

Fraud Analytics Using Descriptive Predictive And Social Network Techniques A Guide To Data Science For Fraud Detection Wiley And Sas Business Series

Data Science and Machine Learning are in high demand, as customers are increasingly looking for ways to glean insights from all their data. More customers now realize that Business Intelligence is not enough as the volume, speed and complexity of data now defy traditional analytics tools. While Business Intelligence addresses descriptive and diagnostic analysis, Data Science unlocks new opportunities through predictive and prescriptive analysis. The purpose of this book is to provide a gentle and instructionally organized introduction to the field of data science and machine learning, with a focus on building and deploying predictive models. The book also provides a thorough overview of the Microsoft Azure Machine Learning service using task oriented descriptions and concrete end-to-end examples, sufficient to ensure the reader can immediately begin using this important new service. It describes all aspects of the service from data ingress to applying machine learning and evaluating the resulting model, to deploying the resulting model as a machine learning web service. Finally, this book attempts to have minimal dependencies, so that you can fairly easily pick and choose chapters to read. When dependencies do exist, they are listed at the start and end of the chapter. The simplicity of this new service from Microsoft will help to take Data Science and Machine Learning to a much broader audience than existing products in this space. Learn how you can quickly build and deploy sophisticated predictive models as machine learning web services with the new Azure Machine Learning service from Microsoft.

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

data science job candidates

The definitive, must-have guide for the forensic accounting professional Financial Forensics Body of Knowledge is the unique, innovative, and definitive guide and technical reference work for the financial forensics and/or forensic accounting professional, including nearly 300 forensic tools, techniques, methods and methodologies apply to virtually all civil, criminal and dispute matters. Many of the tools have never before been published. It defines the profession: "The Art & Science of Investigating People & Money." It defines Forensic Operators: "...financial forensics-capable personnel... possess unique and specific skills, knowledge, experience, education, training, and integrity to function in the financial forensics discipline." It defines why: "If you understand financial forensics you understand fraud, but not vice versa" by applying financial forensics to all aspects of the financial community. It contains a book-within-a-book Companion Section for financial valuation and litigation specialists. It defines foundational financial forensics/forensic accounting methodologies: FAIM, Forensic Accounting Investigation Methodology, ICE/SCORE, CICO, APD, forensic lexicology, and others. It contains a Reader Lookup Table that permits everyone in the financial community to immediately focus on the pertinent issues. Effectively implement comprehensive anti-money laundering regulations Handbook of Anti-Money Laundering details the most up-to-date regulations and provides practical guidance toward implementation. While most books focus on the regulations themselves, this useful guide goes further by explaining their meaning to bank operations, and how the rules apply to real-life scenarios. The international perspective provides a broader understanding of the anti-money laundering controls that are in place worldwide, with certain country-specific details discussed in-depth. Coverage includes the Wolfsberg Principles, Financial Action Task Force guidance, the U.S. Patriot Act, and the latest from both the EU and Bank for International Settlements. The IMF estimates that two to five per cent of the global GDP – \$590 billion to \$1.5 trillion – is laundered every year. Globally, banks and other financial institutions have been required to put in place specific arrangements to prevent and detect money laundering and the criminal activity that underlies it. This book provides the latest regulations and guidance toward application. Understand what money laundering regulations mean in practice Reference international and country-specific rules and regulations Get up to speed on the most current regulations and practices Implement the most effective anti-money laundering measures In response to the increased monitoring and regulation, money launderers have become more sophisticated at disguising the source of their funds. Financial institutions' employees must be ever more aware of what they're facing, and how to deal with it, making actionable guidance a critical companion to any regulatory information. For financial institutions seeking more thorough understanding and practical advice, the Handbook of Anti-Money Laundering is a comprehensive guide. Statistics and Health Care Fraud: How to Save Billions helps the public to

become more informed citizens through discussions of real world health care examples and fraud assessment applications. The author presents statistical and analytical methods used in health care fraud audits without requiring any mathematical background. The public suffers from health care overpayments either directly as patients or indirectly as taxpayers, and fraud analytics provides ways to handle the large size and complexity of these claims. The book starts with a brief overview of global healthcare systems such as U.S. Medicare. This is followed by a discussion of medical overpayments and assessment initiatives using a variety of real world examples. The book covers subjects as:

- Description and visualization of medical claims data
- Prediction of fraudulent transactions
- Detection of excessive billings
- Revealing new fraud patterns

Challenges and opportunities with health care fraud analytics Dr. Tahir Ekin is the Brandon Dee Roberts Associate Professor of Quantitative Methods in McCoy College of Business, Texas State University. His previous work experience includes a working as a statistician on health care fraud detection. His scholarly work on health care fraud has been published in a variety of academic journals including International Statistical Review, The American Statistician, and Applied Stochastic Models in Business and Industry. He is a recipient of the Texas State University 2018 Presidential Distinction Award in Scholar Activities and the ASA/NISS y-Bis 2016 Best Paper Awards. He has developed and taught courses in the areas of business statistics, optimization, data mining and analytics. Dr. Ekin also serves as Vice President of the International Society for Business and Industrial Statistics.

A powerful new tool for all forensic accountants, or anyone who analyzes data that may have been altered Benford's Law gives the expected patterns of the digits in the numbers in tabulated data such as town and city populations or Madoff's fictitious portfolio returns. Those digits, in unaltered data, will not occur in equal proportions; there is a large bias towards the lower digits, so much so that nearly one-half of all numbers are expected to start with the digits 1 or 2. These patterns were originally discovered by physicist Frank Benford in the early 1930s, and have since been found to apply to all tabulated data. Mark J. Nigrini has been a pioneer in applying Benford's Law to auditing and forensic accounting, even before his groundbreaking 1999 Journal of Accountancy article introducing this useful tool to the accounting world. In Benford's Law, Nigrini shows the widespread applicability of Benford's Law and its practical uses to detect fraud, errors, and other anomalies. Explores primary, associated, and advanced tests, all described with data sets that include corporate payments data and election data Includes ten fraud detection studies, including vendor fraud, payroll fraud, due diligence when purchasing a business, and tax evasion Covers financial statement fraud, with data from Enron, AIG, and companies that were the target of hedge fund short sales Looks at how to detect Ponzi schemes, including data on Madoff, Waxenberg, and more Examines many other applications, from the Clinton tax returns and the charitable gifts of Lehman

Brothers to tax evasion and number invention Benford's Law has 250 figures and uses 50 interesting authentic and fraudulent real-world data sets to explain both theory and practice, and concludes with an agenda and directions for future research. The companion website adds additional information and resources. The guide to targeting and leveraging business opportunities using big data & analytics By leveraging big data & analytics, businesses create the potential to better understand, manage, and strategically exploiting the complex dynamics of customer behavior. Analytics in a Big Data World reveals how to tap into the powerful tool of data analytics to create a strategic advantage and identify new business opportunities. Designed to be an accessible resource, this essential book does not include exhaustive coverage of all analytical techniques, instead focusing on analytics techniques that really provide added value in business environments. The book draws on author Bart Baesens' expertise on the topics of big data, analytics and its applications in e.g. credit risk, marketing, and fraud to provide a clear roadmap for organizations that want to use data analytics to their advantage, but need a good starting point. Baesens has conducted extensive research on big data, analytics, customer relationship management, web analytics, fraud detection, and credit risk management, and uses this experience to bring clarity to a complex topic. Includes numerous case studies on risk management, fraud detection, customer relationship management, and web analytics Offers the results of research and the author's personal experience in banking, retail, and government Contains an overview of the visionary ideas and current developments on the strategic use of analytics for business Covers the topic of data analytics in easy-to-understand terms without an undue emphasis on mathematics and the minutiae of statistical analysis For organizations looking to enhance their capabilities via data analytics, this resource is the go-to reference for leveraging data to enhance business capabilities.

Detect fraud earlier to mitigate loss and prevent cascading damage Fraud Analytics Using Descriptive, Predictive, and Social Network Techniques is an authoritative guidebook for setting up a comprehensive fraud detection analytics solution. Early detection is a key factor in mitigating fraud damage, but it involves more specialized techniques than detecting fraud at the more advanced stages. This invaluable guide details both the theory and technical aspects of these techniques, and provides expert insight into streamlining implementation. Coverage includes data gathering, preprocessing, model building, and post-implementation, with comprehensive guidance on various learning techniques and the data types utilized by each. These techniques are effective for fraud detection across industry boundaries, including applications in insurance fraud, credit card fraud, anti-money laundering, healthcare fraud, telecommunications fraud, click fraud, tax evasion, and more, giving you a highly practical framework for fraud prevention. It is estimated that a typical organization loses about 5% of its revenue to fraud every year. More effective fraud detection is possible, and this book describes the various analytical techniques your

organization must implement to put a stop to the revenue leak. Examine fraud patterns in historical data Utilize labeled, unlabeled, and networked data Detect fraud before the damage cascades Reduce losses, increase recovery, and tighten security The longer fraud is allowed to go on, the more harm it causes. It expands exponentially, sending ripples of damage throughout the organization, and becomes more and more complex to track, stop, and reverse. Fraud prevention relies on early and effective fraud detection, enabled by the techniques discussed here. Fraud Analytics Using Descriptive, Predictive, and Social Network Techniques helps you stop fraud in its tracks, and eliminate the opportunities for future occurrence.

Turn unstructured data into valuable business insight Unstructured Data Analytics provides an accessible, non-technical introduction to the analysis of unstructured data. Written by global experts in the analytics space, this book presents unstructured data analysis (UDA) concepts in a practical way, highlighting the broad scope of applications across industries, companies, and business functions. The discussion covers key aspects of UDA implementation, beginning with an explanation of the data and the information it provides, then moving into a holistic framework for implementation. Case studies show how real-world companies are leveraging UDA in security and customer management, and provide clear examples of both traditional business applications and newer, more innovative practices. Roughly 80 percent of today's data is unstructured in the form of emails, chats, social media, audio, and video. These data assets contain a wealth of valuable information that can be used to great advantage, but accessing that data in a meaningful way remains a challenge for many companies. This book provides the baseline knowledge and the practical understanding companies need to put this data to work. Supported by research with several industry leaders and packed with frontline stories from leading organizations such as Google, Amazon, Spotify, LinkedIn, Pfizer Manulife, AXA, Monster Worldwide, Under Armour, the Houston Rockets, DELL, IBM, and SAS Institute, this book provide a framework for building and implementing a successful UDA center of excellence. You will learn: How to increase Customer Acquisition and Customer Retention with UDA The Power of UDA for Fraud Detection and Prevention The Power of UDA in Human Capital Management & Human Resource The Power of UDA in Health Care and Medical Research The Power of UDA in National Security The Power of UDA in Legal Services The Power of UDA for product development The Power of UDA in Sports The future of UDA From small businesses to large multinational organizations, unstructured data provides the opportunity to gain consumer information straight from the source. Data is only as valuable as it is useful, and a robust, effective UDA strategy is the first step toward gaining the full advantage. Unstructured Data Analytics lays this space open for examination, and provides a solid framework for beginning meaningful analysis.

This first of three volumes on credit risk management, providing a thorough introduction to financial risk management and modelling.

Maximize profit and optimize decisions with advanced business analytics Profit-Driven Business Analytics provides actionable guidance on optimizing the use of data to add value and drive better business. Combining theoretical and technical insights into daily operations and long-term strategy, this book acts as a development manual for practitioners seeking to conceive, develop, and manage advanced analytical models. Detailed discussion delves into the wide range of analytical approaches and modeling techniques that can help maximize business payoff, and the author team draws upon their recent research to share deep insight about optimal strategy. Real-life case studies and examples illustrate these techniques at work, and provide clear guidance for implementation in your own organization. From step-by-step

instruction on data handling, to analytical fine-tuning, to evaluating results, this guide provides invaluable guidance for practitioners seeking to reap the advantages of true business analytics. Despite widespread discussion surrounding the value of data in decision making, few businesses have adopted advanced analytic techniques in any meaningful way. This book shows you how to delve deeper into the data and discover what it can do for your business. Reinforce basic analytics to maximize profits Adopt the tools and techniques of successful integration Implement more advanced analytics with a value-centric approach Fine-tune analytical information to optimize business decisions Both data stored and streamed has been increasing at an exponential rate, and failing to use it to the fullest advantage equates to leaving money on the table. From bolstering current efforts to implementing a full-scale analytics initiative, the vast majority of businesses will see greater profit by applying advanced methods. Profit-Driven Business Analytics provides a practical guidebook and reference for adopting real business analytics techniques.

Data Mining with R: Learning with Case Studies, Second Edition uses practical examples to illustrate the power of R and data mining. Providing an extensive update to the best-selling first edition, this new edition is divided into two parts. The first part will feature introductory material, including a new chapter that provides an introduction to data mining, to complement the already existing introduction to R. The second part includes case studies, and the new edition strongly revises the R code of the case studies making it more up-to-date with recent packages that have emerged in R. The book does not assume any prior knowledge about R. Readers who are new to R and data mining should be able to follow the case studies, and they are designed to be self-contained so the reader can start anywhere in the document. The book is accompanied by a set of freely available R source files that can be obtained at the book's web site. These files include all the code used in the case studies, and they facilitate the "do-it-yourself" approach followed in the book. Designed for users of data analysis tools, as well as researchers and developers, the book should be useful for anyone interested in entering the "world" of R and data mining. About the Author Luís Torgo is an associate professor in the Department of Computer Science at the University of Porto in Portugal. He teaches Data Mining in R in the NYU Stern School of Business' MS in Business Analytics program. An active researcher in machine learning and data mining for more than 20 years, Dr. Torgo is also a researcher in the Laboratory of Artificial Intelligence and Data Analysis (LIAAD) of INESC Porto LA.

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more complex to track, stop, and reverse. Fraud prevention relies on early and effective fraud detection, enabled by the techniques discussed here. Fraud Analytics Using Descriptive, Predictive, and Social Network Techniques helps you stop fraud in its tracks, and eliminate the opportunities for future occurrence.

Uncover hidden fraud and red flags using efficient data analytics Fraud Data Analytics Methodology addresses the need for clear, reliable fraud detection with a solid framework for a robust data analytic plan. By combining fraud risk assessment and fraud data analytics, you'll be able to better identify and respond to the risk of fraud in your audits. Proven techniques help you identify signs of fraud hidden deep within company databases, and strategic guidance demonstrates how to build data interrogation search routines into your fraud risk assessment to locate red flags and fraudulent transactions. These methodologies require no advanced software skills, and are easily implemented and integrated into any existing audit program. Professional standards now require all audits to include data analytics, and this informative guide shows you how to leverage this critical tool for recognizing fraud in today's core business systems. Fraud cannot be detected through audit unless the sample contains a fraudulent transaction. This book explores methodologies that allow you to locate transactions that should undergo audit testing. Locate hidden signs of fraud Build a holistic fraud data analytic plan Identify red flags that lead to fraudulent transactions Build efficient data interrogation into your audit plan Incorporating data analytics into your audit program is not about reinventing the wheel. A good auditor must make use of every tool available, and recent advances in analytics have made it accessible to everyone, at any level of IT proficiency. When the old methods are no longer sufficient, new tools are often the boost that brings exceptional results. Fraud Data Analytics Methodology gets you up to speed, with a brand new tool box for fraud detection. Proven guidance for expertly using analytics in fraud examinations, financial analysis, auditing and fraud prevention Fraud Analytics thoroughly reveals the elements of analysis that are used in today's fraud examinations, fraud investigations, and financial crime investigations. This valuable resource reviews the types of analysis that should be considered prior to beginning an investigation and explains how to optimally use data mining techniques to detect fraud. Packed with examples and sample cases illustrating pertinent concepts in practice, this book also explores the two major data analytics providers: ACL and IDEA. Looks at elements of analysis used in today's fraud examinations Reveals how to use data mining (fraud analytic) techniques to detect fraud Examines ACL and IDEA as indispensable tools for fraud detection Includes an abundance of sample cases and examples Written by Delena D Spann, Board of Regent (Emeritus) for the Association of Certified Fraud Examiners (ACFE), who currently serves as Advisory Board Member of the Association of Certified Fraud Examiners, Board Member of the Education Task Force of the Association of Certified Anti-Money Laundering Specialists ASIS International (Economic Crime Council) and Advisory Board Member of the Robert Morris University (School of Business), Fraud Analytics equips you with authoritative fraud analysis techniques you can put to use right away.

"Warranty Fraud Management provides practical guidelines that help companies save money through reduction of fraudulent warranty claims and overbilling. For a typical manufacturing company the warranty cost varies between 1-4% of sales, so warranty cost as such is an important factor. For companies with outsourced warranty service we have seen fraudulent claims and overpayments extending to over 50% of the total warranty cost. Warranty Fraud Management will highlight the methods of fraud, ways to uncover issues and the importance of continuous improvement of the controls to keep up with the continuously evolving misbehavior. On the other hand, setting-up too rigid controls or warranty terms can impact customer satisfaction and increases overall cost in the warranty chain. The book will increase general awareness of warranty fraud -- how fraud is done, the impact of the problem, typical symptoms and process gaps we have seen in diverse companies. Additionally, it will provide a

comprehensive framework for a solid warranty management capability -- there is no single silver bullet to tackle the problem but several areas need to be covered. The spectrum of warranty fraud is very wide, so the right type of actions also differs in different cases"-- Detailed tools and techniques for developing efficiency and effectiveness in forensic accounting Using Analytics to Detect Possible Fraud: Tools and Techniques is a practical overview of the first stage of forensic accounting, providing a common source of analytical techniques used for both efficiency and effectiveness in forensic accounting investigations. The book is written clearly so that those who do not have advanced mathematical skills will be able to understand the analytical tests and use the tests in a forensic accounting setting. It also includes case studies and visual techniques providing practical application of the analytical tests discussed. Shows how to develop both efficiency and effectiveness in forensic accounting Provides information in such a way that non-practitioners can easily understand Written in plain language: advanced mathematical skills are not required Features actual case studies using analytical tests Essential reading for every investor who wants to prevent financial fraud, Using Analytics to Detect Possible Fraud allows practitioners to focus on areas that require further investigative techniques and to unearth deceptive financial reporting before it's too late.

Payment fraud can be defined as an intentional deception or misrepresentation that is designed to result in an unauthorized benefit. Fraud schemes are becoming more complex and difficult to identify. It is estimated that industries lose nearly \$1 trillion USD annually because of fraud. The ideal solution is where you avoid making fraudulent payments without slowing down legitimate payments. This solution requires that you adopt a comprehensive fraud business architecture that applies predictive analytics. This IBM® Redbooks® publication begins with the business process flows of several industries, such as banking, property/casualty insurance, and tax revenue, where payment fraud is a significant problem. This book then shows how to incorporate technological advancements that help you move from a post-payment to pre-payment fraud detection architecture. Subsequent chapters describe a solution that is specific to the banking industry that can be easily extrapolated to other industries. This book describes the benefits of doing fraud detection on IBM System z®. This book is intended for financial decisionmakers, consultants, and architects, in addition to IT administrators.

Learn methods of data analysis and their application to real-world data sets This updated second edition serves as an introduction to data mining methods and models, including association rules, clustering, neural networks, logistic regression, and multivariate analysis. The authors apply a unified "white box" approach to data mining methods and models. This approach is designed to walk readers through the operations and nuances of the various methods, using small data sets, so readers can gain an insight into the inner workings of the method under review. Chapters provide readers with hands-on analysis problems, representing an opportunity for readers to apply their newly-acquired data mining expertise to solving real problems using large, real-world data sets. Data Mining and Predictive Analytics: Offers comprehensive coverage of association rules, clustering, neural networks, logistic regression, multivariate analysis, and R statistical programming language Features over 750 chapter exercises, allowing readers to assess their understanding of the new material Provides a detailed case study that brings together the lessons learned in the book Includes access to the companion website, www.dataminingconsultant.com, with exclusive password-protected instructor content Data Mining and Predictive Analytics will appeal to computer science and statistic students, as well as students in MBA programs, and chief executives.

In 2004, the Government Accountability Office provided a report detailing approximately 200 government-based data-mining projects. While there is comfort in knowing that there are many effective systems, that comfort isn't worth much unless we can determine that these systems are being effectively and responsibly employed. Written by one of the most respected

consultants in the area of data mining and security, *Data Mining for Intelligence, Fraud & Criminal Detection: Advanced Analytics & Information Sharing Technologies* reviews the tangible results produced by these systems and evaluates their effectiveness. While CSI-type shows may depict information sharing and analysis that are accomplished with the push of a button, this sort of proficiency is more fiction than reality. Going beyond a discussion of the various technologies, the author outlines the issues of information sharing and the effective interpretation of results, which are critical to any integrated homeland security effort. Organized into three main sections, the book fully examines and outlines the future of this field with an insider's perspective and a visionary's insight. Section 1 provides a fundamental understanding of the types of data that can be used in current systems. It covers approaches to analyzing data and clearly delineates how to connect the dots among different data elements. Section 2 provides real-world examples derived from actual operational systems to show how data is used, manipulated, and interpreted in domains involving human smuggling, money laundering, narcotics trafficking, and corporate fraud. Section 3 provides an overview of the many information-sharing systems, organizations, and task forces as well as data interchange formats. It also discusses optimal information-sharing and analytical architectures. Currently, there is very little published literature that truly defines real-world systems. Although politics and other factors all play into how much one agency is willing to support the sharing of its resources, many now embrace the wisdom of that path. This book will provide those individuals with an understanding of what approaches are currently available and how they can be most effectively employed.

Detect fraud faster—no matter how well hidden—with IDEA automation. *Fraud and Fraud Detection* takes an advanced approach to fraud management, providing step-by-step guidance on automating detection and forensics using CaseWare's IDEA software. The book begins by reviewing the major types of fraud, then details the specific computerized tests that can detect them. Readers will learn to use complex data analysis techniques, including automation scripts, allowing easier and more sensitive detection of anomalies that require further review. The companion website provides access to a demo version of IDEA, along with sample scripts that allow readers to immediately test the procedures from the book. Business systems' electronic databases have grown tremendously with the rise of big data, and will continue to increase at significant rates. Fraudulent transactions are easily hidden in these enormous datasets, but *Fraud and Fraud Detection* helps readers gain the data analytics skills that can bring these anomalies to light. Step-by-step instruction and practical advice provide the specific abilities that will enhance the audit and investigation process. Readers will learn to:

- Understand the different areas of fraud and their specific detection methods
- Identify anomalies and risk areas using computerized techniques
- Develop a step-by-step plan for detecting fraud through data analytics
- Utilize IDEA software to automate detection and identification procedures

The delineation of detection techniques for each type of fraud makes this book a must-have for students and new fraud prevention professionals, and the step-by-step guidance to automation and complex analytics will prove useful for even experienced examiners. With datasets growing exponentially, increasing both the speed and sensitivity of detection helps fraud professionals stay ahead of the game. *Fraud and Fraud Detection* is a guide to more efficient, more effective fraud identification.

Combine business sense, statistics, and computers in a new and intuitive way, thanks to Big Data. Predictive analytics is a branch of data mining that helps predict probabilities and trends. *Predictive Analytics For Dummies* explores the power of predictive analytics and how you can use it to make valuable predictions for your business, or in fields such as advertising, fraud detection, politics, and others. This practical book does not bog you down with loads of mathematical or scientific theory, but instead helps you quickly see how to use the right algorithms and tools to collect and analyze data and apply it to make predictions. Topics

include using structured and unstructured data, building models, creating a predictive analysis roadmap, setting realistic goals, budgeting, and much more. Shows readers how to use Big Data and data mining to discover patterns and make predictions for tech-savvy businesses Helps readers see how to shepherd predictive analytics projects through their companies Explains just enough of the science and math, but also focuses on practical issues such as protecting project budgets, making good presentations, and more Covers nuts-and-bolts topics including predictive analytics basics, using structured and unstructured data, data mining, and algorithms and techniques for analyzing data Also covers clustering, association, and statistical models; creating a predictive analytics roadmap; and applying predictions to the web, marketing, finance, health care, and elsewhere Propose, produce, and protect predictive analytics projects through your company with Predictive Analytics For Dummies.

Benford's law states that the leading digits of many data sets are not uniformly distributed from one through nine, but rather exhibit a profound bias. This bias is evident in everything from electricity bills and street addresses to stock prices, population numbers, mortality rates, and the lengths of rivers. Here, Steven Miller brings together many of the world's leading experts on Benford's law to demonstrate the many useful techniques that arise from the law, show how truly multidisciplinary it is, and encourage collaboration. Beginning with the general theory, the contributors explain the prevalence of the bias, highlighting explanations for when systems should and should not follow Benford's law and how quickly such behavior sets in. They go on to discuss important applications in disciplines ranging from accounting and economics to psychology and the natural sciences. The contributors describe how Benford's law has been successfully used to expose fraud in elections, medical tests, tax filings, and financial reports. Additionally, numerous problems, background materials, and technical details are available online to help instructors create courses around the book. Emphasizing common challenges and techniques across the disciplines, this accessible book shows how Benford's law can serve as a productive meeting ground for researchers and practitioners in diverse fields.

This book highlights cutting-edge research in the field of network science, offering scientists, researchers and graduate students a unique opportunity to catch up on the latest advances in theory and a multitude of applications. It presents the peer-reviewed proceedings of the fifth International Workshop on Complex Networks & their Applications (COMPLEX NETWORKS 2016), which took place in Milan during the last week of November 2016. The carefully selected papers are divided into 11 sections reflecting the diversity and richness of research areas in the field. More specifically, the following topics are covered: Network models; Network measures; Community structure; Network dynamics; Diffusion, epidemics and spreading processes; Resilience and control; Network visualization; Social and political networks; Networks in finance and economics; Biological and ecological networks; and Network analysis.

Discover how to detect fraud, biases, or errors in your data using Access or Excel With over 300 images, Forensic Analytics reviews and shows how twenty substantive and rigorous tests can be used to detect fraud, errors, estimates, or biases in your data. For each test, the original data is shown with the steps needed to get to the final result. The tests range from high-level data overviews to assess the reasonableness of data, to highly focused tests that give small samples of highly suspicious transactions. These tests are relevant to your organization, whether small or large, for profit, nonprofit, or government-related. Demonstrates how to use Access, Excel, and PowerPoint in a forensic setting Explores use of statistical techniques such as Benford's Law, descriptive statistics, correlation, and time-series analysis to detect fraud and errors Discusses the detection of financial statement fraud using various statistical

approaches Explains how to score locations, agents, customers, or employees for fraud risk Shows you how to become the data analytics expert in your organization Forensic Analytics shows how you can use Microsoft Access and Excel as your primary data interrogation tools to find exceptional, irregular, and anomalous records.

Utilize this easy-to-follow beginner's guide to understand how deep learning can be applied to the task of anomaly detection. Using Keras and PyTorch in Python, the book focuses on how various deep learning models can be applied to semi-supervised and unsupervised anomaly detection tasks. This book begins with an explanation of what anomaly detection is, what it is used for, and its importance. After covering statistical and traditional machine learning methods for anomaly detection using Scikit-Learn in Python, the book then provides an introduction to deep learning with details on how to build and train a deep learning model in both Keras and PyTorch before shifting the focus to applications of the following deep learning models to anomaly detection: various types of Autoencoders, Restricted Boltzmann Machines, RNNs & LSTMs, and Temporal Convolutional Networks. The book explores unsupervised and semi-supervised anomaly detection along with the basics of time series-based anomaly detection. By the end of the book you will have a thorough understanding of the basic task of anomaly detection as well as an assortment of methods to approach anomaly detection, ranging from traditional methods to deep learning. Additionally, you are introduced to Scikit-Learn and are able to create deep learning models in Keras and PyTorch. What You Will Learn Understand what anomaly detection is and why it is important in today's world Become familiar with statistical and traditional machine learning approaches to anomaly detection using Scikit-Learn Know the basics of deep learning in Python using Keras and PyTorch Be aware of basic data science concepts for measuring a model's performance: understand what AUC is, what precision and recall mean, and more Apply deep learning to semi-supervised and unsupervised anomaly detection Who This Book Is For Data scientists and machine learning engineers interested in learning the basics of deep learning applications in anomaly detection

If you've been tasked with building a team to handle risk management for online payments (RMP), this practical introduction provides a framework for choosing the technologies and personnel you need. Author and financial services executive Ohad Samet explains the components of payments risk management, and presents a coherent strategy and operational approach. You'll learn the answers to questions you're likely to encounter in the first 18 months of operation, with information that Samet has shaped and tested over several years in the industry. This book is ideal whether you intend to be a one-person task force or work with dozens of agents and analysts. Use both a portfolio and behavioral approach to analyzing and optimizing losses Learn about your customers to determine if they can and will meet obligations Build an RMP team for payment risk operations, analytics, and decision automation Use linking

mechanisms and velocity models to detect unusual activity among your customers Design system and data architecture to facilitate your activity analysis Implement the decision and loss-reduction mechanisms you need to act on your findings

Anti–Money Laundering in a Nutshell is a concise, accessible, and practical guide to compliance with anti–money laundering law for financial professionals, corporate investigators, business managers, and all personnel of financial institutions who are required, under penalty of hefty fines, to get anti–money laundering training. Money laundering is endemic. As much as 5 percent of global GDP (\$3.6 trillion) is laundered by criminals each year. It's no wonder that every financial institution in the United States—including banks, credit card companies, insurers, securities brokerages, private funds, and money service businesses—must comply with complex examination, training, and reporting requirements mandated by a welter of federal anti–money laundering (AML) laws. Ignorance of crime is no excuse before the law. Financial institutions and businesses that unknowingly serve as conduits for money laundering are no less liable to prosecution and fines than those that condone or abet it. In *Anti–Money Laundering in a Nutshell: Awareness and Compliance for Financial Personnel and Business Managers*, Kevin Sullivan draws on a distinguished career as an AML agent and consultant to teach personnel in financial institutions what money laundering is, who does it, how they do it, how to prevent it, how to detect it, and how to report it in compliance with federal law. He traces the dynamic interplay among employees, regulatory examiners, compliance officers, fraud and forensic accountants and technologists, criminal investigators, and prosecutors in following up on reports, catching launderers, and protecting the integrity and reputations of financial institutions and businesses. In particular, corporate investigators will gain rich insights winnowed from the author's experiences as a New York State and federal investigator.

"Mesmerizing & fascinating..." —The Seattle Post-Intelligencer "The Freakonomics of big data." —Stein Kretsinger, founding executive of Advertising.com Award-winning | Used by over 30 universities | Translated into 9 languages An introduction for everyone. In this rich, fascinating — surprisingly accessible — introduction, leading expert Eric Siegel reveals how predictive analytics (aka machine learning) works, and how it affects everyone every day. Rather than a "how to" for hands-on techies, the book serves lay readers and experts alike by covering new case studies and the latest state-of-the-art techniques. Prediction is booming. It reinvents industries and runs the world. Companies, governments, law enforcement, hospitals, and universities are seizing upon the power. These institutions predict whether you're going to click, buy, lie, or die. Why? For good reason: predicting human behavior combats risk, boosts sales, fortifies healthcare, streamlines manufacturing, conquers spam, optimizes social networks, toughens crime fighting, and wins elections. How? Prediction is powered by the world's most potent, flourishing unnatural resource: data.

Accumulated in large part as the by-product of routine tasks, data is the unsalted, flavorless residue deposited en masse as organizations churn away. Surprise! This heap of refuse is a gold mine. Big data embodies an extraordinary wealth of experience from which to learn. Predictive analytics (aka machine learning) unleashes the power of data. With this technology, the computer literally learns from data how to predict the future behavior of individuals. Perfect prediction is not possible, but putting odds on the future drives millions of decisions more effectively, determining whom to call, mail, investigate, incarcerate, set up on a date, or medicate. In this lucid, captivating introduction — now in its Revised and Updated edition — former Columbia University professor and Predictive Analytics World founder Eric Siegel reveals the power and perils of prediction: What type of mortgage risk Chase Bank predicted before the recession. Predicting which people will drop out of school, cancel a subscription, or get divorced before they even know it themselves. Why early retirement predicts a shorter life expectancy and vegetarians miss fewer flights. Five reasons why organizations predict death — including one health insurance company. How U.S. Bank and Obama for America calculated the way to most strongly persuade each individual. Why the NSA wants all your data: machine learning supercomputers to fight terrorism. How IBM's Watson computer used predictive modeling to answer questions and beat the human champs on TV's Jeopardy! How companies ascertain untold, private truths — how Target figures out you're pregnant and Hewlett-Packard deduces you're about to quit your job. How judges and parole boards rely on crime-predicting computers to decide how long convicts remain in prison. 182 examples from Airbnb, the BBC, Citibank, ConEd, Facebook, Ford, Google, the IRS, LinkedIn, Match.com, MTV, Netflix, PayPal, Pfizer, Spotify, Uber, UPS, Wikipedia, and more. How does predictive analytics work? This jam-packed book satisfies by demystifying the intriguing science under the hood. For future hands-on practitioners pursuing a career in the field, it sets a strong foundation, delivers the prerequisite knowledge, and whets your appetite for more. A truly omnipresent science, predictive analytics constantly affects our daily lives. Whether you are a consumer of it — or consumed by it — get a handle on the power of Predictive Analytics.

Stepped-up efforts to ferret out health care fraud have put every provider on the alert. The HHS, DOJ, state Medicaid Fraud Control Units, even the FBI is on the case -- and providers are in the hot seat! in this timely volume, you'll learn about the types of provider activities that fall under federal fraud and abuse prohibitions as defined in the Medicaid statute and Stark legislation. And you'll discover what goes into an effective corporate compliance program. With a growing number of restrictions, it's critical to know how you can and cannot conduct business and structure your relationships -- and what the consequences will be if you don't comply.

Forensic Accounting and Fraud Examination introduces students and professionals to the world of fraud detection and deterrence, providing a solid

foundation in core concepts and methods for both public and private sector environments. Aligned with the National Institute of Justice (NIJ) model curriculum, this text provides comprehensive and up-to-date coverage of asset misappropriation, corruption, fraud, and other topics a practicing forensic accountant encounters on a daily basis. A focus on real-world practicality employs current examples and engaging case studies to reinforce comprehension, while in-depth discussions clarify technical concepts in an easily relatable style. End of chapter material and integrated IDEA and Tableau software cases introduces students to the powerful, user-friendly tools accounting professionals use to maximize auditing and analytic capabilities, detect fraud, and comply with documentation requirements, and coverage of current methods and best practices provides immediate relevancy to real-world scenarios. Amidst increased demand for forensic accounting skills, even for entry-level accountants, this text equips students with the knowledge and skills they need to successfully engage in the field.

Ensemble methods have been called the most influential development in Data Mining and Machine Learning in the past decade. They combine multiple models into one usually more accurate than the best of its components. Ensembles can provide a critical boost to industrial challenges -- from investment timing to drug discovery, and fraud detection to recommendation systems -- where predictive accuracy is more vital than model interpretability. Ensembles are useful with all modeling algorithms, but this book focuses on decision trees to explain them most clearly. After describing trees and their strengths and weaknesses, the authors provide an overview of regularization -- today understood to be a key reason for the superior performance of modern ensembling algorithms. The book continues with a clear description of two recent developments: Importance Sampling (IS) and Rule Ensembles (RE). IS reveals classic ensemble methods -- bagging, random forests, and boosting -- to be special cases of a single algorithm, thereby showing how to improve their accuracy and speed. REs are linear rule models derived from decision tree ensembles. They are the most interpretable version of ensembles, which is essential to applications such as credit scoring and fault diagnosis. Lastly, the authors explain the paradox of how ensembles achieve greater accuracy on new data despite their (apparently much greater) complexity. This book is aimed at novice and advanced analytic researchers and practitioners -- especially in Engineering, Statistics, and Computer Science. Those with little exposure to ensembles will learn why and how to employ this breakthrough method, and advanced practitioners will gain insight into building even more powerful models. Throughout, snippets of code in R are provided to illustrate the algorithms described and to encourage the reader to try the techniques. The authors are industry experts in data mining and machine learning who are also adjunct professors and popular speakers. Although early pioneers in discovering and using ensembles, they here distill and clarify the recent groundbreaking work of leading academics (such as Jerome

Friedman) to bring the benefits of ensembles to practitioners. Table of Contents: Ensembles Discovered / Predictive Learning and Decision Trees / Model Complexity, Model Selection and Regularization / Importance Sampling and the Classic Ensemble Methods / Rule Ensembles and Interpretation Statistics / Ensemble Complexity

The second edition of a comprehensive introduction to machine learning approaches used in predictive data analytics, covering both theory and practice. Machine learning is often used to build predictive models by extracting patterns from large datasets. These models are used in predictive data analytics applications including price prediction, risk assessment, predicting customer behavior, and document classification. This introductory textbook offers a detailed and focused treatment of the most important machine learning approaches used in predictive data analytics, covering both theoretical concepts and practical applications. Technical and mathematical material is augmented with explanatory worked examples, and case studies illustrate the application of these models in the broader business context. This second edition covers recent developments in machine learning, especially in a new chapter on deep learning, and two new chapters that go beyond predictive analytics to cover unsupervised learning and reinforcement learning.

Learn how advances in technology can help curb bank fraud Fraud prevention specialists are grappling with ever-mounting quantities of data, but in today's volatile commercial environment, paying attention to that data is more important than ever. Bank Fraud provides a frank discussion of the attitudes, strategies, and—most importantly—the technology that specialists will need to combat fraud. Fraudulent activity may have increased over the years, but so has the field of data science and the results that can be achieved by applying the right principles, a necessary tool today for financial institutions to protect themselves and their clientele. This resource helps professionals in the financial services industry make the most of data intelligence and uncovers the applicable methods to strengthening defenses against fraudulent behavior. This in-depth treatment of the topic begins with a brief history of fraud detection in banking and definitions of key terms, then discusses the benefits of technology, data sharing, and analysis, along with other in-depth information, including: The challenges of fraud detection in a financial services environment The use of statistics, including effective ways to measure losses per account and ROI by product/initiative The Ten Commandments for tackling fraud and ways to build an effective model for fraud management Bank Fraud offers a compelling narrative that ultimately urges security and fraud prevention professionals to make the most of the data they have so painstakingly gathered. Such professionals shouldn't let their most important intellectual asset—data—go to waste. This book shows you just how to leverage data and the most up-to-date tools, technologies, and methods to thwart fraud at every turn. Master powerful statistical techniques for uncovering fraud or misrepresentation in complex financial data. The discipline of statistics has developed sophisticated, well-accepted approaches for identifying financial fraud and demonstrating that it is deliberate. Statistical Techniques for Forensic Accounting is the first comprehensive guide to these tools and techniques. Leading expert Dr. Saurav Dutta explains their mathematical underpinnings, shows how to use them properly, and guides you in communicating your findings to other interested and knowledgeable parties, or assessing others' analyses. Dutta is singularly well-qualified to write this book: he has been engaged as an expert in many of the world's highest-profile financial fraud cases, including Worldcom, Global Crossing, Cendant, and HealthSouth. Here, he covers everything professionals need to know to construct and conduct valid and defensible statistical tests, perform analyses, and interpret others' analyses. Coverage includes: exploratory data analysis to identify the "Fraud Triangle" and other red flags... data mining tools, usage, and limitations... statistical terms and methods applicable to forensic

accounting... relevant uncertainty and probability concepts... Bayesian analysis and networks... statistical inference, sampling, sample size, estimation, regression, correlation, classification, prediction, and much more. For all forensic accountants, auditors, investigators, and litigators involved with corporate financial reporting; and for all students interested in forensic accounting and related fields.

A timely look at effective use of social network analysis within the telecommunications industry to boost customer relationships The key to any successful company is the relationship that it builds with its customers. This book shows how social network analysis, analytics, and marketing knowledge can be combined to create a positive customer experience within the telecommunications industry. Reveals how telecommunications companies can effectively enhance their relationships with customers Provides the groundwork for defining social network analysis Defines the tools that can be used to address social network problems A must-read for any professionals eager to distinguish their products in the marketplace, this book shows you how to get it done right, with social network analysis.

Learn the art and science of predictive analytics — techniques that get results Predictive analytics is what translates big data into meaningful, usable business information. Written by a leading expert in the field, this guide examines the science of the underlying algorithms as well as the principles and best practices that govern the art of predictive analytics. It clearly explains the theory behind predictive analytics, teaches the methods, principles, and techniques for conducting predictive analytics projects, and offers tips and tricks that are essential for successful predictive modeling. Hands-on examples and case studies are included. The ability to successfully apply predictive analytics enables businesses to effectively interpret big data; essential for competition today This guide teaches not only the principles of predictive analytics, but also how to apply them to achieve real, pragmatic solutions Explains methods, principles, and techniques for conducting predictive analytics projects from start to finish Illustrates each technique with hands-on examples and includes as series of in-depth case studies that apply predictive analytics to common business scenarios A companion website provides all the data sets used to generate the examples as well as a free trial version of software Applied Predictive Analytics arms data and business analysts and business managers with the tools they need to interpret and capitalize on big data.

Fraud Analytics Using Descriptive, Predictive, and Social Network Techniques A Guide to Data Science for Fraud Detection John Wiley & Sons

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