



Machine Learning Using Python

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Course Overview

This course provides an in-depth overview of Machine Learning algorithms, including exposure with real-time project implementation using various algorithms such as Supervised Learning, Unsupervised Learning, Classification, Regression etc.

This course focuses a hands-on approach, growing an intuitive understanding of Machine learning through customizing own toy version of each algorithm using Python.

Pre Requisites

This course requires an understanding of:

- 🔗 Python Programming
- 🔗 Familiarity with Python Libraries such as Numpy, Panda and Matplotlib
- 🔗 Basics of Statistics
- 🔗 Basics of Calculus
- 🔗 Basics of Linear Algebra
- 🔗 Basics of Probabilities

Course Roadmap

- 📁 Basics of Machine Learning
- 📁 Various IDEs and Libraries used for implementing Machine Learning
- 📁 The steps in a typical Machine Learning Projects
- 📁 Handling, cleaning, and preparing data
- 📁 Selecting and engineering features
- 📁 Selecting a model and tuning hyper parameters using cross-validation
- 📁 Machine Learning Algorithms such as Linear Regression, Logistic Regression, K Means Clustering, Decision Tree, Random Forest, KNN Algorithm, Support Vector Machine etc.
- 📁 Hands on real-time implementation of these algorithms using Python Programming language and Scikit-learn library.

Course Curriculum

Module-1: Introduction to Machine learning

- ✓ **Goal:** This module focuses on Concepts of Machine Learning and its types.

Chapters to be taught:

- Introduction to Machine Learning
- AI vs ML vs Deep Learning
- Machine Learning Process Flow
- Types of Machine Learning
- Supervised Machine Learning with Example
- Unsupervised Machine Learning with Example
- Reinforcement Machine Learning with Example
- Main challenges of Machine Learning
- Testing and Validation Process
- Exercises

Module-2: Introduction to ML Libraries and IDEs

- ✓ **Goal:** This module focuses on ML Libraries and different IDEs used to implement Machine Learning Projects.

Chapters to be taught:

- Introduction to Anaconda
- Hands-on Installation of Anaconda
- Introduction to Virtual Environment
- Usage of Virtual Environment
- Introduction to various libraries of ML
- Usage Example of ML libraries
- Exercise

Module-3: Statistics & Probability for Machine Learning

- ✓ **Goal:** This module focuses on statistics and probability concepts used in machine learning

Chapters to be taught:

- What is data?
- Categories of data
- What is Statistics?
- Basic Terminologies in Statistics
- Sampling Techniques
- Types of Statistics
- Descriptive Statistics
- Probability
- Inferential Statistics
- Exercise

Module-4: Machine Learning Project Life Cycle

- ✓ **Goal:** This module focuses on handling with raw data available in different formats, data exploration and data cleaning.

Chapters to be taught:

- Data Extraction
- Data Transformation
- Data Loading
- Data Exploration-Visualization
- Data Exploration- Data Cleaning
- Data Modelling- Feature Engineering
- Data Modelling- Training the Model
- Data Modelling- Model Evaluation
- Exercise

Module-5: Supervised Learning- Regression

✓ **Goal:** This module focuses on various Supervised Learning Regression Algorithms

Chapters to be taught:

- **Linear Regression**
- **Gradient Descent**
 - **Batch Gradient Descent**
 - **Stochastic Gradient Descent**
 - **Mini-Batch Gradient Descent**
- **Polynomial Regression**
- **Exercise**

Module-6: Supervised Learning- Classification

✓ **Goal:** This module focuses on various Supervised Learning Classification Algorithms

Chapters to be taught:

- **Logistic Regression**
- **Support Vector Machines**
- **Decision Trees**
- **Random Forests**
- **Boosting**
- **KNN**
- **Naïve Bayes**
- **Exercise**

Module-7: Dimensionality Reduction

- ✓ **Goal:** This module helps to learn about impact of dimensions within data, to perform factor analysis using PCA and compress dimensions.

Chapters to be taught:

- Introduction to Dimensionality
- Main Approaches for Dimensionality Reduction
- Principal Component Analysis
- PCA for Compression
- Randomized PCA
- Incremental PCA
- Kernel PCA
- Exercise

Module-8: Unsupervised Learning

- ✓ **Goal:** This module helps to learn about Unsupervised Learning and various types of clustering that can be used to analyse the data.

Chapters to be taught:

- Introduction to Clustering
- Types of Clustering
- K-means Clustering
- Hierarchical Clustering
- Association Rule Mining
- Apriori Algorithm
- Reinforcement Learning
- Exercises

About Me

Highest Qualification: M.Tech

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