Machine Learning with Python

Course Duration : 40 Hrs

Course Overview:

This comprehensive *Machine Learning with Python* course provides a hands-on approach to understanding and implementing machine learning algorithms. It covers the fundamentals of supervised and unsupervised learning, feature engineering, model evaluation, and deployment techniques. Participants will gain practical experience using Python libraries such as NumPy, Pandas, Matplotlib, Scikit-learn, and TensorFlow. The course focuses on real-world applications and projects to help learners develop expertise in predictive analytics, classification, regression, clustering, and deep learning models.

What You Will Learn:

- Understand the fundamentals of machine learning and its real-world applications
- Work with data preprocessing, feature engineering, and model evaluation techniques
- Implement supervised learning algorithms such as linear regression, decision trees, and support vector machines
- Explore unsupervised learning techniques like clustering and dimensionality reduction
- Understand neural networks and deep learning basics using TensorFlow and Keras
- Perform hyperparameter tuning and model optimization

Phone: +91-999-911-1686 **Mail Us:** info@ssdntech.com

- Develop end-to-end machine learning projects from data preparation to model deployment

Target Audience:

- Data science and AI enthusiasts who want to learn machine learning with Python
- Software developers, analysts, and engineers looking to integrate machine learning into their projects
- Students and researchers interested in predictive analytics and data-driven decision-making
- Professionals seeking career advancement in data science, AI, and machine learning

Prerequisites:

- Basic programming knowledge in Python (variables, loops, functions)
- Understanding of fundamental mathematics (linear algebra, probability, statistics)
- Familiarity with data structures and basic data handling using Pandas and NumPy (optional but beneficial)

Course content

1. Introduction to Machine Learning

- Overview of Machine Learning: Types and Applications
- Machine Learning vs. Traditional Programming
- Setting up the Python Environment (Jupyter Notebook, Colab)
- Introduction to Python Libraries for ML: NumPy, Pandas, Matplotlib, Scikit-learn

Phone: +91-999-911-1686 **Mail Us:** info@ssdntech.com

2. Data Preprocessing and Feature Engineering

- Understanding Datasets and Data Types
- Handling Missing Data, Outliers, and Duplicates
- Feature Scaling and Normalization
- Encoding Categorical Variables
- Feature Selection and Feature Extraction

3. Exploratory Data Analysis (EDA)

- Summary Statistics and Data Visualization
- Data Correlation and Multicollinearity
- Handling Imbalanced Data
- Identifying Patterns and Trends

4. Supervised Learning - Regression Models

- Introduction to Supervised Learning
- Simple and Multiple Linear Regression
- Polynomial Regression
- Ridge and Lasso Regression
- Evaluating Regression Models (R^2, RMSE, MAE)

5. Supervised Learning - Classification Models

- Logistic Regression
- Decision Trees and Random Forests
- Support Vector Machines (SVM)
- k-Nearest Neighbors (k-NN)
- Model Evaluation: Confusion Matrix, Precision, Recall, F1-Score, ROC Curve

Phone: +91-999-911-1686 **Mail Us:** info@ssdntech.com

6. Unsupervised Learning - Clustering

- Introduction to Clustering
- K-Means Clustering
- Hierarchical Clustering
- DBSCAN
- Evaluating Clustering Models (Silhouette Score, Davies-Bouldin Index)

7. Dimensionality Reduction Techniques

- Principal Component Analysis (PCA)
- Singular Value Decomposition (SVD)
- t-SNE for Visualization
- Feature Selection vs. Feature Extraction

8. Model Selection, Optimization, and Hyperparameter Tuning

- Bias-Variance Tradeoff
- Cross-Validation Techniques (k-Fold, Leave-One-Out)
- Grid Search and Random Search for Hyperparameter Tuning
- Regularization Techniques

9. Introduction to Deep Learning and Neural Networks

- Understanding Neural Networks: Perceptrons, Activation Functions
- Introduction to Deep Learning Frameworks (TensorFlow, Keras)
- Building a Simple Neural Network with Keras
- Training, Testing, and Optimizing Deep Learning Models

10. End-to-End Machine Learning Project

- Data Collection and Preprocessing
- Model Selection and Training
- Model Evaluation and Interpretation
- Model Deployment using Flask/Streamlit