

Machine Learning model implementation using Python

Course Code : VAC-CS-MLP

L-T-P : 3-0-2

Theory Contact hours: 20

Practical Contact hours: 20

Total Hours: 40

Course Objective: The students will understand the basics of Machine Learning. They will also learn and will be able to apply different machine learning models to various datasets.

Prerequisite: Introduction to Python: Features, Basic Syntax, Variable and Data Types, Operator, Conditional Statements, Loops, Control Statements. Working with Lists, Tuples , dictionary, Functions, Classes and Modules. Exception Handling.

Unit	Content	Hrs/Unit
1	MODULE 1: INTRODUCTION TO MACHINE LEARNING What Is Machine Learning? How Do We Define Learning? Applications of Machine Learning, processes involved in Machine Learning, Introduction to Machine Learning Techniques: Supervised Learning, Unsupervised Learning and Reinforcement Learning, Real life examples of Machine Learning.	3
2	MODULE 2: SUPERVISED LEARNING Classification and Regression: K-Nearest Neighbour, Linear Regression, Logistic Regression, Support Vector Machine (SVM), Decision Trees, Evaluation Measures: SSE, confusion matrix, precision, recall, F-Score, ROC-Curve.	12
3	MODULE 3: UNSUPERVISED LEARNING Introduction to clustering, Types of Clustering- Hierarchical, Agglomerative Clustering and Divisive clustering; Partitional Clustering - K-means clustering. Dimensionality reduction techniques: PCA	5

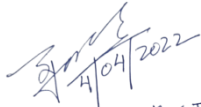
Practical Component: Hardware requirement: • i5 Processor, 8GB RAM, Internet Connection
Software Environment: • Google Colab notebook/ JUPYTER notebook

Laboratory/Practical:

1. Mathematical computing with Python packages like: Numpy, Matplotlib, Pandas
2. Implement basic ML models like KNN, SVM, Decision Tree, K-Means, Logistic Regression, Linear regression
3. Program to demonstrate PCA

Text book and Reference books:

1. Kevin Murphy, Machine Learning: A Probabilistic Perspective, MIT Press, 2012.
2. Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning, Springer 2009 (freely available online).
3. Christopher Bishop, Pattern Recognition and Machine Learning, Springer, 2007.
4. Dr. Rajiv Chopra, Machine Learning, Khanna Publishing House, 2018.


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