AIMLCZG512 – Deep Reinforcement Learning

2025-26 First Semester

Mid-Term Exam Notice

Syllabus

1. **Introduction to Reinforcement Learning**
   - Definition and Applications of Reinforcement Learning [TB Sections 1.1, 1.2, 1.3, 1.4]
2. **Multi-armed Bandits**
   - Definition and application of – k armed bandit problem, action value methods, 10-armed testbed, Incremental Implementation, Tracking a Non-stationary Problem, Optimistic initial Values, UCB Action selection, Associative Search [TB Sections 2.1 – 2.7,2.9]
3. **Finite MDP**
   - Agent-Environment Interface, Goals and Rewards, Returns and Episodes, Policies and Value Function, Optimal Values and Optimal Value Functions, Optimality in Approximation [TB Sections 3.1 – 3.3, 3.4-3.8]
4. **Dynamic Programming**
   - Policy Evaluation, Policy Improvement, Policy Iteration, Value Iteration, Asynchronous Dynamic Programming, Generalized Policy Iteration, Efficiency of Dynamic Programming [Align the preparation with the slide deck] [TB Sections 4.1 – 4.7]
5. **Monte Carlo Methods**
   - Monte-Carlo Prediction, Monte-Carlo estimation of Action Values, Monte Carlo Control (On-policy first-visit MC control (for epsilon soft policies)); [TB Sections 5.1 – 4.4]
   - Note - Off-policy Prediction via Importance Sampling – Excluded.

Question Paper Pattern

4 Questions, each of about 7.5% weight → 30%

Advise to Read:

(1) Lectures & Lecture Slides + Reading of relevant sections of TB Recommended
(2) Fair mix of conceptual and numerical problems
(3) Necessary to understand expressions / concepts / Algorithms to be able to apply to scenario beyond examples in the PPT's.

Sample Question Papers:

- Sharing 2 sample question papers with **TENTATIVE** Marking scheme from my first draft. The marking scheme may be ill-formatted / might contain errors. You can let the students know through discussion forums
- The syllabus used for the mid term exam for the sample QP's shared could be slightly different and thereby there is a chance that certain questions may not be relevant for you.

All the best!

DRL Instructors;