



NTI TECH ACADEMY

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DATA SCIENCE & ML USING PYTHON TRAINING

Introduction To Python

- Why Python
- Application areas of python
- Python implementations
- Cpython
- Jython
- Ironpython
- Pypy
- Pythonversions
- Installingpython
- Python interpreter architecture
- Python byte code compiler
- Python virtual machine(pvm)

Writing and Executing First Python Program

- Using interactive mode
- Using script mode
- General text editor and commandwindow
- Idle editor and idleshell
- Understanding print() function
- How to compile python programexplicitly

Python Language Fundamentals

- Character set
- Keywords
- Comments
- Variables
- Literals

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- Operators
- Reading input from console
- Parsing string to int, float

Python Conditional Statements

- If statement
- If else statement
- If elif statement
- If elif else statement
- Nested if statement

Looping Statements

- While loop
- For loop
- Nested loops
- Pass, break and continue keywords

Standard Data Types

- Int, float, complex, bool, nonetype
- Str, list, tuple, range
- Dict, set, frozenset

String Handling

-
- What is string
- String representations
- Unicode string
- String functions, methods
- String indexing and slicing
- String formatting

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Python List

- Creating and accessing lists
- Indexing and slicing lists
- List methods
- Nested lists
- List comprehension

Python Tuple

- Creating tuple
- Accessing tuple
- Immutability of tuple

Python Set

- How to create a set
- Iteration over sets
- Python set methods
- Python frozenset

Python Dictionary

- Creating a dictionary
- Dictionary methods
- Accessing values from dictionary
- Updating dictionary
- Iterating dictionary
- Dictionary comprehension

Python Functions

- Defining a function
- Calling a function
- Types of functions
- Function arguments
- Positional arguments, keyword arguments
- Default arguments, non-default arguments
- Arbitrary

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arguments, keyword arbitraryarguments • Function
return statement

- Nested function
- Function as argument
- Function as return statement
- Decorator function
- Closure
- Map(), filter(), reduce(), any()functions •
- Anonymous or lambdafunction

Modules & Packages

- Why modules
- Script v/module
- Importingmodule
- Standard v/s third partymodules
- Why packages
- Understanding pip utility

File I/O

- Introduction to filehandling
- File modes
- Functions and methods related to filehandling •
- Understanding with block

Object Oriented Programming

- Procedural v/s object orientedprogramming •
- OOP principles
- Defining a class &objectcreation
- Object attributes
- Inheritance
- Encapsulation
- Polymorphism

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Exception Handling

- Difference between syntax errors and exceptions
- Keywords used in exception handling
- try, except, finally, raise, assert
- Types of except blocks

Regular Expressions(Regex)

- Need of regular expressions
- Re module
- Functions /methods related to regex
- Meta characters & special sequences

GUI Programming

- Introduction to tkinter programming
- Tkinter widgets
- Tk, label, Entry, Textbox, Button
- Frame, messagebox, filedialog etc
- Layout managers
- Event handling
- Displaying image

Multi-Threading Programming

- Multi-processing v/s Multi-threading
- Need of threads
- Creating child threads
- Functions /methods related to threads
- Thread synchronization and locking

SQL

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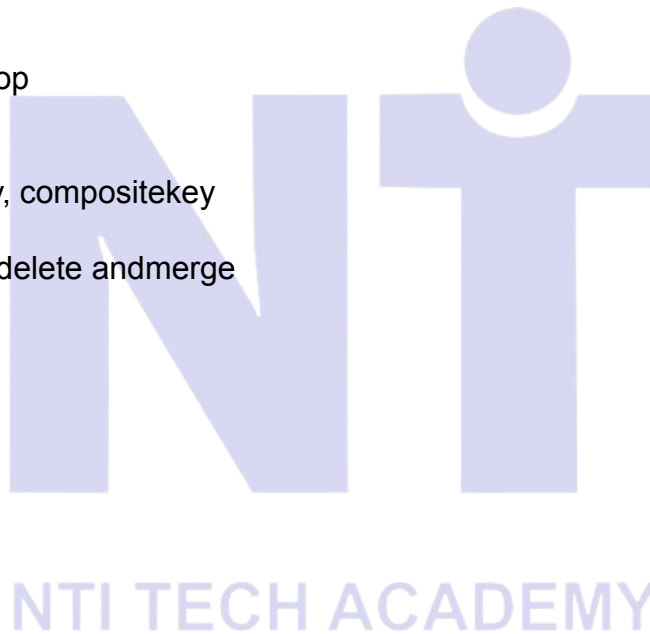
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Introduction to Database

- Database Concepts
- What is DatabasePackage?
- Understanding DataStorage
- Relational Database (RDBMS)Concept

SQL (Structured Query Language)

- SQLbasics
- DML, DDL & DQL
- DDL: create, alter, drop
- SQLconstraints:
- Not null, unique,
- Primary & foreign key, compositekey
- Check, default
- DML: insert, update, delete andmerge
- DQL : select
- Select distinct
- SQLwhere
- SQLoperators
- SQLlike
- SQL orderby
- SQLaliases
- SQLviews
- SQLjoins
- Inner join
- Left (outer) join
- Right (outer) join
- Full (outer) join
- Mysql functions
- Stringfunctions
- Char_length
- Concat
- Lower
- Reverse
- Upper



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- Numeric functions
- Max, min, sum
- Avg, count, abs
- Date functions
- Curdate
- Curtime
- Now

Statistics, Probability & Analytics:

Introduction to Statistics

- Sample or population
- Measures of central tendency
- Arithmetic mean
- Harmonic mean
- Geometric mean
- Mode
- Quartile
- First quartile
- Second quartile (median)
- Third quartile
- Standard deviation

Probability Distributions

- Introduction to probability
- Conditional probability
- Normal distribution
- Uniform distribution
- Exponential distribution
- Right & left skewed distribution
- Random distribution
- Central Limit Theorem

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Testing Hypothesis

- Normality test
- Mean test
- T-test
- Z-test
- ANOVA test
- Chi square test
- Correlation and covariance

Numpy Package

- Difference between list and numpy array
- Vector and matrix operations
- Array indexing and slicing

Panda Package

Introduction to pandas

- Labeled and structured data
- Series and dataframe objects

How to load datasets

- From excel
- From csv
- From html table

Accessing data from Data Frame

- at & iat
- loc & iloc
- head() & tail()

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Exploratory Data Analysis (EDA)

- describe()
- groupby()
- crosstab()
- boolean slicing /query()

Data Manipulation & Cleaning

- Map(), apply()
- Combining data frames
- Adding/removing rows & columns
- Sorting data
- Handling missing values
- Handling duplicacy
- Handling data error

Handling Date and Time

Data Visualization using matplotlib and seaborn packages

- Scatter plot, lineplot, barplot
- Histogram, pie chart,
- Jointplot, pairplot, heatmap
- Outlier detection using boxplot

Machine Learning:

Introduction To Machine Learning

- Traditional v/s Machine Learning Programming
- Real life examples based on ML
- Steps of ML Programming
- Data Preprocessing revised
- Terminology related to ML

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Supervised Learning

- Classification
- Regression

Unsupervised Learning

- Clustering

KNN Classification

- Math behind KNN
- KNN implementation
- Understanding hyperparameters

Performance metrics

- Math behind KNN
- KNN implementation
- Understanding hyperparameters

Regression

- Math behind regression
- Simple linear regression
- Multiple linear regression
- Polynomial regression
- Boston price prediction
- Cost or loss functions
- Mean absolute error
- Mean squared error
- Root mean squared error
- Least square error
- Regularization

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Logistic Regression for classification

- Theory of logistic regression
- Binary and multiclass classification
- Implementing titanic dataset
- Implementing iris dataset
- Sigmoid and softmax functions

Support Vector Machines

- Theory of SVM
- SVM Implementation
- kernel, gamma, alpha

Decision Tree Classification

- Theory of decision tree
- Node splitting
- Implementation with iris dataset
- Visualizing tree

Ensemble Learning

- Random forest
- Bagging and boosting
- Voting classifier

Model Selection Techniques

- Cross validation
- Grid and random search for hyper parameter tuning

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Recommendation System

- Content based technique
 - Collaborative filtering technique
 - Evaluating similarity based on correlation •
- Classification-based recommendations

Clustering

- K-means clustering
- Hierarchical clustering
- Elbow technique
- Silhouette coefficient
- Dendrogram

Text Analysis

- Install nltk
 - Tokenize words
 - Tokenizing sentences
 - Stop words customization
 - Stemming and lemmatization •
- Feature extraction
- Sentiment analysis
 - Count vectorizer
 - Tfidfvectorizer
 - Naive bayes algorithms

Dimensionality Reduction

- Principal component analysis (pca)

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Open CV

- Reading images
- Understanding gray scale image •
- Resizing image
- Understanding haar classifiers •
- Face, eyes classification
- How to use webcam in opencv •
- Building image dataset
- Capturing video
- Face classification in video
- Creating model for gender prediction

Tableau

Tableau - Home

- Tableau - overview
- Tableau - environment setup •
- Tableau - get started
- Tableau - navigation
- Tableau - design flow
- Tableau - file types
- Tableau - data types
- Tableau - show me
- Tableau - data terminology

Tableau - Data Sources

- Tableau - custom data view
- Tableau - data sources
- Tableau - extracting data
- Tableau - field operations
- Tableau - editing metadata
- Tableau - data joining
- Tableau - data blending

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Tableau – Work Sheet

- Tableau - addworksheets
- Tableau - renameworksheet •
- Tableau - save &deleteworksheet •
- Tableau - reorderworksheet
- Tableau - pagedworkbook

Tableau – Calculation

- Tableau -operators
- Tableau -functions
- Tableau - numericcalculations •
- Tableau - stringcalculations
- Tableau - datecalculations
- Tableau - tablecalculations
- Tableau - lodexpressions

Tableau – Sorting & Filter

- Tableau - basicsorting
- Tableau - basicfilters
- Tableau - quickfilters
- Tableau - contextfilters
- Tableau - conditionfilters
- Tableau - topfilters
- Tableau - filteroperations

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Tableau - Charts

- Tableau - barchart
- Tableau - linechart
- Tableau - piechart
- Tableau - crosstab
- Tableau - scatterplot
- Tableau - bubblechart
- Tableau - bulletgraph
- Tableau - boxplot
- Tableau - treemap
- Tableau - bumpchart
- Tableau - ganttchart
- Tableau - histogram
- Tableau - motioncharts
- Tableau - waterfallcharts
- Tableau - dashboard

Projects

- One project using python & sql
- One project using python & ml
- One dashboard using tableau

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