

ELECTIVE III

Machine Learning

UNIT 1: Introduction:

Well-Posed learning problems, Basic concepts, Designing a learning system, Issues in machine learning. Types of machine learning: Learning associations, Supervised learning, Unsupervised learning and Reinforcement learning.

UNIT 2: Data Pre-processing:

Need of Data Pre-processing, Data Pre-processing Methods: Data Cleaning, Data Integration, Data Transformation, Data Reduction; Feature Scaling (Normalization and Standardization), Splitting dataset into Training and Testing set.

UNIT 3: Regression:

Need and Applications of Regression, Simple Linear Regression, Multiple Linear Regression and Polynomial Regression, Evaluating Regression Models Performance (RMSE, Mean Absolute Error, Correlation, RSquare, Accuracy with acceptable error, scatter plot, etc.)

UNIT 4 :Classification:

Need and Applications of Classification, Logistic Regression, Decision tree, Tree induction algorithm – split algorithm based on information theory, split algorithm based on Gini index; Random forest classification, Naïve Bayes algorithm; K-Nearest Neighbours (K-NN), Support Vector Machine (SVM), Evaluating Classification Models Performance (Sensitivity, Specificity, Precision, Recall, etc.). Clustering: Need and Applications of Clustering, Partitioned methods, Hierarchical methods, Density-based methods.

UNIT 5 :Association Rules Learning:

Need and Application of Association Rules Learning, Basic concepts of Association Rule Mining, Naïve algorithm, Apriori algorithm. Artificial Neural Network: Need and Application of Artificial Neural Network, Neural network representation and working, Activation Functions. Genetic Algorithms: Basic concepts, Gene Representation and Fitness Function, Selection, Recombination, Mutation and Elitism.