

Certificate/ Diploma Course in Artificial Intelligence and DataScience
Semester II
DAD-1-05T: Machine Learning

Total Marks: 100
External Marks: 70
Internal Marks: 30
Credits: 4
Pass Percentage: 40%

Objectives

This course aims to provide sound foundation to fundamental concepts of machine learning and its application and prepare students for advanced research and real time problem solving in machine learning and related fields. This course will help students to understand the concepts related to regression, classification, clustering, concept clarity on deep learning, dimensionality reduction, model selection and boosting.

Section A

Unit I: Introduction to ML: Applications of Machine learning, machine learning as a future; Data Pre-processing: Importing the libraries, Importing the dataset, taking care of missing data, encoding categorical data, Splitting the dataset into training set and test set, Feature scaling.

Unit II: Regression: Simple linear regression, Multiple linear regression, Understanding the P-value, Polynomial regression

Unit III: Classification: Logistic Regression, K-Nearest Neighbors, Support vector machine, Naïve Bayes, Decision tree classification, Random forest classification.

Unit IV: Clustering: k-means clustering, k means random initialization trap, selecting the number of clusters, Hierarchical clustering.

Section B

Unit V: ANN: Introduction to ANNs, Biological Neural Networks; Usefulness and Applications of ANNs; Architectures of ANNs: Single layer, Multi layer, Competitive layer; Learning: Supervised and Unsupervised; Activation functions; Linear and Non-linear Separability

Unit VI: Supervised Models: Hebb Net: introduction, algorithm, application for AND problem; **Perceptron:** architecture, algorithm, application for OR Problem; **ADALINE:** architecture, algorithm, application for XOR problem;

Unit VII: MADALINE: architecture, algorithm, application for XOR problem; Back propagation Neural Network: architecture, parameters, algorithm, applications, different issues regarding convergence

Unit VIII Unsupervised Models: Kohonen Self –Organizing Maps: architecture, algorithm, application, Adaptive Resonance Theory: introduction, basic architecture, basic operation, ART1 and ART

Suggested Readings

1. Andreas C. Müller, Introduction to Machine Learning with Python: A Guide for Data Scientists, 2016 ,Sarah Guido
2. E. Alpaydin, Introduction to Machine Learning, 3rd Edition, PHI Learning, 2015
3. K. P. Murphy, Machine Learning:A Probabilistic Perspective, MIT Press, 2012
<https://www.udemy.com/course/machinelearning/>

