

Hands-on: Data Science, Machine learning using Python

Syllabus

1: Introduction to Python

- ❖ Installation and Working with Python
- ❖ Introduction, why python?
- ❖ Versions of Python
- ❖ SET PATH
- ❖ PEP 8 standards
- ❖ Coding conventions
- ❖ Understanding Python variables
- ❖ Identifier rules
- ❖ Literals
- ❖ Keywords
- ❖ IDLE and information
- ❖ Different ways of execution
- ❖ Scripting
- ❖ Python Operators
- ❖ Understanding python blocks
- ❖ Indentation, comments, docstring
- ❖ Type casting, Unicode etc.

2: Python Data Types

- ❖ Mutable and Immutable data types
- ❖ Declaring and using Numeric data types: int, float, complex
- ❖ Using string data type and string operations
- ❖ Defining list and list slicing, its methods
- ❖ Use of Tuple data type

3: Python Program Flow Control

- ❖ Conditional blocks using if, else and elif
- ❖ Nested if, elif ladder
- ❖ Simple for loops in python
- ❖ For loop using range, string, list and dictionaries
- ❖ Use of while loops in python
- ❖ Loop manipulation using: pass, continue, break
- ❖ Programming using Python conditional and loops block
- ❖ Different case studies

4: Python String, List, set and Dictionary Manipulations

- ❖ Building blocks of python programs
- ❖ Understanding string built-in methods
- ❖ List manipulation using built-in methods
- ❖ Tuple operation
- ❖ Set: its methods and manipulation
- ❖ Dictionary: its methods and manipulation
- ❖ functions
- ❖ Modules and Packages

5: Fundamentals of Object orientation:

- ❖ What is OOP
- ❖ Class
- ❖ Reference variable
- ❖ Types of variables
- ❖ Types of Methods
- ❖ Importing Class
- ❖ Constructor
- ❖ OOP's Concepts: Inheritance, Encapsulation, Polymorphism, Abstraction
- ❖ File handling in detail: txt, bin, csv

6. Complete Data Science

NumPy: (Numerical Python)

- ❖ Introduction to Numpy
- ❖ Datatypes of ndarrays
- ❖ Dealing with ndarrays, copies and views
- ❖ Arithmetic operations,
- ❖ Indexing , Slicing, splitting arrays
- ❖ Shape manipulation
- ❖ Stacking together different data

Pandas: (Data Analysis)

- ❖ DataFrame and Series
- ❖ DataFrame operations
- ❖ Data Slicing, indexing
- ❖ DataFrame functions
- ❖ Reading the files- csv, excel
- ❖ Boolean filtering

- ❖ Storing file in various formats
- ❖ Useful DataFrame functions
- ❖ Stats using pandas
- ❖ Dealing with missing data
- ❖ Operations over the data

Matplotlib: (Data Visualization)

- ❖ Introduction to Matplotlib
- ❖ Formatting the graph: colors, markers, linestyle, etc
- ❖ Customization
- ❖ Plotting with list, arrays, pandas
- ❖ Line plot, Scatter plot, Pie plot, Bar plot, Histogram etc

Seaborn: (Data Visualization)

- ❖ Different types of plotting
- ❖ Scatter
- ❖ Distance
- ❖ Histogram
- ❖ Pie plot
- ❖ KDE plot
- ❖ Joint Plot
- ❖ Pair plot

8. Machine Learning

- ❖ Introduction to Machine learning,
- ❖ Types of Machine learning
- ❖ Concepts of Data Preprocessing,
- ❖ Data munging,
- ❖ Importing the data, functioning over the data
- ❖ Arithmetic operations
- ❖ Categorical and Continuous data
- ❖ Feature scaling, selection

- ❖ Binarization, Normalization. Label encoding

9. Machine Learning Algorithms

Linear Regression

- ❖ Importing data
- ❖ Data Selection, operations
- ❖ Splitting the data into training and testing
- ❖ Call the model, build the model and train
- ❖ Find the coefficients and intercept
- ❖ Accuracy measurements
- ❖ Visualization

Multi Linear Regression

- ❖ Importing Datasets
- ❖ Data preprocessing
- ❖ Feature scaling
- ❖ Training and Testing split
- ❖ Characterizing regression
- ❖ Find coefficients and intercepts
- ❖ Finding accuracy

Logistic Regression

- ❖ Theoretical introduction
- ❖ Importing Datasets
- ❖ Data pre-processing
- ❖ Feature scaling
- ❖ Characterizing regression
- ❖ Finding accuracy
- ❖ Confusion Matrix

Decision Tree Classification

- ❖ Polynomial curves
- ❖ Polynomial features
- ❖ Importing dataset
- ❖ Preparing data, preprocessing
- ❖ Characterizing regression
- ❖ Evaluating regressor
- ❖ Finding accuracy
- ❖ Visualization

Support Vector Machine

- ❖ SVM model
- ❖ Importing data, data Selection, operations
- ❖ Preprocessing
- ❖ Splitting the data into training and testing
- ❖ Call the model, build the model and train
- ❖ Predictions, Evaluating the algorithm

Naïve Bayes Classification

- ❖ Naïve Bayes working flow
- ❖ Probability learning, Applications
- ❖ Splitting the data into training and testing
- ❖ Stepwise model building
- ❖ Predictions & Evaluating the algorithm

KNN Classifier:

- ❖ Importing data, data Selection, operations
- ❖ Pros and cons
- ❖ Preprocessing
- ❖ Splitting the data into training and testing
- ❖ Feature scaling
- ❖ Call the model, build the model and train
- ❖ Predictions, Comparing error rate-k value

KMeans clustering:

- ❖ Introduction to Unsupervised learning model
- ❖ K-means clustering in detail
- ❖ Importing the dataset
- ❖ Finding the clusters
- ❖ Visualize the clusters
- ❖ Applying the transformation
- ❖ Building the model
- ❖ Visualize complete clustered model.

Random Forest Regression

- ❖ Ensemble learning
- ❖ How Random Forest works?
- ❖ Advantages and Disadvantages
- ❖ Preparing data
- ❖ Training the regressor
- ❖ Evaluating regressor
- ❖ Accuracy score

Add-on

- ❖ **Building the Machine Learning model**
- ❖ **Git/GitHub: Introduction**
- ❖ **Introduction to Agile Methodology**

- ❖ **Maven**
- ❖ **Jenkins**
- ❖ **Jira**
- ❖ **Support in Technical portfolio building**
- ❖ **Lectures by industry Experts**
- ❖ **Mock and Technical round preparation**
- ❖ **Resume building assistance**
- ❖ **Python 50 Projects**
- ❖ **Data Science 50 Projects**
- ❖ **Machine Learning 50 projects**

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