Faysal Aziz

Advanced Python with Pandas

5-day intensive course

FA-0038 · 5-day

Software Development · Data & Analytics

Introduction

This course is tailored for individuals who have a foundational understanding of Python and are eager to explore its powerful libraries and frameworks, with a focus on data analysis using Pandas. Our goal is to equip you with the skills needed to perform complex data manipulation, analysis, and visualization tasks efficiently.

Learning outcomes

By the end of this course, you will be able to:

1. Understand and apply advanced Python concepts and features in real-world scenarios.
2. Master advanced Python concepts, including list comprehensions, generators, decorators, and context managers, and understand how to use these features to write more efficient and readable code.
3. Utilize Python's standard library to enhance your coding efficiency.
4. Master data manipulation, cleaning, and preparation techniques using Pandas.
5. Perform sophisticated data analysis and visualization tasks.
6. Apply best practices for efficient data analysis workflows in Python.
7. Acquire the skills to handle large datasets efficiently, learning techniques for data chunking, parallel processing, and using Dask with Pandas.
8. ***Create a recommendation engine using Pandas' advanced capabilities.***
9. ***Professional development and integration of a system such as a recommendation system (such as seen on e-commerce platforms) with adjustable parameters.***
10. ***Application lifecycle (using the recommendation engine as the basis of a capstone project).***

Prerequisites

To ensure you get the most out of this course, you should have:

- A solid understanding of Python (variables, data types, control structures).
- Familiarity with functions, classes, and exception handling in Python.
- Basic knowledge of data structures in Python (lists, tuples, dictionaries, sets).
- Experience with Jupyter Notebook or another Python IDE.
- An eagerness to learn and experiment with new concepts.

Training outline

1. Advanced Python Features

1. Comprehensions: List, Set, Dictionary
2. Generators and Iterators
3. Decorators and Context Managers
4. Lambda functions, Map, Filter, and Reduce
5. Modules and Packages
6. Working with the Python Standard Library (os, sys, datetime, collections)

2. Efficient Data Handling in Python

1. Advanced Data Structures (collections: namedtuple, defaultdict, Counter)
2. Working with Files (CSV, JSON, XML)
3. Handling Exceptions for Robust Code
4. Logging for Debugging and Monitoring
5. Recursion and data flattening

3. Introduction to Pandas

1. Pandas Overview and Installation
2. Series and DataFrame: Creation, Data Selection, and Indexing
3. Data Loading and Saving (CSV, Excel, SQL databases)
4. Data Cleaning and Preparation (Handling missing data, data transformation, string operations)

4. Data Analysis with Pandas

1. Advanced Data Manipulation (GroupBy, pivot tables, multi-indexing)
2. Time Series Data (Resampling, Time shifts, Rolling and Expanding windows)
3. Merging, Joining, and Concatenating DataFrames
4. Handling Categorical Data and Text Data

5. Data Visualization and Real-world Applications

1. Introduction to Data Visualization with Matplotlib and Seaborn
2. Plotting with Pandas (Line plots, Bar plots, Histograms, Scatter plots)

   Real-world Data Analysis Projects

   1. Project 1: Analyzing Financial Data
   2. Project 2: Data Cleaning and Analysis in a Real-world Dataset

6. Creating a Recommendation engine using Pandas

1. Theory and algorithm
2. Creating a fully integrated project for recommendation with real data
3. Design, develop and test
4. Deployment options
5. Code security and maintenance

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