

Artificial Intelligence

Building AI-Based Information Systems with Python

Syllabus

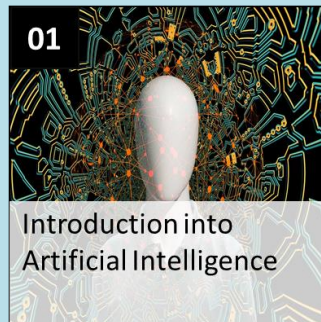


TECHNISCHE
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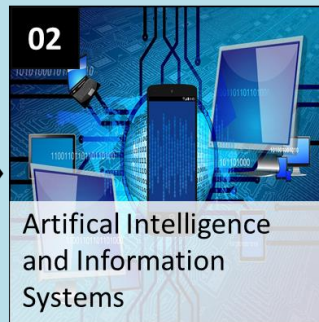
WIRTSCHAFTS
INFORMATIK



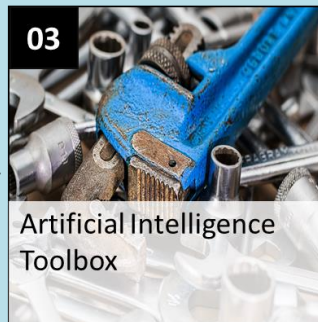
Dr. Dominik Jung
dominik.jung2@porsche.de



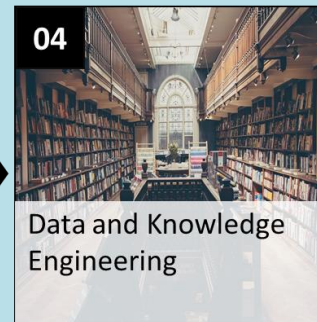
01
Introduction into
Artificial Intelligence



02
Artificial Intelligence
and Information
Systems



03
Artificial Intelligence
Toolbox



04
Data and Knowledge
Engineering



05
Fundamental
Algorithms and
Concepts



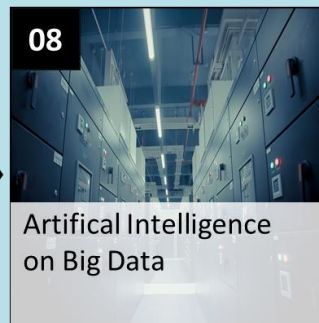
06
Summary: Foundations
of Artificial Intelligence

Exercise 1 + 2
Rapidminer and Python

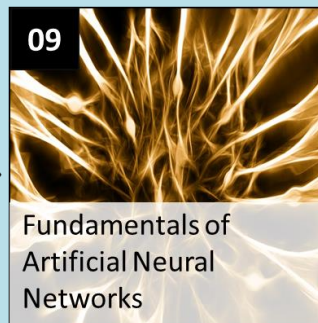
Exercise 3
Modelling AI Problems



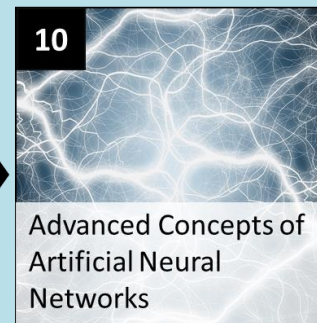
07
Advanced Algorithms
and Concepts



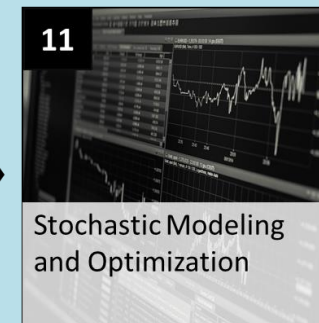
08
Artificial Intelligence
on Big Data



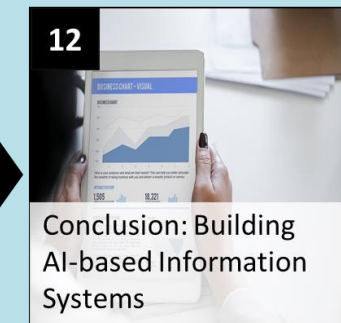
09
Fundamentals of
Artificial Neural
Networks



10
Advanced Concepts of
Artificial Neural
Networks



11
Stochastic Modeling
and Optimization



12
Conclusion: Building
AI-based Information
Systems

Exercise 4
Solving general AI Problems

Exercise 5 + 6
Modelling ANN

Capstone

Image sources: ↗ [Pixabay](#) (2019) / ↗ [CC0](#)

Outline and Organization

Course Organisation

traditional
course

Lecture

Exercise

this
course

Lecture

Capstone

Exercise

Lecture: Friday, 14:30-17:30/18:00, 18.10.2019-01.11.2019

Exercise: Friday, 14:30-17:30, 08.11.2019-22.11.2019

Capstone Project

Each participant is expected to join a team of max. 4 students to analyze and work on a capstone project

Organization:

- **Milestone 1:** Two Pager Submission
- Test-Presentation (voluntarily)
- **Milestone 2:** Final Paper Submission
- **Milestone 3:** Final Presentation
- Location: Consulting hours on demand

Team

General Questions: ki@is.tu-darmstadt.de



Dr. Dominik Jung
dominik.jung2@porsche.de



Timo Sturm, M.Sc.
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Exam

- Exam repetitorium: tba
- Bonus: tba

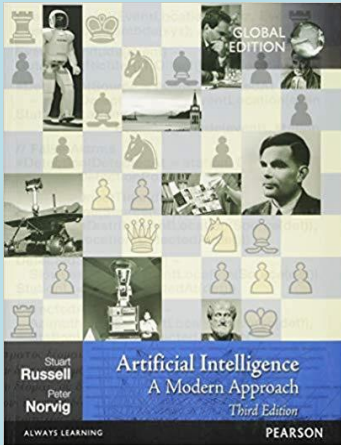
Semester 1

- **Projekthalt:** Erarbeitung einer KI Lösung auf Grundlage des Stoffes von KI 1
- **Bericht:**
 - Erarbeitung einer breiten theoretischen Grundlage über Literaturrecherche (ähnlich wie in einer Seminararbeit)
 - Erläuterung & Diskussion über Einsatzmöglichkeit der implementierten KI Lösung
- **Bonuspunkte:** Es können keine Bonuspunkte für die Klausur gesammelt werden

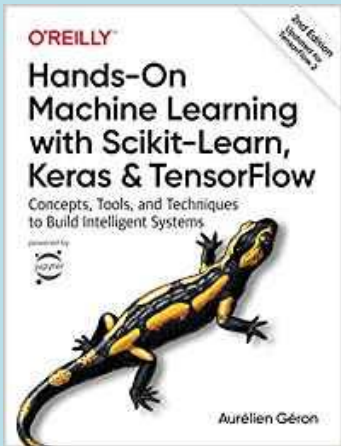
Semester 2

- **Projekthalt:** Erarbeitung einer KI Lösung auf Grundlage des gesamten Moduls
- **Bericht:**
 - Erläuterung & Diskussion über Einsatzmöglichkeit der implementierten KI Lösung
- **Bonuspunkte:** Es kann ein kleines Projekt während KI 1 bearbeitet werden mit welchem Bonuspunkte für die Klausur gesammelt werden können

Recommended literature



Russell, S., & Norvig, P. (2016). *Artificial Intelligence: A Modern Approach Global Edition*.



Géron, A. (2017). *Hands-on machine learning with Scikit-Learn and TensorFlow: concepts, tools, and techniques to build intelligent systems*.

Contact	Description	Distribution
Exam <i>Dr. Dominik Jung</i>	There will be a 60 minutes closed-book/closed-notes exam consisting of short-answer, and analytical questions covering all course material! One third will be general questions, one third related to tools, and the last third will be an overarching case.	60 %
Capstone Project <i>Timo Sturm</i>	Each participant is expected to join a team of max. 4 students to analyze and work on a capstone project. Results should be delivered in a document. Further information will be presented at the capstone introduction.	40 %

- Both elements need to be passed (grade 4.0 or better): Failing (i.e., grade 5.0) the (1) Exam, or the (2) Case Study, or (3) the Exam and the Case Study, results in failing the entire course.
- There is no retake possibility for the Capstone project. Thus, if you fail the Capstone project, you need to retake the course next year!

Course material

- Lecture slides and exercise papers
- All downloads available in Moodle
- Lecture slides will be made available for download - there will be *no printed reader!*
- Teaching material accompanying the exercise will be available for download and should be brought to the exercise classes
- There will be *no printed exercise papers available in the exercise*

Download course material

- Only GIT will be used for additional support
- Material for the lectures (slides, additional documents)
- Exercise papers
- Updates



GIT Course Project:

<https://github.com/Fiddleman/AIBasedInformationSystems>

Course material

The screenshot shows the GitHub interface for the repository 'Fiddleman / AI-Based-Information-Systems'. The top navigation bar includes links for Features, Business, Explore, Marketplace, and Pricing, along with a search bar and 'Sign in' or 'Sign up' buttons. The repository name is displayed in blue, followed by buttons for 'Unwatch' (1), 'Star' (0), and 'Fork' (0). Below this is a tabbed interface with 'Code' selected, and other tabs for 'Issues' (0), 'Pull requests' (0), 'Projects' (0), 'Wiki', 'Security', 'Insights', and 'Settings'. The repository description is 'Course Material Building AI-Based Information Systems with Python', with an 'Edit' button. Below the description is a 'Manage topics' link. A summary bar shows '8 commits', '1 branch', '0 releases', and '1 contributor'. Below this are buttons for 'Branch: master', 'New pull request', 'Create new file', 'Upload files', 'Find File', and a green 'Clone or download' button. The repository content shows a file named 'Fiddleman new readme' with the latest commit '3b14c71' from 14 hours ago. A folder named 'Lecture' is also visible, with a note 'updated readme' and a timestamp '14 hours ago'. A black circular icon with a white arrow points to the repository name.

GIT Course Project:
<https://github.com/Fiddleman/AIBasedInformationSystems>