Nation
Innovation

Machine Learning for Beginners: Hands-On Projects to Master the Basics

Course Overview:

This course is designed to teach machine learning from foundational concepts to advanced techniques through a series of hands-on projects. By the end of this course, students will be proficient in using machine learning algorithms to solve real-world problems and capable of applying ML models in various domains.

Course Objectives:

- Understand the fundamentals of machine learning.
- Implement and evaluate machine learning algorithms.
- Develop problem-solving skills using ML techniques.
- Work with datasets, from preprocessing to modeling.
- Implement machine learning models in real-world applications.

Course Outline:

Module 1: Python Overview

- Role of Python in Machine Learning
- Data Types, Operators, Conditional Statements, Loops
- Data Structures in Python: Lists, Dictionaries, Tuples, Sets
- Functions and Modules
- File Handling: Reading and Writing Files

Module 2: Introduction to Machine Learning

- Introduction to Machine Learning and its Applications
- Types of Machine Learning: Supervised, Unsupervised
- Overview of Machine Learning Workflow
- Setting Up ML Environment (Python, Jupyter Notebooks, ML Libraries)
- Introduction to Python Libraries for Machine Learning (NumPy, Pandas, Matplotlib, Seaborn, Scikit-learn)

Module 3: Data Wrangling

- Introduction to Series & DataFrames
- Handling Missing Values and Outliers
- Data Visualization & Charts
- Categorical Data Encoding: One-Hot Encoding, Label Encoding
- Feature Scaling: Normalization vs Standardization
- Feature Selection and Dimensionality Reduction
- Data Splitting
- Projects: Analysis of Titanic Dataset

Module 4: Introduction to ML Linear Algorithms.

- Linear Regression
- Simple and Multiple Linear Regression
- Evaluation Metrics: MSE, RMSE, R^2
- Regularization techniques
- Logistic Regression
- Binary Classification
- Sigmoid Function
- Evaluation Metrics: Accuracy, Precision, Recall, F1 Score, Confusion matrix, AUC
- Projects
- House Price Prediction using Linear Regression
- Heart Disease Prediction using Logistic Regression

Module 5: Core Classification and Ensemble Algorithms

- Decision Trees
- Random Forest
- k-Nearest Neighbors (KNN)
- Support Vector Machines (SVM)
- Naive Bayes
- Projects
- Breast Cancer Prediction - Analyzing and finding the best model by comparing.

Module 6: Model Evaluation and Tuning

- Cross-Validation and Train-Test Split
- Bias-Variance Tradeoff
- Hyperparameter Tuning using Grid Search and Random Search
- Model Overfitting and Underfitting
- Imbalanced datasets

Module 7: Clustering and Unsupervised Learning

- Introduction to Clustering
- K-Means Clustering
- Hierarchical Clustering
- DBSCAN
- Dimensionality Reduction using t-SNE
- Evaluation Metrics for Unsupervised Learning
- Projects
- Customer Segmentation

Module 8: Capstone Project - Hand Digit Image Classification

- End-to-End Machine Learning Project
- Problem Definition
- Data Exploration and Preprocessing
- Model Selection, Training, and Evaluation
- Hyperparameter Tuning
- Model Deployment - Joblib, Pickle

Module 9: Generative-AI

- Fundamental concepts
- Transformer architecture
- Prompt Engineering
- RAG (Retrieval-Augmented Generation)
- Project: Personalized Chat-Bot using LLMs & Gradio.

Projects:

- Analysis of Titanic Dataset
- House Price Prediction using Linear Regression
- Heart Disease Prediction using Logistic Regression
- Breast Cancer Prediction
- Customer Segmentation
- Personalized Chat-Bot using LLMs & Gradio.
- Hand Digit Image Classification

Assessments:

- Quizzes after each module
- Final project: Comprehensive application incorporating multiple modules

Resources:

- Textbooks and online resources

- Coding exercises and practice problems
- Project templates and examples
- Access to a community forum for support and collaboration

Duration:

- 5 weeks, with 4-5 hours of lectures per week.

Additional Features:

- Live Instructor Classes
- Doubt Sessions
- Project Hands-On
- Certification on Course Completion
- Recorded Sessions
- Evening Classes

For Registration/More Details: https://www.nationin.com/training-internship