

Big Data And Health Analytics

Big Data and Health Analytics CRC Press

As technology evolves and electronic data becomes more complex, digital medical record management and analysis becomes a challenge. In order to discover patterns and make relevant predictions based on large data sets, researchers and medical professionals must find new methods to analyze and extract relevant health information. Big Data Analytics in Bioinformatics and Healthcare merges the fields of biology, technology, and medicine in order to present a comprehensive study on the emerging information processing applications necessary in the field of electronic medical record management. Complete with interdisciplinary research resources, this publication is an essential reference source for researchers, practitioners, and students interested in the fields of biological computation, database management, and health information technology, with a special focus on the methodologies and tools to manage massive and complex electronic information.

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.

This book presents and discusses the main strategic and organizational challenges posed by Big Data and analytics in a manner relevant to both practitioners and scholars. The first part of the book analyzes strategic issues relating to the growing relevance of Big Data and analytics for competitive advantage, which is also attributable to empowerment of activities such as consumer profiling, market segmentation, and development of new products or services. Detailed consideration is also given to the strategic impact of Big Data and analytics on innovation in domains such as government and education and to Big Data-driven business models. The second part of the book addresses the impact of Big Data and analytics on management and organizations, focusing on challenges for governance, evaluation, and change management, while the concluding part reviews real examples of Big Data and analytics innovation at the global level. The text is supported by informative illustrations and case studies, so that practitioners can use the book as a toolbox to improve understanding and exploit business opportunities related to Big Data and analytics.

Healthcare Data Analytics and Management

Demystifying Big Data and Machine Learning for Healthcare

Big Data, Health Law, and Bioethics

Analytics in Healthcare

Big Data Analytics and Intelligence

Computing Systems and Approaches

Applications of Big Data in Healthcare: Theory and Practice begins with the basics of Big Data analysis and introduces the tools, processes and procedures associated with Big Data analytics. The book unites healthcare with Big Data analysis and uses the advantages of the latter to solve the problems faced by the former. The authors present the challenges faced by the healthcare industry, including capturing, storing, searching, sharing and analyzing data. This book illustrates the challenges in the applications of Big Data and suggests ways to overcome them, with a primary emphasis on data repositories, challenges, and concepts for data scientists, engineers and clinicians. The applications of Big Data have grown tremendously within the past few years and its growth can not only be attributed to its competence to handle large data streams but also to its abilities to find insights from complex, noisy, heterogeneous, longitudinal and voluminous data. The main objectives of Big Data in the healthcare sector is to come up with ways to provide personalized healthcare to patients by taking into account the enormous amounts of already existing data. Provides case studies that illustrate the business processes underlying the use of big data and deep learning health analytics to improve health care delivery Supplies readers with a foundation for further specialized study in clinical analysis and data management Includes links to websites, videos, articles and other online content to expand and support the primary learning objectives for each major section of the book

At the intersection of computer science and healthcare, data analytics has emerged as a promising tool for solving problems across many healthcare-related disciplines. Supplying a comprehensive overview of recent healthcare analytics research, Healthcare Data Analytics provides a clear understanding of the analytical techniques currently available to solve

healthcare problems. The book details novel techniques for acquiring, handling, retrieving, and making best use of healthcare data. It analyzes recent developments in healthcare computing and discusses emerging technologies that can help improve the health and well-being of patients. Written by prominent researchers and experts working in the healthcare domain, the book sheds light on many of the computational challenges in the field of medical informatics. Each chapter in the book is structured as a "survey-style" article discussing the prominent research issues and the advances made on that research topic. The book is divided into three major categories: Healthcare Data Sources and Basic Analytics - details the various healthcare data sources and analytical techniques used in the processing and analysis of such data Advanced Data Analytics for Healthcare - covers advanced analytical methods, including clinical prediction models, temporal pattern mining methods, and visual analytics Applications and Practical Systems for Healthcare - covers the applications of data analytics to pervasive healthcare, fraud detection, and drug discovery along with systems for medical imaging and decision support Computer scientists are usually not trained in domain-specific medical concepts, whereas medical practitioners and researchers have limited exposure to the data analytics area. The contents of this book will help to bring together these diverse communities by carefully and comprehensively discussing the most relevant contributions from each domain.

"The chapters in this volume offer useful case studies, technical roadmaps, lessons learned, and a few prescriptions to do this, avoid that."-From the Foreword by Joe LaCugna, Ph.D., Enterprise Analytics and Business Intelligence, Starbucks Coffee CompanyWith the growing barrage of "big data," it becomes vitally important for organizations to make the most of this data. 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.

Foundations and Frontiers

Big Data, Big Analytics

Strategies, Implementation Methods, and Best Practices

Strategic and Organizational Impacts

Big Data and Artificial Intelligence for Healthcare Applications

Data Science and Big Data Analytics

Add a touch of data analytics to your healthcare systems and get insightful outcomes

Key Features

- Perform healthcare analytics with Python and SQL
- Build predictive models on real healthcare data with pandas and scikit-learn
- Use analytics to improve healthcare performance

Book Description

In recent years, machine learning technologies and analytics have been widely utilized across the healthcare sector. Healthcare Analytics Made Simple bridges the gap between practising doctors and data scientists. It equips the data scientists' work with healthcare data and allows them to gain better insight from this data in order to improve healthcare outcomes. This book is a complete overview of machine learning for healthcare analytics, briefly describing the current healthcare landscape, machine learning algorithms, and Python and SQL programming languages. The step-by-step instructions teach you how to obtain real healthcare data and perform descriptive, predictive, and prescriptive analytics using popular Python packages such as pandas and scikit-learn. The latest research results in disease detection and healthcare image analysis are reviewed. By the end of this book, you will understand how to use Python for healthcare data analysis, how to import, collect, clean, and refine data from electronic health record (EHR) surveys, and how to make predictive models with this data through real-world algorithms and code examples. What you will learn

- Gain valuable insight into healthcare incentives, finances, and legislation
- Discover the connection between machine learning and healthcare processes
- Use SQL and Python to analyze data
- Measure healthcare quality and provider performance
- Identify features and attributes to build successful healthcare models
- Build predictive models using real-world healthcare data
- Become an expert in predictive modeling with structured clinical data
- See what lies ahead for healthcare analytics

Who this book is for

Healthcare Analytics Made Simple is for you if you are a developer who has a working knowledge of Python or a related programming language, although you are new to healthcare or predictive modeling with healthcare data. Clinicians interested in analytics and healthcare computing will also benefit from this book. This book can also serve as a textbook for students enrolled in an introductory course on machine learning for healthcare.

Data availability is surpassing existing paradigms for governing, managing, analyzing, and interpreting health data. Big Data and Health Analytics provides frameworks, use cases, and examples that illustrate the role of big data and analytics in modern health care, including how public health information can inform health delivery.

Written for health

Big data consists of data sets that are too large and complex for traditional data processing and data management applications. Therefore, to obtain the valuable information within the data,

one must use a variety of innovative analytical methods, such as web analytics, machine learning, and network analytics. As the study of big data becomes more popular, there is an urgent demand for studies on high-level computational intelligence and computing services for analyzing this significant area of information science. *Big Data Analytics for Sustainable Computing* is a collection of innovative research that focuses on new computing and system development issues in emerging sustainable applications. Featuring coverage on a wide range of topics such as data filtering, knowledge engineering, and cognitive analytics, this publication is ideally designed for data scientists, IT specialists, computer science practitioners, computer engineers, academicians, professionals, and students seeking current research on emerging analytical techniques and data processing software.

Data Analytics in Biomedical Engineering and Healthcare explores key applications using data analytics, machine learning, and deep learning in health sciences and biomedical data. The book is useful for those working with big data analytics in biomedical research, medical industries, and medical research scientists. The book covers health analytics, data science, and machine and deep learning applications for biomedical data, covering areas such as predictive health analysis, electronic health records, medical image analysis, computational drug discovery, and genome structure prediction using predictive modeling. Case studies demonstrate big data applications in healthcare using the MapReduce and Hadoop frameworks. Examines the development and application of data analytics applications in biomedical data Presents innovative classification and regression models for predicting various diseases Discusses genome structure prediction using predictive modeling Shows readers how to develop clinical decision support systems Shows researchers and specialists how to use hybrid learning for better medical diagnosis, including case studies of healthcare applications using the MapReduce and Hadoop frameworks

Methodologies and Applications

High-Performance Big-Data Analytics

Theory and Practice

From Data to Knowledge to Healthcare Improvement

Big Data Analytics in Healthcare

Applications of Big Data and Business Analytics in Management

This is a comprehensive, practical guide which looks at the advantages and limitations of new data analysis techniques being introduced across public health and administration services. The Affordable Care Act (ACT) and free market reforms in healthcare are generating a rapid change of pace. The "electronification" of medical records from paper to digital, which is required to meet the meaningful use standards set forth by the Act, is advancing what and how information can be analyzed. Coupled with the advent of more computing power and big data analytics and techniques, practitioners now more than ever need to stay on top of these trends. This book presents a comprehensive look at healthcare analytics from population data to geospatial analysis using current case studies and data analysis examples in health. This resource will appeal to undergraduate and graduate students in health administration and public health. It will benefit healthcare professionals and administrators in nursing and public health, as well as medical students who are interested in the future of data within healthcare.

With the amount of data in the world exploding, big data could generate significant value in the field of infectious disease. The increased use of social media provides an opportunity to improve public health surveillance systems and to develop predictive models. Advances in machine learning and crowdsourcing may also offer the possibility to gather information about disease dynamics, such as contact patterns and the impact of the social environment. New, rapid, point-of-care diagnostics may make it possible to capture not only diagnostic information but also other potentially epidemiologically relevant information in real time. With a wide range of data available for analysis, decision-making and policy-making processes could be improved. While there are many opportunities for big data to be used for infectious disease research, operations, and policy, many challenges remain before it is possible to capture the full potential of big data. In order to explore some of the opportunities and issues associated with the scientific, policy, and operational aspects of big data in relation to microbial threats and public health, the National Academies of Sciences, Engineering, and Medicine convened a workshop in May 2016. Participants discussed a range of topics including preventing, detecting, and responding to infectious disease threats using big data and related analytics; varieties of data (including demographic, geospatial, behavioral, syndromic, and laboratory) and their broader applications; means to improve their collection, processing, utility, and validation; and approaches that can be learned from other sectors to inform big data strategies for infectious disease research, operations, and policy. This publication summarizes the presentations and discussions from the workshop.

Exploratory data analysis helps to recognize natural patterns hidden in the data. This book describes the tools for hypothesis generation by visualizing data through graphical representation and provides insight into advanced analytics concepts in an easy way. The book addresses the complete data visualization technologies workflow, explores basic and high-level concepts of computer science and engineering in medical science, and provides an overview of the clinical scientific research areas that enables smart diagnosis equipment. It will discuss

techniques and tools used to explore large volumes of medical data and offers case studies that focus on the innovative technological upgradation and challenges faced today. The primary audience for the book includes specialists, researchers, graduates, designers, experts, physicians, and engineers who are doing research in this domain.

This book covers a wide range of topics on the role of Artificial Intelligence, Machine Learning, and Big Data for healthcare applications and deals with the ethical issues and concerns associated with it. This book explores the applications in different areas of healthcare and highlights the current research. "Big Data and Artificial Intelligence for Healthcare Applications" covers healthcare big data analytics, mobile health and personalized medicine, clinical trial data management and presents how Artificial Intelligence can be used for early disease diagnosis prediction and prognosis. It also offers some case studies that describes the application of Artificial Intelligence and Machine Learning in healthcare. Researchers, healthcare professionals, data scientists, systems engineers, students, programmers, clinicians, and policymakers will find this book of interest.

Smart Health Systems

Discovering, Analyzing, Visualizing and Presenting Data

Analytics in Healthcare and the Life Sciences

Big Data Analytics for Intelligent Healthcare Management

Demystifying Big Data, Machine Learning, and Deep Learning for Healthcare Analytics

A Perspective for Health Care

Healthcare transformation requires us to continually look at new and better ways to manage insights – both within and outside the organization today. Increasingly, the ability to glean and operationalize new insights efficiently as a byproduct of an organization's day-to-day operations is becoming vital to hospitals and health systems ability to survive and prosper. One of the long-standing challenges in healthcare informatics has been the ability to deal with the sheer variety and volume of disparate healthcare data and the increasing need to derive veracity and value out of it. Demystifying Big Data and Machine Learning for Healthcare investigates how healthcare organizations can leverage this tapestry of big data to discover new business value, use cases, and knowledge as well as how big data can be woven into pre-existing business intelligence and analytics efforts. This book focuses on teaching you how to: Develop skills needed to identify and demolish big-data myths Become an expert in separating hype from reality Understand the V's that matter in healthcare and why Harmonize the 4 C's across little and big data Choose data fidelity over data quality Learn how to apply the NRF Framework Master applied machine learning for healthcare Conduct a guided tour of learning algorithms Recognize and be prepared for the future of artificial intelligence in healthcare via best practices, feedback loops, and contextually intelligent agents (CIAs) The variety of data in healthcare spans multiple business workflows, formats (structured, un-, and semi-structured), integration at point of care/need, and integration with existing knowledge. In order to deal with these realities, the authors propose new approaches to creating a knowledge-driven learning organization-based on new and existing strategies, methods and technologies. This book will address the long-standing challenges in healthcare informatics and provide pragmatic recommendations on how to deal with them.

Healthcare Data Analytics and Management help readers disseminate cutting-edge research that delivers insights into the analytic tools, opportunities, novel strategies, techniques and challenges for handling big data, data analytics and management in healthcare. As the rapidly expanding and heterogeneous nature of healthcare data poses challenges for big data analytics, this book targets researchers and bioengineers from areas of machine learning, data mining, data management, and healthcare providers, along with clinical researchers and physicians who are interested in the management and analysis of healthcare data. Covers data analysis, management and security concepts and tools in the healthcare domain Highlights electronic medical health records and patient information records Discusses the different techniques to integrate Big data and Internet-of-Things in healthcare, including machine learning and data mining Includes multidisciplinary contributions in relation to healthcare applications and challenges

Big Data Analytics and Intelligence is essential reading for researchers and experts working in the fields of health care, data science, analytics, the internet of things, and information retrieval.

This comprehensive book focuses on better big-data security for healthcare organizations. Following an extensive introduction to the Internet of Things (IoT) in healthcare including challenging topics and scenarios, it offers an in-depth analysis of medical body area networks with the 5th generation of IoT communication technology along with its nanotechnology. It also describes a novel strategic framework and computationally intelligent model to measure possible security vulnerabilities in the context of e-health. Moreover, the book addresses healthcare systems that handle large volumes of data driven by patients' records and health/personal information, including big-data-based knowledge management systems to support clinical decisions. Several of the issues faced in storing/processing big data are presented along with the available tools, technologies and algorithms to deal with those problems as well as a case study in healthcare analytics. Addressing trust, privacy, and security issues as well as the

IoT and big-data challenges, the book highlights the advances in the field to guide engineers developing different IoT devices and evaluating the performance of different IoT techniques. Additionally, it explores the impact of such technologies on public, private, community, and hybrid scenarios in healthcare. This book offers professionals, scientists and engineers the latest technologies, techniques, and strategies for IoT and big data.

Knowledge Modelling and Big Data Analytics in Healthcare

A Roadmap for Usage and Exploitation of Big Data in Europe

Public Health Informatics and Information Systems

Data Science for Healthcare

New Horizons for a Data-Driven Economy

Internet of Things and Big Data Technologies for Next Generation Healthcare

Make healthcare analytics work: leverage its powerful opportunities for improving outcomes, cost, and efficiency. This book gives you the practical frameworks, strategies, tactics, and case studies you need to go beyond talk to action. The contributing healthcare analytics innovators survey the field's current state, present start-to-finish guidance for planning and implementation, and help decision-makers prepare for tomorrow's advances. They present in-depth case studies revealing how leading organizations have organized and executed analytic strategies that work, and fully cover the primary applications of analytics in all three sectors of the healthcare ecosystem: Provider, Payer, and Life Sciences. Co-published with the International Institute for Analytics (IIA), this book features the combined expertise of IIA's team of leading health analytics practitioners and researchers. Each chapter is written by a member of the IIA faculty, and bridges the latest research findings with proven best practices. This book will be valuable to professionals and decision-makers throughout the healthcare ecosystem, including provider organization clinicians and managers; life sciences researchers and practitioners; and informaticists, actuaries, and managers at payer organizations. It will also be valuable in diverse analytics, operations, and IT courses in business, engineering, and healthcare certificate programs.

Society is now completely driven by data with many industries relying on data to conduct business or basic functions within the organization. With the efficiencies that big data bring to all institutions, data is continuously being collected and analyzed. However, data sets may be too complex for traditional data-processing, and therefore, different strategies must evolve to solve the issue. The field of big data works as a valuable tool for many different industries. The Research Anthology on Big Data Analytics, Architectures, and Applications is a complete reference source on big data analytics that offers the latest, innovative architectures and frameworks and explores a variety of applications within various industries. Offering an international perspective, the applications discussed within this anthology feature global representation. Covering topics such as advertising curricula, driven supply chain, and smart cities, this research anthology is ideal for data scientists, data analysts, computer engineers, software engineers, technologists, government officials, managers, CEOs, professors, graduate students, researchers, and academicians.

This book presents a detailed review of high-performance computing infrastructures for next-generation big data and fast data analytics. Features: includes case studies and learning activities throughout the book and self-study exercises in every chapter; presents detailed case studies on social media analytics for intelligent businesses and on big data analytics (BDA) in the healthcare sector; describes the network infrastructure requirements for effective transfer of big data, and the storage infrastructure requirements of applications which generate big data; examines real-time analytics solutions; introduces in-database processing and in-memory analytics techniques for data mining; discusses the use of mainframes for handling real-time big data and the latest types of data management systems for BDA; provides information on the use of cluster, grid and cloud computing systems for BDA; reviews the peer-to-peer techniques and tools and the common information visualization techniques, used in BDA.

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.

Proceedings of a Workshop

Exploratory Data Analytics for Healthcare

Handbook of Data Science Approaches for Biomedical Engineering

Creating Clear and Compelling Visualizations to "See how You're Doing"

Big Data Analytics for Sustainable Computing

Techniques in healthcare computing using machine learning and Python

When data from all aspects of our lives can be relevant to our health - from our habits at the grocery store and our Google searches to our FitBit data and our medical records - can we really differentiate between big data and health big data? Will health big data be used for good, such as to improve drug safety, or ill, as in insurance discrimination? Will it disrupt health care (and the health care system) as we know it? Will it be possible to protect our health privacy? What barriers will there be to collecting and utilizing health big data? What role should law play, and what ethical concerns may arise? This timely, groundbreaking volume explores these questions and more from a variety of perspectives, examining how law promotes or discourages the use of big data in the health care sphere, and also what we can learn from other sectors.

The upcoming trends in healthcare are intended towards improving the overall quality of life. In the past, management of health issues were limited to clinics and hospitals and managing patient's data and analyzing it. This procedure was difficult and time consuming. A great effort was also needed in diagnosing the cause and type of disease, but this all has changed now. As advancement in research and technologies, a positive impact on healthcare is seen. This book assesses the need and era of smart healthcare and delivers content relevant to current age and time. It describes the trend, usage and practicality of IWMDs i.e. Wearable Medical Device or Sensors (WMSs) and Implantable Medical Devices (IMDs) and how they enhance the awareness of daily healthcare. It establishes a relation and conjunction of daily healthcare monitoring with clinical healthcare. A healthcare system is called smart when there is an ability to make decisions, which comes from data analytics. Smart healthcare systems possess capability of data analytics and IoT based services which can be implemented on smart phones using cloud technology. This book discusses various research trends and technologies related to innovations and advancements for smart healthcare systems. It also elaborates challenges, scope upcoming techniques, devices and future directions for smart healthcare systems. The proposed book would in particular benefit researchers interested in interdisciplinary sciences, It would also be of value to faculty, research communities, and researchers from diverse disciplines who aspire to create new and innovative research initiatives.

Big Data Analytics for Intelligent Healthcare Management covers both the theory and application of hardware platforms and architectures, the development of software methods, techniques and tools, applications and governance, and adoption strategies for the use of big data in healthcare and clinical research. The book provides the latest research findings on the use of big data analytics with statistical and machine learning techniques that analyze huge amounts of real-time healthcare data. Examines the methodology and requirements for development of big data architecture, big data modeling, big data as a service, big data analytics, and more Discusses big data applications for intelligent healthcare management, such as revenue management and pricing, predictive analytics/forecasting, big data integration for medical data, algorithms and techniques, etc. Covers the development of big data tools, such as data, web and text mining, data mining, optimization, machine learning, cloud in big data with Hadoop, big data in IoT, and more

Unique prospective on the big data analytics phenomenon for both business and IT professionals The availability of Big Data, low-cost commodity hardware and new information management and analytics software has produced a unique moment in the history of business. The convergence of these trends means that we have the capabilities required to analyze astonishing data sets quickly and cost-effectively for the first time in history. These capabilities are neither theoretical nor trivial. They represent a genuine leap forward and a clear opportunity to realize enormous gains in terms of efficiency, productivity, revenue and profitability. The Age of Big Data is here, and these are truly revolutionary times. This timely book looks at cutting-edge companies supporting an exciting new generation of business analytics. Learn more about the trends in big data and how they are impacting the business world (Risk, Marketing, Healthcare, Financial Services, etc.) Explains this new technology and how companies can use them effectively to gather the data that they need and glean critical insights Explores relevant topics such as data privacy, data visualization, unstructured data, crowd sourcing data scientists, cloud computing for big data, and much more.

Data Analytics in Biomedical Engineering and Healthcare

Emerging Business Intelligence and Analytic Trends for Today's Businesses

Big Data and Business Analytics

Big Data Analytics in Bioinformatics and Healthcare

Visualizing Health and Healthcare Data

Emerging Trends

Applications of Big Data and Business Analytics in Management uses advanced analytic tools to explore the solutions to problems in society, environment and industry. The chapters within bring together researchers, engineers and practitioners, encompassing a wide and diverse set of topics in almost every field.

Data Science and Big Data Analytics is about harnessing the power of data for new insights. The book covers the breadth of activities and methods and tools that Data Scientists use. The content focuses on concepts, principles and practical applications that are applicable to any industry and technology environment, and the learning is supported and explained with examples that you can replicate using open-source software. This book will help you: Become a contributor on a data science team Deploy a structured lifecycle approach to data analytics problems Apply appropriate analytic techniques and tools to analyzing big data Learn how to tell a compelling story with data to drive business action Prepare for EMC Proven Professional Data Science Certification Corresponding data sets are available from the book's page at Wiley which you can find on the Wiley site by searching for the ISBN 9781118876138. Get started discovering, analyzing, visualizing, and presenting data in a meaningful way today!

Features of statistical and operational research methods and tools being used to improve the healthcare industry With a focus on cutting-edge approaches to the quickly growing field of healthcare, Healthcare Analytics: From Data to Knowledge to Healthcare Improvement provides an integrated and comprehensive treatment on recent research advancements in data-driven healthcare analytics in an effort to provide more personalized and smarter healthcare services. Emphasizing data and healthcare analytics from an operational management and statistical perspective, the book details how analytical methods and tools can be utilized to enhance healthcare quality and operational efficiency. Organized into two main sections, Part I features biomedical and health informatics and specifically addresses the analytics of genomic and proteomic data; physiological signals from patient-monitoring systems; data uncertainty in clinical laboratory tests; predictive modeling; disease modeling for sepsis; and the design of cyber infrastructures for early prediction of epidemic events. Part II focuses on healthcare delivery systems, including system advances for transforming clinic workflow and patient care; macro analysis of patient flow distribution; intensive care units; primary care; demand and resource allocation; mathematical models for predicting patient readmission and postoperative outcome; physician-patient interactions; insurance claims; and the role of social media in healthcare. Healthcare Analytics: From Data to Knowledge to Healthcare Improvement also features:

- Contributions from well-known international experts who shed light on new approaches in this growing area
- Discussions on contemporary methods and techniques to address the handling of rich and large-scale healthcare data as well as the overall optimization of healthcare system operations
- Numerous real-world examples and case studies that emphasize the vast potential of statistical and operational research tools and techniques to address the big data environment within the healthcare industry
- Plentiful applications that showcase analytical methods and tools tailored for successful healthcare systems modeling and improvement

The book is an ideal reference for academics and practitioners in operations research, management science, applied mathematics, statistics, business, industrial and systems engineering, healthcare systems, and economics. Healthcare Analytics: From Data to Knowledge to Healthcare Improvement is also appropriate for graduate-level courses typically offered within operations research, industrial engineering, business, and public health departments.

Handbook of Data Science Approaches for Biomedical Engineering covers the research issues and concepts of biomedical engineering progress and the ways they are aligning with the latest technologies in IoT and big data. In addition, the book includes various real-time/offline medical applications that directly or indirectly rely on medical and information technology. Case studies in the field of medical science, i.e., biomedical engineering, computer science, information security, and interdisciplinary tools, along with modern tools and the technologies used are also included to enhance understanding. Today, the role of Big Data and IoT proves that ninety percent of data currently available has been generated in the last couple of years, with rapid increases happening every day. The reason for this growth is increasing in communication through electronic devices, sensors, web logs, global positioning system (GPS) data, mobile data, IoT, etc. Provides in-depth information about Biomedical Engineering with Big Data and Internet of Things Includes technical approaches for solving real-time healthcare problems and practical solutions through case studies in Big Data and Internet of Things Discusses big data applications for healthcare management, such as predictive analytics and forecasting, big data integration for medical data, algorithms and techniques to speed up the analysis of big medical

data, and more

Big Data and Health Analytics

A Practical Introduction

Healthcare Analytics

Big Data and Analytics

Innovative Healthcare Systems for the 21st Century

Early Detection of Neurological Disorders Using Machine Learning Systems

The only data visualization book written by and for health and healthcare professionals In health and healthcare, data and information are coming at organizations faster than they can consume and interpret it. Health providers, payers, public health departments, researchers, and health information technology groups know the ability to analyze and communicate this vast array of data in a clear and compelling manner is paramount to success. However, they simply cannot find experienced people with the necessary qualifications. The quickest (and often the only) route to meeting this challenge is to hire smart people and train them. *Data Visualization for Health and Healthcare Professionals* is a one-of-a-kind book for health and healthcare professionals to learn the best practices of data visualization specific to their field. This book provides a high-level summary of health and healthcare data, an overview of relevant visual intelligence research, strategies and techniques to gather requirements, and instruction on how to build strong teams with the expertise required to create dashboards and reports that people love to use. Clear and detailed explanations of data visualization best practices will help you understand the how and the why. Learn how to build beautiful and useful data products that deliver powerful analytics for the end user Follow along with examples of data visualization best practices, including table and graph design for health and healthcare data Avoid common mistakes in data visualization by learning why they do not work and better ways to display the data Written by a top leader in the field of health and healthcare data visualization, this book is an excellent resource for top management in healthcare, as well as entry-level to experienced data analysts in any health-related organization.

This revised edition covers all aspects of public health informatics and discusses the creation and management of an information technology infrastructure that is essential in linking state and local organizations in their efforts to gather data for the surveillance and prevention. Public health officials will have to understand basic principles of information resource management in order to make the appropriate technology choices that will guide the future of their organizations. Public health continues to be at the forefront of modern medicine, given the importance of implementing a population-based health approach and to addressing chronic health conditions. This book provides informatics principles and examples of practice in a public health context. In doing so, it clarifies the ways in which newer information technologies will improve individual and community health status. This book's primary purpose is to consolidate key information and promote a strategic approach to information systems and development, making it a resource for use by faculty and students of public health, as well as the practicing public health professional. Chapter highlights include: *The Governmental and Legislative Context of Informatics; Assessing the Value of Information Systems; Ethics, Information Technology, and Public Health; and Privacy, Confidentiality, and Security*. Review questions are featured at the end of every chapter. Aside from its use for public health professionals, the book will be used by schools of public health, clinical and public health nurses and students, schools of social work, allied health, and environmental sciences.

While doctors and physicians are more than capable of detecting diseases of the brain, the most agile human mind cannot compete with the processing power of modern technology. Utilizing algorithmic systems in healthcare in this way may provide a way to treat neurological diseases before they happen. *Early Detection of Neurological Disorders Using Machine Learning Systems* provides innovative insights into implementing smart systems to detect neurological diseases at a faster rate than by normal means. The topics included in this book are artificial intelligence, data analysis, and biomedical informatics. It is designed for clinicians, doctors, neurologists, physiotherapists, neurorehabilitation specialists, scholars, academics, and students interested in topics centered on biomedical engineering, bio-electronics, medical electronics, physiology, neurosciences, life sciences, and physics.

This book offers a practical introduction to healthcare analytics that does not require a background in data science or statistics. It presents the basics of data, analytics and tools and includes multiple examples of their applications in the field. The book also identifies practical challenges that fuel the need for analytics in healthcare as well as the solutions to address these problems. In the healthcare field, professionals have access to vast amount of data in the form of staff records, electronic patient record, clinical findings, diagnosis, prescription drug, medical imaging procedure, mobile health, resources available, etc. Managing the data and analyzing it to properly understand it and use it to make well-informed decisions can be a challenge for managers and health care professionals. A new generation of applications, sometimes referred to as end-user analytics or self-serve analytics, are specifically designed for non-technical users such as managers and business professionals. The ability to use these increasingly accessible tools with the abundant data requires a basic understanding of the core concepts of data, analytics, and interpretation of outcomes. This book is a resource for such

individuals to demystify and learn the basics of data management and analytics for healthcare, while also looking towards future directions in the field.

Big Data and Analytics for Infectious Disease Research, Operations, and Policy

Applications of Big Data in Healthcare

Research Anthology on Big Data Analytics, Architectures, and Applications

Healthcare Analytics Made Simple

Advances and Applications

Knowledge Modelling and Big Data Analytics in Healthcare: Advances and Applications focuses on automated analytical techniques for healthcare applications used to extract knowledge from a vast amount of data. It brings together a variety of different aspects of the healthcare system and aids in the decision-making processes for healthcare professionals. This book connects four contemporary areas of research rarely brought together in one book: artificial intelligence, big data and knowledge modelling, and healthcare. They present state-of-the-art research from the healthcare sector, including research on medical imaging, healthcare analysis, and the applications of artificial intelligence in drug discovery. This book is intended for data scientists, academicians, and industry professionals in the healthcare sector.

Artificial Intelligence and Big Data Analytics for Smart Healthcare serves as a key reference for practitioners and experts involved in healthcare as they strive to enhance the value added of healthcare and develop more sustainable healthcare systems. It brings together insights from emerging sophisticated information and communication technologies such as big data analytics, artificial intelligence, machine learning, data science, medical intelligence, and, by dwelling on their current and prospective applications, highlights managerial and policymaking challenges they may generate. The book is split into five sections: big data infrastructure, framework and design for smart healthcare; signal processing techniques for smart healthcare applications; business analytics (descriptive, diagnostic, predictive and prescriptive) for smart healthcare; emerging tools and techniques for smart healthcare; and challenges (security, privacy, and policy) in big data for smart healthcare. The content is carefully developed to be understandable to different members of healthcare chain to level up collaborations with researchers and industry. Presents a holistic discussion on the new landscape of data driven medical technologies including Big Data, Analytics, Artificial Intelligence, Machine Learning, and Precision Medicine Discusses emerging technologies with case study driven approach with reference to real world application and systems, to make easier understanding to the reader not familiar with them Encompasses an international collaboration perspective, providing understandable knowledge to professionals involved with healthcare to leverage productive partnerships with technology developers

This book presents the latest in decision-making tools, techniques, and solutions for policy makers to utilize in overcoming challenges faced by healthcare systems. With contributions from experts world-wide, an array of healthcare management models, techniques, and integrative solutions are presented, drawing on econometric, system dynamics, and agent-based models as well as state-of-the-art empirical studies. As total healthcare spending (both total expenditures on healthcare as a percentage of GDP and average spending on per capita) increases across most of the world's economies, healthcare systems continue to face challenges in terms of cost, quality, and access, as a result of its fragmented nature. Consequently, healthcare managers and policy makers require innovative integrative approaches and solutions to better manage complex, dynamic healthcare systems. This volume offers researchers and policy makers an insightful and critical review of the state of the art in healthcare modeling, with a particular focus on system dynamics, agent-based models, and modern empirical studies. This book will be of interest to those in the fields of health, business management, and information systems.

Demystifying Big Data, Machine Learning, and Deep Learning for Healthcare Analytics presents the changing world of data utilization, especially in clinical healthcare. Various techniques, methodologies, and algorithms are presented in this book to help organize data in a structured manner that will assist physicians in the care of patients and help biomedical engineers and computer scientists understand the impact of these techniques on healthcare analytics. The book is divided into two parts. Part 1 covers big data aspects such as healthcare decision support systems and analytics-related topics. Part 2 focuses on current frameworks and applications of deep learning and machine learning, and provides an outlook on future directions in research and development. The entire book takes a case study approach, providing a wealth of real-world case studies and application chapters to act as a foundational reference for biomedical engineers, computer scientists, healthcare researchers, and clinicians. Provides a comprehensive reference for biomedical engineers, computer scientists, advanced industry practitioners, researchers, and clinicians to understand and develop healthcare analytics using advanced tools and technologies Includes in-depth illustrations of advanced techniques via dataset samples, statistical tables, and graphs Unique case study approach provides readers with insights for practical clinical implementation

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