

Artificial Intelligence | Basics of Algorithms & Application

Overview: Exercise & Capstone Project

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0 Structure of the Exercise & Capstone Project

0.1 Overview

0.2 Structure of the Exercise

0.3 Structure of the Capstone Project

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(feel free to connect)

Timo Sturm

Information Systems | Software & Digital Business Group (Prof. Buxmann)

➤ Education

- Bachelor: Information Systems at TU Darmstadt
- Master: Information Systems (Focus: Data & Web Science) at Uni Mannheim

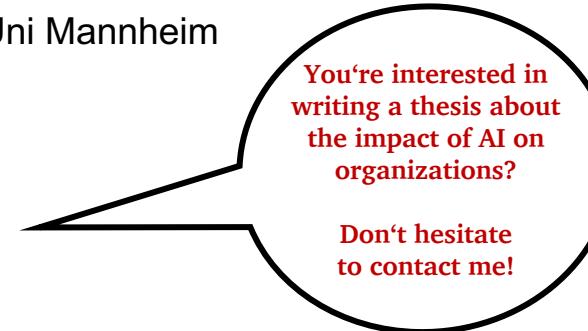
➤ Research Foci

- Artificial Intelligence in the Business Context
- Data Science and Machine Learning
- Data-driven Innovation & Innovation Processes

➤ AI-related Main Experiences

- Data Science & IoT Consulting @ SAP Germany
- Data Scientist (Area: Predictive Maintenance) @ SAP SE
- Big Data & Analytics Consulting @ SAP America, Inc.

➤ Contact via: timo.sturm@tu-darmstadt.de



You're interested in writing a thesis about the impact of AI on organizations?

Don't hesitate to contact me!

Overview

LECTURE

Focus

Theoretical concepts

Goal

Comprehend theory

Outcomes

- (1) (Great) exam &
- (2) foundations for practical use

EXERCISE

Focus

AI development tools

Goal

Learn how to handle AI development tools

Outcomes

Practical training for capstone & real world projects

CAPSTONE PROJECT

Focus

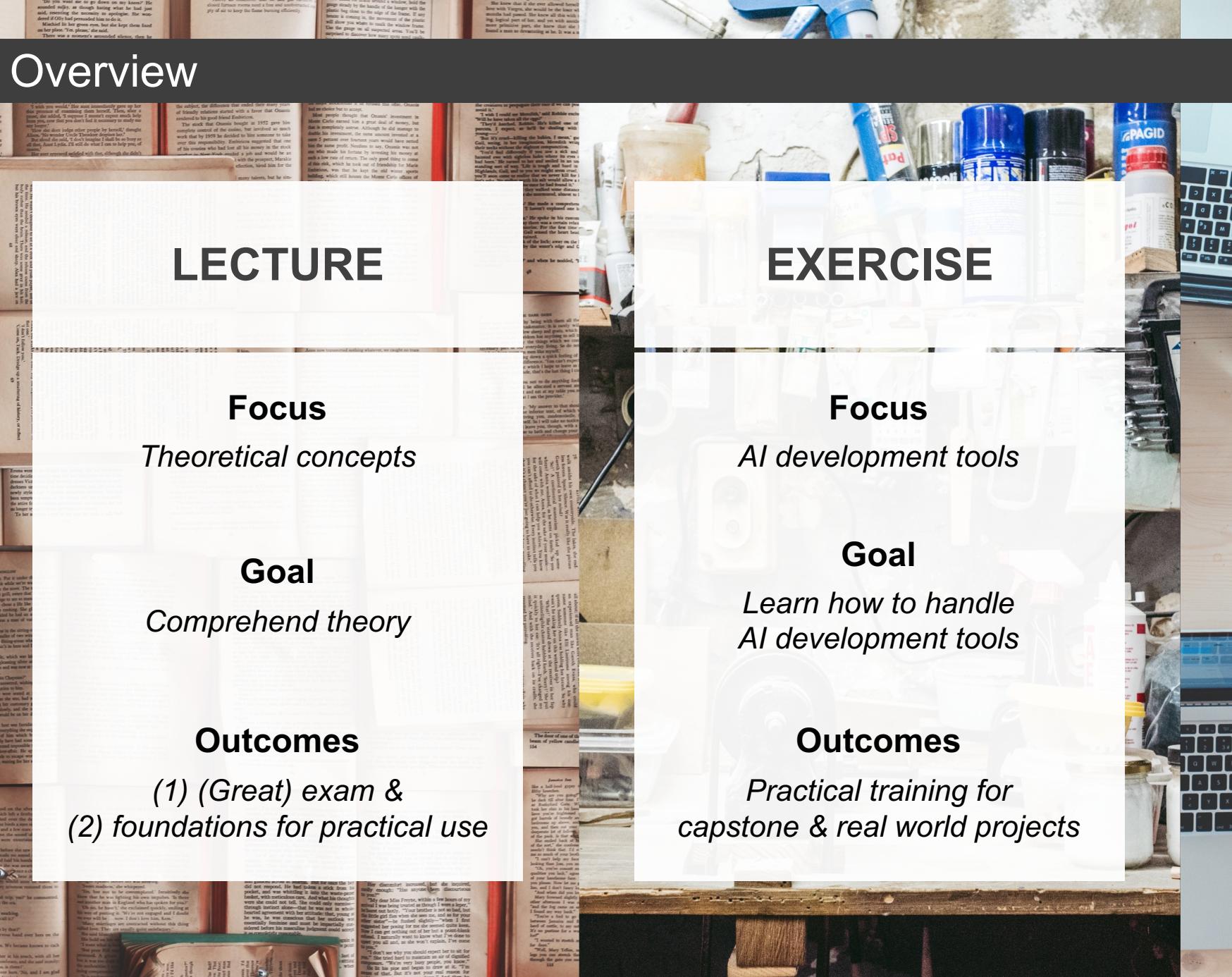
Realization of AI initiatives

Goal

Gather first-hand experience in conducting AI initiatives

Outcomes

Practical experiences & manifestation of theory



60%
Written
Exam
*(Content of
AI 1 + 2)*

YOUR GRADE

40%
Capstone
Project
*(Written Report +
Slide Deck)*

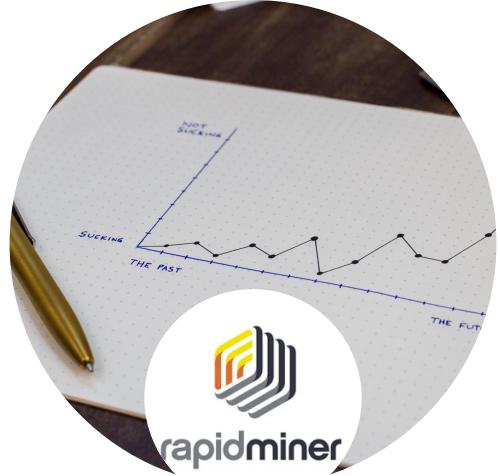
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Exercise #3

“Introduction to RapidMiner”

- Why should I care about RapidMiner?
- What are its working principles?
- How do I use RapidMiner for...
 - (i) ...data exploration & preparation?
 - (ii) ...basic AI modeling?



Exercise #4

“Introduction to Python”

- Why should I care about Python?
- What are its working principles?
- How do I use Python for...
 - (i) ...data exploration & preparation?
 - (ii) ...basic AI modeling?



Exercise #5

“Building AI Solutions”

- How can I build effective AI solutions with...
 - (i) ...Python?
 - (ii) ...RapidMiner?
- How can I combine both tools to render AI initiatives more efficient?

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Structure of the Capstone Project



- **Project Team:** Form a team consisting of **6 students**
→ If you cannot form such a team, apply independently (alone or as a smaller group) and we will assign you to a team
- **Project Goals:** Gather first-hand experience in conducting AI initiatives
 - i. **Realize an AI solution**, by thoroughly conducting:
 - *Data exploration*
 - *Data preparation*
 - *AI modeling*
 - *AI evaluation*
 - ii. **Discuss what is needed** from an **organization's perspective** to actually use your solution
 - *What value may your AI create?*
 - *Which properties should your AI offer to be beneficial?*
 - *What does the organization potentially have to change to use your AI?*
 - ...
- **Submission:** Explain what you have done, which possibilities you have explored, and which solution you offer
 - Provide a **written report**
 - Provide a **slide deck** as if you would pitch your project to us

Realize an AI initiative by:

- Using methods for **data preprocessing** you have learned in the lecture
 - + trying advanced problem-specific methods
- Using the **AI algorithms** that you learned in the lecture
 - + trying further advanced algorithms
- Understanding the **business value** your AI initiative can deliver
 - if it is done right

⇒ **Overall:** Explore further methods and algorithms, be creative!

⇒ Feel free to use RapidMiner, Python, or a combination of both to realize your project!

1) REPORT

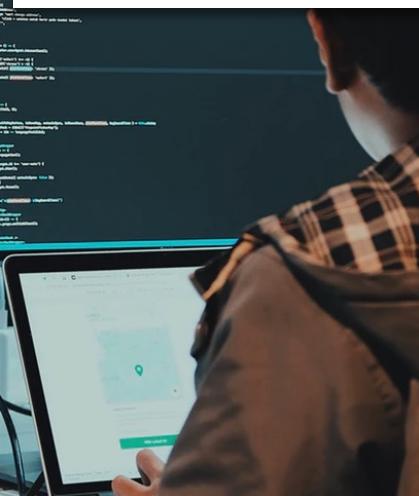
- **Template:** Use the document template provided by us via git
(we use the template of the International Conference on Information Systems (ICIS))
- **Submission:** Submit your report as a single **PDF file!**
- **Scope:** 4 - 6 pages (excluding references (if references are needed))
→ Please note: Any page which is too less or too much will degrade your grade by 0.3!
- **Required content** (*follows roughly the usual structure of a scientific paper*):
 - 1) **Introduction/Motivation:** Which problem are you trying to solve and why is this beneficial? What are you trying to achieve?
 - 2) **Data Overview and Preparation:**
 - Provide an overview of the data you have used by reporting its structure and size (optionally: particularities that are relevant for your project)
 - Provide an overview of the data preparation that you have conducted
 - 3) **Development of AI Solution:**
 - Explain the models you have built and investigated
 - Report and compare computed performance measures of all built models
 - 4) **Discussion:**
 - Which model would you chose as a final solution for the problem that you want to solve and why?
 - Discuss whether your solution is already sufficient to be used in a real-world context and how it can be used
 - Which limitations exist with your solution and what could be done to potentially provide an even better solution?

2) SLIDE DECK



- **Template:** Feel free to create **your own template!**
- **Submission:** Submit your slides as a single **PDF file!**
- **Content:** Outline the main aspects of your project in an **easy-to-understand** and **visualized** way

3) AI IMPLEMENTATION



- **Tool:** You can implement your AI solution using **RapidMiner**, **Python**, or **both combined**
- **Submission:** Submit all of your final code and/or RapidMiner processes (regarding all models you present in your report)

Deadline Overview: MAIN CAPSTONE PROJECT

➤ **Team Formation:** Apply individually or as a team until **30.04.2023 23:59**

- **Send a mail indicating:**
 - your *full name*
 - your *matriculation number*
 - your *email address*
- **If you apply as a team:** Please indicate the above information for all team members in a single mail
- **Send the mail to:** timo.sturm@tu-darmstadt.de
- **Final Formation:** We will reach out to you with the final team formation shortly after the above registration deadline
(we will try to not split any teams that apply with exactly 4 people)

➤ **Project Kick-Off:** We will kick off the project together with Porsche on **12.05.2023 14:25**

- All teams will work on the same real-world problem
- End of project & submission of AI solution: **09.07.2023 23:59**

➤ **Final Project Submission:** Submit your finalized project until: **13.08.2023 23:59**

- Submit your written report and slides as a PDF
- Submit your implementation files as RapidMiner processes and/or python code with the used data
(submit all files that we would need to recreate all models that you mention in your report)