AI Use for Students

Provided by L. Kobilke & J. Schindler

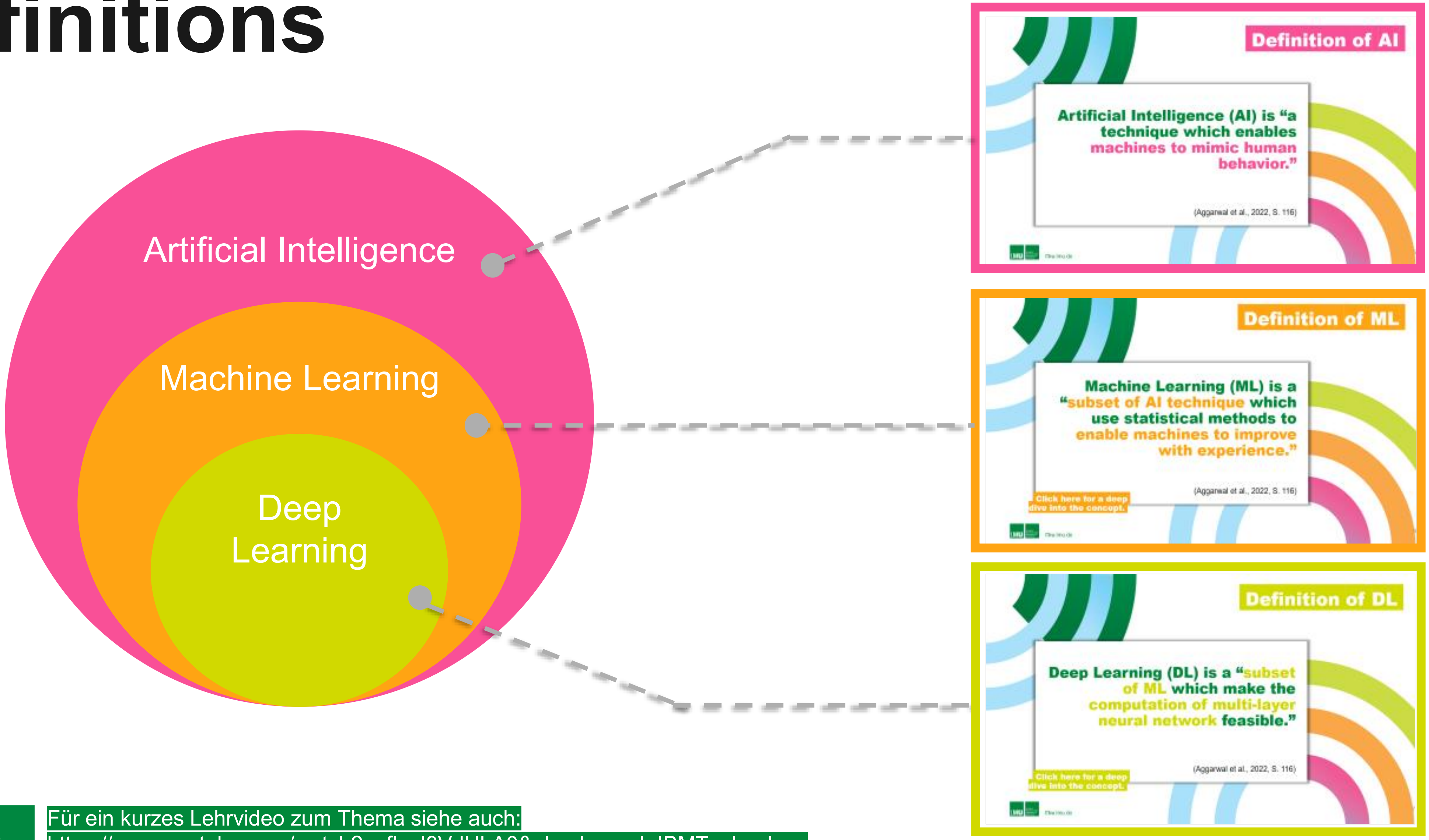
Last update: 2025-06-25

Table of Contents

1 Definitions

AI, Machine Learning, Deep Learning

Definitions



Für ein kurzes Lehrvideo zum Thema siehe auch:
https://www.youtube.com/watch?v=fLvJ8VdHLA0&ab_channel=IBMTechnology

Definition of AI

Artificial Intelligence (AI) is "a technique which enables machines to mimic human behavior."

(Aggarwal et al., 2022, S. 116)

Definition of ML

Machine Learning (ML) is a "subset of AI technique which use statistical methods to enable machines to improve with experience."

(Aggarwal et al., 2022, S. 116)

Click here for a deep dive into the concept.

Definition of DL

Deep Learning (DL) is a "subset of ML which make the computation of multi-layer neural network feasible."

(Aggarwal et al., 2022, S. 116)

Click here for a deep dive into the concept.

Deep Dive ML with Examples

Machine Learning

- Machine Learning (ML), “a branch of AI, enables software programs to enhance their predictive accuracy without explicit programming, using historical data to forecast new output values” (Mian et al., 2024, p. 1).
- How it works: Involves creating and using algorithms that can learn from and make predictions or decisions based on data. These algorithms can be simple linear regression models or more complex deep learning models.
- Examples: From simple tasks like recommending products based on user history (as seen in e-commerce) to complex operations like detecting fraudulent transactions in banking.

Deep Dive DL with Examples

Deep Learning

- Deep Learning (DL), "a subset of ML, involves training models to organize sounds, text, or images using neural networks and substantial labeled data. In some cases, deep learning models surpass human performance, achieving state-of-the-art accuracy" (Mian et al., 2024, p. 1). DL is a special case of *neural networks,* namely those that have multiple (often many) layers, which are termed as 'deep' networks. This depth allows the models to learn complex patterns.
- How it works: Involves feeding data is into the input layer of the network and passes through multiple hidden layers, where each layer transforms the input using weights and biases, often followed by a non-linear activation function. Each layer's output serves as the input for the next layer. This multi-layer structure enables the model to learn complex patterns and features from data, with higher layers building on the features recognized by previous layers.
- Examples: Complex tasks such as natural language processing (enabling machines to understand and generate human language) and autonomous driving (making sense of real-time traffic scenarios to navigate safely).

Sources

Aggarwal, K., Mijwil, M. M., Sonia, Al-Mistarehi, A.-H., Alomari, S., Gök, M., Zein Alaabdin, A. M., & Abdulrhman, S. H. (2022). Has the future started? The current growth of artificial intelligence, machine learning, and deep learning. *Iraqi Journal for Computer Science and Mathematics, 3*(1), 115–123. https://doi.org/10.52866/ijcsm.2022.01.01.013

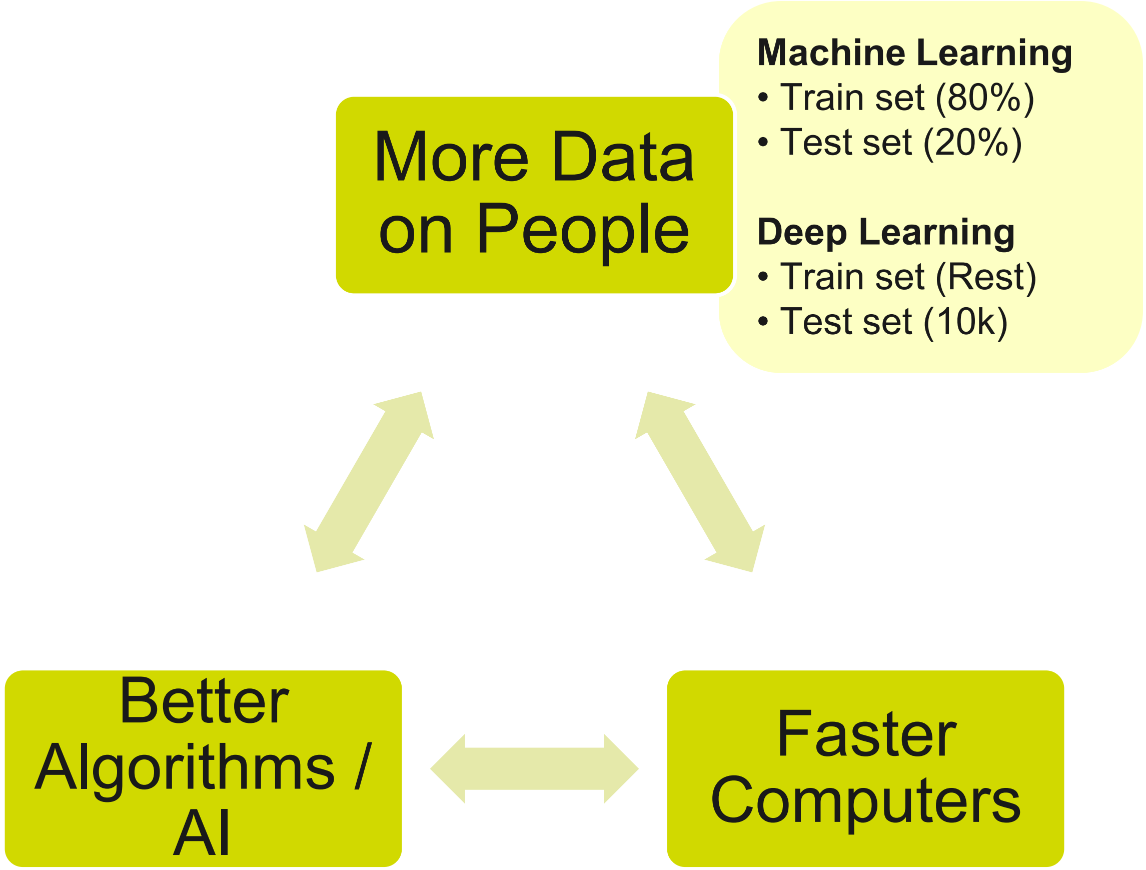
Mian, S. M., Khan, M. S., Shawez, M., & Kaur, A. (2024). Artificial Intelligence (AI), Machine Learning (ML) & Deep Learning (DL): A Comprehensive Overview on Techniques, Applications and Research Directions. In 2024 *2nd International Conference on Sustainable Computing and Smart Systems (ICSCSS)* (pp. 1404-1409). https://doi.org/10.1109/ICSCSS60660.2024.10625198

2

Mathematical Understanding of Deep Learning

ifkw

Why DL instead of ML?



Repetition of Math Rules I

Power Rule for Derivatives

The power rule states that if you have a function $f(x) = x^n$, then its derivative $f'(x)$ is given by $f'(x) = n \cdot x^{n-1}$

Example

Function: $f(x) = x^3$

Derivative: Using the power rule, $f'(x) = 3 \cdot x^{3-1} = 3x^2$

Repetition of Math Rules II

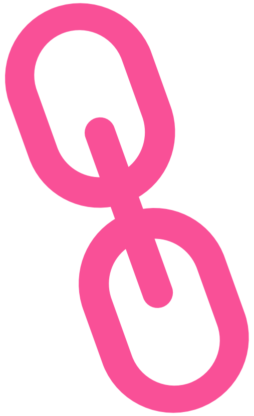
Chain Rule for Derivatives

The chain rule states that if you have two functions, say f and g, where one function g is nested inside another function f, then the derivative of the combined function (often called a **composite function**) can be found by multiplying the derivative of the outer function by the derivative of the inner function.

Mathematically, if you have a function $y = f(g(x))$, then the derivative y' is given by:

$$y' = f'(g(x)) \cdot g'(x)$$

Here, $f'(g(x))$ represents the derivative of the outer function f evaluated at $g(x)$, and $g'(x)$ is the derivative of the inner function g.



Repetition of Math Rules II

Chain Rule for Derivatives

Example

Function: $h(x) = (3x + 2)^2$

Step 1: Identify the Functions

- Let $g(x) = 3x + 2$ (the inner function).
- Let $f(u) = u^2$ where $u = g(x)$ (the outer function).

Step 2: Differentiate Each Function

- Derivative of $g(x)$: $g'(x) = 3$.
- Derivative of $f(u)$: $f'(u) = 2u$ (using the power rule).

Step 3: Apply the Chain Rule

- Plug $g(x)$ into $f'(u)$ to get $f'(g(x)) = 2(3x + 2)$.
- Multiply $f'(g(x))$ by $g'(x)$:
  $h'(x) = 2(3x + 2) \cdot 3 = 6(3x + 2)$

Definition of Computation Graphs

A way to visualize the operations and flow of data in deep learning algorithms. A computation graph is a directed graph where each node in the graph represents a variable or operation (e.g., addition, multiplication), while edges represent the flow of data (tensors) between operations.

Deep Learning

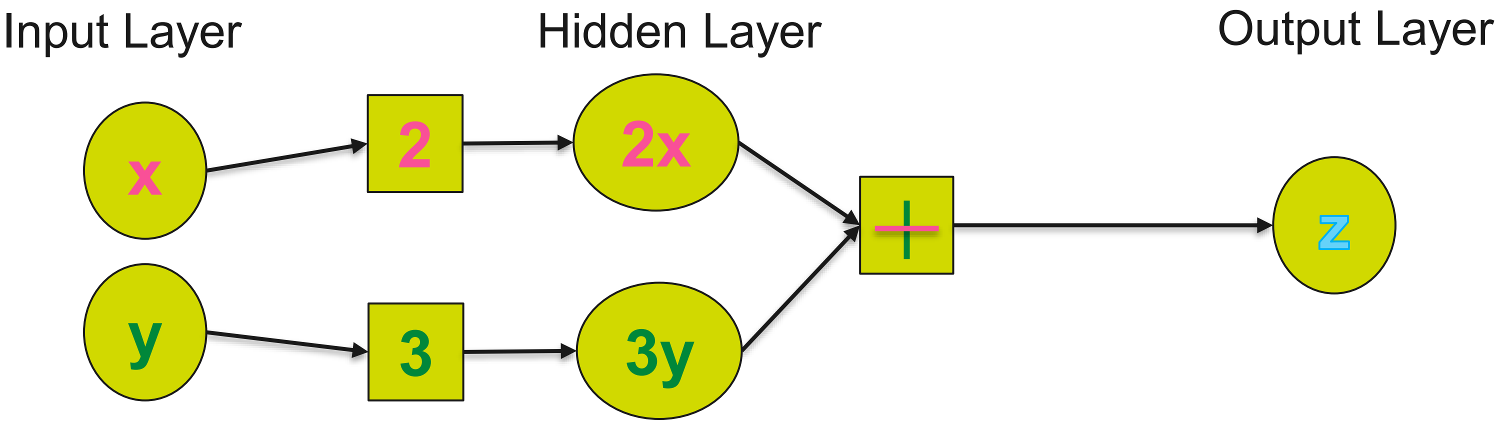
Steps in DL

- Computing a neural networks proceeds in four phases:
  1. **Forward Pass =** feeding input data into the graph & computing the output
  2. **Calculating the Loss function =** a measure of how far the network's predictions are from the actual target values, e.g. formula: $L = \frac{1}{2}(z_{\text{predicted}} - z_{\text{target}})^2$
  3. **Backward Pass =** backpropagation happens with the goal of minimizing the loss by adjusting the network's parameters (i.e., the weights)
  4. **Gradient Decent =** once the gradients are computed for all parameters, they are used to update the parameters in the opposite direction of the gradient to reduce the loss.

Deep Learning

Example

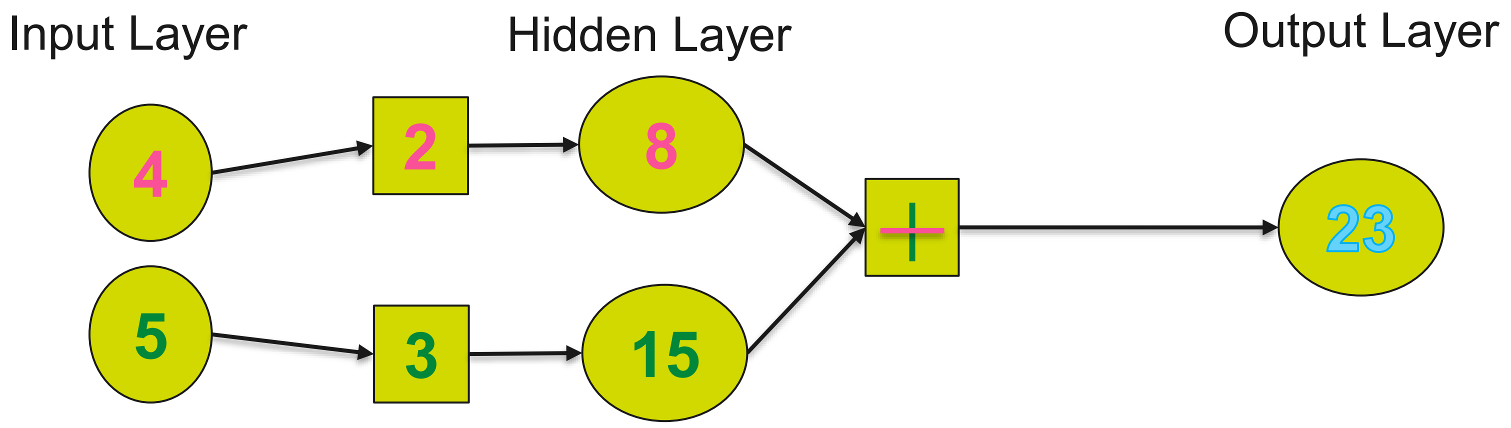
- Let's consider a simple example: computing the function $z = 2x + 3y$. The computation graph for this has nodes for the inputs x and y, the mathematical operations, and the output z.



Deep Learning

Phase 1: Forward Pass

- feeding input data into the graph and computing the output:
  1. You feed (some **arbitrarily chosen**) values for x and y (here 4 and 5).
  2. Compute $2x$ and $3y$.
  3. Add the results to get z.



$z = 2 \times 4 + 3 \times 5 = 8 + 15 = 23$

Deep Learning

Phase 2: Loss Calculation

- Using the Mean Squared Error (MSE) formula:

$$L = \frac{1}{2}(z_{\text{predicted}} - z_{\text{target}})^2$$

- Plug in the values into the formula:

Where $z_{\text{predicted}} = 23$ and $z_{\text{target}} = 30$, thus:

$$L = \frac{1}{2}(23 - 30)^2 = \frac{1}{2} \times 49 = 24.5$$

The goal of the training process is to minimize this error of 24.5, i.e., get it closer to 0! Minimizing the loss involves adjusting the weights in the network so that the predictions get closer to the target values over successive training iterations (see next slides).

Deep Learning

Phase 3: Backward Pass

- Minimize the loss (see prior slide) by adjusting the network's parameters through computing the **Gradient of Loss**
  1. First, calculate the gradient (partial derivatives) of the loss function with respect to the output **z**:

Gradient of the Loss w.r.t. the Output z:

$$\frac{\partial L}{\partial z} = z_{\text{predicted}} - z_{\text{target}} = 23 - 30 = -7$$

Click here for a full explanation of the calculation!

Interpretation of the Gradient $\frac{\partial L}{\partial z}$:
This result of -7 tells us that increasing **z** would decrease the loss because the gradient is negative. If **z** were to increase, it would be moving closer to **z_target**, thus reducing the loss.

Calculating $\frac{\partial L}{\partial z}$

The derivative of the loss function with respect to z can be calculated by differentiating L with respect to z. Applying the power rule and chain rule in differentiation, we get:

$$\frac{\partial L}{\partial z} = \frac{\partial}{\partial z}\left(\frac{1}{2}(z_{\text{predicted}} - z_{\text{target}})^2\right)$$
$$\frac{\partial L}{\partial z} = 1 \times (z_{\text{predicted}} - z_{\text{target}}) \times \frac{\partial}{\partial z}(z_{\text{predicted}} - z_{\text{target}})$$

Since $z_{\text{predicted}}$ is directly z and z_{target} is a constant, the derivative $\frac{\partial}{\partial z}(z_{\text{predicted}} - z_{\text{target}})$ is 1.

Thus:

$$\frac{\partial L}{\partial z} = (z_{\text{predicted}} - z_{\text{target}})$$

Deep Learning

Phase 3: Backward Pass

- Minimize the loss by adjusting the network's parameters through computing the **Gradient of Loss**
  2. Second, calculate the gradient (partial derivatives) of the loss function with respect to ***x***:

Gradient w.r.t. Weight of x (which is 2 here):

$$\frac{\partial L}{\partial 2} = \frac{\partial L}{\partial z} \times \frac{\partial z}{\partial 2} = -7 \times x = -7 \times 4 = -28$$

Click here for a full explanation of the calculation!

Interpretation of the Gradient $\frac{\partial L}{\partial 2}$:
The result of -28 indicates that a slight increase in the weight 2 (i.e., making it larger than 2) would significantly decrease the loss L because the gradient is negative.

2. **Compute the Partial Derivative of z w.r.t the Weight 2 ($\frac{\partial z}{\partial 2}$):**
   - The term 2 in the equation $z = 2x + 3y$ multiplies the input x. To find out how z changes as we change the weight 2, we differentiate z with respect to 2. Since $z = 2x + 3y$, differentiating it w.r.t. 2 gives x. This derivative represents how z changes if the weight 2 (applied on x) changes slightly.
   - Mathematically, $\frac{\partial z}{\partial 2} = x$.
3. **Apply the Chain Rule to Find the Gradient of L w.r.t the Weight 2 ($\frac{\partial L}{\partial 2}$):**
   - We use the chain rule: $\frac{\partial L}{\partial 2} = \frac{\partial L}{\partial z} \times \frac{\partial z}{\partial 2}$.
   - Substituting the values: $\frac{\partial L}{\partial 2} = -7 \times x = -7 \times 4 = -28$.

Deep Learning

Phase 3: Backward Pass

- Minimize the loss by adjusting the network's parameters through computing the **Gradient of Loss**
  2. Second, calculate the gradient (partial derivatives) of the loss function with respect to ***y***:

Gradient w.r.t. Weight of y (which is 3 here):

$$\frac{\partial L}{\partial 3} = \frac{\partial L}{\partial z} \times \frac{\partial z}{\partial 3} = -7 \times y = -7 \times 5 = -35$$

Click here for a full explanation of the calculation!

Interpretation of the Gradient $\frac{\partial L}{\partial 3}$:
The result of -35 indicates that a slight increase in the weight 3 (i.e., making it larger than 3) would significantly decrease the loss L because the gradient is negative.

Steps for Calculating the Gradient w.r.t. Weight 3

2. **Partial Derivative of z w.r.t. the Weight 3 ($\frac{\partial z}{\partial 3}$):**
   - In the function $z = 2x + 3y$, the derivative of z with respect to 3 is y, since 3 is the coefficient of y. Thus, if we increase 3 by a tiny amount, z increases proportionally to the value of y.
   - Mathematically, $\frac{\partial z}{\partial 3} = y$.
3. **Apply the Chain Rule to Determine $\frac{\partial L}{\partial 3}$:**
   - Using the chain rule: $\frac{\partial L}{\partial 3} = \frac{\partial L}{\partial z} \times \frac{\partial z}{\partial 3}$.
   - Plugging in the values: $\frac{\partial L}{\partial 3} = -7 \times y = -7 \times 5 = -35$.

Deep Learning

Phase 4: Gradient Decent

- Once the gradients are computed for all parameters, they are used to update the parameters in the opposite direction of the gradient to reduce the loss.
- The **learning rate α determines** how much the weights in the network should be adjusted with respect to the gradient of the loss function during training. A larger learning rate means that the model weights are updated more significantly with each step, potentially speeding up convergence.

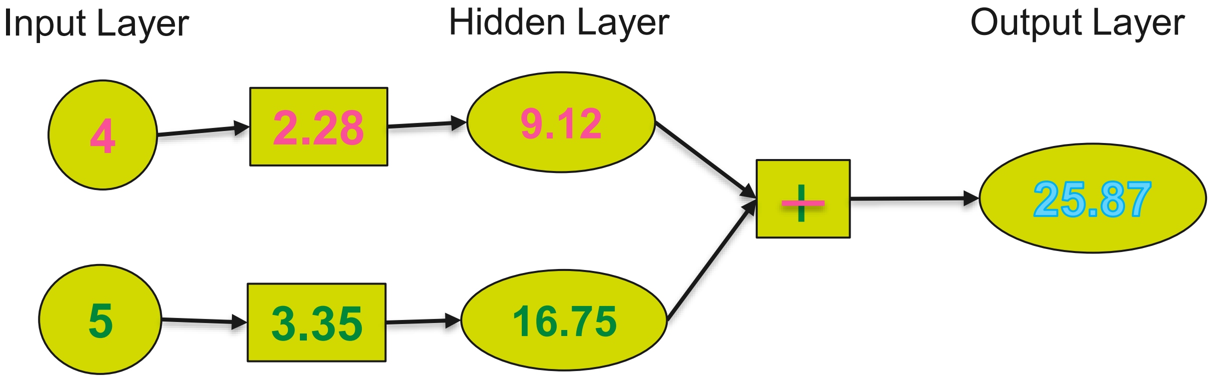
Assuming a learning rate $\alpha = 0.01$, the updates would be:

- **Update for Weight of x** (initially 2):

$$2_{\text{new}} = 2 - \alpha \times \frac{\partial L}{\partial 2} = 2 + 0.01 \times 28 = 2.28$$

- **Update for Weight of y** (initially 3):

$$3_{\text{new}} = 3 - \alpha \times \frac{\partial L}{\partial 3} = 3 + 0.01 \times 35 = 3.35$$



$z = 2.28 \cdot 4 + 3.35 \cdot 5 = 9.12 + 16.75 = 25.87$

Deep Learning

Congratulations! You've successfully completed your first iteration of backpropagation. Excellent work! 😊 👏

What have we achieved? We've effectively updated the weights of x and y to reduce the loss, bringing z closer to our target value of 30 upon reevaluating with the updated parameters. Originally our model calculated $z = 2x + 3y$, but it now computes $z = 2.28x + 3.35y$.

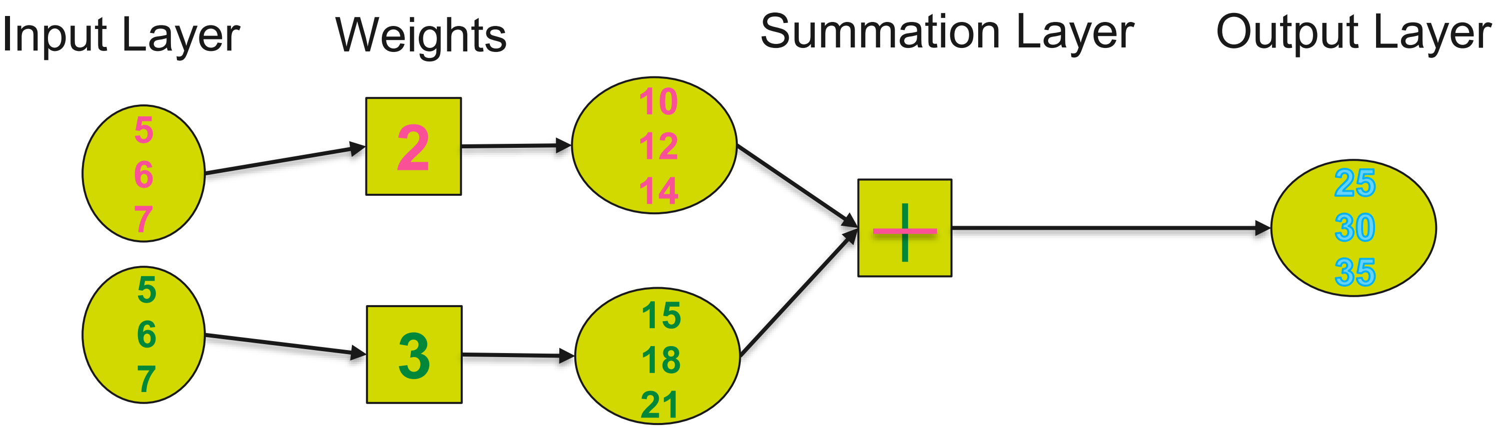
This entire process — calculating the output (forward pass), evaluating the error (loss calculation), computing gradients (backward pass), and updating the parameters (gradient descent) — is a cycle that repeats across training iterations to minimize the loss and improve model accuracy!

Deep Learning

How to scale this example?

In a real neural network, **inputs and weights are typically managed as vectors and matrices**, not just individual numbers. This matrix-based approach enables the handling of multiple inputs and outputs simultaneously, which significantly enhances the network's ability to process a wide array of data swiftly!

Furthermore, actual neural networks typically comprise **many more layers** than those presented here. This added complexity allows them to **learn deeper patterns and subtleties** in the data.



Input Matrix X:

$$X = \begin{bmatrix} x_1 & x_2 & x_3 \\ y_1 & y_2 & y_3 \end{bmatrix} = \begin{bmatrix} 5 & 6 & 7 \\ 5 & 6 & 7 \end{bmatrix}$$

Weight Matrix W:

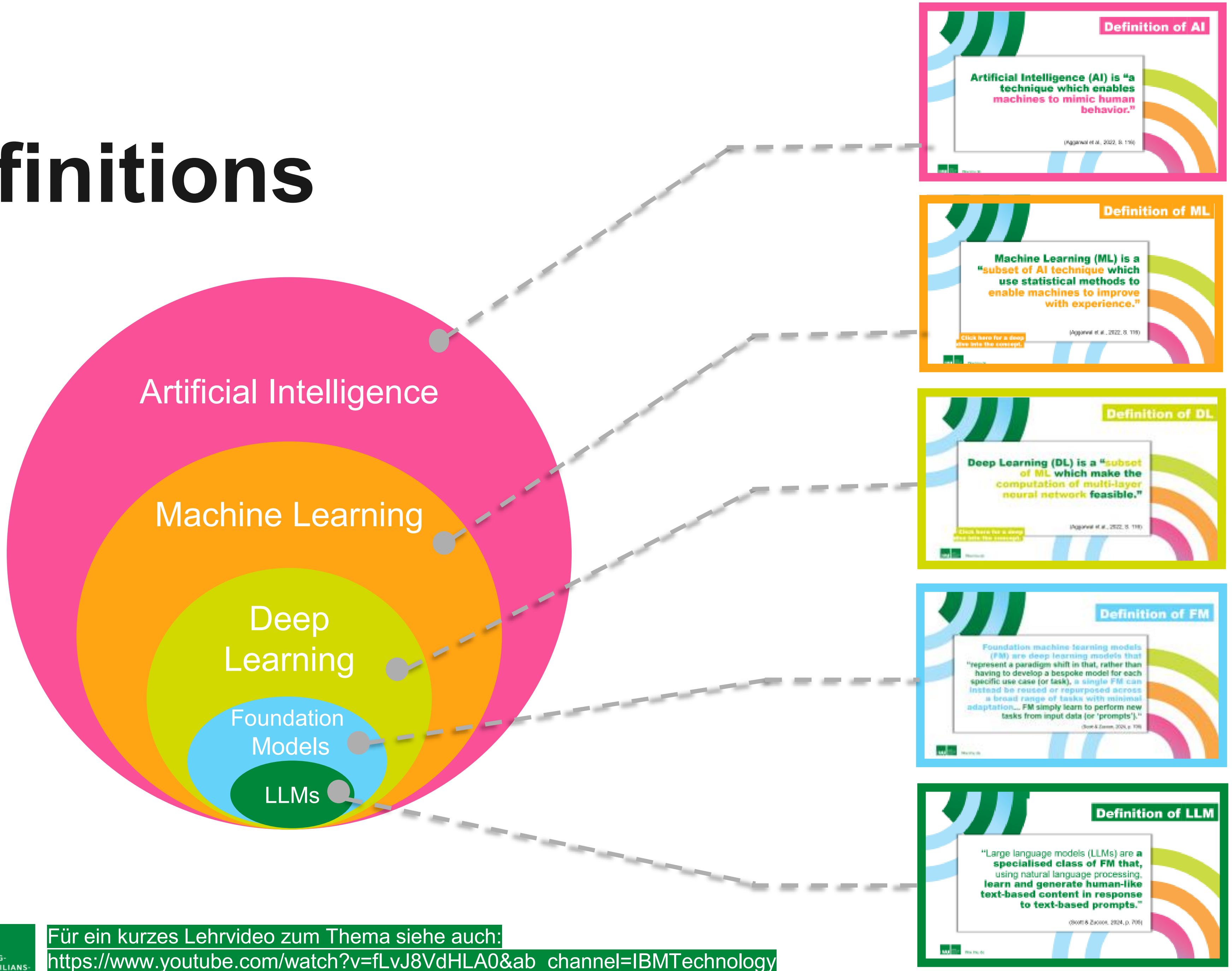
$$W = \begin{bmatrix} 2 & 3 \end{bmatrix}$$

Calculation:

The output Z is calculated as: $Z = W \cdot X$

3 Understanding Large Language Models (LLMs)

Definitions



Für ein kurzes Lehrvideo zum Thema siehe auch:
https://www.youtube.com/watch?v=fLvJ8VdHLA0&ab_channel=IBMTechnology

Definition of FM

Foundation machine learning models (FM) are deep learning models that “represent a paradigm shift in that, rather than having to develop a bespoke model for each specific use case (or task), **a single FM can instead be reused or repurposed across a broad range of tasks with minimal adaptation**... FM simply learn to perform new tasks from input data (or ‘prompts’).“

(Scott & Zuccon, 2024, p. 705)

Definition of LLM

"Large language models (LLMs) are **a specialised class of FM that,** using natural language processing, **learn and generate human-like text-based content in response to text-based prompts.**"

(Scott & Zuccon, 2024, p. 705)

Definition of GenAI

“We can define ‘Generative AI’ as the production of previously unseen synthetic content, in any form and to support any task, through generative modeling.”

(García-Peñalvo & Vázquez-Ingelmo, 2023, S. 14)

Users provide a description of what they want (called a prompt), and the AI generates content based on this prompt.

The Inner Workings of LLMs

Das Lehrvideo stammt von:
https://www.youtube.com/watch?v=EzotR4veOus

Ethical and Legal Risks of AI

Institut für Kommunikationswissenschaft und Medienforschung

- Incorrect or **misleading statements about reality** (including fabrication/"hallucination"), e.g., missing specialized knowledge or even use of outdated knowledge
- **Plagiarism** of existing content
- Reinforcement of **biases** (e.g., social, political, cultural) and mainstream perspectives, tendency to always please the user
- High **resource consumption** (compared to alternatives like search engines)
- Dependence on **commercial providers** with particularistic interests
- Violations of **data protection, copyrights,** and own or others' **intellectual property** when sharing ideas or data with AI tools, including unauthorized use for AI training
- **Misuse of AI** tools or data (e.g., for economic, political, or ideological purposes)

→ Broad ethical (social, political, ecological) and legal risks, especially when AI serves as an information source, informs decision-making, or processes sensitive data

Ethical and Legal Risks of AI

ifkw
Institut für Kommunikationswissenschaft und Medienforschung

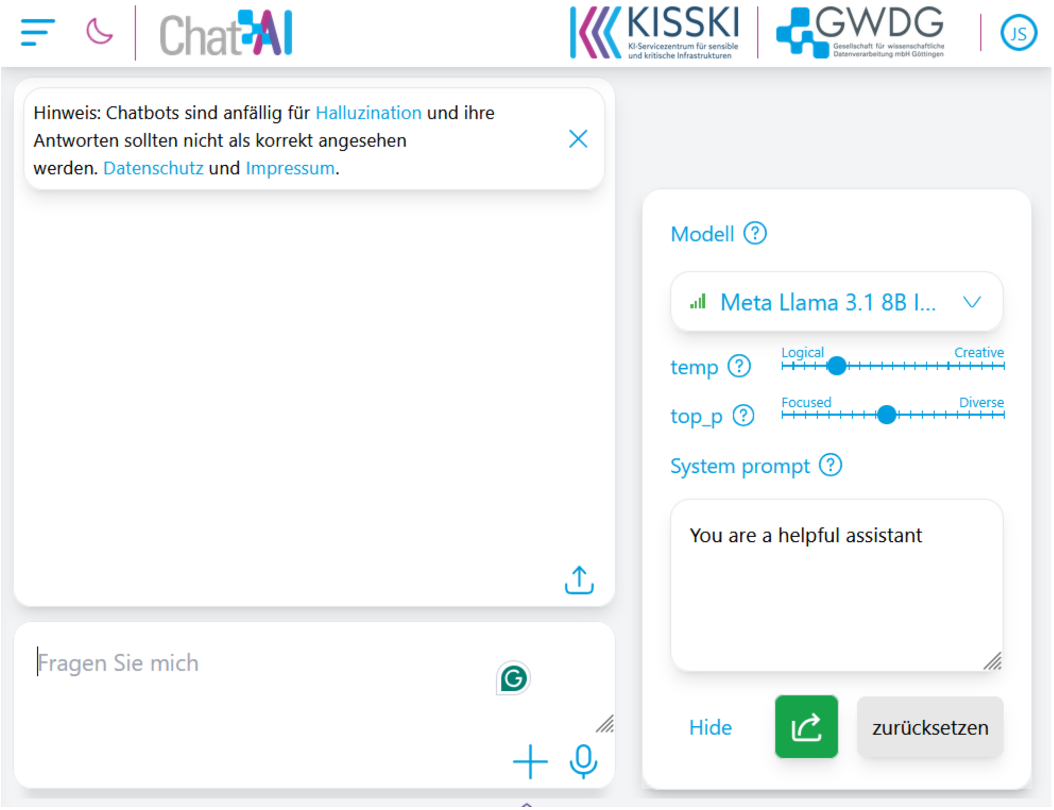
- Incorrect or **misleading statements about reality** (including fabrication/"hallucination"), e.g., missing specialized knowledge or even use of outdated knowledge
- **Plagiarism** of existing content
- Reinforcement of **biases** (e.g., social, political, cultural) and mainstream perspectives, tendency to always please the user
- High **resource consumption** (compared to alternatives like search engines)
- Dependence on **commercial providers** with particularistic interests
- Violations of **data protection, copyrights,** and (own or others') **intellectual property** (when sharing ideas or data with AI tools)
- Unauthorized use of personal and **copyrighted data for AI training**
- **Misuse of AI** tools or data (e.g., for economic, political, or ideological purposes)

→ Broad ethical (social, political, ecological) and legal risks, especially when AI serves as an information source, informs decision-making, or processes sensitive data

Open Source Models

Chat AI as an alternative to ChatGPT:
https://chat-ai.academiccloud.de

- Customization options (open source language models, system prompts, logic vs. creativity level)
- Compliance with German Data Protection Law (applies only to internal models like Meta LLaMA)



Sources

Institut für Kommunikationswissenschaft und Medienforschung

García-Peñalvo, F., & Vázquez-Ingelmo, A. (2023). What do we mean by GenAI? A systematic mapping of the evolution, trends, and techniques involved in generative AI. *International Journal of Interactive Multimedia and Artificial Intelligence, 8*(4), 7-16. https://doi.org/10.9781/ijimai.2023.07.006

Scott, I. A., & Zuccon, G. (2024). The new paradigm in machine learning–Foundation models, large language models and beyond: A primer for physicians. *Internal Medicine Journal, 54*(5), 705-715. https://doi.org/10.1111/imj.16393

4 Guiding Principles of AI Use @IfKW

IfKW Rules for AI Use

Institut für Kommunikationswissenschaft und Medienforschung

- **Only use AI in assessments when explicitely permitted by the teacher**
  (this may also concern other tasks, e.g., translations, stimulus creation, data analysis, etc.).
- **Completely and appropriately document the use of AI in assessed work**
  (in accordance with the guidelines of the teacher, IfKW, and APA).
- **It is almost always better to cite scientific sources than AI output.**
- **Do not enter personal information into AI systems**
  (without consent and compliance with German/EU data protection standards).
- **Only upload copyrighted content if permitted legally and ethically.**
- **Personally check any AI output you include in assessed work, as you are fully responsible for it.**

Guiding Principles for any AI Use

ifkw
Institut für Kommunikationswissenschaft und Medienforschung

- Do not blindly rely on AI-generated results—always critically evaluate and verify them.
- Always include your own thoughts, or better, start with them, and use precise prompts.
- Always consider the ethical and legal implications of AI use.

→ Only use AI if you can take full responsibility for the work process and the results

5 Applications of AI for Students

Overview of Possible AI Uses

ifkw
Institut für Kommunikationswissenschaft und Medienforschung

- Idea development
- Topic and literature research
- Data analysis
- Writing
- Formal editing
- Content editing

→ **Different recommendations and risks**

Remember: Use AI in assessments only when explicitely permitted by the teacher!

Idea Development with AI

ifkw
Institut für Kommunikations-wissenschaft und Medienforschung

e.g., research questions, titles, theory development, methodological implementation, interpretation of findings…

Recommendations:

- start with own thoughts and ideas
- use specific prompts
- critically evaluate all AI-generated suggestions
- **alternatives:** brainstorm with fellow students

Risks: incorrect information, plagiarism, lack of originality, biases, inappropriate research approaches…

Remember: Completely and appropriately document AI use in assessed work!

Topic/Literature Research with AI

ifkw
Institut für Kommunikationswissenschaft und Medienforschung

e.g., topic overview, explaining content, finding sources, summarizing sources…

Remember: do not use general purpose AI (such as ChatGPT) for literature research!

Recommendations:

- consider specialized AI tools
- verify all AI-generated information and sources against scientific literature
- **alternatives:** start with a textbook for an overview, then use scientific databases

Risks: incorrect information, incomplete information, irrelevant information, biased information, plagiarized content, missing sources, fabricated sources, unauthorized uploading of content…

Remember: Completely and appropriately document AI use in assessed work!

Data Analysis with AI

e.g., methods selection, instructions for applying methods, actual data processing or analysis

Remember: do not let AI perform your whole data analysis!

Recommendations:

- cross-check all AI-generated suggestions with reliable sources
- double-check all data that is based on AI-generated instructions or processing
- **alternatives:** use textbooks, scientific literature, official methodology resources like tutorials, and common data analysis software

Risks: incorrect information, incorrect results, fabricated results, misinterpretation of results, intransparent and unreproducible processes; unauthorized uploading of data

Remember: Completely and appropriately document AI use in assessed work!

Writing with AI

ifkw
Institut für Kommunikationswissenschaft und Medienforschung

e.g., creative writing techniques, structuring drafts, writing drafts…

Remember: do not use AI for full-text generation!

Recommendations:

- start with your own input
- use precise prompts
- critically evaluate and verify all AI-generated results
- **alternatives:** use traditional writing techniques, talk to fellow students to develop your arguments

Risks: incorrect content, unoriginal content, biased content, plagiarism, missing sources fabricated sources…

Remember: Completely and appropriately document AI use in assessed work!

Formal Editing with AI

Institut für Kommunikationswissenschaft und Medienforschung

e.g., correct spelling and grammar, citation style…

Recommendations:

- consider specialized AI tools
- use precise prompts
- carefully review all AI-generated changes
- **alternatives:** ask fellow students for feedback

Risks: unintended changes to meaning or citation styles

Remember: Completely and appropriately document AI use in assessed work!

Content Editing with AI

Institut für Kommunikationswissenschaft und Medienforschung

e.g., language flow, conciseness, argumentative quality…

Recommendations:

- consider specialized AI tools
- use precise prompts
- critically assess all AI-generated changes
- **alternatives:** ask fellow students for feedback

Risks: unintended changes to meaning, biases, loss of personal writing style

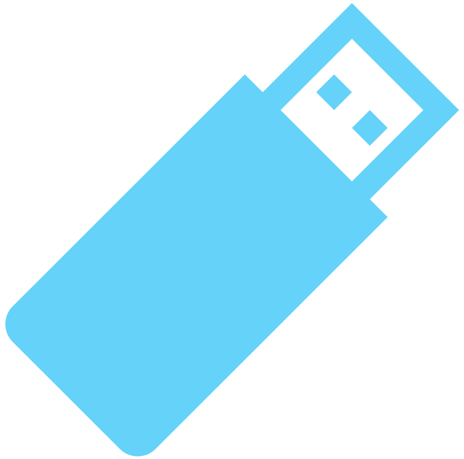
Remember: Completely and appropriately document AI use in assessed work!

6 Effective Prompting

Limitations of LLMs

- Relies on vast amounts of data to identify patterns and similarities for content creation, i.e., the quality of generated content highly depends on the quality of the input data.
- In addition, the quality of generated content depends on the preciseness of prompts. Learning to guide AI tools with meaningful prompts ensures better use of generative AI!

So let's dive into prompting!



In case that you need even more reasons to create perfect prompts…

ifkw
Institut für Kommunikationswissenschaft und Medienforschung

- Proper prompts **save time by reducing follow-up questions** and misunderstandings.
- Detailed prompts lead to more accurate and **useful responses**.
- Tailored prompts allow for **customized responses that fit specific needs** and contexts.
- Use **feedback to improve** your prompts (see next slide).

Key Elements of an Effective Prompt

ifkw
Institut für Kommunikationswissenschaft und Medienforschung

- **Task:** Clearly define what you want the AI to do. Start with a **Verb**: Use action-oriented verbs like "Explain," "Describe," "List," etc.
- **Context:** Provide background information to set the scene. **Exemplars:** Include examples for clarity and precision.
- **Persona:** Specify the tone or personality you expect in the response.
- **Format:** Indicate how you want the information presented.
- **Tone:** Choose the appropriate tone (formal, casual, persuasive, etc.).

Prioritize the elements in your prompt based on what is most critical to your query!

Example Prompt

ifkw
Institut für Kommunikationswissenschaft und Medienforschung

- **Prompt:** "Develop a detailed three-month schedule for completing a communication science thesis on the topic of 'Digital Media's Influence on Youth Political Engagement.' The plan should include weekly milestones, recommended reading timeline based on my reading list of 20 sources, and checkpoints for preliminary data analysis. Consider the typical stages of thesis development, from literature review to final editing."
- **Breakdown of the Prompt**:
  - Task: Develop a detailed three-month schedule.
  - Context: Completion of a communication science thesis on digital media's influence on youth political engagement.
  - Exemplars: Include weekly milestones, reading timeline, and data analysis checkpoints.
  - Format: Structured timeline with stages and key activities.
  - Tone: Directive and informative, focusing on clear, actionable steps.

Most Common Errors

- Not being clear about **what you need** or want to achieve.
- Including too much **unnecessary information**.
- Using a **tone that doesn’t fit** the context or audience.

Prompt for better Prompts

"Ich möchte, dass du mein Prompt Creator wirst. Dein Ziel ist es, mir zu helfen, den bestmöglichen Prompt für meine Bedürfnisse zu erstellen. Der Prompt wird von dir, ChatGPT, verwendet. Du wirst den folgenden Prozess befolgen:

1. Als erstes fragst du mich, worum es in dem Prompt gehen soll. Ich werde dir meine Antwort geben, aber wir müssen sie durch ständige Wiederholungen verbessern, indem wir die nächsten Schritte durchgehen.

2. Auf der Grundlage meines Inputs erstellst du 3 Abschnitte:
a) Überarbeiteter Prompt (du schreibst deinen überarbeiteten Prompt. Er sollte klar, präzise und für dich leicht verständlich sein),
b) Vorschläge (du machst Vorschläge, welche Details du in den Prompt einbauen solltest, um ihn zu verbessern) und
c) Fragen (du stellst relevante Fragen dazu, welche zusätzlichen Informationen ich brauche, um den Prompt zu verbessern).

3. Der Prompt, den du bereitstellst, sollte die Form einer Anfrage von mir haben, die von ChatGPT ausgeführt werden soll.

4. Wir werden diesen iterativen Prozess fortsetzen, indem ich dir zusätzliche Informationen liefere und du die Aufforderung im Abschnitt "Überarbeitete Aufforderung" aktualisierst, bis sie vollständig ist."

Idee von www.digitaleprofis.de

Exercises for instructors

Provided by L. Kobilke & J. Schindler

Table of Contents

1

Idea Development

This exercise is recommended for students who have already passed their **first** semester at IfKW.

Idea development: Exercise

Objective: To understand how AI can be used as a tool to develop and expand research ideas without replacing human creativity and critical thinking.

Instructions: Individually, formulate a thesis statement that you are interested in exploring that is related to the seminar. The statement should be based on your current knowledge and understanding of the topic. Write down your idea clearly and concisely, especially why it is relevant and worth exploring. Next, use AI (such as ChatGPT) to expand on your initial idea. You might ask the AI to suggest related subtopics, potential implications, or counterarguments that could enrich your initial idea. Record the AI's responses and note any new insights that could be useful. The whole process should take you 25-30 minutes.

Estimated time: 50-60 minutes

Idea development: Exercise

Reflection: In small groups, share your original ideas and the expansions provided by the AI. In the next 15-20 minutes discuss with your peers:

- How did the AI contribute to the development of your initial idea?
- Were the suggestions provided by the AI relevant and useful to your project?
- Which types of prompts elicited the most effective responses from the AI?
- What limitations did you observe in the responses provided by the AI?
- Did the AI's suggestions show a tendency towards a specific outcome or direction, such as confirmation bias aligned with your thesis statement?

2

Topic and Literature Research

This exercise is recommended for students who have already passed their **second** semester at IfKW.

Topic and Literature Research: Exercise

Objective: Develop the ability to critically evaluate and verify literature provided by AI, recognizing that this process may be more time-consuming compared to traditional methods such as databases and other literature aggregators.

Instructions, Part 1: Individually, use an AI tool (such as ChatGPT) to request scientific sources related to your thesis statement. Record the sources provided by the AI, including any direct links or citations. Access the sources provided by the AI. This might involve following direct links to online resources or locating the citations in LMU's library. During the next 20 minutes:

- Check whether these sources are freely available or if they are behind paywalls. Note any difficulties in accessing the content.
- Assess the relevance of each source to your thesis statement. In addition, consider the impact factor of the journals, citation counts of the articles, and the publication date to determine the timeliness and significance of the research.

Estimated time: 60 minutes

Topic and Literature Research: Exercise

Instructions, Part 2: Write down the search terms you would normally use based on your current knowledge and the focus of your thesis. Then, request the AI to suggest additional search terms that relate to your thesis and the sources it initially provided. Note these AI-suggested terms and compare them to your initial terms to identify any new and useful suggestions. Combine your original search terms with any relevant terms suggested by the AI and perform a comprehensive literature search using academic databases such as Communication and Mass Media Complete, Scopus, or Web of Science.

Finally, compare the list of sources you found through your database search with those initially provided by the AI, assessing the relevance and quality of the sources from both lists to determine the effectiveness of AI-generated terms versus traditional search terms. This should take up to 20 minutes.

Estimated time: 60 minutes

Topic and Literature Research: Exercise

Reflection: In small groups, share your learnings from the literature research process results. In the next 15-20 minutes, discuss with your peers:

- Whether the sources provided by the AI directly support or oppose the thesis statement. Were these sources on-point or peripheral? Where they biased towards the direction of your thesis statement (confirmation bias)?
- Analyze the depth, scope and academic standing of the information / journals provided by the AI sources. Do these sources cover the necessary ground or provide new insights into the research topic?
- Compare the relevance and quality of the sources retrieved through AI with those obtained via traditional database searches. Which method provided more credible and academically rigorous sources? Discuss any discrepancies in the findings from the two approaches and what those might imply about the reliability of AI as a research tool.

3 Content Editing

This exercise is recommended for students who have already passed their **first** semester at IfKW.

Content editing: Exercise

Objective: Develop the ability to produce a zero draft that captures preliminary thoughts and ideas as a basis for creating high-quality AI feedback while ensuring academic integrity and accuracy.

Instructions, Part 1: Dedicate 25 minutes to uninterrupted writing on your thesis statement. During this time, your goal is to write continuously without concern for spelling, grammar, or coherence. Begin with a meta-statement such as, “I am sitting down to write a zero draft about [insert thesis statement]. I’m currently thinking about [insert specific aspect of the topic], but it’s a complex idea.” Continue to explore your thoughts freely, allowing your mind to wander through different facets of the topic.

Estimated time: 75-90 minutes

Content editing: Exercise

Instructions, Part 2: After completing your zero draft session, take 10 minutes to carefully review the text you have written. Identify and highlight any sections that contain insightful thoughts, unique ideas, or particularly coherent passages. These elements should capture the main themes, pose interesting questions, or present clear ideas that are central to your topic. If necessary, reorganize the text to enhance its clarity and focus, removing any sections that are not directly relevant to your research goals.

Estimated time: 75-90 minutes

Content editing: Exercise

Instructions, Part 3: Next, use an AI tool, such as ChatGPT, to refine this selected text. You can request the AI to: a) Enhance the clarity and depth of your text, b) Make your text more concise, c) Improve the logical flow of your argument, or d) Transform it into a more academic tone.

When submitting your text to the AI, specify which of these enhancements you are seeking. Additionally, ask the AI to explain any changes it makes to your text, detailing the reasons behind each modification. Allocate 20 minutes to refine your text in a collaborative back-and-forth session with the AI.

Content editing: Exercise

Reflection: Share your experiences and insights gained from this writing process with the class for the next 20 minutes:

- What were your initial feelings when starting the zero draft? Was it difficult to write without worrying about correctness or coherence? How did these feelings change as you progressed through the zero draft and subsequent AI-enhanced editing phases?
- What challenges did you face while creating the zero draft and refining it into structured AI input? How did you address these challenges?
- Reflect on your interaction with the AI during the text enhancement. What insights did you gain about crafting prompts?
- How useful was the AI's feedback in improving your text's clarity, conciseness, and logic?
- How has this exercise influenced your approach to academic writing and research? What key lessons will you apply to future projects?