

Visualization Analysis And Design Ak Peters Visualization Series

This is the first book that focuses entirely on the fundamental questions in visualization. Unlike other existing books in the field, it contains discussions that go far beyond individual visual representations and individual visualization algorithms. It offers a collection of investigative discourses that probe these questions from different perspectives, including concepts that help frame these questions and their potential answers, mathematical methods that underpin the scientific reasoning of these questions, empirical methods that facilitate the validation and falsification of potential answers, and case studies that stimulate hypotheses about potential answers while providing practical evidence for such hypotheses. Readers are not instructed to follow a specific theory, but their attention is brought to a broad range of schools of thoughts and different ways of investigating fundamental questions. As such, the book represents the by now most significant collective effort for gathering a large collection of discourses on the foundation of data visualization. Data visualization is a relatively young scientific discipline. Over the last three decades, a large collection of computer-supported visualization techniques have been developed, and the merits and benefits of using these techniques have been evidenced by numerous applications in practice. These technical advancements have given rise to the scientific curiosity about some fundamental questions such as why and how visualization works, when it is useful or effective and when it is not, what are the primary factors affecting its usefulness and effectiveness, and so on. This book signifies timely and exciting opportunities to answer such fundamental questions by building on the wealth of knowledge and experience

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accumulated in developing and deploying visualization technology in practice.

Lauded for its easy-to-understand, conversational discussion of the fundamentals of mediation, moderation, and conditional process analysis, this book has been fully revised with 50% new content, including sections on working with multicategorical antecedent variables, the use of PROCESS version 3 for SPSS and SAS for model estimation, and annotated PROCESS v3 outputs. Using the principles of ordinary least squares regression, Andrew F. Hayes carefully explains procedures for testing hypotheses about the conditions under and the mechanisms by which causal effects operate, as well as the moderation of such mechanisms. Hayes shows how to estimate and interpret direct, indirect, and conditional effects; probe and visualize interactions; test questions about moderated mediation; and report different types of analyses. Data for all the examples are available on the companion website (www.afhayes.com), along with links to download PROCESS. New to This Edition *Chapters on using each type of analysis with multicategorical antecedent variables. *Example analyses using PROCESS v3, with annotated outputs throughout the book. *More tips and advice, including new or revised discussions of formally testing moderation of a mechanism using the index of moderated mediation; effect size in mediation analysis; comparing conditional effects in models with more than one moderator; using R code for visualizing interactions; distinguishing between testing interaction and probing it; and more. *Rewritten Appendix A, which provides the only documentation of PROCESS v3, including 13 new preprogrammed models that combine moderation with serial mediation or parallel and serial mediation. *Appendix B, describing how to create customized models in PROCESS v3 or edit preprogrammed models.

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This book is a comprehensive introduction to visual computing, dealing with the modeling and synthesis of visual data by means of computers. What sets this book apart from other computer graphics texts is the integrated coverage of computer graphics and visualization topics, including important techniques such as subdivision and multi-resolution modeling, scene graphs, shadow generation, ambient occlusion, and scalar and vector data visualization. Students and practitioners will benefit from the comprehensive coverage of the principles that are the basic tools of their trade, from fundamental computer graphics and classic visualization techniques to advanced topics.

Build beautiful data visualizations with D3 The Fullstack D3 book is the complete guide to D3. With dozens of code examples showing each step, you can gain new insights into your data by creating visualizations. Learn how to quickly turn data into insights with D3 We have the data. But it needs to be understood by humans. The best way to convert this data into an understandable format is to mold it into a data visualization. And D3 is the best tool for job if you need to create custom data visualizations. With Fullstack D3 and Data Visualization you and your team will be able to share key insights, uncover problems before they start, and impress your boss by creating gorgeous visualizations. What's Inside Chapter 0: Introduction When would you want to use D3.js? There is a spectrum of libraries to create charts on the web: on one end, you have easy-to-use, basic libraries that will create a standard chart type. Chapter 1: Making your first chart In this chapter we make a line chart. Line charts are a great starting place because of their popularity, but also because of their simplicity. Chapter 2: Making a scatterplot When looking at the relationship between two metrics, a scatterplot is a good choice. In this chapter we show how to create a scatterplot. Chapter 3: Making a bar chart In this

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chapter we cover how to create a histogram, which is a bar chart that shows the distribution of one metric, with the metric values on the x axis and the frequency of values on the y axis. Chapter 4: Animations and Transitions When we update our charts, we can animate elements from their old to their new positions. These animations can be visually exciting, but more importantly, they have functional benefits. Chapter 5: Interactions The biggest advantage of creating charts with JavaScript is the ability to respond to user input. Chapter 6: Making a map Maps are also uniquely good at answering geography-based questions. In this chapter, we'll build a map and learn how to plot values within a location. Chapter 7: Data Visualization Basics Now that we're comfortable with how to create a chart, we should zoom out a bit and talk about what chart to create. Chapter 8: Common Charts In this chapter, we talk about common chart types and when to use them. Chapter 9: Dashboard Design A dashboard is any web interface that makes sense out of dynamic data, and in this chapter we learn how to make one. Chapter 10: Advanced Visualization: Marginal Histogram First, we'll focus on enhancing a chart we've already made: our scatter plot. This chart will have multiple goals, all exploring the daily temperature ranges in our weather dataset. Chapter 11: Advanced Visualization: Radial Weather Chart We talked about radar charts in Chapter 10. For this project, we'll build a more complex radar chart. Chapter 12: Advanced Visualization: Animated Sankey Diagram In this project, we'll be simulating real data and creating an animated diagram to engage our viewers. Chapter 13: D3 and React What's the best way to draw a chart within React? It turns out that there is a fair bit of overlap in functionality between a React and D3 - we'll discuss how we can create blazing fast charts using the two together. Chapter 14: D3 and Angular In this chapter we show how to create optimized SVG charts using D3 and

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Angular.

A new book for a new generation of engineering professionals, *Visualization, Modeling, and Graphics for Engineering Design* was written from the ground up to take a brand-new approach to graphic communication within the context of engineering design and creativity. With a blend of modern and traditional topics, this text recognizes how computer modeling techniques have changed the engineering design process. From this new perspective, the text is able to focus on the evolved design process, including the critical phases of creative thinking, product ideation, and advanced analysis techniques. Focusing on design and design communication rather than drafting techniques and standards, it goes beyond the what to explain the why of engineering graphics. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Visualizing the data is an essential part of any data analysis. Modern computing developments have led to big improvements in graphic capabilities and there are many new possibilities for data displays. This book gives an overview of modern data visualization methods, both in theory and practice. It details modern graphical tools such as mosaic plots, parallel coordinate plots, and linked views. Coverage also examines graphical methodology for particular areas of statistics, for example Bayesian analysis, genomic data and cluster analysis, as well software for graphics.

No matter what your actual job title, you are—or soon will be—a data worker. Every day, at work, home, and school, we are bombarded with vast amounts of free data collected and shared by everyone and everything from our co-workers to our calorie counters. In this highly anticipated follow-up to *The Functional Art*—Alberto Cairo's foundational guide to understanding information graphics and visualization—the

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respected data visualization professor explains in clear terms how to work with data, discover the stories hidden within, and share those stories with the world in the form of charts, maps, and infographics. In *The Truthful Art*, Cairo transforms elementary principles of data and scientific reasoning into tools that you can use in daily life to interpret data sets and extract stories from them. *The Truthful Art* explains:

- The role infographics and data visualization play in our world
- Basic principles of data and scientific reasoning that anyone can master
- How to become a better critical thinker
- Step-by-step processes that will help you evaluate any data visualization (including your own)
- How to create and use effective charts, graphs, and data maps to explain data to any audience

The Truthful Art is also packed with inspirational and educational real-world examples of data visualizations from such leading publications as *The New York Times*, *The Wall Street Journal*, *Estado de São Paulo* (Brazil), *Berliner Morgenpost* (Germany), and many more.

Linked Data (LD) is a well-established standard for publishing and managing structured information on the Web, gathering and bridging together knowledge from different scientific and commercial domains. The development of Linked Data Visualization techniques and tools has been adopted as the established practice for the analysis of this vast amount of information by data scientists, domain experts, business users, and citizens. This book covers a wide spectrum of visualization topics, providing an overview of the recent advances in this area, focusing on techniques, tools, and use cases of visualization and visual analysis of LD. It presents core concepts related to data visualization and LD technologies, techniques employed for data visualization based on the characteristics of data, techniques for Big Data visualization, tools and use cases in the LD context, and, finally, a thorough assessment of the usability of these tools

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under different scenarios. The purpose of this book is to offer a complete guide to the evolution of LD visualization for interested readers from any background and to empower them to get started with the visual analysis of such data. This book can serve as a course textbook or as a primer for all those interested in LD and data visualization.

Mobile Data Visualization is about facilitating access to and understanding of data on mobile devices. Wearable trackers, mobile phones, and tablets are used by millions of people each day to read weather maps, financial charts, or personal health meters. What is required to create effective visualizations for mobile devices? This book introduces key concepts of mobile data visualization and discusses opportunities and challenges from both research and practical perspectives. Mobile Data Visualization is the first book to provide an overview of how to effectively visualize, analyze, and communicate data on mobile devices. Drawing from the expertise, research, and experience of an international range of academics and practitioners from across the domains of Visualization, Human Computer Interaction, and Ubiquitous Computing, the book explores the challenges of mobile visualization and explains how it differs from traditional data visualization. It highlights opportunities for reaching new audiences with engaging, interactive, and compelling mobile content. In nine chapters, this book presents interesting perspectives on mobile data visualization including: how to characterize and classify mobile visualizations; how to interact with them while on the go and with limited attention spans; how to adapt them to various mobile contexts; specific methods on how to design and evaluate them; reflections on privacy, ethical and other challenges, as well as an outlook to a future of ubiquitous visualization. This accessible book is a valuable and rich resource for visualization designers, practitioners, researchers, and students alike.

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In *Data Sketches*, Nadieh Bremer and Shirley Wu document the deeply creative process behind 24 unique data visualization projects, and they combine this with powerful technical insights which reveal the mindset behind coding creatively. Exploring 12 different themes – from the Olympics to Presidents & Royals and from Movies to Myths & Legends – each pair of visualizations explores different technologies and forms, blurring the boundary between visualization as an exploratory tool and an artform in its own right. This beautiful book provides an intimate, behind-the-scenes account of all 24 projects and shares the authors' personal notes and drafts every step of the way. The book features: Detailed information on data gathering, sketching, and coding data visualizations for the web, with screenshots of works-in-progress and reproductions from the authors' notebooks Never-before-published technical write-ups, with beginner-friendly explanations of core data visualization concepts Practical lessons based on the data and design challenges overcome during each project Full-color pages, showcasing all 24 final data visualizations This book is perfect for anyone interested or working in data visualization and information design, and especially those who want to take their work to the next level and are inspired by unique and compelling data-driven storytelling.

Get complete instructions for manipulating,

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processing, cleaning, and crunching datasets in Python. Updated for Python 3.6, the second edition of this hands-on guide is packed with practical case studies that show you how to solve a broad set of data analysis problems effectively. You'll learn the latest versions of pandas, NumPy, IPython, and Jupyter in the process. Written by Wes McKinney, the creator of the Python pandas project, this book is a practical, modern introduction to data science tools in Python. It's ideal for analysts new to Python and for Python programmers new to data science and scientific computing. Data files and related material are available on GitHub. Use the IPython shell and Jupyter notebook for exploratory computing

Learn basic and advanced features in NumPy (Numerical Python)

Get started with data analysis tools in the pandas library

Use flexible tools to load, clean, transform, merge, and reshape data

Create informative visualizations with matplotlib

Apply the pandas groupby facility to slice, dice, and summarize datasets

Analyze and manipulate regular and irregular time series data

Learn how to solve real-world data analysis problems with thorough, detailed examples

Go beyond spreadsheets and tables and design a data presentation that really makes an impact. This practical guide shows you how to use Tableau Software to convert raw data into compelling data visualizations that provide insight or allow viewers to

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explore the data for themselves. Ideal for analysts, engineers, marketers, journalists, and researchers, this book describes the principles of communicating data and takes you on an in-depth tour of common visualization methods. You'll learn how to craft articulate and creative data visualizations with Tableau Desktop 8.1 and Tableau Public 8.1.

- Present comparisons of how much and how many
- Use blended data sources to create ratios and rates
- Create charts to depict proportions and percentages
- Visualize measures of mean, median, and mode
- Learn how to deal with variation and uncertainty
- Communicate multiple quantities in the same view
- Show how quantities and events change over time
- Use maps to communicate positional data
- Build dashboards to combine several visualizations

Now more than ever, content must be visual if it is to travel far. Readers everywhere are overwhelmed with a flow of data, news, and text. Visuals can cut through the noise and make it easier for readers to recognize and recall information. Yet many researchers were never taught how to present their work visually. This book details essential strategies to create more effective data visualizations.

Jonathan Schwabish walks readers through the steps of creating better graphs and how to move beyond simple line, bar, and pie charts. Through more than five hundred examples, he demonstrates the do's and don'ts of data visualization, the

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principles of visual perception, and how to make subjective style decisions around a chart's design. Schwabish surveys more than eighty visualization types, from histograms to horizon charts, ridgeline plots to choropleth maps, and explains how each has its place in the visual toolkit. It might seem intimidating, but everyone can learn how to create compelling, effective data visualizations. This book will guide you as you define your audience and goals, choose the graph that best fits for your data, and clearly communicate your message.

Although there are several good books on unsupervised machine learning, we felt that many of them are too theoretical. This book provides practical guide to cluster analysis, elegant visualization and interpretation. It contains 5 parts. Part I provides a quick introduction to R and presents required R packages, as well as, data formats and dissimilarity measures for cluster analysis and visualization. Part II covers partitioning clustering methods, which subdivide the data sets into a set of k groups, where k is the number of groups pre-specified by the analyst. Partitioning clustering approaches include: K-means, K-Medoids (PAM) and CLARA algorithms. In Part III, we consider hierarchical clustering method, which is an alternative approach to partitioning clustering. The result of hierarchical clustering is a tree-based representation of the objects called dendrogram. In this part, we describe how to

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compute, visualize, interpret and compare dendrograms. Part IV describes clustering validation and evaluation strategies, which consists of measuring the goodness of clustering results. Among the chapters covered here, there are: Assessing clustering tendency, Determining the optimal number of clusters, Cluster validation statistics, Choosing the best clustering algorithms and Computing p-value for hierarchical clustering. Part V presents advanced clustering methods, including: Hierarchical k-means clustering, Fuzzy clustering, Model-based clustering and Density-based clustering.

This new edition provides major revisions to a text that is suitable for the introduction to biomedical engineering technology course offered in a number of technical institutes and colleges in Canada and the US. Each chapter has been thoroughly updated with new photos and illustrations which depict the most modern equipment available in medical technology. This third edition includes new problem sets and examples, detailed block diagrams and schematics and new chapters on device technologies and information technology.

The fundamental mathematical tools needed to understand machine learning include linear algebra, analytic geometry, matrix decompositions, vector calculus, optimization, probability and statistics. These topics are traditionally taught in disparate

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courses, making it hard for data science or computer science students, or professionals, to efficiently learn the mathematics. This self-contained textbook bridges the gap between mathematical and machine learning texts, introducing the mathematical concepts with a minimum of prerequisites. It uses these concepts to derive four central machine learning methods: linear regression, principal component analysis, Gaussian mixture models and support vector machines. For students and others with a mathematical background, these derivations provide a starting point to machine learning texts. For those learning the mathematics for the first time, the methods help build intuition and practical experience with applying mathematical concepts. Every chapter includes worked examples and exercises to test understanding. Programming tutorials are offered on the book's web site. This book provides a practical introduction to analyzing ecological data using real data sets. The first part gives a largely non-mathematical introduction to data exploration, univariate methods (including GAM and mixed modeling techniques), multivariate analysis, time series analysis, and spatial statistics. The second part provides 17 case studies. The case studies include topics ranging from terrestrial ecology to marine biology and can be used as a template for a reader's own data analysis. Data from all case studies are available from

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www.highstat.com. Guidance on software is provided in the book.

Provides information on the methods of visualizing data on the Web, along with example projects and code.

Not only does almost everyone in the civilized world use a personal computer, smartphone, and/or tablet on a daily basis to communicate with others and access information, but virtually every other modern appliance, vehicle, or other device has one or more computers embedded inside it. One cannot purchase a current-model automobile, for example, without several computers on board to do everything from monitoring exhaust emissions, to operating the anti-lock brakes, to telling the transmission when to shift, and so on.

Appliances such as clothes washers and dryers, microwave ovens, refrigerators, etc. are almost all digitally controlled. Gaming consoles like Xbox, PlayStation, and Wii are powerful computer systems with enhanced capabilities for user interaction. Computers are everywhere, even when we don't see them as such, and it is more important than ever for students who will soon enter the workforce to understand how they work. This book is completely updated and revised for a one-semester upper level undergraduate course in Computer Architecture, and suitable for use in an undergraduate CS, EE, or CE curriculum at the junior or senior level. Students should have had a course(s) covering introductory topics in digital logic and computer organization. While this is not a text for a programming course, the reader should be familiar with computer

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programming concepts in at least one language such as C, C++, or Java. Previous courses in operating systems, assembly language, and/or systems programming would be helpful, but are not essential.

This book explores Information theory (IT) tools, which have become state of the art to solve and understand better many of the problems in visualization. This book covers all relevant literature up to date. It is the first book solely devoted to this subject, written by leading experts in the field.

Visualization Analysis and Design CRC Press

Designing a complete visualization system involves many subtle decisions. When designing a complex, real-world visualization system, such decisions involve many types of constraints, such as performance, platform (in)dependence, available programming languages and styles, user-interface toolkits, input/output data format constraints, integration with third-party code, and more. Focusing on those techniques and methods with the broadest applicability across fields, the second edition of *Data Visualization: Principles and Practice* provides a streamlined introduction to various visualization techniques. The book illustrates a wide variety of applications of data visualizations, illustrating the range of problems that can be tackled by such methods, and emphasizes the strong connections between visualization and related disciplines such as imaging and computer graphics. It covers a wide range of sub-topics in data visualization: data representation; visualization of scalar, vector, tensor, and volumetric data; image processing and domain modeling techniques; and

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information visualization. See What's New in the Second Edition: Additional visualization algorithms and techniques New examples of combined techniques for diffusion tensor imaging (DTI) visualization, illustrative fiber track rendering, and fiber bundling techniques Additional techniques for point-cloud reconstruction Additional advanced image segmentation algorithms Several important software systems and libraries Algorithmic and software design issues are illustrated throughout by (pseudo)code fragments written in the C++ programming language. Exercises covering the topics discussed in the book, as well as datasets and source code, are also provided as additional online resources.

Whether you have some experience with Tableau software or are just getting started, this manual goes beyond the basics to help you build compelling, interactive data visualization applications. Author Ryan Sleeper, one of the world's most qualified Tableau consultants, complements his web posts and instructional videos with this guide to give you a firm understanding of how to use Tableau to find valuable insights in data. Over five sections, Sleeper—recognized as a Tableau Zen Master, Tableau Public Visualization of the Year author, and Tableau Iron Viz

Champion—provides visualization tips, tutorials, and strategies to help you avoid the pitfalls and take your Tableau knowledge to the next level. Practical Tableau sections include: Fundamentals: get started with Tableau from the beginning Chart types: use step-by-step tutorials to build a variety of charts in Tableau Tips and

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tricks: learn innovative uses of parameters, color theory, how to make your Tableau workbooks run efficiently, and more Framework: explore the INSIGHT framework, a proprietary process for building Tableau dashboards Storytelling: learn tangible tactics for storytelling with data, including specific and actionable tips you can implement immediately

An Updated Guide to the Visualization of Data for Designers, Users, and Researchers Interactive Data Visualization: Foundations, Techniques, and Applications, Second Edition provides all the theory, details, and tools necessary to build visualizations and systems involving the visualization of data. In color throughout, it explains basic terminology and concepts, algorithmic and software engineering issues, and commonly used techniques and high-level algorithms. Full source code is provided for completing implementations. New to the Second Edition New related readings, exercises, and programming projects Better quality figures and numerous new figures New chapter on techniques for time-oriented data This popular book continues to explore the fundamental components of the visualization process, from the data to the human viewer. For developers, the book offers guidance on designing effective visualizations using methods derived from human perception, graphical design, art, and usability analysis. For practitioners, it shows how various public and commercial visualization systems are used to solve specific problems in diverse domains. For researchers, the text describes emerging technology and hot topics in development at academic and industrial centers today.

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Each chapter presents several types of exercises, including review questions and problems that motivate readers to build on the material covered and design alternate approaches to solving a problem. In addition, programming projects encourage readers to perform a range of tasks, from the simple implementation of algorithms to the extension of algorithms and programming techniques. Web Resource A supplementary website includes downloadable software tools and example data sets, enabling hands-on experience with the techniques covered in the text. The site also offers links to useful data repositories and data file formats, an up-to-date listing of software packages and vendors, and instructional tools, such as reading lists, lecture slides, and demonstration programs.

Our world is being revolutionized by data-driven methods: access to large amounts of data has generated new insights and opened exciting new opportunities in commerce, science, and computing applications. Processing the enormous quantities of data necessary for these advances requires large clusters, making distributed computing paradigms more crucial than ever. MapReduce is a programming model for expressing distributed computations on massive datasets and an execution framework for large-scale data processing on clusters of commodity servers. The programming model provides an easy-to-understand abstraction for designing scalable algorithms, while the execution framework transparently handles many system-level details, ranging from scheduling to synchronization to fault tolerance. This book focuses on MapReduce algorithm design, with

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an emphasis on text processing algorithms common in natural language processing, information retrieval, and machine learning. We introduce the notion of MapReduce design patterns, which represent general reusable solutions to commonly occurring problems across a variety of problem domains. This book not only intends to help the reader "think in MapReduce", but also discusses limitations of the programming model as well. This volume is a printed version of a work that appears in the Synthesis Digital Library of Engineering and Computer Science. Synthesis Lectures provide concise, original presentations of important research and development topics, published quickly, in digital and print formats. For more information visit www.morganclaypool.com

This book provides students with an in-depth understanding of the concepts, frameworks and processes used to analyze and present visual data for better decision-making. Expert contributors provide guidance in translating complex concepts from large data sets and how this translation drives management practice. The book's first part provides a descriptive consideration of state-of-the-art science in visual design. The second part complements the first with a rich set of cases and visual examples, illustrating development and best practice to provide students with real-world context. Through their presentation of modern scientific principles, the editors inspire structured discussions of audience and design, recognizing differences in need, bias and effective processes across contexts and stakeholders. This cutting-edge resource will be of value

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to students in business analytics, business communication and management science classes, who will learn to be capable managers through the effective and direct visual communication of data. Researchers and practitioners will also find this an engaging and informative book.

As computers proliferate and as the field of computer graphics matures, it has become increasingly important for computer scientists to understand how users perceive and interpret computer graphics. *Experimental Design: From User Studies to Psychophysics* is an accessible introduction to psychological experiments and experimental design, covering the major components in the design, execution, and analysis of perceptual studies. The book begins with an introduction to the concepts central to designing and understanding experiments, including developing a research question, setting conditions and controls, and balancing specificity with generality. The book then explores in detail a number of types of experimental tasks: free description, rating scales, forced-choice, specialized multiple choice, and real-world tasks as well as physiological studies. It discusses the advantages and disadvantages of each type and provides examples of that type of experiment from the authors' own work. The book also covers stimulus-related issues, including popular stimulus resources. It concludes with a thorough examination of statistical techniques for analyzing results, including methods specific to individual tasks.

Author Scott Murray teaches you the fundamental concepts and methods of D3, a JavaScript library that

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lets you express data visually in a web browser.

"This is a book about what the science of perception can tell us about visualization. There is a gold mine of information about how we see to be found in more than a century of work by vision researchers. The purpose of this book is to extract from that large body of research literature those design principles that apply to displaying information effectively"--

A guide to the practice of researching for graphic design projects. It explains key theories; examines the importance of audience, communication theory, semiotics and semantics.

Visualizing with Text uncovers the rich palette of text elements usable in visualizations from simple labels through to documents. Using a multidisciplinary research effort spanning across fields including visualization, typography, and cartography, it builds a solid foundation for the design space of text in visualization. The book illustrates many new kinds of visualizations, including microtext lines, skim formatting, and typographic sets that solve some of the shortcomings of well-known visualization techniques. Key features: More than 240 illustrations to aid inspiration of new visualizations Eight new approaches to data visualization leveraging text Quick reference guide for visualization with text Builds a solid foundation extending current visualization theory Bridges between visualization, typography, text analytics, and natural language processing The author website, including teaching exercises and interactive demos and code, can be found here. Designers, developers, and academics can use this book as a reference and

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inspiration for new approaches to visualization in any application that uses text.

For many researchers, Python is a first-class tool mainly because of its libraries for storing, manipulating, and gaining insight from data. Several resources exist for individual pieces of this data science stack, but only with the Python Data Science Handbook do you get them all—IPython, NumPy, Pandas, Matplotlib, Scikit-Learn, and other related tools. Working scientists and data crunchers familiar with reading and writing Python code will find this comprehensive desk reference ideal for tackling day-to-day issues: manipulating, transforming, and cleaning data; visualizing different types of data; and using data to build statistical or machine learning models. Quite simply, this is the must-have reference for scientific computing in Python. With this handbook, you'll learn how to use:

- IPython and Jupyter: provide computational environments for data scientists using Python
- NumPy: includes the ndarray for efficient storage and manipulation of dense data arrays in Python
- Pandas: features the DataFrame for efficient storage and manipulation of labeled/columnar data in Python
- Matplotlib: includes capabilities for a flexible range of data visualizations in Python
- Scikit-Learn: for efficient and clean Python implementations of the most important and established machine learning algorithms

Learn How to Design Effective Visualization Systems
Visualization Analysis and Design provides a systematic, comprehensive framework for thinking about visualization in terms of principles and design choices. The book features a unified approach encompassing

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information visualization techniques for abstract data, scientific visualization techniques for spatial data, and visual analytics techniques for interweaving data transformation and analysis with interactive visual exploration. It emphasizes the careful validation of effectiveness and the consideration of function before form. The book breaks down visualization design according to three questions: what data users need to see, why users need to carry out their tasks, and how the visual representations proposed can be constructed and manipulated. It walks readers through the use of space and color to visually encode data in a view, the trade-offs between changing a single view and using multiple linked views, and the ways to reduce the amount of data shown in each view. The book concludes with six case studies analyzed in detail with the full framework. The book is suitable for a broad set of readers, from beginners to more experienced visualization designers. It does not assume any previous experience in programming, mathematics, human–computer interaction, or graphic design and can be used in an introductory visualization course at the graduate or undergraduate level.

Master the art and science of data storytelling—with frameworks and techniques to help you craft compelling stories with data. The ability to effectively communicate with data is no longer a luxury in today’s economy; it is a necessity. Transforming data into visual communication is only one part of the picture. It is equally important to engage your audience with a narrative—to tell a story with the numbers. *Effective Data Storytelling* will teach you

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the essential skills necessary to communicate your insights through persuasive and memorable data stories. Narratives are more powerful than raw statistics, more enduring than pretty charts. When done correctly, data stories can influence decisions and drive change. Most other books focus only on data visualization while neglecting the powerful narrative and psychological aspects of telling stories with data. Author Brent Dykes shows you how to take the three central elements of data storytelling—data, narrative, and visuals—and combine them for maximum effectiveness. Taking a comprehensive look at all the elements of data storytelling, this unique book will enable you to:

Transform your insights and data visualizations into appealing, impactful data stories
Learn the fundamental elements of a data story and key audience drivers
Understand the differences between how the brain processes facts and narrative
Structure your findings as a data narrative, using a four-step storyboarding process
Incorporate the seven essential principles of better visual storytelling into your work
Avoid common data storytelling mistakes by learning from historical and modern examples

Effective Data Storytelling: How to Drive Change with Data, Narrative and Visuals is a must-have resource for anyone who communicates regularly with data, including business professionals, analysts, marketers, salespeople, financial managers, and educators.

The visualization process doesn't happen in a vacuum; it is grounded in principles and methodologies of design, cognition, perception, and human-computer-interaction

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that are combined to one's personal knowledge and creative experiences. Design for Information critically examines other design solutions —current and historic— helping you gain a larger understanding of how to solve specific problems. This book is designed to help you foster the development of a repertoire of existing methods and concepts to help you overcome design problems. Learn the ins and outs of data visualization with this informative book that provides you with a series of current visualization case studies. The visualizations discussed are analyzed for their design principles and methods, giving you valuable critical and analytical tools to further develop your design process. The case study format of this book is perfect for discussing the histories, theories and best practices in the field through real-world, effective visualizations. The selection represents a fraction of effective visualizations that we encounter in this burgeoning field, allowing you the opportunity to extend your study to other solutions in your specific field(s) of practice. This book is also helpful to students in other disciplines who are involved with visualizing information, such as those in the digital humanities and most of the sciences.

This book presents an accessible introduction to data-driven storytelling. Resulting from unique discussions between data visualization researchers and data journalists, it offers an integrated definition of the topic, presents vivid examples and patterns for data storytelling, and calls out key challenges and new opportunities for researchers and practitioners.

The two-volume set LNCS 10271 and 10272 constitutes the

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refereed proceedings of the 19th International Conference on Human-Computer Interaction, HCII 2017, held in Vancouver, BC, Canada, in July 2017. The total of 1228 papers presented at the 15 colocated HCII 2017 conferences was carefully reviewed and selected from 4340 submissions. The papers address the latest research and development efforts and highlight the human aspects of design and use of computing systems. They cover the entire field of Human-Computer Interaction, addressing major advances in knowledge and effective use of computers in a variety of application areas. The papers included in this volume cover the following topics: HCI theory and education; HCI, innovation and technology acceptance; interaction design and evaluation methods; user interface development; methods, tools, and architectures; multimodal interaction; and emotions in HCI.

This non-traditional introduction to the mathematics of scientific computation describes the principles behind the major methods, from statistics, applied mathematics, scientific visualization, and elsewhere, in a way that is accessible to a large part of the scientific community. Introductory material includes computational basics, a review of coordinate systems, an introduction to facets (planes and triangle meshes) and an introduction to computer graphics. The scientific computing part of the book covers topics in numerical linear algebra (basics, solving linear system, eigen-problems, SVD, and PCA) and numerical calculus (basics, data fitting, dynamic processes, root finding, and multivariate functions). The visualization component of the book is separated into three parts: empirical data, scalar values over 2D data, and volumes.

In the age of big data, being able to make sense of data is an important key to success. Interactive Visual Data Analysis advocates the synthesis of visualization, interaction, and

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automatic computation to facilitate insight generation and knowledge crystallization from large and complex data. The book provides a systematic and comprehensive overview of visual, interactive, and analytical methods. It introduces criteria for designing interactive visual data analysis solutions, discusses factors influencing the design, and examines the involved processes. The reader is made familiar with the basics of visual encoding and gets to know numerous visualization techniques for multivariate data, temporal data, geo-spatial data, and graph data. A dedicated chapter introduces general concepts for interacting with visualizations and illustrates how modern interaction technology can facilitate the visual data analysis in many ways. Addressing today's large and complex data, the book covers relevant automatic analytical computations to support the visual data analysis. The book also sheds light on advanced concepts for visualization in multi-display environments, user guidance during the data analysis, and progressive visual data analysis. The authors present a top-down perspective on interactive visual data analysis with a focus on concise and clean terminology. Many real-world examples and rich illustrations make the book accessible to a broad interdisciplinary audience from students, to experts in the field, to practitioners in data-intensive application domains.

Features: Dedicated to the synthesis of visual, interactive, and analysis methods
Systematic top-down view on visualization, interaction, and automatic analysis
Broad coverage of fundamental and advanced visualization techniques
Comprehensive chapter on interacting with visual representations
Extensive integration of automatic computational methods
Accessible portrayal of cutting-edge visual analytics technology
Foreword by Jack van Wijk

For more information, you can also visit the author website, where the book's figures will be made available under the CC BY

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One of the "six best books for data geeks" - Financial Times
With over 200 images and extensive how-to and how-not-to examples, this new edition has everything students and scholars need to understand and create effective data visualisations. Combining 'how to think' instruction with a 'how to produce' mentality, this book takes readers step-by-step through analysing, designing, and curating information into useful, impactful tools of communication. With this book and its extensive collection of online support, readers can: - Decide what visualisations work best for their data and their audience using the chart gallery - See data visualisation in action and learn the tools to try it themselves - Follow online checklists, tutorials, and exercises to build skills and confidence - Get advice from the UK's leading data visualisation trainer on everything from getting started to honing the craft. Explore more resources about data visualisation and Andy Kirk.

You have a mound of data front of you and a suite of computation tools at your disposal. Which parts of the data actually matter? Where is the insight hiding? If you're a data scientist trying to navigate the murky space between data and insight, this practical book shows you how to make sense of your data through high-level questions, well-defined data analysis tasks, and visualizations to clarify understanding and gain insights along the way. When incorporated into the process early and often, iterative visualization can help you refine the questions you ask of your data. Authors Danyel Fisher and Miriah Meyer provide detailed case studies that demonstrate how this process can evolve in the real world. You'll learn: The data counseling process for moving from general to more precise questions about your data, and arriving at a working visualization The role that visual representations play in data discovery Common visualization

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types by the tasks they fulfill and the data they use
Visualization techniques that use multiple views and
interaction to support analysis of large, complex data sets

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