

exploratory data analysis with python

Exploratory Data Analysis with Python: Uncover Hidden Insights in Your Data

Introduction:

Are you drowning in data but struggling to extract meaningful insights? Do you wish you could transform raw numbers into compelling narratives that drive informed decisions? Then you've come to the right place! This comprehensive guide dives deep into the world of Exploratory Data Analysis (EDA) using Python, equipping you with the practical skills and knowledge to unlock the hidden potential within your datasets. We'll cover everything from importing and cleaning your data to visualizing complex relationships and drawing insightful conclusions – all using Python's powerful data science libraries. Get ready to transform from data novice to data detective!

I. Setting the Stage: Importing and Preparing Your Data

Before we can dive into the exciting world of analysis, we need to get our data ready. This involves several crucial steps:

Choosing the Right Libraries: Python boasts a rich ecosystem of libraries for data manipulation and analysis. We'll focus primarily on Pandas, NumPy, and Matplotlib (and Seaborn for enhanced visualizations). Understanding their strengths and knowing when to use each is paramount. Pandas provides the powerful DataFrame structure for efficient data handling, NumPy offers optimized numerical computations, and Matplotlib/Seaborn empowers us to create insightful visualizations.

Data Import: We'll explore various methods for importing data, covering common file formats like CSV, Excel, JSON, and SQL databases. Effective data import is the foundation of a successful EDA. We'll examine techniques to handle different data structures and encoding issues.

Data Cleaning: Real-world datasets are rarely perfect. We'll discuss common data cleaning tasks, including handling missing values (imputation or removal), dealing with outliers, and transforming data types. This stage is crucial for ensuring the accuracy and reliability of your analysis. We'll explore different techniques like mean/median imputation, removing rows with missing data, and using more advanced imputation methods like K-Nearest Neighbors.

Data Transformation: Sometimes, the raw data isn't in a format suitable for analysis. We'll discuss techniques for data transformation, such as scaling (standardization, normalization), encoding categorical variables (one-hot encoding, label encoding), and creating new features from existing ones (feature engineering). Effective transformation is key to getting the most out of your data.

II. Unveiling Patterns: Descriptive Statistics and Data Visualization

Once our data is clean and transformed, we can begin exploring its underlying patterns. This involves:

Descriptive Statistics: We'll cover calculating key descriptive statistics like mean, median, mode,

standard deviation, variance, percentiles, and exploring their interpretations. These provide a concise summary of the data's central tendency, dispersion, and shape. We'll also discuss the importance of understanding data distributions (normal, skewed, etc.).

Data Visualization: Visualization is crucial for communicating insights effectively. We'll explore various visualization techniques using Matplotlib and Seaborn, including histograms, box plots, scatter plots, bar charts, line charts, and heatmaps. We'll focus on creating informative and aesthetically pleasing visualizations that effectively convey the story hidden in your data. We'll delve into best practices for creating clear and impactful visualizations, including choosing appropriate chart types, labeling axes correctly, and using color effectively.

III. Delving Deeper: Correlation Analysis and Hypothesis Testing

To understand relationships between variables, we need to go beyond descriptive statistics.

Correlation Analysis: We'll learn how to calculate correlation coefficients (Pearson, Spearman) to measure the strength and direction of linear relationships between variables. We'll also explore the concept of correlation vs. causation and the limitations of correlation analysis.

Hypothesis Testing: We'll introduce fundamental concepts of hypothesis testing, focusing on t-tests and ANOVA, to assess whether observed differences between groups are statistically significant or due to chance. We'll discuss setting up hypotheses, choosing appropriate tests, interpreting p-values, and drawing conclusions.

IV. Advanced Techniques: Dimensionality Reduction and Clustering

For high-dimensional datasets, advanced techniques can help simplify the analysis.

Dimensionality Reduction: We'll briefly touch upon techniques like Principal Component Analysis (PCA) to reduce the number of variables while retaining most of the important information. This can simplify visualization and modeling.

Clustering: We'll explore unsupervised learning techniques like K-means clustering to group similar data points together, revealing hidden structures within the data.

V. Conclusion: From Data to Insights

This comprehensive exploration of EDA with Python empowers you to extract valuable insights from your data. Remember that EDA is an iterative process—you'll likely revisit and refine your analysis as you uncover new patterns and insights. The key is to ask insightful questions, explore your data systematically, and communicate your findings clearly.

Article Outline: Exploratory Data Analysis with Python

Introduction: Hooking the reader and outlining the article's scope.

Chapter 1: Data Wrangling and Preparation: Importing, cleaning, and transforming data using Pandas and NumPy.

Chapter 2: Descriptive Statistics and Visualization: Calculating key statistics and creating insightful visualizations with Matplotlib and Seaborn.

Chapter 3: Correlation and Hypothesis Testing: Exploring relationships between variables and drawing statistically significant conclusions.

Chapter 4: Advanced EDA Techniques: Introduction to dimensionality reduction and clustering.

Conclusion: Recap of key takeaways and encouragement for further exploration.

(Detailed explanation of each chapter would follow here, mirroring the content already provided in the main article body. Due to length constraints, this detailed explanation is omitted but would be included in the full blog post.)

FAQs:

1. What is the best Python library for EDA? Pandas is essential, complemented by NumPy for numerical operations and Matplotlib/Seaborn for visualization.
1. How do I handle missing data in EDA? Strategies include imputation (filling missing values) or removal of rows/columns with missing data, depending on the context and extent of missingness.
1. What are the common types of data visualizations used in EDA? Histograms, box plots, scatter plots, bar charts, and heatmaps are frequently used.
1. What is the difference between correlation and causation? Correlation measures the association between variables, but doesn't imply that one causes the other.
1. How do I interpret a p-value in hypothesis testing? A low p-value (typically below 0.05) suggests statistically significant evidence against the null hypothesis.
1. What is dimensionality reduction and why is it useful? It reduces the number of variables, simplifying analysis and improving model performance for high-dimensional datasets.

1. What are some common clustering algorithms? K-means is a popular choice.
1. Where can I find datasets for practice? Kaggle, UCI Machine Learning Repository, and government open data portals are excellent resources.
1. Can I use EDA for time series data? Absolutely! EDA for time series data involves visualizing trends, seasonality, and other temporal patterns.

Related Articles:

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4. Introduction to NumPy for Data Science: Understanding NumPy arrays and their applications.
5. Understanding Statistical Significance: A beginner-friendly explanation of hypothesis testing.
6. Principal Component Analysis (PCA) Explained: A clear explanation of PCA and its applications.
7. K-Means Clustering Algorithm: A detailed guide to the K-means clustering algorithm.
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Suresh Kumar Mukhiya, Usman Ahmed, 2020-03-27 Discover techniques to summarize the characteristics of your data using PyPlot, NumPy, SciPy, and pandas Key Features Understand the fundamental concepts of exploratory data analysis using Python Find missing values in your data and identify the correlation between different variables Practice graphical exploratory analysis techniques using Matplotlib and the Seaborn Python package Book Description Exploratory Data Analysis (EDA) is an approach to data analysis that involves the application of diverse techniques to gain insights into a dataset. This book will help you gain practical knowledge of the main pillars of EDA - data cleaning, data preparation, data exploration, and data visualization. You'll start by performing EDA using open source datasets and perform simple to advanced analyses to turn data into meaningful insights. You'll then learn various descriptive statistical techniques to describe the basic characteristics of data and progress to performing EDA on time-series data. As you advance, you'll learn how to implement EDA techniques for model development and evaluation and build predictive models to visualize results. Using Python for data analysis, you'll work with real-world datasets, understand data, summarize its characteristics, and visualize it for business intelligence. By the end of this EDA book, you'll have developed the skills required to carry out a preliminary investigation on any dataset, yield insights into data, present your results with visual aids, and build a model that correctly predicts future outcomes. What you will learn Import, clean, and explore data to perform preliminary analysis using powerful Python packages Identify and transform erroneous data using different data wrangling techniques Explore the use of multiple regression to describe non-linear relationships Discover hypothesis testing and explore techniques of time-series analysis Understand and interpret results obtained from graphical analysis Build, train, and optimize predictive models to estimate results Perform complex EDA techniques on open source datasets Who this book is for This EDA book is for anyone interested in data analysis, especially students,

statisticians, data analysts, and data scientists. The practical concepts presented in this book can be applied in various disciplines to enhance decision-making processes with data analysis and synthesis. Fundamental knowledge of Python programming and statistical concepts is all you need to get started with this book.

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exploratory data analysis with python: Think Stats Allen B. Downey, 2014-10-16 If you know how to program, you have the skills to turn data into knowledge, using tools of probability and statistics. This concise introduction shows you how to perform statistical analysis computationally, rather than mathematically, with programs written in Python. By working with a single case study throughout this thoroughly revised book, you'll learn the entire process of exploratory data analysis—from collecting data and generating statistics to identifying patterns and testing hypotheses. You'll explore distributions, rules of probability, visualization, and many other tools and concepts. New chapters on regression, time series analysis, survival analysis, and analytic methods will enrich your discoveries. Develop an understanding of probability and statistics by writing and testing code Run experiments to test statistical behavior, such as generating samples from several distributions Use simulations to understand concepts that are hard to grasp mathematically Import data from most sources with Python, rather than rely on data that's cleaned and formatted for statistics tools Use statistical inference to answer questions about real-world data

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exploratory data analysis with python: Become a Python Data Analyst Alvaro Fuentes, 2018-08-31 Enhance your data analysis and predictive modeling skills using popular Python tools Key Features Cover all fundamental libraries for operation and manipulation of Python for data analysis Implement real-world datasets to perform predictive analytics with Python Access modern data analysis techniques and detailed code with scikit-learn and SciPy Book Description Python is one of the most common and popular languages preferred by leading data analysts and statisticians for working with massive datasets and complex data visualizations. Become a Python Data Analyst introduces Python's most essential tools and libraries necessary to work with the data analysis process, right from preparing data to performing simple statistical analyses and creating meaningful data visualizations. In this book, we will cover Python libraries such as NumPy, pandas, matplotlib, seaborn, SciPy, and scikit-learn, and apply them in practical data analysis and statistics examples. As you make your way through the chapters, you will learn to efficiently use the Jupyter Notebook to operate and manipulate data using NumPy and the pandas library. In the concluding chapters, you will gain experience in building simple predictive models and carrying out statistical computation and analysis using rich Python tools and proven data analysis techniques. By the end of this book, you will have hands-on experience performing data analysis with Python. What you will learn Explore important Python libraries and learn to install Anaconda distribution Understand the basics of NumPy Produce informative and useful visualizations for analyzing data Perform common statistical calculations Build predictive models and understand the principles of predictive analytics Who this book is for Become a Python Data Analyst is for entry-level data analysts, data engineers, and BI professionals who want to make complete use of Python tools for performing efficient data analysis. Prior knowledge of Python programming is necessary to understand the concepts covered in this book

exploratory data analysis with python: Exploratory Data Analysis Using R Ronald K. Pearson, 2018-05-04 Exploratory Data Analysis Using R provides a classroom-tested introduction to exploratory data analysis (EDA) and introduces the range of interesting - good, bad, and ugly - features that can be found in data, and why it is important to find them. It also introduces the mechanics of using R to explore and explain data. The book begins with a detailed overview of data, exploratory analysis, and R, as well as graphics in R. It then explores working with external data, linear regression models, and crafting data stories. The second part of the book focuses on developing R programs, including good programming practices and examples, working with text data, and general predictive models. The book ends with a chapter on keeping it all together that includes managing the R installation, managing files, documenting, and an introduction to reproducible computing. The book is designed for both advanced undergraduate, entry-level graduate students, and working professionals with little to no prior exposure to data analysis, modeling, statistics, or programming. It keeps the treatment relatively non-mathematical, even though data analysis is an inherently mathematical subject. Exercises are included at the end of

most chapters, and an instructor's solution manual is available. About the Author: Ronald K. Pearson holds the position of Senior Data Scientist with GeoVera, a property insurance company in Fairfield, California, and he has previously held similar positions in a variety of application areas, including software development, drug safety data analysis, and the analysis of industrial process data. He holds a PhD in Electrical Engineering and Computer Science from the Massachusetts Institute of Technology and has published conference and journal papers on topics ranging from nonlinear dynamic model structure selection to the problems of disguised missing data in predictive modeling. Dr. Pearson has authored or co-authored books including *Exploring Data in Engineering, the Sciences, and Medicine* (Oxford University Press, 2011) and *Nonlinear Digital Filtering with Python*. He is also the developer of the DataCamp course on base R graphics and is an author of the *datarobot* and *GoodmanKruskal* R packages available from CRAN (the Comprehensive R Archive Network).

exploratory data analysis with python: *IPython Interactive Computing and Visualization Cookbook* Cyrille Rossant, 2014-09-25 Intended to anyone interested in numerical computing and data science: students, researchers, teachers, engineers, analysts, hobbyists... Basic knowledge of Python/NumPy is recommended. Some skills in mathematics will help you understand the theory behind the computational methods.

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categories a record belongs to Statistical machine learning methods that “learn” from data
Unsupervised learning methods for extracting meaning from unlabeled data

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exploratory data analysis with python: Hands-On Data Analysis with Pandas Stefanie Molin, 2021-04-29 Get to grips with pandas by working with real datasets and master data

discovery, data manipulation, data preparation, and handling data for analytical tasks

Key Features

- Perform efficient data analysis and manipulation tasks using pandas 1.x
- Apply pandas to different real-world domains with the help of step-by-step examples
- Make the most of pandas as an effective data exploration tool

Book Description

Extracting valuable business insights is no longer a 'nice-to-have', but an essential skill for anyone who handles data in their enterprise. Hands-On Data Analysis with Pandas is here to help beginners and those who are migrating their skills into data science get up to speed in no time. This book will show you how to analyze your data, get started with machine learning, and work effectively with the Python libraries often used for data science, such as pandas, NumPy, matplotlib, seaborn, and scikit-learn. Using real-world datasets, you will learn how to use the pandas library to perform data wrangling to reshape, clean, and aggregate your data. Then, you will learn how to conduct exploratory data analysis by calculating summary statistics and visualizing the data to find patterns. In the concluding chapters, you will explore some applications of anomaly detection, regression, clustering, and classification using scikit-learn to make predictions based on past data. This updated edition will equip you with the skills you need to use pandas 1.x to efficiently perform various data manipulation tasks, reliably reproduce analyses, and visualize your data for effective decision making - valuable knowledge that can be applied across multiple domains.

What you will learn

- Understand how data analysts and scientists gather and analyze data
- Perform data analysis and data wrangling using Python
- Combine, group, and aggregate data from multiple sources
- Create data visualizations with pandas, matplotlib, and seaborn
- Apply machine learning algorithms to identify patterns and make predictions
- Use Python data science libraries to analyze real-world datasets
- Solve common data representation and analysis problems using pandas
- Build Python scripts, modules, and packages for reusable analysis code

Who this book is for

This book is for data science beginners, data analysts, and Python developers who want to explore each stage of data analysis and scientific computing using a wide range of datasets. Data scientists looking to implement pandas in their machine learning workflow will also find plenty of valuable know-how as they progress. You'll find it easier to follow along with this book if you have a working knowledge of the Python programming language, but a Python crash-course tutorial is provided in the code bundle for anyone who needs a refresher.

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- Scale up your data programs with full confidence
- Read and write data to and from a variety of sources and formats
- Deal with messy data with PySpark's data manipulation functionality
- Discover new data sets and perform exploratory data analysis
- Build automated data pipelines that transform, summarize, and get insights from data
- Troubleshoot common PySpark errors
- Creating reliable long-running jobs

Data Analysis with Python and PySpark is your guide to delivering successful Python-driven data projects. Packed with relevant examples and essential techniques, this practical book teaches you to build pipelines for reporting, machine learning, and other data-centric tasks. Quick exercises in every chapter help you practice what you've learned, and rapidly start implementing PySpark into your data systems. No previous knowledge of Spark is required. Data Analysis with Python and PySpark helps you solve the daily challenges of data science with PySpark. You'll learn how to scale your processing capabilities across multiple machines while ingesting data from any source--whether that's Hadoop clusters,

cloud data storage, or local data files. Once you've covered the fundamentals, you'll explore the full versatility of PySpark by building machine learning pipelines, and blending Python, pandas, and PySpark code.

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exploratory data analysis with python: *Secondary Analysis of Electronic Health Records* MIT Critical Data, 2016-09-09 This book trains the next generation of scientists representing different disciplines to leverage the data generated during routine patient care. It formulates a more complete lexicon of evidence-based recommendations and support shared, ethical decision making by doctors with their patients. Diagnostic and therapeutic technologies continue to evolve rapidly, and both individual practitioners and clinical teams face increasingly complex ethical decisions. Unfortunately, the current state of medical knowledge does not provide the guidance to make the majority of clinical decisions on the basis of evidence. The present research infrastructure is inefficient and frequently produces unreliable results that cannot be replicated. Even randomized controlled trials (RCTs), the traditional gold standards of the research reliability hierarchy, are not without limitations. They can be costly, labor intensive, and slow, and can return results that are seldom generalizable to every patient population. Furthermore, many pertinent but unresolved clinical and medical systems issues do not seem to have attracted the interest of the research enterprise, which has come to focus instead on cellular and molecular investigations and single-agent (e.g., a drug or device) effects. For clinicians, the end result is a bit of a “data desert” when it comes to making decisions. The new research infrastructure proposed in this book will help the medical profession to make ethically sound and well informed decisions for their patients.

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away. Become a good data analyst by creating quality data visualizations using Python. **KEY FEATURES** ● Exciting coverage on loads of Python libraries, including Matplotlib, Seaborn, Pandas, and Plotly. ● Tons of examples, illustrations, and use-cases to demonstrate visual storytelling of varied datasets. ● Covers a strong fundamental understanding of exploratory data analysis (EDA), statistical modeling, and data mining. **DESCRIPTION** Data visualization plays a major role in solving data science challenges with various capabilities it offers. This book aims to equip you with a sound knowledge of Python in conjunction with the concepts you need to master to succeed as a data visualization expert. The book starts with a brief introduction to the world of data visualization and talks about why it is important, the history of visualization, and the capabilities it offers. You will learn how to do simple Python-based visualization with examples with progressive complexity of key features. The book starts with Matplotlib and explores the power of data visualization with over 50 examples. It then explores the power of data visualization using one of the popular exploratory data analysis-oriented libraries, Pandas. The book talks about statistically inclined data visualization libraries such as Seaborn. The book also teaches how we can leverage bokeh and Plotly for interactive data visualization. Each chapter is enriched and loaded with 30+ examples that will guide you in learning everything about data visualization and storytelling of mixed datasets. **WHAT YOU WILL LEARN** ● Learn to work with popular Python libraries and frameworks, including Seaborn, Bokeh, and Plotly. ● Practice your data visualization understanding across numerous datasets and real examples. ● Learn to visualize geospatial and time-series datasets. ● Perform correlation and EDA analysis using Pandas and Matplotlib. ● Get to know storytelling of complex and unstructured data using Bokeh and Pandas. ● Learn best practices in writing clean and short python scripts for a quicker visual summary of datasets. **WHO THIS BOOK IS FOR** This book is for all data analytics professionals, data scientists, and data mining hobbyists who want to be strong data visualizers by learning all the popular Python data visualization libraries. Prior working knowledge of Python is assumed. **TABLE OF CONTENTS** 1. Introduction to Data Visualization 2. Why Data Visualization 3. Various Data Visualization Elements and Tools 4. Using Matplotlib with Python 5. Using NumPy and Pandas for Plotting 6. Using Seaborn for Visualization 7. Using Bokeh with Python 8. Using Plotly, Folium, and Other Tools for Data Visualization 9. Hands-on Examples and Exercises, Case Studies, and Further Resources

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the tools used in data analytics and data science Uses Python throughout Presents tools, alongside solved examples, with steps that the reader can easily reproduce and adapt to their needs Focuses on the practical use of the tools rather than on lengthy explanations Provides the reader with the opportunity to use the book whenever needed rather than following a sequential path The book can be read independently from the previous volume and each of the chapters in this volume is sufficiently independent from the others, providing flexibility for the reader. Each of the topics addressed in the book tackles the data science workflow from a practical perspective, concentrating on the process and results obtained. The implementation and deployment of trained models are central to the book. Time series analysis, natural language processing, topic modelling, social network analysis, neural networks and deep learning are comprehensively covered. The book discusses the need to develop data products and addresses the subject of bringing models to their intended audiences – in this case, literally to the users' fingertips in the form of an iPhone app. About the Author Dr. Jesús Rogel-Salazar is a lead data scientist in the field, working for companies such as Tympa Health Technologies, Barclays, AKQA, IBM Data Science Studio and Dow Jones. He is a visiting researcher at the Department of Physics at Imperial College London, UK and a member of the School of Physics, Astronomy and Mathematics at the University of Hertfordshire, UK.

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Marc Wintjen, 2020-06-19 Understand data analysis concepts to make accurate decisions based on data using Python programming and Jupyter Notebook Key Features Find out how to use Python code to extract insights from data using real-world examples Work with structured data and free text sources to answer questions and add value using data Perform data analysis from scratch with the help of clear explanations for cleaning, transforming, and visualizing data Book Description Data literacy is the ability to read, analyze, work with, and argue using data. Data analysis is the process of cleaning and modeling your data to discover useful information. This book combines these two concepts by sharing proven techniques and hands-on examples so that you can learn how to communicate effectively using data. After introducing you to the basics of data analysis using Jupyter Notebook and Python, the book will take you through the fundamentals of data. Packed with practical examples, this guide will teach you how to clean, wrangle, analyze, and visualize data to gain useful insights, and you'll discover how to answer questions using data with easy-to-follow steps. Later chapters teach you about storytelling with data using charts, such as histograms and scatter plots. As you advance, you'll understand how to work with unstructured data using natural language processing (NLP) techniques to perform sentiment analysis. All the knowledge you gain will help you discover key patterns and trends in data using real-world examples. In addition to this, you will learn how to handle data of varying complexity to perform efficient data analysis using modern Python libraries. By the end of this book, you'll have gained the practical skills you need to analyze data with confidence. What you will learn Understand the importance of data literacy and how to communicate effectively using data Find out how to use Python packages such as NumPy, pandas, Matplotlib, and the Natural Language Toolkit (NLTK) for data analysis Wrangle data and create DataFrames using pandas Produce charts and data visualizations using time-series datasets Discover relationships and how to join data together using SQL Use NLP techniques to work with unstructured data to create sentiment analysis models Discover patterns in real-world datasets that provide accurate insights Who this book is for This book is for aspiring data analysts and data scientists looking for hands-on tutorials and real-world examples to understand data analysis concepts using SQL, Python, and Jupyter Notebook. Anyone looking to evolve their skills to become data-driven personally and professionally will also find this book useful. No prior knowledge of data analysis or programming is required to get started with this book.

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Petrou, 2020-02-27 Use the power of pandas to solve most complex scientific computing problems with ease. Revised for pandas 1.x. Key Features This is the first book on pandas 1.x Practical, easy to implement recipes for quick solutions to common problems in data using pandas Master the fundamentals of pandas to quickly begin exploring any dataset Book Description The pandas library

is massive, and it's common for frequent users to be unaware of many of its more impressive features. The official pandas documentation, while thorough, does not contain many useful examples of how to piece together multiple commands as one would do during an actual analysis. This book guides you, as if you were looking over the shoulder of an expert, through situations that you are highly likely to encounter. This new updated and revised edition provides you with unique, idiomatic, and fun recipes for both fundamental and advanced data manipulation tasks with pandas. Some recipes focus on achieving a deeper understanding of basic principles, or comparing and contrasting two similar operations. Other recipes will dive deep into a particular dataset, uncovering new and unexpected insights along the way. Many advanced recipes combine several different features across the pandas library to generate results. What you will learn Master data exploration in pandas through dozens of practice problems Group, aggregate, transform, reshape, and filter data Merge data from different sources through pandas SQL-like operations Create visualizations via pandas hooks to matplotlib and seaborn Use pandas, time series functionality to perform powerful analyses Import, clean, and prepare real-world datasets for machine learning Create workflows for processing big data that doesn't fit in memory Who this book is for This book is for Python developers, data scientists, engineers, and analysts. Pandas is the ideal tool for manipulating structured data with Python and this book provides ample instruction and examples. Not only does it cover the basics required to be proficient, but it goes into the details of idiomatic pandas.

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more interesting and rich in insights using analytical languages. You'll start by learning how to configure your Power BI environment to use your Python and R scripts. The book then explores data ingestion and data transformation extensions, and advances to focus on data augmentation and data visualization. You'll understand how to import data from external sources and transform them using complex algorithms. The book helps you implement personal data de-identification methods such as pseudonymization, anonymization, and masking in Power BI. You'll be able to call external APIs to enrich your data much more quickly using Python programming and R programming. Later, you'll learn advanced Python and R techniques to perform in-depth analysis and extract valuable information using statistics and machine learning. You'll also understand the main statistical features of datasets by plotting multiple visual graphs in the process of creating a machine learning model. By the end of this book, you'll be able to enrich your Power BI data models and visualizations using complex algorithms in Python and R. What you will learn

Discover best practices for using Python and R in Power BI products
Use Python and R to perform complex data manipulations in Power BI
Apply data anonymization and data pseudonymization in Power BI
Log data and load large datasets in Power BI using Python and R
Enrich your Power BI dashboards using external APIs and machine learning models
Extract insights from your data using linear optimization and other algorithms
Handle outliers and missing values for multivariate and time-series data
Create any visualization, as complex as you want, using R scripts

Who this book is for This book is for business analysts, business intelligence professionals, and data scientists who already use Microsoft Power BI and want to add more value to their analysis using Python and R. Working knowledge of Power BI is required to make the most of this book. Basic knowledge of Python and R will also be helpful.

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- 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

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Key Features

- Get well-versed with various data cleaning techniques to reveal key insights
- Manipulate data of different complexities to shape them into the right form as per your business needs
- Clean, monitor, and validate large data volumes to diagnose problems before moving on to data analysis

Book Description

Getting clean data to reveal insights is essential, as directly jumping into data analysis without proper data cleaning may lead to incorrect results. This book shows you tools and techniques that you can apply to clean and handle data with Python. You'll begin by getting familiar with the shape of data by using practices that can be deployed routinely with most data sources. Then, the book teaches you how to manipulate data to get it into a useful form. You'll also learn how to filter and summarize data to gain insights and better understand what makes sense and what does not, along with discovering how to operate on data to address the issues you've identified. Moving on, you'll perform key tasks, such as handling missing values, validating errors, removing duplicate data, monitoring high volumes of data, and handling outliers and invalid dates. Next, you'll cover recipes on using

supervised learning and Naive Bayes analysis to identify unexpected values and classification errors, and generate visualizations for exploratory data analysis (EDA) to visualize unexpected values. Finally, you'll build functions and classes that you can reuse without modification when you have new data. By the end of this Python book, you'll be equipped with all the key skills that you need to clean data and diagnose problems within it. What you will learn

- Find out how to read and analyze data from a variety of sources
- Produce summaries of the attributes of data frames, columns, and rows
- Filter data and select columns of interest that satisfy given criteria
- Address messy data issues, including working with dates and missing values
- Improve your productivity in Python pandas by using method chaining
- Use visualizations to gain additional insights and identify potential data issues
- Enhance your ability to learn what is going on in your data
- Build user-defined functions and classes to automate data cleaning

Who this book is for This book is for anyone looking for ways to handle messy, duplicate, and poor data using different Python tools and techniques. The book takes a recipe-based approach to help you to learn how to clean and manage data. Working knowledge of Python programming is all you need to get the most out of the book.

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