An Introduction to Artificial Intelligence (AI) in Finance

Dr. Lennart Stitz
Data Scientist
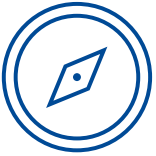BASF Coatings GmbH

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Münster

Course Outline

1. Introduction to Machine Learning & AI

2. Data Preprocessing

3. Training, Validation, and Testing

4. Unsupervised Learning

5. Supervised Learning
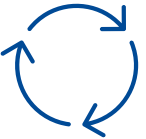
6. Reinforcement Learning

Learning Objectives

Grasp core concepts of artificial intelligence, machine learning, and data science.

Navigate ethical and regulatory challenges in financial AI applications.

Apply the data science lifecycle to financial datasets and problems.

Implement and evaluate supervised, unsupervised, and reinforcement learning techniques for financial applications.

Preliminary Course Plan

Wednesday 16:00-18:00 JUR 498	03.12.	10.12.	17.12.	24.12.	31.12.	07.01.	14.01.	21.01.	28.01.	04.02.
Friday 12:00-14:00 WIWI Pool 3	05.12.	12.12.	19.12.	26.12.	02.01.	09.01.	16.01.	23.01.	30.01.	06.02.

*subject to change

Final Grade:

70% Data Science Project & Presentation
30% Exam (60 Minutes)

Lectures	Practice Sessions
Presentations	No Class

Data Science Project & Presentation (1/3)

Task

- Formulate a research question based on the available data that can be addressed using supervised and/or unsupervised learning. Clearly explain the limitations of both the research question and the chosen analytical approach. Novelty is not required.
- Design and implement your solution, making all necessary decisions regarding research design (e.g., data cleaning, feature engineering, model selection). Provide well-reasoned justifications for each choice.
- Evaluate model performance and interpret the results, highlighting any limitations of the insights generated.

Data

- Annual financial data from Compustat Capital IQ to be used for the task is provided on learnweb.
- Items are defined in the provided pdf-file.

Data Science Project & Presentation (2/3)

Grading

- The final grade of the data science project is determined by the handed in report & code (67%) and the final presentation (33%).

Deadlines

- You can work alone or in groups of two. **Whether you work alone or in a group of two**, you need to **inform me via email** to lennart.stitz@basf.com **until Sunday, December 14th, 2025, 23:59.**
- All **reports** (as PDFs) **& used code** to replicated your findings needs to be handed in to lennart.stitz@basf.com by **Sunday, February 1st, 2026, 23:59.**
- All **presentations** (as PDFs or PPTs) need to be handed in to lennart.stitz@basf.com by **Wednesday, February 3rd, 2026, 23:59.**

Late or incomplete submissions will not be accepted and will result in 0 points

Data Science Project & Presentation (3/3)

Formalities

- Reports must be written in English.
- The general formatting rules of the FCM apply.
- Reports must not exceed 15 pages (including tables, figures, etc. but excluding cover page, table of contents, and references).

Guidelines & Hints

- Concise reports are preferred over lengthy narratives that lack focus.
- Select a research design that can be executed within the constraints of the available hardware. If needed, reduce the dataset size and/or narrow the optimization scope.

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