

Reinforcement Learning

Course Workload		Assessment form (examination/ graded test/ ungraded test)
ECTS	Hours	
6	216	Exam

The course allows students to become familiar with the basic concepts, methods, algorithms and technologies of reinforcement learning. The course includes both the theoretical foundations of algorithms and principles, as well as practical exercises on the implementation of the algorithms themselves and their application to various types of problems. The course also covers the most popular frameworks for working with reinforcement learning.

Course structure:

1. Reinforcement Learning Basics

- 1.1. Deep Q Network algorithm
- 1.2. Taxonomy of algorithms
- 1.3. Proximal Policy Optimization algorithm
- 1.4. Basic definition and statement of the problem
- 1.5. Sample problems
- 1.6. Main cycle of work

2. Reinforcement learning technologies

- 2.1. Stable-baselines3 framework
- 2.2. Preparing your Python environment for reinforcement learning
- 2.3. RLLib framework
- 2.4. Unity ML Agents framework
- 2.5. Saving and analyzing experimental results

3. Existing Reinforcement Learning Problems

- 3.1. Classic reinforcement learning problems
- 3.2. Popular modern applications of reinforcement learning
- 3.3. Types and specifics of tasks

4. Advanced reinforcement learning techniques

- 4.1. Simulation training
- 4.2. Hierarchical methods
- 4.3. Exploration against Exploitation
- 4.4. Intrinsic motivation of agents
- 4.5. Award function design