Artificial Intelligence

Algorithms and Applications with Python

Exam Preparation

TECHNISCHE UNIVERSITÄT DARMSTADT

WIRTSCHAFTS INFORMATIK

AIAA 1 + 2

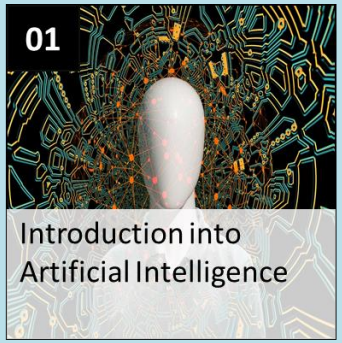
Dr. Dominik Jung
dominik.jung42@gmail.com

</> course material: ↗ https://github.com/dominikjung42 | syllabus: ↗ www.is.tu-darmstadt.de

Agenda

5.1 Exam Organisation and Preparation
5.2 Questions and Restrictions
5.3 Course Evaluation and Discussion

Course Overview

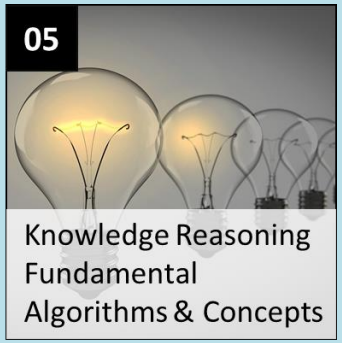


Introduction into Artificial Intelligence

Problem-Solving Agents

Introduction into AI-Programming with Python

Data and Knowledge Engineering

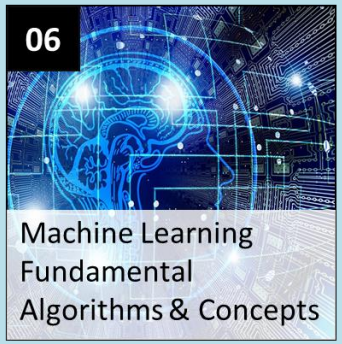


Knowledge Reasoning Fundamental Algorithms & Concepts

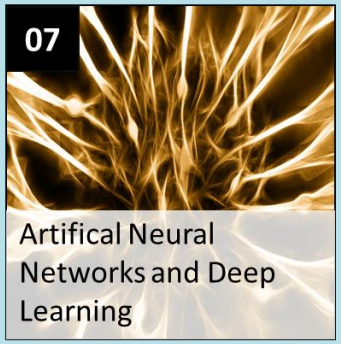
Workbook Exercises

Code Lectorial
Python

Workbook & Coding Exercises



Machine Learning Fundamental Algorithms & Concepts



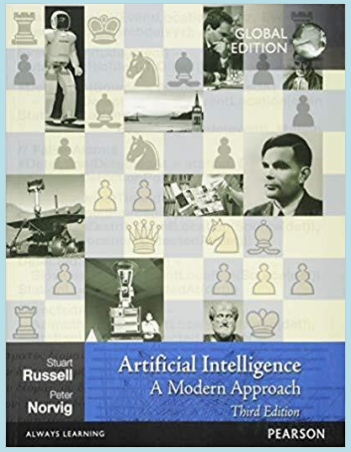
Artifical Neural Networks and Deep Learning

Stochastic Modeling and Optimization

Building Productive AI-based Information Systems

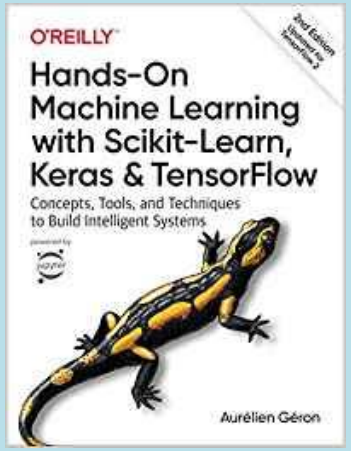
Workbook & Coding Exercises

Literature Recommendations



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

▶ Availability: ↗University Library Darmstadt | ↗Amazon



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

▶ Availability: ↗University Library Darmstadt | ↗Amazon

Which Content is Relevant for the Exam?

Outline

2 Artificial Intelligence and Information Systems

- 2.1 Artificial Intelligence Project Management
- 2.2 Artificial Intelligence Project Lifecycle
- 2.3 Skills and Roles in Artificial Intelligence Projects
- 2.4 Types of Artificial Intelligence based Information Systems

▶ **What we will learn:**

- How typical AI projects are implemented, and how their life cycle and phases look like
- What skills are needed to implement an AI project
- Why the industry needs AI specialists, and how typical AI jobs look like
- Which types of AI based information systems exists and how they can be used to solve real-world problems

Image source: Pixabay (2019) / CC0

▶ **Duration:**

- 120 min

▶ **Relevant for Exam:**

- 2.1-2.4

Artifical Intelligence: Building AI-Based Information Systems with Python - Dr. Dominik Jung

Note: There might still be questions where you might need a basic understanding of the content of the excluded chapters

Always exam relevant

- **Lecture** slides, **lectorials** and **exercises** (*except excluded chapters on the overview*)
- **Referenced chapters** of **the course books** and **all literature downloads** available in GIT (*look at the folder "literature"*)
- The **handouts** for the business cases and the **discussion results**
- **Every teaching material** accompanying this lecture (**code examples**, guest lectures etc.)

How to start

- Start to recapitulate the storyline of the lecture. Read the related chapters of the literature if you are unsecure or the video recordings of the lecture
- Answer all the classroom tasks, discuss the results with your learning group
- Take a deeper dive at the coding exercises. Solve the coding exercises of each chapter
- Solve the previous exams that are online available

Closed Book and Closed Notes Exam (preliminary!)

33 %

BASIC CONCEPTS AND THEORETICAL BACKGROUND

- You will have to answer multiple questions related to basic concepts of the lecture or give basic definitions or formulas.
- Aka “knowledge questions”.

33 %

APPLYING THEORY TO PRACTICE

- You will have to show that you understand the algorithms and concepts and that you can use them to solve a (business/real-life) problem.
- For this kind of task you might need your calculator or geometrical triangle, pen and eraser.

34 %

PROGRAMMING

- You will have to write, read and understand code examples in the context of business analytics problems.
- Use the exercises, lectorials and the code examples to prepare!

Note: It may be possible that the point distribution differs in the final exam

Example: Basic Concepts and Theoretical Background

1. Many people have tried to define the concept "*Artificial intelligence (AI)*". The most popular one in AI is the definition from McCarthy. Please give his definition of *Artificial Intelligence* we have discussed in lecture. (1 P)

Example: Application of Theoretical Concepts

1. Describe the following problem using a Markov chain. In particular, determine the state space, transition matrix, and transition graph of the Markov chain. Explain

Example: Programming

1. Please give python code to start and initialize the perceptron with the dataset start_weights? (1 P)

Previous Exams are Online Available

EXAM

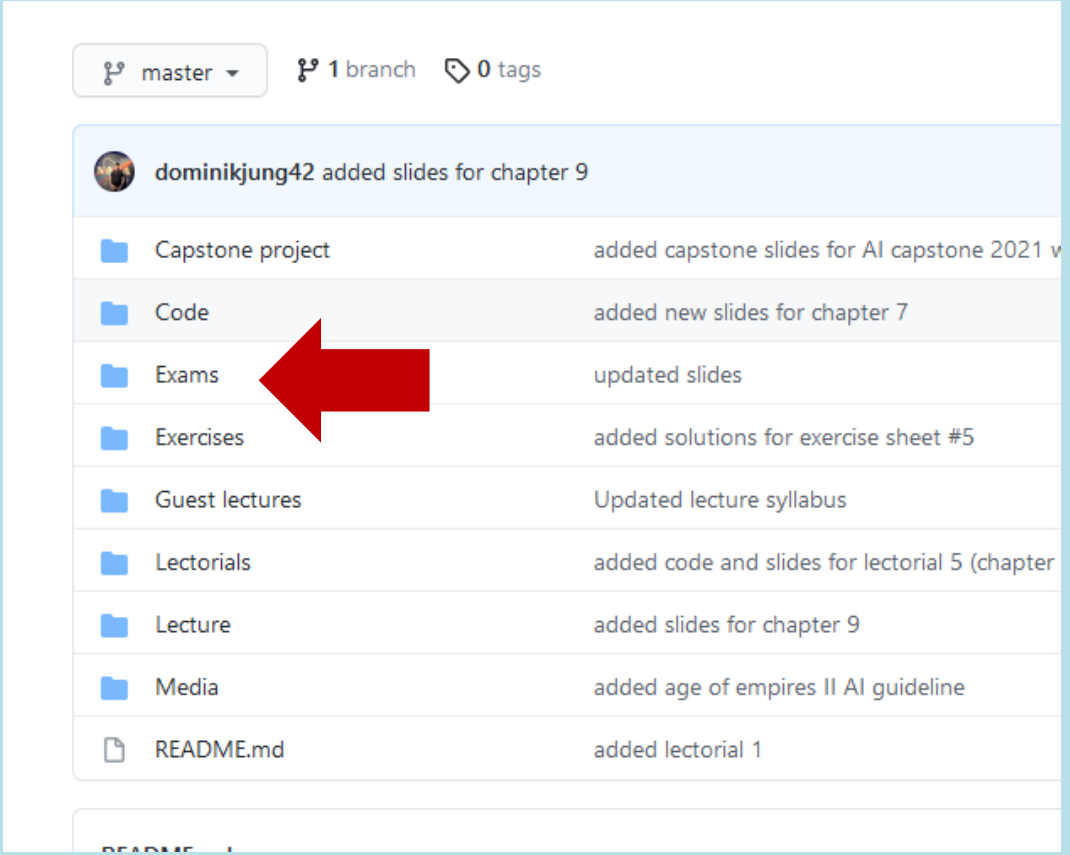
Course: Artificial Intelligence – Algorithms and Applications with Python

Date: *2021/*

Name: _____

Matr.-Nr.: _____

Section	1	2	3	Σ
Points				



Not Relevant Content

The following contents are additionally not exam relevant for the writing (!) exam this semester (!)

- Subchapter 8.1 - From Uncertainty to Probability (in particular slide 21!)

Questions