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Statistics Machine Learning

Data Analysis

Statistics

Machine Learning

*If you are looking to master the
fundamental concepts of Data*

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Analysis and Data Science driven by the Python programming language to develop a solid understanding of all the latest innovative technologies, then this is just that one comprehensive book you have been waiting for. If you are

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looking to learn how to write effective and efficient codes in Python and master this extremely intuitive and flexible programming language that can be used for a variety of coding projects including machine learning algorithms, web

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applications, data mining and visualization, game development. Then this is just the book that you need. Some of the highlights of this book include: What the Python language is all about and how we are able to utilize it to get a lot of

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coding done. A look at the data analysis and how we can benefit, no matter what industry we are. How Python is able to work well with the data analysis and why it is the number one language to help you handle this. A look at some of the

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steps that we are able to utilize when it comes to our data analysis so we can get it all done the right way. How to install and use the NumPy library, one of the best extensions with Python, to help us get our data analysis done. How to

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work with the Pandas and IPython extensions so that we are able to get things done with your analysis. The practical uses of the data analysis to help you get it done. A look at the Matplotlib library to help you create some of your own

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visuals with your data when the analysis is done. How to work with data visuals and how they are so important to your work. The five major stages of the TDSP lifecycle that outline the interactive steps required for project execution along

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with the deliverables created at each stage. Installation instructions for Python so you can download and install Python on your operating system and get hands-on coding experience. Python coding concepts such as data types,

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classes, and objects variables, numbers, constructor functions, Booleans and much more. Learn the functioning of various data science libraries like Scikit-Learn, which has evolved as the gold standard for machine learning and

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data analysis. Deep dive into the Matplotlib library, which offers visualization tools and science computing modules supported by SciPy and learn how to create various graphs using Matplotlib and Pandas library. Learn how machine

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learning allows analysis of large volumes of data and delivers faster and more accurate results.

Overview of four different machine-learning algorithms that can be used to cater to the available data set and create a desired machine-

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learning model. Learn how companies are able to employ a predictive analytics model to gain an understanding of customer interactions with their products or services based on customer's feelings or emotions shared on the

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social media platforms. All industries are able to benefit when it comes to working with data analysis and seeing some of the results that you would like. It is not always easy, and it is something that takes longer than many companies are prepared.

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However, when you are able to put it all together, and you work with the Python language to get it done, you will find that it can provide you with some insights that are invaluable. When you are ready to learn how to complete your own Python data

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analysis and Python data science, make sure to check out this guidebook to help you get started. Even if you have never studied Python language before, you can learn it quickly. So what are you waiting for? Go to the top of the

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page and click Buy Now

The second edition of a bestseller, Statistical and Machine-Learning Data Mining: Techniques for Better Predictive Modeling and Analysis of Big Data is still the only book, to date, to distinguish between

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statistical data mining and machine-learning data mining. The first edition, titled Statistical Modeling and Analysis for Database Marketing: Effective Techniques for Mining Big Data, contained 17 chapters of innovative and practical

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statistical data mining techniques. In this second edition, renamed to reflect the increased coverage of machine-learning data mining techniques, the author has completely revised, reorganized, and repositioned the original

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chapters and produced 14 new chapters of creative and useful machine-learning data mining techniques. In sum, the 31 chapters of simple yet insightful quantitative techniques make this book unique in the field of data mining literature.

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The statistical data mining methods effectively consider big data for identifying structures (variables) with the appropriate predictive power in order to yield reliable and robust large-scale statistical models and analyses. In contrast, the

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author's own GenIQ Model provides machine-learning solutions to common and virtually unapproachable statistical problems. GenIQ makes this possible — its utilitarian data mining features start where statistical data

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mining stops. This book contains essays offering detailed background, discussion, and illustration of specific methods for solving the most commonly experienced problems in predictive modeling and analysis of big data.

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They address each methodology and assign its application to a specific type of problem. To better ground readers, the book provides an in-depth discussion of the basic methodologies of predictive modeling and analysis. While this

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type of overview has been attempted before, this approach offers a truly nitty-gritty, step-by-step method that both tyros and experts in the field can enjoy playing with. An Introduction to Statistical Learning provides an accessible

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overview of the field of statistical learning, an essential toolset for making sense of the vast and complex data sets that have emerged in fields ranging from biology to finance to marketing to astrophysics in the past twenty

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years. This book presents some of the most important modeling and prediction techniques, along with relevant applications. Topics include linear regression, classification, resampling methods, shrinkage approaches, tree-based

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methods, support vector machines, clustering, and more. Color graphics and real-world examples are used to illustrate the methods presented. Since the goal of this textbook is to facilitate the use of these statistical learning techniques

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by practitioners in science, industry, and other fields, each chapter contains a tutorial on implementing the analyses and methods presented in R, an extremely popular open source statistical software platform. Two of the

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authors co-wrote The Elements of Statistical Learning (Hastie, Tibshirani and Friedman, 2nd edition 2009), a popular reference book for statistics and machine learning researchers. An Introduction to Statistical Learning

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covers many of the same topics, but at a level accessible to a much broader audience. This book is targeted at statisticians and non-statisticians alike who wish to use cutting-edge statistical learning techniques to analyze their data.

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The text assumes only a previous course in linear regression and no knowledge of matrix algebra.

Did you know that the value of data usage has increased job opportunities, but that there are few specialists? These days, everyone

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is aware of the role that data can play, whether it is an election, business or education. But how can you start working in a wide interdisciplinary field that is occupied with so much hype? This book, Data Science: What the Best

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Data Scientists Know About Data Analytics, Data Mining, Statistics, Machine Learning, and Big Data - That You Don't, presents you with a step-by-step approach to Data Science as well as secrets only known by the best Data Scientists. It

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combines analytical engineering, Machine Learning, Big Data, Data Mining, and Statistics in an easy to read and digest method. Data gathered from scientific measurements, customers, IoT sensors, and so on is very important

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only when one can draw meaning from it. Data Scientists are professionals that help disclose interesting and rewarding challenges of exploring, observing, analyzing, and interpreting data. To do that, they apply special

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techniques that help them discover the meaning of data. Becoming the best Data Scientist is more than just mastering analytic tools and techniques. The real deal lies in the way you apply your creative ability like expert Data Scientists. This

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*book will help you discover that and
get you there. The goal with Data
Science: What the Best Data
Scientists Know About Data
Analytics, Data Mining, Statistics,
Machine Learning, and Big Data -
That You Don't is to help you*

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expand your skills from being a basic Data Scientist to becoming an expert Data Scientist ready to solve real-world data centric issues. At the end of this book, you will learn how to combine Machine Learning, Data Mining, analytics, and

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programming, and extract real knowledge from data. As you read, you will discover important statistical techniques and algorithms that are helpful in learning Data Science. When you have finished, you will have a strong foundation to

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*help you explore many other fields related to Data Science. This book will discuss the following topics:
What Data Science is What it takes to become an expert in Data Science Best Data Mining techniques to apply in data Data*

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*visualization Logistic regression
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Machine Learning and Data*

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*Introduction to Statistical and
Machine Learning Methods for Data
Science*

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As telescopes, detectors, and computers grow ever more powerful, the volume of data at the disposal of astronomers and astrophysicists will enter the

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petabyte domain, providing accurate measurements for billions of celestial objects. This book provides a comprehensive and accessible introduction to the cutting-edge statistical

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**methods needed to
efficiently analyze complex
data sets from astronomical
surveys such as the
Panoramic Survey Telescope
and Rapid Response System,
the Dark Energy Survey, and**

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**the upcoming Large
Synoptic Survey Telescope.
It serves as a practical
handbook for graduate
students and advanced
undergraduates in physics
and astronomy, and as an**

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**indispensable reference for
researchers. Statistics, Data
Mining, and Machine
Learning in Astronomy
presents a wealth of
practical analysis problems,
evaluates techniques for**

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**solving them, and explains
how to use various
approaches for different
types and sizes of data sets.
For all applications
described in the book,
Python code and example**

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data sets are provided. The supporting data sets have been carefully selected from contemporary astronomical surveys (for example, the Sloan Digital Sky Survey) and are easy to download

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and use. The accompanying Python code is publicly available, well documented, and follows uniform coding standards. Together, the data sets and code enable readers to reproduce all the

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**figures and examples,
evaluate the methods, and
adapt them to their own
fields of interest. Describes
the most useful statistical
and data-mining methods for
extracting knowledge from**

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astronomical data sets
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from contemporary
astronomical surveys Uses a
freely available Python
codebase throughout Ideal**

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**for students and working
astronomers**

**A practical guide that will
help you understand the
Statistical Foundations of
any Machine Learning
Problem KEY FEATURES ●**

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**Develop a Conceptual and
Mathematical understanding
of Statistics ● Get an
overview of Statistical
Applications in Python ●
Learn how to perform
Hypothesis testing in**

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**Statistics ● Understand why
Statistics is important in
Machine Learning ● Learn
how to process data in
Python DESCRIPTION This
book talks about Statistical
concepts in detail, with its**

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applications in Python. The book starts with an introduction to Statistics and moves on to cover some basic Descriptive Statistics concepts such as mean, median, mode, etc. You will

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then explore the concept of Probability and look at different types of Probability Distributions. Next, you will look at parameter estimations for the unknown parameters present in the

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**population and look at
Random Variables in detail,
which are used to save the
results of an experiment in
Statistics. You will then
explore one of the most
important fields in Statistics**

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- Hypothesis Testing, and then explore various types of tests used to check our hypothesis. The last part of our book will focus on how you can process data using Python, some elements of

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**Non-parametric statistics,
and finally, some
introduction to Machine
Learning. WHAT YOU WILL
LEARN ● Understand the
basics of Statistics ● Get to
know more about Descriptive**

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Statistics ● Understand and learn advanced Statistics techniques ● Learn how to apply Statistical concepts in Python ● Understand important Python packages for Statistics and Machine

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**Learning WHO THIS BOOK
IS FOR This book is for
anyone who wants to
understand Statistics and its
use in Machine Learning.
This book will help you
understand the Mathematics**

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**behind the Statistical
concepts and the
applications using the
Python language. Having a
working knowledge of the
Python language is a
prerequisite. TABLE OF**

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CONTENTS 1. Introduction
to Statistics 2. Descriptive
Statistics 3. Probability 4.
Random Variables 5.
Parameter Estimations 6.
Hypothesis Testing 7.
Analysis of Variance 8.

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**Regression 9. Non
Parametric Statistics 10.
Data Analysis using Python
11. Introduction to Machine
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Data Analytics, Statistics
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**Python with many Examples
and Real World Applications
for Financial Data Analytics,
Text and Image Processing,
Stock Return Prediction with
News, House Price
Modeling, Face Recognition**

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Exploratory Data Analytics -
Equality and Performance
Measurement - Text and
Image Processing -
Stochastic and Probability**

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Learning - Parameter
Estimation - Statistical Tests
- Bayesian Statistics -
Regression - Regression
Diagnostics - Analysis of
Variance (ANOVA) -**

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- Workflow - Feature
Engineering - Learning,
Validation and Prediction -
Under- and Overfit - Train-**

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Hyperparameter tuning -
Supervised Machine
Learning for Regression and
Classification- K-Nearest
Neighbors - Decision Trees -
Bootstrapping - Bagging -**

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**Random Forests - Boosting -
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Clustering - Principal
Components Analysis -
Fallacies**
Carry out a variety of

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advanced statistical analyses including generalized additive models, mixed effects models, multiple imputation, machine learning, and missing data techniques using R. Each

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**chapter starts with
conceptual background
information about the
techniques, includes
multiple examples using R to
achieve results, and
concludes with a case study.**

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Written by Matt and Joshua F. Wiley, Advanced R Statistical Programming and Data Models shows you how to conduct data analysis using the popular R language. You'll delve into

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the preconditions or hypothesis for various statistical tests and techniques and work through concrete examples using R for a variety of these next-level analytics. This is a

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**must-have guide and
reference on using and
programming with the R
language. What You'll
Learn**Conduct advanced
analyses in R including:
generalized linear models,

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**generalized additive models,
mixed effects models,
machine learning, and
parallel processing Carry out
regression modeling using R
data visualization, linear and
advanced regression,**

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**additive models, survival /
time to event analysis
Handle machine learning
using R including parallel
processing, dimension
reduction, and feature
selection and classification**

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**Address missing data using
multiple imputation in R
Work on factor analysis,
generalized linear mixed
models, and modeling
intraindividual variability
Who This Book Is For**

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**Working professionals,
researchers, or students who
are familiar with R and basic
statistical techniques such
as linear regression and who
want to learn how to use R
to perform more advanced**

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analytics. Particularly, researchers and data analysts in the social sciences may benefit from these techniques.

Additionally, analysts who need parallel processing to

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**speed up analytics are given
proven code to reduce time
to result(s).**

**Gene Expression Data
Analysis
Statistical Foundations of
Data Science**

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**Practical Statistics for Data
Scientists**

**Data Analytics II
Methodologies and
Applications**

**This Book Includes: Python
for Data Analysis and**

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**Science with Big Data
Analysis, Statistics and
Machine Learning.
Data Analytics,
Computational Statistics,
and Operations Research for
Engineers**

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Build Machine Learning models with a sound statistical understanding. About This Book Learn about the statistics behind powerful predictive models with p-value, ANOVA, and F-statistics. Implement statistical computations programmatically for supervised and unsupervised learning

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through K-means clustering. Master the statistical aspect of Machine Learning with the help of this example-rich guide to R and Python. Who This Book Is For This book is intended for developers with little to no background in statistics, who want to implement Machine Learning in

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their systems. Some programming knowledge in R or Python will be useful. What You Will Learn

- Understand the Statistical and Machine Learning fundamentals necessary to build models
- Understand the major differences and parallels between the statistical way

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and the Machine Learning way to solve problems Learn how to prepare data and feed models by using the appropriate Machine Learning algorithms from the more-than-adequate R and Python packages Analyze the results and tune the model appropriately to your own

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predictive goals Understand the concepts of required statistics for Machine Learning Introduce yourself to necessary fundamentals required for building supervised & unsupervised deep learning models Learn reinforcement learning and its application in the field of artificial

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intelligence domain In Detail Complex statistics in Machine Learning worry a lot of developers. Knowing statistics helps you build strong Machine Learning models that are optimized for a given problem statement. This book will teach you all it takes to perform complex statistical

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computations required for Machine Learning. You will gain information on statistics behind supervised learning, unsupervised learning, reinforcement learning, and more. Understand the real-world examples that discuss the statistical side of Machine Learning and familiarize yourself with it. You

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will also design programs for performing tasks such as model, parameter fitting, regression, classification, density collection, and more. By the end of the book, you will have mastered the required statistics for Machine Learning and will be able to apply your new skills to any sort of

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industry problem. Style and approach
This practical, step-by-step guide will
give you an understanding of the
Statistical and Machine Learning
fundamentals you'll need to build
models.

Development of high-throughput
technologies in molecular biology

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during the last two decades has contributed to the production of tremendous amounts of data. Microarray and RNA sequencing are two such widely used high-throughput technologies for simultaneously monitoring the expression patterns of thousands of

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genes. Data produced from such experiments are voluminous (both in dimensionality and numbers of instances) and evolving in nature. Analysis of huge amounts of data toward the identification of interesting patterns that are relevant for a given biological question

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requires high-performance computational infrastructure as well as efficient machine learning algorithms. Cross-communication of ideas between biologists and computer scientists remains a big challenge. Gene Expression Data Analysis: A Statistical and Machine

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Learning Perspective has been written with a multidisciplinary audience in mind. The book discusses gene expression data analysis from molecular biology, machine learning, and statistical perspectives. Readers will be able to acquire both theoretical and practical knowledge

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of methods for identifying novel patterns of high biological significance. To measure the effectiveness of such algorithms, we discuss statistical and biological performance metrics that can be used in real life or in a simulated environment. This book discusses a

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large number of benchmark algorithms, tools, systems, and repositories that are commonly used in analyzing gene expression data and validating results. This book will benefit students, researchers, and practitioners in biology, medicine, and computer science by enabling

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them to acquire in-depth knowledge in statistical and machine-learning-based methods for analyzing gene expression data. Key Features: An introduction to the Central Dogma of molecular biology and information flow in biological systems A systematic overview of the methods

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for generating gene expression data
Background knowledge on statistical
modeling and machine learning
techniques Detailed methodology of
analyzing gene expression data with
an example case study Clustering
methods for finding co-expression
patterns from microarray, bulkRNA,

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and scRNA data A large number of practical tools, systems, and repositories that are useful for computational biologists to create, analyze, and validate biologically relevant gene expression patterns Suitable for multidisciplinary researchers and practitioners in

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computer science and the biological sciences

Get complete instructions for manipulating, 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

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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

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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

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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

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summarize datasets Analyze and
manipulate regular and irregular time
series data Learn how to solve real-
world data analysis problems with
thorough, detailed examples
Are you looking to master the
fundamental concepts of Data
Analysis and Data Science? Do you

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want learn Python programming language fast? You are in the right place! Python can be used for a variety of coding projects including machine learning algorithms, web applications, data mining and visualization, game development. Some of the highlights of this book

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include: - What the Python language is - How we can benefit from data analysis, no matter what industry we are. - How Python is able to work well with the data analysis - How to install and use the NumPy library, one of the best extensions with Python, to help us get our data analysis done. - How

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to work with the Pandas and IPython extensions so that we are able to get things done with your analysis. - A look at the Matplotlib library to help you create some of your own visuals with your data when the analysis is done. - How to work with data visuals and how they are so important to

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your work. - The five major stages of the TDSP lifecycle. - Installation instructions for Python - Python coding concepts such as data types, classes, and objects variables, numbers, constructor functions, Booleans and much more. - Learn the functioning of various data science

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libraries like Scikit-Learn - How to create various graphs using Matplotlib and Pandas library. - Learn how machine learning allows analysis of large volumes of data and delivers faster and more accurate results. - Overview of four different machine-learning algorithms - Learn how

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companies are able to employ a predictive analytics model Even if you have never studied Python language before, you can learn it quickly. So what are you waiting for? Go to the top of the page and click Buy Now!

Data Science

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Learning

Statistical Tools, Machine Learning,
and R-Statistical Software Overview

Data Science and Machine Learning

A Unified Framework

Data Science, Analytics and Machine
Learning with R

50+ Essential Concepts Using R and

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Python

The recent rapid growth in the variety and complexity of new machine learning architectures requires the development of improved methods for designing, analyzing, evaluating, and communicating machine learning technologies. Statistical Machine

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Learning: A Unified Framework provides students, engineers, and scientists with tools from mathematical statistics and nonlinear optimization theory to become experts in the field of machine learning. In particular, the material in this text directly supports the mathematical

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analysis and design of old, new, and not-yet-invented nonlinear high-dimensional machine learning algorithms. Features: Unified empirical risk minimization framework supports rigorous mathematical analyses of widely used supervised, unsupervised, and

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reinforcement machine learning
algorithms Matrix calculus methods
for supporting machine learning
analysis and design applications
Explicit conditions for ensuring
convergence of adaptive, batch,
minibatch, MCEM, and MCMC
learning algorithms that minimize

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both unimodal and multimodal
objective functions Explicit conditions
for characterizing asymptotic
properties of M-estimators and model
selection criteria such as AIC and BIC
in the presence of possible model
misspecification This advanced text is
suitable for graduate students or

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highly motivated undergraduate students in statistics, computer science, electrical engineering, and applied mathematics. The text is self-contained and only assumes knowledge of lower-division linear algebra and upper-division probability theory. Students, professional

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engineers, and multidisciplinary scientists possessing these minimal prerequisites will find this text challenging yet accessible. About the Author: Richard M. Golden (Ph.D., M.S.E.E., B.S.E.E.) is Professor of Cognitive Science and Participating Faculty Member in Electrical

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Engineering at the University of Texas at Dallas. Dr. Golden has published articles and given talks at scientific conferences on a wide range of topics in the fields of both statistics and machine learning over the past three decades. His long-term research interests include identifying

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conditions for the convergence of deterministic and stochastic machine learning algorithms and investigating estimation and inference in the presence of possibly misspecified probability models.

Data analysis and machine learning are research areas at the intersection

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of computer science, artificial intelligence, mathematics and statistics. They cover general methods and techniques that can be applied to a vast set of applications such as web and text mining, marketing, medical science, bioinformatics and business intelligence. This volume contains the

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revised versions of selected papers in the field of data analysis, machine learning and applications presented during the 31st Annual Conference of the German Classification Society (Gesellschaft für Klassifikation - GfKI). The conference was held at the Albert-Ludwigs-University in Freiburg,

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Germany, in March 2007.

Practical Machine Learning for Data Analysis Using Python is a problem solver ' s guide for creating real-world intelligent systems. It provides a comprehensive approach with concepts, practices, hands-on examples, and sample code. The book

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teaches readers the vital skills required to understand and solve different problems with machine learning. It teaches machine learning techniques necessary to become a successful practitioner, through the presentation of real-world case studies in Python machine learning

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ecosystems. The book also focuses on building a foundation of machine learning knowledge to solve different real-world case studies across various fields, including biomedical signal analysis, healthcare, security, economics, and finance. Moreover, it covers a wide range of machine

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learning models, including regression, classification, and forecasting. The goal of the book is to help a broad range of readers, including IT professionals, analysts, developers, data scientists, engineers, and graduate students, to solve their own real-world problems. Offers a

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comprehensive overview of the application of machine learning tools in data analysis across a wide range of subject areas Teaches readers how to apply machine learning techniques to biomedical signals, financial data, and healthcare data Explores important classification and regression

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algorithms as well as other machine learning techniques Explains how to use Python to handle data extraction, manipulation, and exploration techniques, as well as how to visualize data spread across multiple dimensions and extract useful features

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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

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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

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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

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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.

Pattern Recognition and Machine

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Learning

50 Essential Concepts

with Applications in R

Techniques for Better Predictive

Modeling and Analysis of Big Data,

Second Edition

An Introduction to Statistical Learning

Methods with R

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Statistics for Data Science

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fundamentals for Data Science, this book is for you. Who Should Read this Book?Aspiring data scientists who are looking forward to begin their journey in the vast field of data science. People who are seeking to learn and understand data analysis from its

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very deep-rooted basics have found the right book. Clear basic concepts make the foundation of a good knowledge base, which ultimately helps to gain sharp insights into this topic further. This book will give you the practical exposure along with its

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*theory explained
comprehensively. This book is the
perfect compilation for beginners
as well as intermediate learners
who intend to learn statistics and
data analysis techniques. Why
this book? This book will guide you
step by step from the very basics*

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to how you can start your own data science project. The best part about this book is its structure, it's structured in such a way that integrates practicals along with its theory to make the concepts easily understandable. It will help you to understand a

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basic concept like mean, median, mode, scatter plot and histograms. Thus ensures no prior knowledge is required to start learning from this book. The content of this book is specially designed to encompass all the concepts that come under the

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domain of data science. This book will guide you through the problems and concepts of statistics. What is statistics?>Most of the people think statistics in data science is something different and more profound than what we learnt in

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our mathematics classes but it's not. It is the same concept of data collection followed by its organization, interpretation and presentation. Statistics is the key to develop a desired model in machine learning. Using statistics you can convert your raw

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*meaningless chunk of data to a
well-structured informative data.*

What's Inside This Book?

Probability & Bayes Theorem,

Data Exploration and Analysis

Structured Data Estimates Mean

and Median Estimates Variability

Exploring the data distribution

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Percentiles and Boxplots

Frequency table and Histograms

Density Estimates Mode

Correlation Categorical and

Numeric Data Visualizing Multiple

Variables Regression Analysis

Clustering Analysis Statistical

tests and ANOVA Classification

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*Naïve Bayes Discriminant
Analysis Linear regression
Logistic Regression Statistical
Machine Learning K_Nearest
Neighbor Trees Models Bagging
and Random Forest Boosting
algorithms Principal Component
Analysis K_means Clustering*

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*Hierarchical Clustering Model
Based Clustering Sources &
References From AI Sciences
Publishing* Our books may be the
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from scratch. Readers are advised to adopt a hands on approach, which would lead to better mental representations. Frequently Asked Questions
Q: Does this book include everything I need to become a data analyst expert?
A: Unfortunately, no. This book is

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computers to learn and discern
patterns without actually being*

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programmed. When Statistical techniques and machine learning are combined together they are a powerful tool for analysing various kinds of data in many computer science/engineering areas including, image processing, speech processing,

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*natural language processing,
robot control, as well as in
fundamental sciences such as
biology, medicine, astronomy,
physics, and materials.*

*Introduction to Statistical Machine
Learning provides a general
introduction to machine learning*

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that covers a wide range of topics concisely and will help you bridge the gap between theory and practice. Part I discusses the fundamental concepts of statistics and probability that are used in describing machine learning algorithms. Part II and

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Part III explain the two major approaches of machine learning techniques; generative methods and discriminative methods.

While Part III provides an in-depth look at advanced topics that play essential roles in making machine learning algorithms more useful

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MATLAB/Octave programs provide
you with the necessary practical
skills needed to accomplish a
wide range of data analysis tasks.
Provides the necessary
background material to
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*such as statistics, probability,
linear algebra, and calculus.
Complete coverage of the
generative approach to statistical
pattern recognition and the
discriminative approach to
statistical machine learning.
Includes MATLAB/Octave*

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programs so that readers can test the algorithms numerically and acquire both mathematical and practical skills in a wide range of data analysis tasks Discusses a wide range of applications in machine learning and statistics and provides examples drawn

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from image processing, speech processing, natural language processing, robot control, as well as biology, medicine, astronomy, physics, and materials.

"This textbook is a well-rounded, rigorous, and informative work presenting the mathematics

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behind modern machine learning techniques. It hits all the right notes: the choice of topics is up-to-date and perfect for a course on data science for mathematics students at the advanced undergraduate or early graduate level. This book fills a sorely-

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needed gap in the existing literature by not sacrificing depth for breadth, presenting proofs of major theorems and subsequent derivations, as well as providing a copious amount of Python code. I only wish a book like this had been around when I first began

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*my journey!" -Nicholas Hoell,
University of Toronto "This is a
well-written book that provides a
deeper dive into data-scientific
methods than many introductory
texts. The writing is clear, and the
text logically builds up
regularization, classification, and*

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The purpose of Data Science and Machine Learning: Mathematical and Statistical Methods is to provide an accessible, yet comprehensive

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*textbook intended for students interested in gaining a better understanding of the mathematics and statistics that underpin the rich variety of ideas and machine learning algorithms in data science. Key Features:
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understanding. Presentation is self-contained, accessible, and comprehensive. Extensive list of exercises and worked-out examples. Many concrete algorithms with Python code. Full color throughout. The Authors: Dirk P. Kroese, PhD, is a Professor

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of Mathematics and Statistics at The University of Queensland. He has published over 120 articles and five books in a wide range of areas in mathematics, statistics, data science, machine learning, and Monte Carlo methods. He is a pioneer of the well-known Cross-

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Entropy method—an adaptive Monte Carlo technique, which is being used around the world to help solve difficult estimation and optimization problems in science, engineering, and finance.

Zdravko Botev, PhD, is an Australian Mathematical Science

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Institute Lecturer in Data Science and Machine Learning with an appointment at the University of New South Wales in Sydney, Australia. He is the recipient of the 2018 Christopher Heyde Medal of the Australian Academy of Science for distinguished

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research in the Mathematical Sciences. Thomas Taimre, PhD, is a Senior Lecturer of Mathematics and Statistics at The University of Queensland. His research interests range from applied probability and Monte Carlo methods to applied physics and

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the remarkably universal self-mixing effect in lasers. He has published over 100 articles, holds a patent, and is the coauthor of Handbook of Monte Carlo Methods (Wiley). Radislav Vaisman, PhD, is a Lecturer of Mathematics and Statistics at The

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University of Queensland. His research interests lie at the intersection of applied probability, machine learning, and computer science. He has published over 20 articles and two books.

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through the necessary steps to pick the best techniques and models and then implement those models to successfully address the original business need. No software is shown in the book, and mathematical details are kept to a minimum. This allows

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used in Machine Learning using
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*Proceedings of the 31st Annual
Conference of the Gesellschaft für
Klassifikation e.V., Albert-Ludwigs-
Universität Freiburg, March 7-9,
2007*

*This Book Includes: Python for
Data Analysis and Science with
Big Data Analysis, Statistics and*

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Machine Learning

*Analysis, Machine Learning, and
Visualization*

Statistical methods are a key part of data science, yet very few data scientists have any formal statistics training. Courses and

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what's important and what's not. Many data science resources incorporate statistical methods but lack a deeper statistical perspective. If you 're familiar with the R programming language, and have some exposure to

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How the principles of experimental design yield definitive answers to questions
How to use regression to estimate outcomes and detect anomalies
Key classification techniques for

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predicting which categories a record belongs to
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latest research in supervised learning algorithms and applications, clustering algorithms and cluster validation indices
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analysis Presents hands-on training on the use of Python libraries, MATLAB® tools, WEKA, SAP-HANA and R/Bioconductor This is the first textbook on pattern recognition to present the Bayesian viewpoint. The book

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presents approximate inference algorithms that permit fast approximate answers in situations where exact answers are not feasible. It uses graphical models to describe probability distributions when no other books

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apply graphical models to machine learning. No previous knowledge of pattern recognition or machine learning concepts is assumed. Familiarity with multivariate calculus and basic linear algebra is required, and some experience in

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the use of probabilities would be helpful though not essential as the book includes a self-contained introduction to basic probability theory.

Statistics and Machine Learning
Methods for EHR Data

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With Machine Learning, Deep
Learning and NLP Examples
Introduction to Data Science
Practical Machine Learning for
Data Analysis Using Python
What the Best Data Scientists
Know about Data Analytics, Data

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Mining, Statistics, Machine
Learning, and Big Data
Essentials of Data Science and
Analytics
A Statistical and Machine Learning
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The use of Electronic Health

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Records (EHR)/Electronic Medical Records (EMR) data is becoming more prevalent for research. However, analysis of this type of data has many unique complications due to how they are collected, processed

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and types of questions that can be answered. This book covers many important topics related to using EHR/EMR data for research including data extraction, cleaning, processing, analysis, inference, and

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predictions based on many years of practical experience of the authors. The book carefully evaluates and compares the standard statistical models and approaches with those of machine learning and deep

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learning methods and reports the unbiased comparison results for these methods in predicting clinical outcomes based on the EHR data. Key Features: Written based on hands-on experience of contributors from

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multidisciplinary EHR research projects, which include methods and approaches from statistics, computing, informatics, data science and clinical/epidemiological domains. Documents the detailed

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experience on EHR data extraction, cleaning and preparation Provides a broad view of statistical approaches and machine learning prediction models to deal with the challenges and limitations of

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EHR data. Considers the complete cycle of EHR data analysis. The use of EHR/EMR analysis requires close collaborations between statisticians, informaticians, data scientists and

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clinical/epidemiological
investigators. This book reflects
that multidisciplinary perspective.
Gain a broad foundation of
advanced data analytics
concepts and discover the recent
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Neo4j, Elasticsearch, and MongoDB. This book discusses how to implement ETL techniques including topical crawling, which is applied in domains such as high-frequency algorithmic trading and goal-

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oriented dialog systems. You'll also see examples of machine learning concepts such as semi-supervised learning, deep learning, and NLP. Advanced Data Analytics Using Python also covers important traditional data

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giving you samples to use in your own projects. What You Will Learn Work with data analysis techniques such as classification, clustering, regression, and forecasting Handle structured and

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unstructured data, ETL techniques, and different kinds of databases such as Neo4j, Elasticsearch, MongoDB, and MySQL Examine the different big data frameworks, including Hadoop and Spark Discover

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advanced machine learning concepts such as semi-supervised learning, deep learning, and NLP Who This Book Is For Data scientists and software developers interested in the field of data analytics.

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Time series data analysis is increasingly important due to the massive production of such data through the internet of things, the digitalization of healthcare, and the rise of smart cities. As continuous monitoring and data

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collection become more common, the need for competent time series analysis with both statistical and machine learning techniques will increase.

Covering innovations in time series data analysis and use

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cases from the real world, this practical guide will help you solve the most common data engineering and analysis challenges in time series, using both traditional statistical and modern machine learning

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techniques. Author Aileen Nielsen offers an accessible, well-rounded introduction to time series in both R and Python that will have data scientists, software engineers, and researchers up and running

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quickly. You'll get the guidance
you need to confidently: Find and
wrangle time series data
Undertake exploratory time
series data analysis Store
temporal data Simulate time
series data Generate and select

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features for a time series
Measure error Forecast and
classify time series with machine
or deep learning Evaluate
accuracy and performance
A comprehensive introduction to
machine learning that uses

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probabilistic models and inference as a unifying approach. Today's Web-enabled deluge of electronic data calls for automated methods of data analysis. Machine learning provides these, developing

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methods that can automatically detect patterns in data and then use the uncovered patterns to predict future data. This textbook offers a comprehensive and self-contained introduction to the field of machine learning, based on a

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unified, probabilistic approach. The coverage combines breadth and depth, offering necessary background material on such topics as probability, optimization, and linear algebra as well as discussion of recent

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developments in the field, including conditional random fields, L1 regularization, and deep learning. The book is written in an informal, accessible style, complete with pseudo-code for the most important

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algorithms. All topics are copiously illustrated with color images and worked examples drawn from such application domains as biology, text processing, computer vision, and robotics. Rather than providing a

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cookbook of different heuristic methods, the book stresses a principled model-based approach, often using the language of graphical models to specify models in a concise and intuitive way. Almost all the

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models described have been implemented in a MATLAB software package—PMTK (probabilistic modeling toolkit)—that is freely available online. The book is suitable for upper-level undergraduates with

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an introductory-level college
math background and beginning
graduate students.

Data Wrangling with Pandas,
NumPy, and IPython

Data Analysis, Machine Learning
and Knowledge Discovery

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Statistics Essentials for Beginner
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Statistical and Machine-Learning
Data Mining

Machine Learning

Python Programming

Advanced R Statistical

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Programming and Data Models

A practitioner's tools have a direct impact on the success of his or her work. This book will provide the data scientist with the tools and techniques required to excel with statistical learning methods in the areas of data access, data munging, exploratory data analysis, supervised

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machine learning, unsupervised machine learning and model evaluation. Machine learning and data science are large disciplines, requiring years of study in order to gain proficiency. This book can be viewed as a set of essential tools we need for a long-term career in the data science field – recommendations are

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provided for further study in order to build advanced skills in tackling important data problem domains. The R statistical environment was chosen for use in this book. R is a growing phenomenon worldwide, with many data scientists using it exclusively for their project work. All of the code examples for the book are written

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in R. In addition, many popular R packages and data sets will be used. Data analysis, machine learning and knowledge discovery are research areas at the intersection of computer science, artificial intelligence, mathematics and statistics. They cover general methods and techniques that can be applied to a vast set

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of applications such as web and text mining, marketing, medicine, bioinformatics and business intelligence. This volume contains the revised versions of selected papers in the field of data analysis, machine learning and knowledge discovery presented during the 36th annual conference of the German

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Classification Society (GfKI). The conference was held at the University of Hildesheim (Germany) in August 2012. ? With the rapidly advancing fields of Data Analytics and Computational Statistics, it's important to keep up with current trends, methodologies, and applications. This book investigates the role of data

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mining in computational statistics for machine learning. It offers applications that can be used in various domains and examines the role of transformation functions in optimizing problem statements. Data Analytics, Computational Statistics, and Operations Research for Engineers: Methodologies and

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Applications presents applications of computationally intensive methods, inference techniques, and survival analysis models. It discusses how data mining extracts information and how machine learning improves the computational model based on the new information. Those interested in this

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reference work will include students, professionals, and researchers working in the areas of data mining, computational statistics, operations research, and machine learning.

Statistical methods are a key part of data science, yet few data scientists have formal statistical training. Courses and

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books on basic statistics rarely cover the topic from a data science perspective. The second edition of this popular guide adds comprehensive examples in Python, provides practical guidance on applying statistical methods to data science, tells you how to avoid their misuse, and gives you advice on what's important and

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what's not. Many data science resources incorporate statistical methods but lack a deeper statistical perspective. If you're familiar with the R or Python programming languages and have some exposure to statistics, this quick reference bridges the gap in an accessible, readable format. With this book, you'll learn: Why

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exploratory data analysis is a key preliminary step in data science How random sampling can reduce bias and yield a higher-quality dataset, even with big data How the principles of experimental design yield definitive answers to questions How to use regression to estimate outcomes and

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*detect anomalies Key classification
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a record belongs to Statistical machine
learning methods that "learn" from data
Unsupervised learning methods for
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Practical Time Series Analysis
A Probabilistic Perspective*

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acquainted with the R
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required to perform
tasks such as linear
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an ever-evolving field,
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popularity at an
exponential rate. Data
science includes

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extracted from the
fields of statistics;
computer science, and,
most importantly,
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statistical methods for data science tasks. It starts off with simple statistics and then move on to statistical methods that are used in data science algorithms.

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modeling. The book emphasizes the fundamentals of each technique, with step-by-step codes and real-world examples with data from areas such as

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medicine and health,
biology, engineering,
technology, and related
sciences. The authors
want to mitigate the
readers' feeling that
they may be sitting in

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front of a black box.
Toward this end,
examples use the most
recent R language
syntax, with recognized
robust, widespread and
current packages. Code

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scripts are exhaustively commented, making it clear to readers what happens in each command. For data collection, readers are instructed how to build their own

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robots from the very beginning (not only API type, but also handcrafted ones). An entire chapter focuses on the concept of spatial analysis,

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allowing readers to
build their own maps
through geo-referenced
data (such as in
epidemiologic research)
and some basic
statistical techniques.

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Other chapters cover ensemble and uplift modelling, and GLMM (Generalized Linear Mixed Models) estimations, both linear and nonlinear. The book

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will serve computer and data scientists working with researchers, clinicians, and engineers, as well as the researchers and engineers themselves who

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**inference, linear
regression, and machine
learning. It also helps
you develop skills such
as R programming, data
wrangling, data
visualization,**

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predictive algorithm
building, file
organization with
UNIX/Linux shell,
version control with Git
and GitHub, and
reproducible document

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preparation. This book is a textbook for a first course in data science. No previous knowledge of R is necessary, although some experience with

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programming may be helpful. The book is divided into six parts: R, data visualization, statistics with R, data wrangling, machine learning, and

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productivity tools. Each part has several chapters meant to be presented as one lecture. The author uses motivating case studies that realistically mimic

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a data scientist's
experience. He starts by
asking specific
questions and answers
these through data
analysis so concepts are
learned as a means to

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answering the questions.
Examples of the case
studies included are: US
murder rates by state,
self-reported student
heights, trends in world
health and economics,

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the impact of vaccines
on infectious disease
rates, the financial
crisis of 2007–2008,
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team, image processing

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of hand-written digits,
and movie recommendation
systems. The statistical
concepts used to answer
the case study questions
are only briefly
introduced, so

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complementing with a probability and statistics textbook is highly recommended for in-depth understanding of these concepts. If you read and understand

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multiple linear regression and expands the techniques of model building via nonparametric regression and kernel tricks. It provides a comprehensive account on sparsity explorations and model selections for multiple

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regression, generalized linear models, quantile regression, robust regression, hazards regression, among others. High-dimensional inference is also thoroughly addressed and so is feature screening. The book also

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provides a comprehensive account on high-dimensional covariance estimation, learning latent factors and hidden structures, as well as their applications to statistical estimation, inference, prediction

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and machine learning problems. It also introduces thoroughly statistical machine learning theory and methods for classification, clustering, and prediction. These include CART, random forests, boosting,

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***support vector machines,
clustering algorithms, sparse
PCA, and deep learning.***

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models currently being used by statisticians, breeders and data scientists. It provides an accessible way to understand the theory behind each statistical learning tool, the required pre-processing, the basics of model

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building, how to train statistical learning methods, the basic R scripts needed to implement each statistical learning tool, and the output of each tool. To do so, for each tool the book provides background theory, some

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elements of the R statistical software for its implementation, the conceptual underpinnings, and at least two illustrative examples with data from real-world genomic selection experiments. Lastly, worked-out

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examples help readers check their own comprehension. The book will greatly appeal to readers in plant (and animal) breeding, geneticists and statisticians, as it provides in a very accessible way the

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necessary theory, the appropriate R code, and illustrative examples for a complete understanding of each statistical learning tool. In addition, it weighs the advantages and disadvantages

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of each tool.

Data science and analytics have emerged as the most desired fields in driving business decisions. Using the techniques and methods of data science, decision makers can uncover

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***hidden patterns in their data,
develop algorithms and models
that help improve processes and
make key business decisions.
Data science is a data driven
decision making approach that
uses several different areas and***

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disciplines with a purpose of extracting insights and knowledge from structured and unstructured data. The algorithms and models of data science along with machine learning and predictive modeling

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are widely used in solving business problems and predicting future outcomes. This book combines the key concepts of data science and analytics to help you gain a practical understanding of these fields.

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The four different sections of the book are divided into chapters that explain the core of data science. Given the booming interest in data science, this book is timely and informative. Data analysis is changing fast.

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Driven by a vast range of application domains and affordable tools, machine learning has become mainstream. Unsupervised data analysis, including cluster analysis, factor analysis, and low

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*dimensionality mapping methods
continually being updated, have
reached new heights of
achievement in the incredibly
rich data wor*

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