

Machine Learning - Course Content



Course objectives and learning outcomes

1. Course objectives: The main objectives of the course is to prepare the students to become skillful by doing hands on project based learning in the real time environment. Also making them to become industry /job - ready

2. Course outcomes: To gain hands on working skills and industry project experience by learning & practicing of Python Programming Language, Python packages for Data Science, Data Wrangling & Exploratory Data Analysis, Build & evaluate Machine Learning Algorithms, Build a web application using flask web framework & Build a number of use cases in multiple domains such as Banking, Financial Services, Insurance, Retail, Ecommerce, Telecom, Agriculture, Aviation etc.

3. Prerequisite:

Skills Required: Basic Knowledge of Python Programming

System Requirement:

Hardware Requirements: 4GB RAM, Processor- Intel core i3/M1 OS-Windows/Linux/MAC

Module	Session duration	Session/Module Name	Topics
1	1 Hour	Introduction to Data Science	What is data science Why is it important Use Cases of Data Science The Various Data Science Disciplines Data Science and Business Buzzwords ML In Data Science Data Science Methodology
2	2 Hours	Python Basics	A quick introduction to Python syntax, variable assignment, and numbers Data Types Variables & Operators Functions Flow Controls Conditional Constructs Working with External Libraries Imports, operator overloading, and survival tips for venturing into the world of external libraries
3	2 Hours	Python Packages: Numpy & Pandas	Python Packages NUMPY: Array Array Manipulations Functions Numerical Operations Indexing & Slicing Append & Concatenate Pandas: Creating, Reading and Writing Indexing, Selecting & Assigning Summary Functions and Maps Grouping and Sorting Data Types and Missing Values Renaming and Combining
4	1.5 Hours	Data Visualization	Introduction to Data Visualization Data Visualization with Matplotlib & Seaborn Line Charts Bar Charts Heatmaps Scatter Plots Area Chart Pie Chart Distributions Box Plot Choosing Plot Types and Custom Styles
5	2.5 Hours	Data Wrangling Techniques	Introduction to Data preprocessing Importing the Dataset Character Encodings Handling Missing Values Inconsistent Data Entry Parsing Dates Working with categorical Data Splitting the data into Train and Test set Outlier Analysis Feature Scaling

6	3 Hours	Supervised Learning – Regression	<p>Introduction to Regression</p> <p>Linear Regression</p> <p>Multi Linear Regression</p> <p>Polynomial Regression</p>
7	6 Hours	Supervised Learning - Classification	<p>Introduction to Classification</p> <p>Logistic Regression</p> <p>Decision Tree Classification</p> <p>Random Forest Classification</p> <p>K-nearest Neighbors</p> <p>Naïve-Bayes</p> <p>Support Vector Machine</p> <p>XGboost</p>
8	3 Hours	Model Evaluation Metrics	<p>Regression Evaluation Metrics</p> <p>MAE</p> <p>MSE</p> <p>R Squared</p> <p>RMSE</p> <p>Classification metrics</p> <p>Confusion Metrics</p> <p>Accuracy</p> <p>Precision</p> <p>Recall F1 Score</p> <p>AUC ROC Curves</p>
9	3 Hours	Hyper-parameter Optimization	<p>Handling Imbalanced Data</p> <p>Oversampling</p> <p>Undersampling</p> <p>Ensembling Techniques</p> <p>SMOTE</p> <p>Hyper-parameter tuning</p> <p>Grid Search</p> <p>Randomize Search</p>
10	3 Hours	Unsupervised Learning	<p>Introduction to Clustering</p> <p>K-Means Clustering</p> <p>Hierarchical Clustering</p> <p>Clustering use cases</p>
11	3 Hours	Build & Deploy ML Application	<p>Introduction to different modes of deployment</p> <p>Working with Flask Framework</p> <p>Building application with flask framework</p> <p>Integrating Machine Learning model with web application</p>