



TECHNOCATION FREELANCING TRAINING INSTITUTE & SOFTWARE HOUSE

Professional Machine Learning Course Outline

Module 1: Introduction to Machine Learning

- What is Machine Learning?
- Types of Machine Learning (Supervised, Unsupervised, Reinforcement Learning)
- Machine Learning vs. Deep Learning vs. AI
- Real-World Applications of ML

Module 2: Setting Up the ML Environment

- Installing Python and Jupyter Notebook
- Introduction to ML Libraries: NumPy, Pandas, Matplotlib
- Introduction to Scikit-Learn and TensorFlow
- Data Handling and Preprocessing Basics

Module 3: Data Preprocessing and Feature Engineering

- Handling Missing Data
- Feature Scaling and Normalization
- Encoding Categorical Data
- Feature Selection and Dimensionality Reduction (PCA, LDA)

Module 4: Supervised Learning – Regression Models

- Linear Regression and Multiple Linear Regression
- Polynomial Regression
- Ridge and Lasso Regression
- Evaluating Regression Models (RMSE, R² Score)

Module 5: Supervised Learning – Classification Models

- Logistic Regression
- k-Nearest Neighbors (k-NN)
- Support Vector Machines (SVM)
- Decision Trees and Random Forest Classifiers
- Performance Metrics (Confusion Matrix, Precision, Recall, F1-Score, ROC Curve)

Module 6: Unsupervised Learning

- Introduction to Clustering
- k-Means Clustering
- Hierarchical Clustering
- Principal Component Analysis (PCA)
- Association Rule Learning (Apriori, Eclat)

Module 7: Neural Networks & Deep Learning Basics

- Introduction to Artificial Neural Networks (ANN)
- Building a Neural Network with TensorFlow/Keras
- Activation Functions and Backpropagation
- Introduction to Convolutional Neural Networks (CNN)

Module 8: Reinforcement Learning & Advanced Topics

- Basics of Reinforcement Learning
- Q-Learning and Deep Q Networks
- Introduction to Generative Adversarial Networks (GANs)
- Hyperparameter Tuning and Model Optimization

Module 9: Model Evaluation, Deployment, and Production

- Hyperparameter Tuning (Grid Search, Random Search)
- Model Deployment Using Flask or FastAPI
- Integrating ML Models with Cloud Services (AWS, GCP, Azure)
- ML Model Monitoring and Maintenance

Final Module: Capstone Project & Certification

- End-to-End ML Project Development
- Implementing ML Models in Real-World Applications
- Model Evaluation and Optimization
- Final Presentation and Certification

