TX00DQ05-3001 Reinforcement Learning

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Grading

Exams: 60%. 4 (or 5) weekly exams, each covering one week topics. Possibility to resit one (1) of the exams. Must get >= 40% of total max points

Project work: 40%. Must be passed.

Exercises: will improve the grade by max 1 unit.

Extra points from other activities like small studies, writing assignments etc. as agreed during the course compensate for possibly missing exam or project points.

Project: solving/trying to solve a reinforcement learning problem using Python libraries. Can use pre-existing solutions, however, own contribution must be there - for example compare different algorithms, analyse effect of changes etc. Can be substituted by writing a summary of reinforcement learning applications in a certain field. Project work takes place in teams of two (2).

Draft schedule

week1a	Reinforcement learning and its applications. Markov Decision Process (MDP). Policy. Value functions.	week1b	Exercises: Python basics, Jupyter notebooks, numpy
week2a	**Exam 1**. Bellman equations, solving optimality in tabular case with dynamic programming	week2b	Exercises: Working with MDPs, dynamic programming
week3a	**Exam 2**. Monte Carlo methods and Temporal Difference (TD) learning.	week3b	Exercises: MC and TD
week4a	**Exam 3**. Large state spaces, value function approximation. Eligibility traces. TD(λ).	week4b	Exercises: function approximation, deep learning
week5a	**Exam 4**. Case studies/recap/overflow area. Project	week5b	Case studies/recap/overflow area. Project
week6a	**Resit exam**. Project	week6b	Project
week7a	Project	week7b	Project

Materials

Sutton & Barto: Reinforcement Learning, 2nd edition. Available at
http://incompleteideas.net/book/the-book-2nd.html

Videos from a reinforcement learning course given by David Silver.
https://www.youtube.com/watch?v=2pWv7GOvuf0