



REINFORCEMENT LEARNING

PROF. BALARAMAN RAVINDRAN

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IIT Madras

INTENDED AUDIENCE : Any interested learner

INDUSTRIES APPLICABLE TO : Data analytics/data science/robotics

COURSE OUTLINE :

Reinforcement learning is a paradigm that aims to model the trial-and-error learning process that is needed in many problem situations where explicit instructive signals are not available. It has roots in operations research, behavioral psychology and AI. The goal of the course is to introduce the basic mathematical foundations of reinforcement learning, as well as highlight some of the recent directions of research.

ABOUT INSTRUCTOR :

Prof. Balaraman Ravindran is currently an Professor in Computer Science at IIT Madras and Mindtree Faculty Fellow . He has nearly two decades of research experience in machine learning and specifically reinforcement learning. Currently his research interests are centered on learning from and through interactions and span the areas of data mining, social network analysis, and reinforcement learning.

COURSE PLAN :

Week 1: Introduction

Week 2: Bandit algorithms - UCB, PAC

Week 3: Bandit algorithms - Median Elimination, Policy Gradient

Week 4: Full RL & MDPs

Week 5: Bellman Optimality

Week 6: Dynamic Programming & TD Methods

Week 7: Eligibility Traces

Week 8: Function Approximation

Week 9: Least Squares Methods

Week 10: Fitted Q, DQN & Policy Gradient for Full RL

Week 11: Hierarchical RL

Week 12: POMDPs