

## **CS8082 MACHINE LEARNING TECHNIQUES**

### DETAILED SYLLABUS

#### **OBJECTIVES:**

- To understand the need for machine learning for various problem solving
- To study the various supervised, semi-supervised and unsupervised learning algorithms in machine learning
- To understand the latest trends in machine learning
- To design appropriate machine learning algorithms for problem solving

#### **UNIT I INTRODUCTION**

Learning Problems – Perspectives and Issues – Concept Learning – Version Spaces and Candidate Eliminations – Inductive bias – Decision Tree learning – Representation – Algorithm – Heuristic Space Search.

#### **UNIT II NEURAL NETWORKS AND GENETIC ALGORITHMS**

Neural Network Representation – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms – Hypothesis Space Search – Genetic Programming – Models of Evaluation and Learning.

#### **UNIT III BAYESIAN AND COMPUTATIONAL LEARNING**

Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm – Probability Learning – Sample Complexity – Finite and Infinite Hypothesis Spaces – Mistake Bound Model.

#### **UNIT IV INSTANT BASED LEARNING**

K- Nearest Neighbour Learning – Locally weighted Regression – Radial Basis Functions – Case Based Learning.

#### **UNIT V ADVANCED LEARNING**

Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction – Inverting Resolution – Analytical Learning – Perfect Domain Theories – Explanation Base Learning – FOCL Algorithm – Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning

#### **TEXT BOOK:**

1. Tom M. Mitchell, Machine Learning II, McGraw-Hill Education (India) Private Limited, 2013.

#### **REFERENCES:**

1. Ethem Alpaydin, —Introduction to Machine Learning (Adaptive Computation and Machine Learning) II, The MIT Press 2004.
2. Stephen Marsland, —Machine Learning: An Algorithmic Perspective II, CRC Press, 2009.