Machine Learning Using Python

Introduction:

Python is a popular platform used for research and development of production systems. It is a vast language with a number of modules, packages, and libraries that provide multiple ways of achieving a task. Python and its libraries like NumPy, SciPy, Scikit-Learn, Matplotlib are used in data science and data analysis. They are also extensively used for creating scalable machine learning algorithms. Python implements popular machine learning techniques such as Classification, Regression, Recommendation, and Clustering. Python offers a ready-made framework for performing data mining tasks on large volumes of data effectively in lesser time. It includes several implementations achieved through algorithms such as linear regression, logistic regression, Naïve Bayes, k-means, K nearest neighbor, and Random Forest.
Machine learning is a discipline that deals with programming the systems so as to make them automatically learn and improve with experience. Here, learning implies recognizing and understanding the input data and making informed decisions based on the supplied data. It is very difficult to consider all the decisions based on all possible inputs. To solve this problem, algorithms are developed that build knowledge from specific data and past experience by applying the principles of statistical science, probability, logic, mathematical optimization, reinforcement learning, and control theory.

Duration:

- 22.5 Hours.(9 days*2 hrs=18 hrs)

Content:

Course Objectives:

- To introduce students/Faculty to the basic concepts and techniques of Machine Learning.
- To develop skills of using recent machine learning software for solving practical problems.
- To gain experience in doing independent study and research.

Entry Requirements (Pre-requisites):

- Students must have Knowledge of Python Programming.
- Statistics and Algebra, Math's.

S.No	Lessons	Topics	Time (22.5 Hours)
1	Introduction to Machine Learning and Overview of pandas	What is Machine Learning Machine Learning Classification Types of Algorithms Reading and manipulating CSV files	2.5hr
2	Sklearn Package, and Linear Regression using Machine Learning	Linear Regression with One variable Evaluation Metrics in Regression Models Train/Test splitting of data & Cross-Validation Linear Regression with Multiple Variables	2.5hr
3	Polynomial Regression	Under fitting, Overfitting, Best fit Polynomial Features Non-Linear Regression with One variable Non-Linear Regression with Multiple Variable	2.5hr
4	Classification models - 1	Introduction to categorical types of data Types of classification K-Nearest Neighbors Classifier Evaluation Metrics for Classification	2.5hr

		Models	
5		Logistic regression Support Vector Machines	2.5hr
6	Classification models - 2	Introduction to Decision Tree Terminology related to Decision Trees Types of Decision Trees Decision Trees Classifier	2.5hr
7		Decision Tree Regressor Random Forest Algorithm	2.5hr
8	Unsupervised Learning and Clustering	Introduction to Unsupervised Learning Types of Unsupervised Learning Introduction to clustering Types of Clustering methods KMeans Clustering Applications	2.5 hr
9	Dimensionality Reduction	Dimensionality reduction Principal Component Analysis (PCA)	2.5hr

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Hardware Requirements:

- i3 or above Processor is required
- 4 GB or above RAM is recommended
- Good Internet Connectivity
- OS-Windows 10 is Preferable