and are among the most significant health issues in developed countries with a rapidly aging population. The book presents novel insights on CKD and bladder cancer obtained by omics data integration as an example of the application of systems biology in the clinical setting. Describes a range of state of the art omics analytical platforms Covers all aspects of the systems biology approach—from sample preparation to data integration and bioinformatics analysis Contains specific examples of omics methods applied in the investigation of human diseases (Chronic Kidney Disease, Bladder Cancer) Integration of omics Approaches and Systems Biology for Clinical Applications will appeal to a wide spectrum of scientists including biologists, biotechnologists, biochemists, biophysicists, and bioinformaticians working on the different molecular platforms. It is also an excellent text for students interested in these fields.

Biomedical engineering and health informatics are closely related to each other, and it is often difficult to tell where one ends and the other begins, but ICT systems in healthcare and biomedical systems and devices are already becoming increasingly interconnected, and share the common entity of data. This is something which is set to become even more prevalent in future, and will complete the chain and flow of information from the sensor, via processing, to the actuator, which may be anyone or anything from a human healthcare professional to a robot. Methods for automating the processing of information, such as signal processing, machine learning, predictive analytics and decision support, are increasingly important for providing actionable information and supporting personalized and preventive healthcare protocols in both biomedical and digital healthcare systems and applications. This book of proceedings presents 50 papers from the 12th eHealth conference, eHealth2018, held in Vienna, Austria, in May 2018. The theme of this year's conference is Biomedical Meets eHealth – From Sensors to Decisions, and the papers included here cover a wide range of topics from the field of eHealth. The book will be of interest to all those working to design and implement healthcare today.

Blockchain technology allows value exchange without the need for a central authority and ensures trust powered by its decentralized architecture. As such, the growing use of the internet of things (IoT) and the rise of artificial intelligence (AI) are to be benefited immensely by this technology that can offer devices and applications data security, decentralization, accountability, and reliable authentication. Bringing

together blockchain technology, AI, and IoT can allow these tools to complement the strengths and weaknesses of the others and make systems more efficient.

Multidisciplinary Functions of Blockchain Technology in AI and IoT Applications deliberates upon prospects of blockchain technology using AI and IoT devices in various application domains. This book contains a comprehensive collection of chapters on machine learning, IoT, and AI in areas that include security issues of IoT, farming, supply chain management, predictive analytics, and natural languages processing. While highlighting these areas, the book is ideally intended for IT industry professionals, students of computer science and software engineering, computer scientists, practitioners, stakeholders, researchers, and academicians interested in updated and advanced research surrounding the functions of blockchain technology in AI and IoT applications across diverse fields of research.

This book bridges the gap between theory and applications that currently exist in undergraduate engineering probability textbooks. It offers examples and exercises using data (sets) in addition to traditional analytical and conceptual ones. Conceptual topics such as one and two random variables, transformations, etc. are presented with a focus on applications. Data analytics related portions of the book offer detailed coverage of receiver operating characteristics curves, parametric and nonparametric hypothesis testing, bootstrapping, performance analysis of machine vision and clinical diagnostic systems, and so on. With Excel spreadsheets of data provided, the book offers a balanced mix of traditional topics and data analytics expanding the scope, diversity, and applications of engineering probability. This makes the contents of the book relevant to current and future applications students are likely to encounter in their endeavors after completion of their studies. A full suite of classroom material is included. A solutions manual is available for instructors. Bridges the gap between conceptual topics and data analytics through appropriate examples and exercises; Features 100's of exercises comprising of traditional analytical ones and others based on data sets relevant to machine vision, machine learning and medical diagnostics; Intersperses analytical approaches with computational ones, providing two-level verifications of a majority of examples and exercises.

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.

This book is about predictive analytics. Yet, each chapter could easily be handled by an entire volume of its own. So one might think of this a survey of predictive modeling. A predictive model is a statistical model or machine learning model used to predict future behavior based on past behavior. In order to use this book, one should have a basic understanding of mathematical statistics - it is an advanced book. Some theoretical foundations are laid out but not proven, but references are provided for additional coverage. Every chapter culminates in an example using R. R is a free software environment for statistical computing and graphics. You may download R, from a preferred CRAN mirror at <http://www.r-project.org/>. The book is organized so that statistical models are presented first (hopefully in a logical order), followed by machine learning models, and then applications: uplift modeling and time series. One could use this a textbook with problem solving in R- but there are no "by-hand" exercises.

This unique text/reference presents an overview of the computational aspects of protein crystallization, describing how to build robotic high-throughput and crystallization analysis systems. The coverage encompasses the complete data analysis cycle, including the set-up of screens by analyzing prior crystallization trials, the classification of crystallization trial images by effective feature extraction, the analysis of crystal growth in time series images, the segmentation of crystal regions in images, the application of focal stacking methods for crystallization images, and the visualization of trials. Topics and features: describes the fundamentals of protein crystallization, and the scoring and categorization of crystallization image trials; introduces a selection of computational methods for protein crystallization screening, and the hardware and software architecture for a basic high-throughput system; presents an overview of the image features used in protein crystallization classification, and a spatio-temporal analysis of protein crystal growth; examines focal stacking techniques to avoid blurred crystallization images, and different thresholding methods for binarization or segmentation; discusses visualization methods and software for protein crystallization analysis, and reviews alternative methods to X-ray diffraction for obtaining structural information; provides an overview of the current challenges and potential future trends in protein crystallization. This interdisciplinary work serves as an essential reference on the computational and data analytics components of protein crystallization for the structural biology community, in addition to computer scientists wishing to enter the field of protein crystallization.

MATLAB is used in a wide range of applications in geosciences, such as image processing in remote sensing, generation and processing of digital elevation models and the analysis of time series. This book introduces basic methods of data analysis in geosciences using MATLAB. The text includes a brief description of each method and numerous examples demonstrating how MATLAB can be used on data sets from earth sciences. All MATLAB recipes can be easily modified in order to analyse the reader's own data sets.

This book presents the findings of scientific studies on the successful operation of complex transport infrastructures in regions with extreme climatic and geographical conditions. It features the proceedings of the VIII International Scientific Siberian Transport Forum, TransSiberia 2019, which was held in Novosibirsk, Russia, on May 22–27, 2019. The book discusses improving energy efficiency in the transportation sector and the use of artificial intelligence in transport, highlighting a range of topics, such as freight and logistics, freeway traffic modelling and control, intelligent transport systems and smart mobility, transport data and transport models, highway and railway construction and trucking on the Siberian ice roads. Consisting of 214 high-quality papers on a wide range of issues, these proceedings appeal to scientists, engineers, managers in the transport sector, and anyone involved in the construction and operation of transport infrastructure facilities.

The first textbook to teach students how to build data analytic solutions on large data sets using cloud-based technologies. This is the first textbook to teach students how to build data analytic solutions on large data sets (specifically in Internet of Things applications) using cloud-based technologies for data storage, transmission and mashup, and AI techniques to analyze this data. This textbook is designed to train college students to master modern cloud computing systems in operating principles, architecture design, machine learning algorithms, programming models and software tools for big data mining, analytics, and cognitive applications. The book will be suitable for use in one-semester computer science or electrical engineering courses on cloud computing, machine learning, cloud programming, cognitive computing, or big data science. The book will also be very useful as a reference for professionals who want to work in cloud computing and data science. Cloud and Cognitive Computing begins with two introductory chapters on fundamentals of cloud computing, data science, and adaptive computing that lay the foundation for the rest of the book. Subsequent chapters cover topics including cloud architecture, mashup services, virtual machines, Docker containers, mobile clouds, IoT and AI, inter-cloud mashups, and cloud performance and benchmarks, with a focus on Google's Brain Project, DeepMind, and X-Lab programs, IBKai HwangM SyNapsee, Bluemix programs, cognitive initiatives, and neurocomputers. The book then covers machine learning algorithms and cloud programming software tools and application development,

applying the tools in machine learning, social media, deep learning, and cognitive applications. All cloud systems are illustrated with big data and cognitive application examples.

This volume comprises papers dedicated to data science and the extraction of knowledge from many types of data: structural, quantitative, or statistical approaches for the analysis of data; advances in classification, clustering and pattern recognition methods; strategies for modeling complex data and mining large data sets; applications of advanced methods in specific domains of practice. The contributions offer interesting applications to various disciplines such as psychology, biology, medical and health sciences; economics, marketing, banking and finance; engineering; geography and geology; archeology, sociology, educational sciences, linguistics and musicology; library science. The book contains the selected and peer-reviewed papers presented during the European Conference on Data Analysis (ECDA 2013) which was jointly held by the German Classification Society (GfKI) and the French-speaking Classification Society (SFC) in July 2013 at the University of Luxembourg.

Advancements in data science have created opportunities to sort, manage, and analyze large amounts of data more effectively and efficiently. Applying these new technologies to the healthcare industry, which has vast quantities of patient and medical data and is increasingly becoming more data-reliant, is crucial for refining medical practices and patient care. *Data Analytics in Medicine: Concepts, Methodologies, Tools, and Applications* is a vital reference source that examines practical applications of healthcare analytics for improved patient care, resource allocation, and medical performance, as well as for diagnosing, predicting, and identifying at-risk populations. Highlighting a range of topics such as data security and privacy, health informatics, and predictive analytics, this multi-volume book is ideally designed for doctors, hospital administrators, nurses, medical professionals, IT specialists, computer engineers, information technologists, biomedical engineers, data-processing specialists, healthcare practitioners, academicians, and researchers interested in current research on the connections between data analytics in the field of medicine.

In this book readers will find technological discussions on the existing and emerging technologies across the different stages of the big data value chain. They will learn about legal aspects of big data, the social impact, and about education needs and requirements. And they will discover the business perspective and how big data technology can be exploited to deliver value within different sectors of the economy. The book is structured in four parts: Part I "The Big Data Opportunity" explores the value potential of big data with a particular focus on the European context. It also describes the legal, business and social dimensions that need to be addressed, and briefly introduces the European Commission's BIG project. Part II "The Big Data Value Chain" details the complete big data lifecycle from a technical point of view, ranging from data acquisition, analysis, curation and storage, to data usage and exploitation. Next, Part III "Usage and Exploitation of Big Data" illustrates the value creation possibilities of big data applications in various sectors, including industry, healthcare, finance, energy, media and public services. Finally, Part IV "A Roadmap for Big Data Research" identifies and prioritizes the cross-sectorial requirements for big data research, and outlines the most urgent and challenging technological, economic, political and societal issues for big data in Europe. This compendium summarizes more than two years of work performed by a leading group of major European research centers and industries in the context of the BIG project. It brings together research findings, forecasts and estimates related to this challenging technological context that is becoming the major axis of the new digitally transformed business environment.

MATLAB® is used for a wide range of applications in geosciences, such as image processing in remote sensing, the generation and processing of digital elevation models and the analysis of time series. This book introduces methods of data analysis in geosciences using MATLAB, such as basic statistics for univariate, bivariate and multivariate datasets, time-series analysis, signal processing, the analysis of spatial and directional data and image analysis. The revised and updated Fourth Edition includes sixteen new sections and most chapters have greatly been expanded so that they now include a step by step discussion of all methods before demonstrating the methods with MATLAB functions. New sections include: Array Manipulation; Control Flow; Creating Graphical User Interfaces; Hypothesis Testing; Kolmogorov-Smirnov Test; Mann-Whitney Test; Ansari-Bradley Test; Detecting Abrupt Transitions in Time Series; Exporting 3D Graphics to Create Interactive Documents; Importing, Processing and Exporting LANDSAT Images; Importing and Georeferencing TERRA ASTER Images; Processing and Exporting EO-1 Hyperion Images; Image Enhancement; Correction and Rectification; Shape-Based Object Detection in Images; Discriminant Analysis; and Multiple Linear Regression. The text includes numerous examples demonstrating how MATLAB can be used on data sets from earth sciences. The book's supplementary electronic material (available online through Springer Link) includes recipes that include all the MATLAB commands featured in the book and the example data.

Internet of Things and Big Data Analytics Toward Next-Generation Intelligence Springer

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