

Python for Machine Learning

Module 1: Statistics

Module 2: Python Programming Language

Module 3: Data Analytics [Numpy, Pandas, Matplotlib, Seaborn]

Module 4: Machine Learning [Scikit learn]

Module 1: Statistics

1) Understanding the Data

- 1) Data, Data Types
- 2) Meaning of variables
- 3) Measures of Central Tendency
- 4) Measures of Spread / Dispersion
- 5) Measures of Shape
- 6) Data Distribution
- 7) Correlation, Covariance
- 8) Practical Examples

2) Probability Distributions

- 1) Mean, Median, Mode, Expected value
- 2) Binomial Random Variable
- 3) Normal Distribution
- 4) Poisson Random Variable
- 5) Continuous Random Variable
- 6) Discrete Random Variable
- 7) Practical Examples

3) Sampling Distributions

- 1) Central Limit Theorem
- 2) Sampling Distributions for Sample Proportion, p -hat
- 3) Sampling Distributions for Sample Mean, \bar{x} , Z-scores
- 4) Practical Examples

4) Hypothesis Testing

- 1) Type I and Type II Errors
- 2) Decision Making, Power
- 3) Testing for mean, variance, proportion
- 4) Practical Examples

5) Association between Categorical Variables

- 1) Contingency Tables
- 2) Independent and Dependent
- 3) Pearson's Chi-Square Test
- 4) Misuses of Chi-Squared Test
- 5) Measures of Association
- 6) Practical Examples

6) ANOVA Analysis

- 1) Analysis of Variance & Co-Variance
- 2) ANOVA Assumptions & Comparisons
- 3) F-Tests
- 4) Practical Examples

Module 2: Python Programming Language

1) Installation

- 1) Ensure you can run Python from the command line
- 2) Ensure you can run pip from the command line
- 3) Ensure pip, setuptools, and wheel are up to date
- 4) Optionally, create a virtual environment
- 5) Creating Virtual Environments
- 6) Use pip for Installing
- 7) Installing from PyPI
- 8) Source Distributions vs Wheels
- 9) Upgrading packages
- 10) Installing to the User Site
- 11) Requirements files

2) Python Programming Basics

- 1) Demo: Evolution and Top Computer Languages
- 2) Why step into Python?
- 3) Python Features
- 4) Why Python is Year-on-Year Demand?
- 5) Python Frameworks, Career Perspective in Python
- 6) Job Opportunities in Python
- 7) Where Python is Used?
- 8) Compare with Other Popular Languages?
- 9) Python.org, Python Installation & Introduction
- 10) What are Operators, Expressions, Data Types?
- 11) What are Variables and Rules, Statements, Python Shell, Program Execution, Python Editors?
- 12) Different types of Comments and Functions, Programming Rules
- 13) Boolean Values, Data type Conversions
- 14) Flow Controls: If-else, If-elif-else, Assignment
- 15) Augmented Operators, Multiple Assignment
- 16) While Loop, For Loop
- 17) Break, Continue, Pass, exit(), Range() function, Infinite Loops
- 18) Functions, Return statement, Parameter types, Optional and Named Parameters, Loops with Functions,
- 19) Value and Reference Types, Local and Global Scope,
- 20) LIST, Tuple, Type, Index, Slicing, Sub lists, Concatenation, Replication, in and not in, append,
- 21) index(), insert(), remove(), sort(), like, Mutable, Immutable, Converting types
- 22) Dictionary Type: keys(), values(), items(), get(), setdefault(), pprint(), pformat()
- 23) Programs: Find Given number is Prime or not
- 24) Programs: Biggest among 3 values, Given number is Even or Odd
- 25) Programs: Print Sum of the Given Range of values, Print Given Range of Tables

3) Strings

- 1) String Literals, Escape Sequences, Raw strings, Triple Quotes, String Concatenation and Replica, Multiline Strings, Indexing and Slicing, in and not in Operators, String Methods, Regular Expressions, Pattern Matching, matching Multiple groups
- 2) Methods: lower(), upper(), title(), isalpha(), isdecimal(), isspace(), join(), split(), rjust(), ljust(), strip(), lstrip(), startswith(), endswith(), isdigit(), maketrans(), replace(), max(), min(), replace(), index(), rindex(), find(), rfind(), swapcase(), zfill() Modules: re, re.compile(), re.search(), format()
- 3) To Remove special Characters, Sort Words alphabetical order
- 4) Print list of Unicode chars, Common Characters in strings
- 5) Substring in a string, to check Phone Number string
- 6) Programs: User need to input until correct age and password, Program to find given string is Palindrome

4) Files

- 1) Reading and Writing Files, Absolute and Relative path, file methods, Open files, Reading file, Writing or Appending data, Current Working directory, File path, checking path directory, store list of variables onto a file, Savings variables using Shelve module, Shutil module, Moving and Renaming Files and Folders, Permanently Deleting Folders and files, Command Line Arguments
- 2) Methods: open(), read(), Write(), close(), readLine(), seek(), tell(), makedirs(), getcwd(), getsize(), listdir(), isfile(), isdir(), pprint.pformat(), unlink(), rmdir(), rmtree(), os.walk(), shutil.copy(), copytree(), move(), read(n), readlines(), truncate(), argv
- 3) Accept String and write onto a file until user presses Enter key
- 4) Find Given String in a File, Program to Merge Name and body
- 5) Display list of Folders, Filenames and File size, Restore data from drive
- 6) Programs: Reading data from a file character wise, Line by Line

5) Functions

- 1) Passing Parameter to a function, Required Arguments, Keyword Arguments, Variable Length Arguments, Default Arguments
- 2) Recursive Functions, Inner Functions, Nested Functions, Type less Functions, Returning Multiple Parameters
- 3) Mixed List and Dictionary Parameter Passing, Recursive Functions,
- 4) ASCII and Unicode
- 5) Enumerate, Generator Function
- 6) Lambda Function, Collecting lambda functions in LIST
- 7) Methods: ord(), chr(), Enumerate(), yield(), zip(), dir(), help()
- 8) Programs: Difference between Normal and Lambda Function, Return List of elements which are divisible by 2 using Lambda, collecting List of values in Lambda functions.

6) Collections

- 1) List, Set, Tuple and Dictionary Data types
- 2) Mutable and Immutable Data Types
- 3) Working with References, List Concatenation and Replica, Nested List : List of Lists, Stack and Queue DS, List Slicing, Two and Three Dimensional Matrix, List Comprehension, Multiple Assignment, dictionary methods, pretty Printing, set, union, intersection, difference, Swapping values using or, xor
- 4) Methods: append(), extend(), insert(), remove(), clear(), index(), count(), sort(), copy(), reverse(), len(), list(), enumerate(), max(), min(), sum(), pop(), items(), values(), keys(), setdefault()
- 5) Intersect strings and List, Sort and Reverse using Lists and Tuples
- 6) Using Nested Lists, Stack and Queue, Slice Insert and Delete
- 7) Addition of two Matrices, Multiplication of Matrix, Transpose of a Matrix
- 8) Fibonacci Series, Find number of Primes in a List, Building List Comprehension
- 9) Programs: Search a key in a List, Difference between Extend and Append in a List

7) Regular Expressions

- 1) Regular Expression Basics
- 2) Regex Groups and the Pipe Character
- 3) Repetition in Regex Patterns and Greedy / Non greedy Matching
- 4) Regex Dot-Star and the Caret/Dollar Characters
- 5) Regex sub() Method and Verbose Mode
- 6) Regular Expression using the methods like compile(), search(), group(), findall(), match(), split()
- 7) Quantifiers in Regular Expression
- 8) Program: Quantifiers in Regular Expression
- 9) Program: Special Characters in Regular Expression
- 10) Program: Using Regular Expressions on Files
- 11) Program: Using Regular Expressions to get data from a HTML table
- 12) Program: A Phone and Email Scraper

8) Date & Time

- 1) Introduction to Time module
- 2) Finding current Date and Time
- 3) now() method
- 4) Combining Date and Time
- 5) Formatting Date & Time – codes
- 6) Program: Formatting Date and Time
- 7) Program: To accept a date from the keyboard and display the day of the week
- 8) Program: Finding difference between two dates
- 9) Program: Finding difference between two times
- 10) Program: Comparing two dates
- 11) Program: Sorting dates
- 12) Program: Delaying program's execution
- 13) Program: Knowing program's efficiency
- 14) Program: Using "calendar" module

9) Python Decorators and Generators

- 1) Generator Syntax
- 2) Difference between Iteration and Generators
- 3) Creating Generators
- 4) Decorators Purpose
- 5) Simple Function Decorators
- 6) Classes as Decorators
- 7) Decorator Arguments

10) Data Structures in Python

- 1) Program: Implementing a Linked List
- 2) Program: Implementing a Stack
- 3) Program: Implementing a Queue
- 4) Program: Implementing a DeQue

11) Debugging & Exception Handling

- 1) Types of Errors
- 2) Syntax and Logical Errors
- 3) Runtime Error
- 4) Exception Handling, Try-Except
- 5) Types of Exception, Multiple Exception block, Raise Exception,
- 6) Handle Multiple Exceptions, IDLE's Debugger
- 7) Go, Step, Over, Out, Quit, Debugger Mode
- 8) Global and Local Variables
- 9) Debugging Mutable and Immutable Objects, Trace outs, Breakpoints
- 10) Programs: How to handle Runtime Error, How to Handle Multiple Exceptions, Raising Exceptions
- 11) Program using Mutable and Immutable Objects

12) Object Oriented Programming OOPs

- 1) Difference between Procedure Oriented Programming and Object Oriented Programming
- 2) Object Oriented Concepts
- 3) What is Class and Object
- 4) OOPS Features : Encapsulation, Polymorphism, Abstraction, Inheritance
- 5) Types of Inheritance
- 6) What is constructor, Passing parameters to Constructors
- 7) Initializing Objects, class method, static variable and methods
- 8) Fibonacci Series, Find number of Primes in a List, Building List Comprehension
- 9) Example using Overloading and Overriding, Object Overloading
- 10) Abstract methods and their need
- 11) Program on Abstract method and abstract class
- 12) Program on Interfaces in Python
- 13) Programs: What is Class and Object, Declaring self, Multiple methods call through object

13) Packaging Python Projects

- 1) A simple project
- 2) Creating the package files
- 3) Creating a test folder
- 4) Creating setup.py
- 5) Generating distribution archives
- 6) Uploading the distribution archives

(Advanced Python Programming)

14) Implementing Multithreading in Python

- 1) Different ways of Creating user-defined Threads in Python
- 2) Program: Creating a Thread without extending any class – target function not taking any Arguments
- 3) Program: Creating a Thread without extending any class – target function taking some arguments
- 4) Program on creating our own Thread by extending Thread class
- 5) Program on creating multiple Threads
- 6) Synchronization
- 7) Program: Without Synchronization
- 8) Program: With Synchronization – using Locks
- 9) Program: Producer Consumer Threads – Problem (Buggy Program)
- 10) Program: Producer Consumer Threads – Problem – Solution – using Condition class
- 11) Program: Producer Consumer Threads – Problem – Solution – using Queue class

15) Socket/Network Programming

- 1) What is a Computer Network
- 2) Different Types of Networks
- 3) Equipment used in Networking
- 4) Clients and Servers
- 5) Protocols
- 6) Sockets
- 7) Program: Knowing the IP Address of a website
- 8) Program: To get different parts of the web URL
- 9) Program: Reading the source code of a Web Page
- 10) Program: Downloading a web page from internet
- 11) Program: Downloading an image from internet
- 12) Socket Programming in Python
- 13) Program: Socket Programming in Python – Client-Server Demo
- 14) Program: Socket Programming in Python- creating a chat application – demo

16) GUI Programming in Python

- 1) How to install PyCharm IDE and use it
- 2) Program: GUI Programming in Python using Tkinter Module
- 3) Program: GUI Programming using PyQt5 Module
- 4) Program: GUI Programming using PyQt5 Designer
- 5) Program: Creating a GUI Calculator1 using PyQt5 Designer
- 6) Converting .py to .exe (Steps)

17) Sending Email

- 1) Sending Email from Python code - Ex1
- 2) Sending Email from Python code – Ex2 (Sending to Multiple Receivers)
- 3) Sending Email from Python code – Ex3 (Sending message with a subject)
- 4) Sending Email from Python code – Ex4 (Sending message with File Attachment)

18) Python XML and JSON Processing

- 1) Program: Python XML Processing Demo1
- 2) Program: Python XML Processing Demo2 - findall()
- 3) Program: Python XML Processing Demo3 - iter()
- 4) Program: Python JSON Processing Demo1
- 5) Program: Python JSON Processing Demo2 – traversing the details of all Employees
- 6) Program: Python JSON Processing Demo3 - getting a particular key's value
- 7) Program: Python JSON Processing Demo4 - getting nth key's value in an array
- 8) Program: Python JSON Processing Demo5 - len()

19) Python Database Programming – accessing MySQL Database

- 1) Program: Establishing a connection with the MySQL Database and fetching all records in a table
- 2) Program: Get a particular Record(s) in a table
- 3) Program: Add/Insert Record
- 4) Program: Update a Record
- 5) Program: Delete a Record
- 6) Program: Establishing a connection with a public MySQL Database Engine Server and fetching all
- 7) records in a table

20) Python Database Programming – accessing Oracle Database

- 1) Establishing a connection with the Oracle Database and fetching all records in a table
- 2) Program: Add/Insert Record
- 3) Program: Update a Record
- 4) Program: Invoking a stored procedure in Oracle DB
- 5) Program: Invoking a stored procedure in Oracle DB with “out” parameters
- 6) Program: Invoking a stored function in Oracle DB

21) Python Database Programming – accessing MongoDB Database

- 1) Program: Establishing a connection with the MongoDB Database and fetching all documents in a collection
- 2) Program: To exclude the _id field in a find query in pymongo
- 3) Program: Establishing a connection with a public MongoDB Database Engine Server and fetching
- 4) all documents in a collection
- 5) Program: Get a particular Document(s) in a Collection – condition with logical operator
- 6) Program: Get a particular Document(s) in a Collection – condition with equality
- 7) Program: Add a Document to a MongoDB Database Collection
- 8) Program: Update a Document
- 9) Program: Delete a Document

Module 3: Data Analysis

1) NumPy

- 1) Program: NumPy Demo1
- 2) Program: NumPy Demo2 – transforming the 1D array into 2D array
- 3) Program: NumPy avoids copies wherever possible – demo
- 4) Program: If we need a true copy of an array – demo
- 5) Program: To demonstrate that in NumPy arrays, the operations are propagated to the individual elements.
- 6) Program: Indexing Demo1
- 7) Program: Indexing Demo2
- 8) Program: Array Indexing Demo3 – Generating arrays using `arange()`
- 9) Program: Generating arrays using `arange()` – Ex2
- 10) Program: To generate zeros
- 11) Program: To generate ones
- 12) Program on `linspace()`
- 13) Program: To generate identity matrix
- 14) Program: To generate random numbers between 0 to 1
- 15) Program: Generating random integers
- 16) Program: Finding index of max value and min value in an array
- 17) Program: Knowing datatype of an array
- 18) Program: Slicing / Indexing 2-D arrays
- 19) NumPy Operations
- 20) Program: Performing arithmetic operations between two 1-D arrays
- 21) Program: Applying a scalar value to a 1-D array
- 22) Program: Using Universal array Functions on 1-D arrays
- 23) Program: Comparing Arrays
- 24) Program on `any()` and `all()`
- 25) Program: on `logical_and()`, and `logical_or()` functions
- 26) Program: on `where()`
- 27) Program: To retrieve non-zero elements from an array
- 28) Program: Aliasing the arrays()
- 29) Program: Viewing arrays (shallow copying)
- 30) Program: Copying arrays (deep copying)
- 31) Program: Attributes of an Array – `ndim`
- 32) Program: Attributes of an array – `shape`
- 33) Program: Attributes of an array – `size`, `itemsize`, `dtype`, `nbytes`
- 34) Program on `reshape()`
- 35) Program on `flatten()`
- 36) Program: Matrix object in numpy – demo1
- 37) Program: Getting diagonal elements of a Matrix
- 38) Program: Finding Max and Min elements in a Matrix
- 39) Program: Finding Sum and Average of Matrix elements
- 40) Program: Product of Matrix elements
- 41) Program: Sorting of Matrix elements
- 42) Program: Transpose of a Matrix
- 43) Program: Addition of two matrices
- 44) Program: Multiplication of two matrices

2) Pandas

- 1) What is Data Analysis?
- 2) What is Pandas and How to install pandas?
- 3) What is a Pandas Series and Pandas DataFrame?
- 4) What is the difference between Series and DataFrame?
- 5) Program: Reading tabular data file (data with rows and columns) into pandas – demo on read_table()
- 6) Program: To display top 7 rows and last 7 rows only
- 7) Program: Explicitly specifying the delimiter symbol and solving header row problem
- 8) Program: Explicitly specifying the column names
- 9) Program on read_csv() and to_csv
- 10) Program on type() and selecting a pandas series from a DataFrame
- 11) Program: Creating a new series/column in a DataFrame
- 12) Program: Filtering rows of a pandas DataFrame by column value
- 13) Program: using the loc indexer – conditional lookup
- 14) Program: Applying multiple filter criteria to a pandas DataFrame
- 15) Program: Reading from a selection of columns
- 16) Program on iterrows(), iteritems()
- 17) Program on dropping a column or a row from display, also covers usage of “axis” parameter
- 18) Program on mean() method
- 19) Program on “groupby” in pandas
- 20) Program on using multiple aggregate functions at one go
- 21) Program: Grabbing information from a Series
- 22) Program: Basic operations on a Series
- 23) Program: Creating DataFrame from a Python Dictionary
- 24) Program: Creating DataFrame from a Python List of Tuples, also covers Transposing a DataFrame and
- 25) Adding a header to a DataFrame
- 26) Program: Creating a DataFrame and doing some operations on it
- 27) Program: Retrieving alternate rows and retrieving rows in reverse order
- 28) Program: Dealing with Missing data
- 29) Program: Concatenation of DataFrames
- 30) Program: Merging of DataFrames based on single key
- 31) Program: Joining of DataFrames
- 32) Program on head() of DataFrame
- 33) Program: Getting unique elements of a column in a DataFrame
- 34) Program: Getting count of unique elements of a column in a DataFrame
- 35) Program: Getting count of each unique element of a column in a DataFrame
- 36) Program on apply() on a DataFrame, Program on apply() on a lambda expression
- 37) Program: Knowing column names of a DataFrame
- 38) Program: Dropping a column in a DataFrame
- 39) Program: Sorting a DataFrame
- 40) Program: Setting a column as index
- 41) Program: Checking for null values in a DataFrame
- 42) Program: To figure out whether there are any null values in a DataFrame
- 43) Program: To figure out how many null values are present in a DataFrame
- 44) Program: Reading and writing from an Excel Spreadsheet file
- 45) Program: Reading from an HTML table (Web Scrapping in Pandas)
- 46) Project: Mini Project1 on Pandas Data Analysis – Analysis on San Francisco Employees Salaries Data
- 47) Project: Mini Project2 on Pandas Data Analysis - Analysis on E-Commerce Purchase Data

3) **Matplotlib [Data Visualization]**

- 1) What is Data Visualization?
- 2) Why should we go for Data Visualization
- 3) What is Matplotlib
- 4) How to Install Matplotlib
- 5) Program: A Simple plot using Matplotlib
- 6) Program: To Demonstrate creating multiple plots on the same canvas
- 7) Program on using Matplotlib's object-oriented API method
- 8) Program: To demonstrate putting a plot inside another plot
- 9) Program: Creating sub-plots using Object-Oriented method
- 10) Program: Controlling Figure size and DPI
- 11) Program: To save a matplotlib's figure/plot
- 12) Program: Displaying legends
- 13) Program: Settings colors, line widths, line types and markers
- 14) Program: Controlling axes appearance

4) **Seaborn [Data Visualization]**

- 1) What is Seaborn?
- 2) Seaborn Vs Matplotlib
- 3) How to install Seaborn
- 4) Program on loading a seaborn built-in dataset – “tips”
- 5) Program on distplot, jointplot
- 6) Program on pairplot
- 7) Program on Pairplot with a “hue” argument & Program on pairplot with palette argument
- 8) Program on “rugplot” (dashed plot)
- 9) Program on kdeplot
- 10) Program on barplot
- 11) Program on using the estimator argument for the barplot
- 12) Program on countplot
- 13) Program on Boxplot
- 14) Program on violinplot
- 15) Program on violinplot using “split” argument
- 16) Program on stripplot
- 17) Program on swarmplot
- 18) Program on combining violinplot and swarmplot
- 19) Program on factorplot/catplot
- 20) Program on heatmap
- 21) Program on clustermap
- 22) Program on PairGrid
- 23) Program on facetGrid
- 24) Program on Implot (Linear regression model plot)
- 25) Program on controlling size and color of seaborn plots
- 26) Program on line plot
- 27) Project: Seaborn Data Visualizations on the titanic dataset

5) **Pandas Data Visualization capabilities**

- 1) Program on histogram, bar plot
- 2) Program on line plot, scatter plot
- 3) Program on Program on box plot
- 4) Program on pie chart

6) Plotly and Cufflinks

- 1) Installation of Plotly and Cufflinks
- 2) Program on Line plot
- 3) Program on Scatter plot
- 4) Program on Bar plot
- 5) Program on Box plot
- 6) Program on Histogram plot
- 7) Program on Bubble plot

7) Geographical Plotting / Choropleth Maps

- 1) What is Geographical Plotting
- 2) What is Choropleth Maps
- 3) Program: Demo1 on Choropleth Mapping on a particular nation-wide scale
- 4) Program: Demo2 on Choropleth Mapping on a particular nation-wide scale
- 5) Program: Demo3 on Choropleth Mapping on Global/World/International scale

8) Data Capstone Projects

- 1) Project: 911 calls dataset from kaggle – Emergency call data in Pennsylvania
- 2) What is Exploratory Data Analysis
- 3) Project: Finance/Stock Market Data Analytics

Capstone project: When we pursue any course or under some training, at the end of the training we should be able to apply our knowledge to solve some real-world problems/requirements

9) Social Media Analytics

- 1) Program: Twitter Data Mining - Sentiment Analysis
- 2) Program: To draw a Pie chart on Twitter sentiment analysis
- 3) Program: Word Cloud using Python - Ex1 (on a Sample data)
- 4) Program: Word Cloud using Python - Ex2 (on Twitter tweets)
- 5) Program: Word Cloud using Python - Ex3 (on a Wikipedia article), also covers styling the WordCloud
- 6) Program: YouTube Data Analytics using Python

10) Python Geocoding/Location Mapping

- 1) What is Geocoding/Location Mapping
- 2) Installation
- 3) Program: Mapping the geo-coordinates Ex1
- 4) Program: Mapping with markers
- 5) Program: Marking multiple points
- 6) Program: Using Polygon Markers
- 7) Program: Geo-Visualization of San Francisco's Crime Data 2018
- 8) Program: Clustered Markers Demo
- 9) Program: Drawing lines between Markers

Module 4: Machine Learning

1) Basic Techniques of ML

- 1) Splitting the dataset for training and testing
- 2) Evaluating the accuracy using cross-validation
- 3) Visualizing the confusion matrix
- 4) Extracting the performance report
- 5) Evaluating cars based on their characteristics (task)
- 6) Extracting validation curves
- 7) Extracting learning curves
- 8) Estimating the income bracket (task)

2) Linear Regression

- 1) Simple Linear Regression with Gradient Descent
- 2) Linear Regression with Quadratic equation
- 3) Stochastic Gradient Descent Model
- 4) Error Minimization Model
- 5) Linear Regression for classification
- 6) Estimating the coefficients
- 7) Assessing the accuracy of the coefficient estimates
- 8) Multiple Linear regression
- 9) Finding a new dependent Variable as prediction
- 10) How to find a Slope and Intercept
- 11) Project: Linear Regression Project - to predict yearly amount spent via Mobile App and Website by Ecommerce customers

3) Logistic Regression

- 1) Spline Regression
- 2) Sigmoid, Ridge and Lasso Regression
- 3) The Logistic Model
- 4) Estimating the Regression Coefficients
- 5) Making predictions
- 6) Multiple Logistic Regression
- 7) Non-Linear Regression
- 8) Project: Logistic Regression Project – predict whether or not an internet user will click on an Advertisement

4) Linear Discriminant Analysis

- 1) Exploratory Data Analysis
- 2) Single Variant Model Analysis
- 3) Multi Variant Model Analysis
- 4) Quadratic Discriminant Analysis

5) Support Vector Machines

- 1) Maximum Margin Classifier
- 2) What is a hyperplane
- 3) What are marginal Hyper planes
- 4) Classification using a separating Hyper plane
- 5) SVM Linear Model
- 6) SVM Non-Linear Model
- 7) SVM Kernel Method
- 8) SVM Power Kernel Method
- 9) Project: SVM Project – to classify iris flowers

6) K-Nearest Neighbors

- 1) Advantages of KNN
- 2) Disadvantages of KNN
- 3) How to find an appropriate K value?
- 4) How do we use KNN for classification?
- 5) How do we use KNN for regression?
- 6) How to find the Nearest Neighbor?
- 7) Project: KNN Project – working with UCI dataset – classify type of breast cancer for a set of patients

7) Random Forest

- 1) What is Random Forests?
- 2) Overview of Random Forests
- 3) Classification with Random Forests
- 4) Implementation of Random Forests
- 5) Project: Decision Trees and Random Forests using Python – Predict whether a customer would repay the loan amount or not

8) Decision Trees

- 1) How to build a decision tree
- 2) What is classification and its uses?
- 3) What is a decision tree
- 4) Creating a Decision tree
- 5) Information Entropy
- 6) Information Gain
- 7) Gini Index and Entropy methods
- 8) Project: Decision Trees and Random Forests on IRIS Dataset – to classify a flower

9) Time Series Analysis

- 1) Qualitative Methods
- 2) Quantitative Methods
- 3) Moving Averages
- 4) Smoothing Techniques
- 5) Exponential Smoothing
- 6) Weighted Moving Averages
- 7) ARMA, ARIMA
- 8) Trend and Seasonality forecasting
- 9) Linear, Quadratic, Exponential
- 10) Auto Regressive

10) Machine Learning with Clustering Models [unsupervised Learning]

- 1) What is clustering? types of clusters.
- 2) Clustering data using the k-means algorithm
- 3) Compressing an image using vector quantization
- 4) Building a Mean Shift clustering model
- 5) Grouping data using agglomerative clustering
- 6) Evaluating the performance of clustering algorithms
- 7) Automatically estimating the number of clusters using DBSCAN algorithm
- 8) Finding patterns in stock market data
- 9) Building a customer segmentation model
- 10) Project: K-Means Clustering Project – to cluster Universities into two groups – Private and Public

11) Recommendation Engines

- 1) Introduction
- 2) Collaborative Filtering and Content-based Filtering
- 3) Cold Start
- 4) Project: Recommendation Systems using Python Pandas – Recommending Similar Movies for the new users
- 5) Project: Building a Book Recommender System using Python Pandas – Recommending Similar Books for the new users

12) NLP/Natural Language Processing

- 1) Introduction
- 2) What is NLTK
- 3) Some NLTK Terminology
- 4) Applications of NLP
- 5) Install “nltk” (Natural Language Tool Kit)
- 6) Program on using nltk package for sentence tokenizing and word tokenizing
- 7) Program on Bigrams, Trigrams and Ngrams
- 8) Program on stop words, stemming, POS tagging, Lemmatizing, Chunking
- 9) Program on Named Entity Recognition
- 10) Word Counts with CountVectorizer
- 11) Program on CountVectorizer
- 12) Word Frequencies with TF-IDF Vectorizer
- 13) Program on TF-IDF Vectorizer
- 14) Document/Text Classification
- 15) Principle of Naïve Bayes Classification
- 16) Types of Naïve Bayes Classification
- 17) Project: Classify Yelp Reviews into 1 star or 5-star categories based on the text content in the reviews (covering - Multinomial Naive Bayes Classifier for Text Analysis)

WHAT WE OFFER

We offer certification programs for Python technology. Certificates are issued on successful completion of the course and the assessment examination. Students are requested to participate in the real-time project program to get first-hand experience on the usage and application of the Python technology. The real-time projects are designed by our team of industry experts to help students get best possible exposure to the Python technology and its applications.