UNIVERSITY OF TECHNOLOGY
IN THE EUROPEAN CAPITAL OF CULTURE
CHEMNITZ

Deep Reinforcement Learning

Foreword

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

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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

- **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 reserved for:
  - Master Neurorobotik.
  - Master Informatik (Multi-Agent systems)
  - Master angewandte Informatik (Themenschwerpunkte Informatik I/II).
  - Master Data Science.

Course description

- One lecture and one exercise.
- All materials are at:

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

- Written exam, 90 minutes, 5 credit points, but possibility of oral exams.
- Registration and forum on OPAL:

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

Exercises

- Exercises : programming in Python the algorithms seen in the course (using tensorflow, keras, scikit-learn).
- 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.