Machine Learning with Python Training Syllabus

Introduction to Python

- Overview of Python- Starting with Python
- Introduction to installation of Python
- Introduction to Python Editors & IDE's(Canopy, pycharm, Jupyter, Rodeo, Ipython etc…)
- Understand Jupyter notebook & Customize Settings
- Concept of Packages/Libraries - Important packages(NumPy, SciPy, scikit-learn, Pandas,Matplotlib, etc)
- Installing & loading Packages & Name Spaces
- Data Types & Data objects/structures (strings, Tuples, Lists, Dictionaries)
- List and Dictionary Comprehensions
- Variable & Value Labels – Date & Time Values Basic Operations - Mathematical - string - date Reading and writing data
- Simple plotting
- Control flow & conditional statements Debugging & Code profiling

Data Analysis – Visualization using Python

- Introduction exploratory data analysis
- Descriptive statistics, Frequency Tables and summarization Univariate Analysis (Distribution of data & Graphical Analysis)
- Bivariate Analysis(Cross Tabs, Distributions & Relationships, Graphical Analysis)
- Creating Graphs- Bar/pie/line chart/histogram/ boxplot/ scatter/ density etc)
- Important Packages for Exploratory Analysis(NumPy Arrays, Ma/tplotlib, Pandas and scipy.stats etc)
- Basic statistics & implementation of stats methods in Python
- Basic Statistics - Measures of Central Tendencies and Variance
- Inferential Statistics -Sampling - Concept of Hypothesis Testing
- Important modules for statistical methods: Numpy, Scipy, Pandas

Machine Learning

Predictive Modeling – Basics

- Introduction to Machine Learning & Predictive Modeling
- Types of Business problems - Mapping of Techniques - Regression vs. classification vs. segmentation vs. Forecasting
- Major Classes of Learning Algorithms -Supervised vs Unsupervised Learning
- Different Phases of Predictive Modeling (Data Pre-processing, Sampling, Model Building, Validation)

Machine learning Techniques

- Types of Learning

  - ✓ Supervised Learning
  - ✓ Unsupervised Learning

- Advice for Applying Machine Learning
- Machine Learning System Design

Supervised Learning

- Regression
- Classification

Machine Learning Algorithms & Applications – Implementation in Python

- Linear Regression
- Segmentation - Cluster Analysis (K-Means) Decision Trees
- Support Vector Machines(SVM)
- Other Techniques (KNN, Naïve Bayes,)
- Important python modules for Machine Learning (SciKit Learn, scipy, etc)

Unsupervised Learning

- Clustering
- Recommendation
- Deep Learning

Unsupervised Learning – Clustering

Document retrieval : A case study in clustering and measuring similarity

- Clustering System Overview
- Clustering fundamentals: Data and Models
- Feature selection in Model building

- Prioritizing important words with tf-idf
- Clustering and Similarity ML block diagram

Unsupervised Learning – Recommendation

Recommending Products

- Recommender System overview
- Collaborative filtering
- Understanding Collaborative Filtering and support vector Machine
- Effect of popular items
- Normalising co-occurrence matrices and leveraging purchase histories
- The matrix completion task
- Recommendation from known user/item features
- Reccommender systems ML block diagram

Unsupervised Learning - Deep Learning

Unsupervised Learning – Recommendation

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Unsupervised Learning - Deep Learning

- Artificial Neural Networks(ANN)