RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA,
BHOPAL

New Scheme Based On AICTE Flexible Curricula

CSE-Artificial Intelligence and Machine Learning/ Artificial Intelligence and Machine Learning, VII-Semester

AL702 (B) Advance Machine Learning

Course Objective: To introduce advanced concepts and methods of machine learning and to develop an understanding of the role of machine learning in massive scale automation. To design and implement various machine learning algorithms in a range of real-world applications.

Unit I: Artificial Neural Network:Introduction to ANN, Perceptron, Cost Function, Gradient Checking, multi-layer perceptron and backpropagation algorithm that is used to help learn parameters for a neural network, Random Initialization

Unit II: Decision Trees:Representing concepts as decision trees, Recursive induction of decision trees, best splitting attribute: entropy and information gain. Searching for simple trees and computational complexity, Overfitting, noisy data, and pruning.

Unit III: Ensemble Methods: Bagging, boosting, stacking and learning with ensembles. Random Forest

Unit IV: Introduction to reinforcement learning(RL), Reinforcement Learning, RL-framework, MDP, Bellman equations, Value Iteration and Policy Iteration, Actor-critic model, Q-learning, SARSA,Bandit algorithms – UCB, PAC,Median Elimination, Policy Gradient, Full RL & MDPs, Bellman Optimality,

Unit V: Dynamic Programming - Value iteration, Policy iteration, and Q-learning & Temporal Difference Methods, Temporal-Difference Learning, Eligibility Traces, Function Approximation, Least Squares Methods,Fitted Q, Deep Q-Learning, Advanced Q-learning algorithms , Inverse reinforcement learning, Deep Inverse Reinforcement Learning, Generative Adversarial Imitation Learning,Recent Trends in RL Architectures.

Recommended Books:

1. Christopher M. Bishop, “Pattern Recognition and Machine Learning”, Springer-Verlag New York Inc., 2nd Edition, 2011.
2. Tom M. Mitchell, “Machine Learning”, McGraw Hill Education, First edition, 2017.
3. Jeeva Jose, Introduction to Machine Learning, Khanna Book Publishing 2020.
4. Rajiv Chopra, Machine Learning, Khanna Book Publishing 2021
5. Ethem Apaydin, Introduction to Machine Learning, 2e. The MIT Press, 2010
6. Reinforcement Learning: An Introduction, Sutton and Barto, 2nd Edition.
7. Reinforcement Learning: State-of-the-Art, Marco Wiering and Martijn van Otterlo, Eds