

# Homework 05

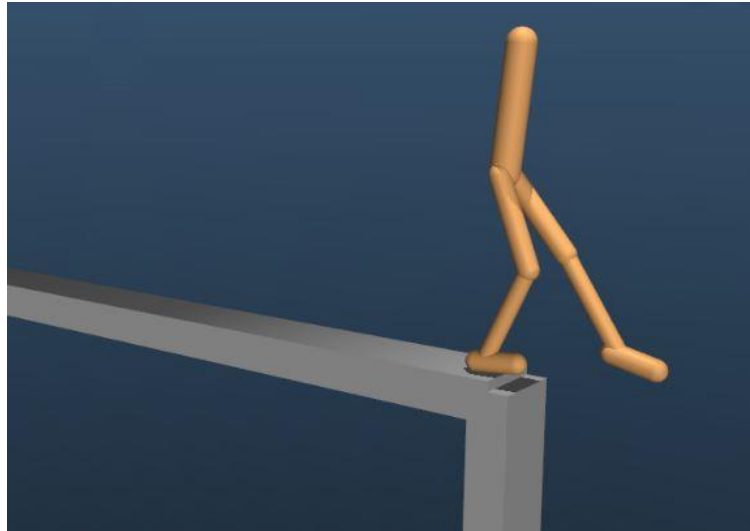
## Neural Networks and Deep Learning

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# Reinforcement learning



- Use the available environment to explore reinforcement learning algorithms
- Train and test your agent using PyTorch
- Write the report (as always, 3 pages length + Appendix for additional figures/tables)

No competition will be activated for this final homework

# Reinforcement learning

## Homework objectives:

1. Extend the available PyTorch script (Lab06) or create a brand-new one, in order to:
  - Train a agent to move in a simple grid world (10x10 matrix) using a set of 5 basic actions (stay, move up, down, right, left) in order to find a target position (goal).  
Note that the given “Agent” class already implements both SARSA and Q-learning, but the hyperparameters for exploration policies (i.e., epsilon and alpha schedules) might need some tuning.
  - Analyze the behavior of the agent when trained using SARSA vs. Q-learning, in order to investigate the different policy learned (e.g., one agent could be more conservative than the other in particular circumstances).
  - Train and test the agent behavior on a modified environment, by changing the “Environment” class by either:
    - adding some obstacles in the environment that need to be circumnavigated
    - adding some cliffs/holes that need to be avoided
    - adding other kinds of impediments (e.g., sand cells) that might lead to some penalty, but could still be traversed if that allows a faster reaching of the target*(feel free to just try one of these, combine several, or explore your own ideas)*
2. Write a short report describing your work and the results achieved (figures are appreciated)
3. Send the Homework through the Moodle platform:
  - the script **MUST** work by running the following command: `python training.py`