
# Deep Reinforcement Learning

## Foreword

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**Background**

- 2002: Master in Electrical Engineering (Supélec).
- 2006: Ph.D in Computer Science (Inria).
  - Emergence of sensorimotor function on a distributed numerical substrate.
- Postdoc in Psychology (Münster).
- 2011: lecturer at TU Chemnitz:
  - Habilitation in 2017:
    - On the role of dopamine in motivated behavior: a neuro-computational approach.
  - Courses: machine learning, computer vision, deep RL.

**Research**

- Computational neuroscience
  - Dopamine, biological reinforcement learning
  - Basal Ganglia, decision-making
  - Cerebellum, motor control
  - Hippocampus, memory
- Machine learning
  - Reservoir computing
  - Successor representations
  - Graph neural networks
  - Deep reinforcement learning

- Erasmus coordinator: https://www.tu-chemnitz.de/informatik/international/erasmus.php.en

## Course description

- Registration and forum on OPAL:

https://bildungsportal.sachsen.de/opal/auth/RepositoryEntry/21637267457.

- One lecture (Wednesday 09:15) and one exercise (Tuesday 13:45).
- All materials are at:

https://www.tu-chemnitz.de/informatik/KI/edu/deeprl/notes

- The videos might be slightly outdated.
- Written exam, 90 minutes, 5 credit points, based on a research paper.

## Course description

- **Neurocomputing** (573180) is an informal prequisite of deep reinforcement learning, but it is possible to study it parallel.
- The content is available for everybody, but the exam is only for:
  - Master Neurorobotik.
  - Master Data Science.
  - Master Informatik ($\rightarrow$ Multi-Agent systems).
  - Master angewandte Informatik ($\rightarrow$ Themenschwerpunkte Informatik I/II).
- The course is quite math-heavy: calculus, statistics, information theory.

## Exercises

- Exercises : programming in Python the algorithms seen in the course (using tensorflow, keras, gym).
- The first exercises are a tutorial on Python and Numpy (common with Neurocomputing and CV).
- Exercises are there to better understand the algorithms and learn to use the modern tools.
- There will be no programming question at the exam, but some may be related to the exercises.