Risiken und Chancen von Generativer KI - Nutzung von Prompt Engineering für innovative Geschäftsmodelle

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KEY TAKEAWAYS

01 GenAI is **here to stay** and changing our (work) life – whether we like it or not

02 GenAI as a **co-pilot** or collaborator can **augment human capabilities** in processes and workflows

03 **Prompt Engineering** is the key to master GenAI and will be an even more **important skill** in the future

Who am I?

Introduction

thiemowa.github.io

thiemo.wambsganss@bfh.ch

2023 – today: Tenure-Tracked Assistant Professor for Digital Technology Management and lead of the "Human-Centered AI-based Systems (HAIS) Lab" at Bern University of Applied Sciences, Bern, Switzerland.

2022 - 2023: Postdoc at the Machine Learning for Educational Lab (ML4ED) at the Swiss Federal Institute of Technology in Lausanne (EPFL), Switzerland.

2018-2022: Research Associate and Ph.D. Student in Information Systems with Prof. Dr. Jan Marco Leimeister, University of St.Gallen (HSG), Switzerland.

2021- 2022: Swiss National Science Foundation (SNSF) Scholar at Human-Computer Interaction Institute (HCII), Carnegie Mellon University with Kenneth Koedinger and at the Natural Language and Information Processing Research Group, Cambridge University with Paula Buttery

Research Output: Publications in leading international outlets in **Human-Computer Interaction** (e.g., CHI20, CHI21, CHI22), **Natural Language Processing** (e.g., ACL21, ACL22, COLING22), and **Educational Technology** (e.g., ICIS21, ICIS22, C&E22). Received several awards, such as the **Delina Learntec Award 2021**, the **Best Theory Paper First Runner-Up Award at ICIS20**, **two ACM CHI Honorable Mention Awards (CHI20, CHI21)** and listed among the **top 100 in the Wirtschaftswoche (WIWO) research ranking** of all business administration and management **researchers under the age of 40** in the German-speaking countries.

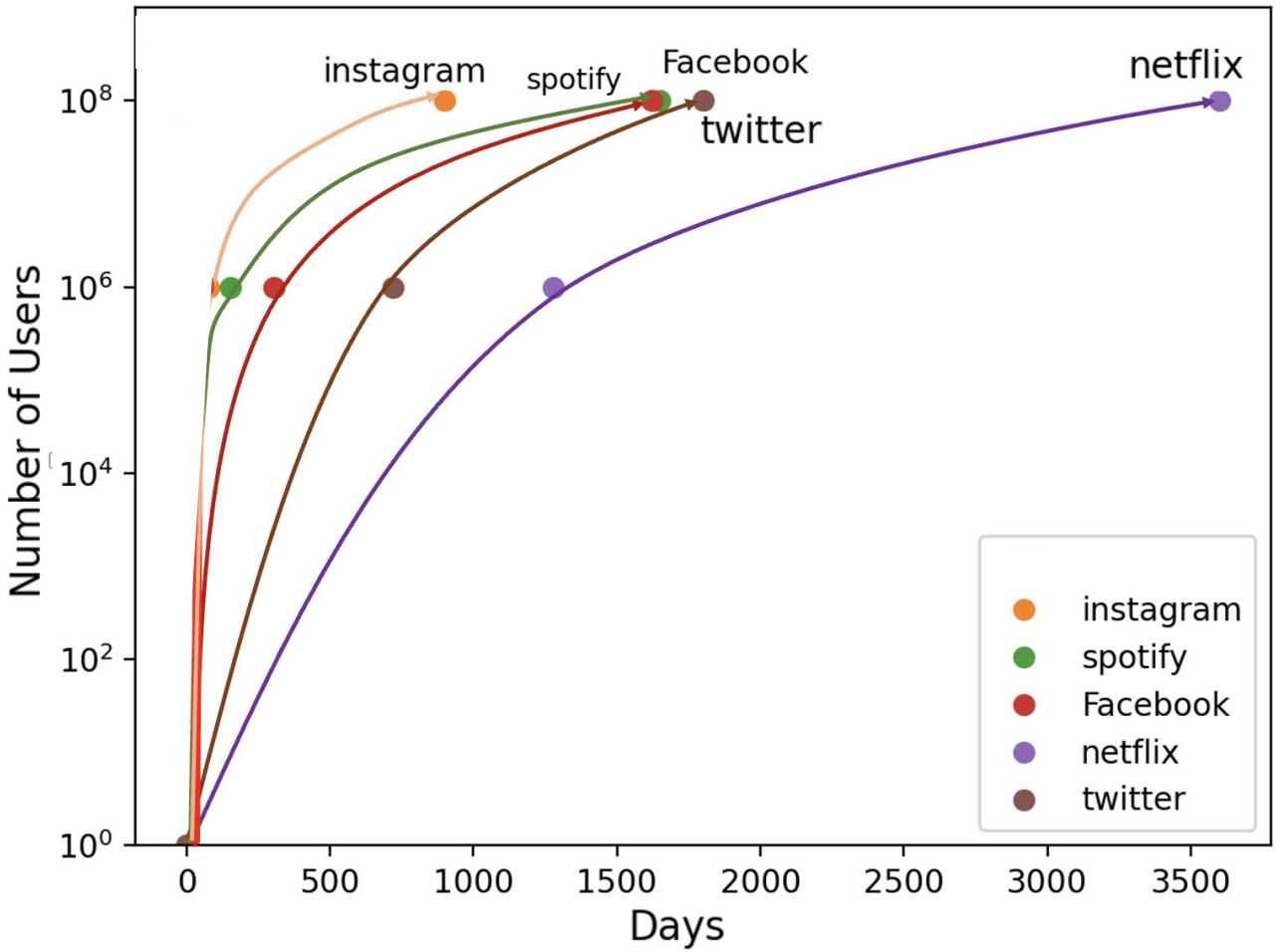
Today‘s Agenda

1. Introduction to Gen AI
2. Prompt Engineering and Potentials for Businesses
3. Challenges and Risks

Introduction to Gen AI

Berner Fachhochschule | Haute école spécialisée bernoise | Bern University of Applied Sciences

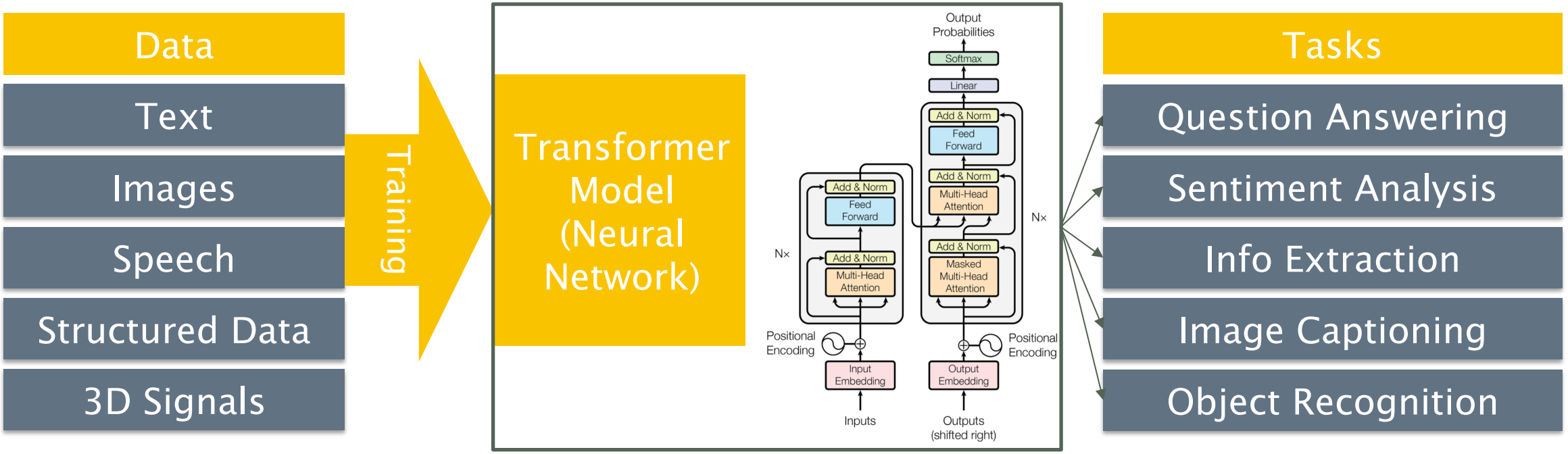
Adoption Rate: Bandwagon Effect at Work



Source: https://twitter.com/kylelf_ (Feb 16, 2023)

Definition of Generative AI

"Generative AI (GenAI) is a class of machine learning algorithms that can learn from content such as text, images, and audio in order to generate new content."



A simple classification task: Is a following term a swiss company name?

Foundation of classification models (supervised learning)

Text/ Input	Label
Transgourmet	1
Helvetia	1
Thiemo Wambsganss	0
SBB	1
Peter Schmitt	0
…	

Foundation of Large Language Models: Masked Training

Example Bern University of Apl. Sci.

- [redacted] Berner Fachhochschule (BFH; französisch *Haute école spécialisée bernoise HESB*, englisch *Bern University of Applied Sciences BUAS*) ist eine anwendungsorientierte Hochschule, die 1997 gegründet wurde.

Text/ Input	Label
Die [redacted] Fachhochschule (BFH; französisch Haute école spécialisée bernoise HESB, englisch Bern University of Applied Sciences BUAS) ist eine anwendungsorientierte Hochschule, die 1997 gegründet wurde.	Berner
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…	…
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Sources: Wikipedia

Pretraining: Data Collection

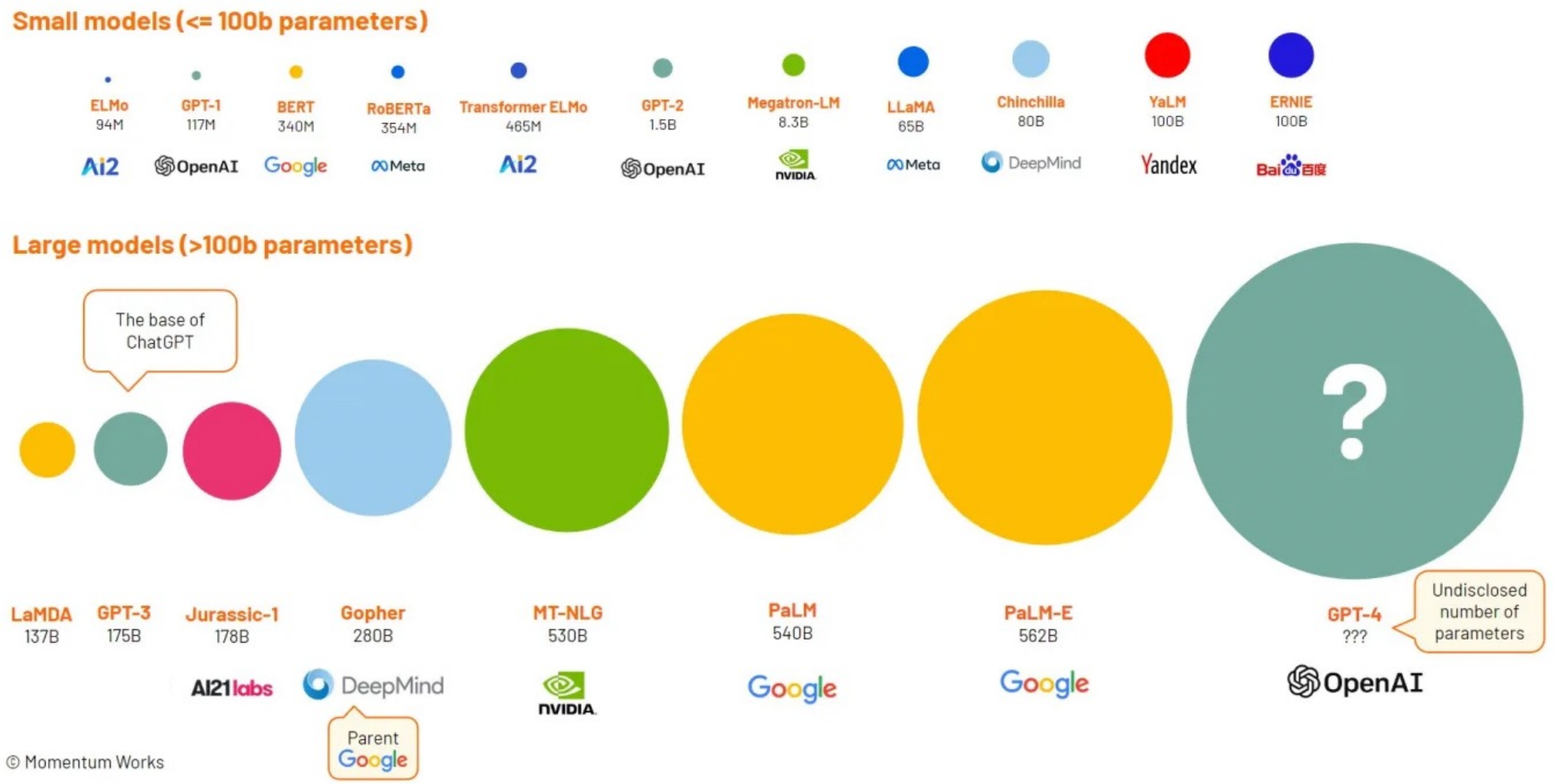
Trained a large amount of publicly available data

Dataset	Sampling prop.	Epochs	Disk size
CommonCrawl	67.0%	1.10	3.3 TB
C4	15.0%	1.06	783 GB
Github	4.5%	0.64	328 GB
Wikipedia	4.5%	2.45	83 GB
Books	4.5%	2.23	85 GB
ArXiv	2.5%	1.06	92 GB
StackExchange	2.0%	1.03	78 GB

Table 1: **Pre-training data.** Data mixtures used for pre-training, for each subset we list the sampling proportion, number of epochs performed on the subset when training on 1.4T tokens, and disk size. The pre-training runs on 1T tokens have the same sampling proportion.

[Training data mixture used in Meta's LLaMA model]

How It‘s Going:
Large Language Models Becoming Very Large



Prompt Engineering and Potentials for Businesses

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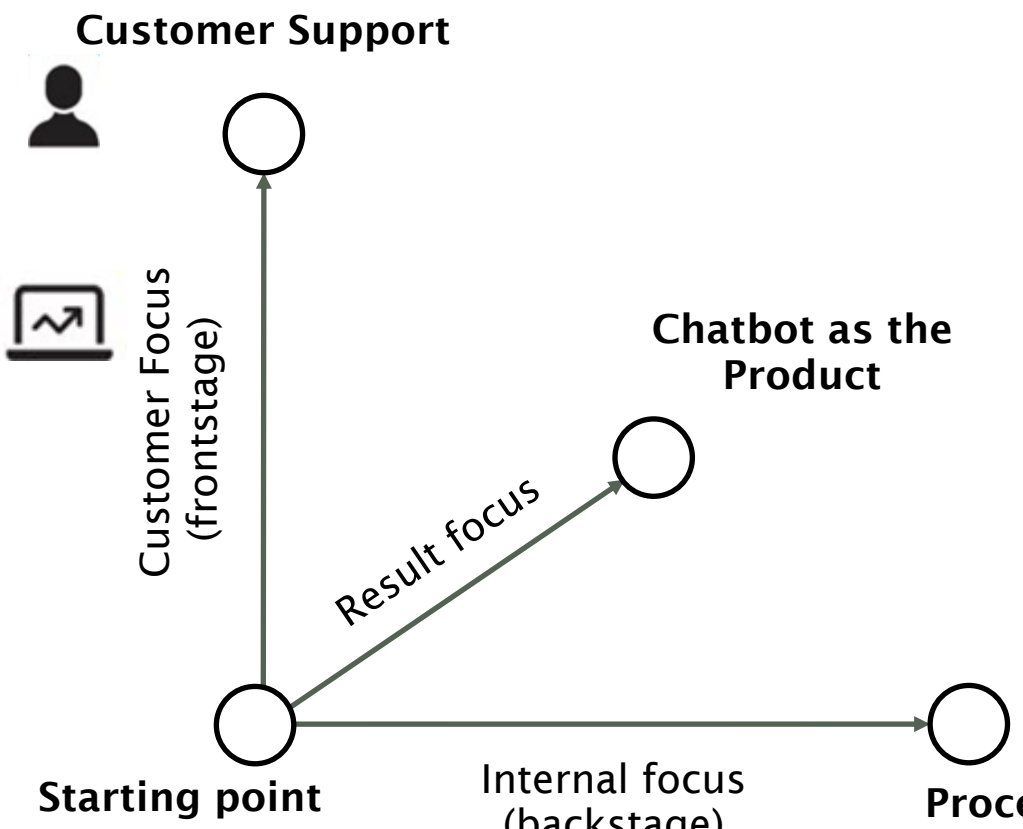
AI as a Collaborator?!

Potential Use-Cases for Generative AI



Improve Customer Acquisition

24/7 customer support

Personalization to user

Lead generation through gathering user preferences

Automation Reduce manual work

Automated routing

ChatGPT is Addictive

Generative	Predicting next word (language model)
Pre-trained	Previously trained on large amounts of data
Transformer	Encoder-decoder based neural network

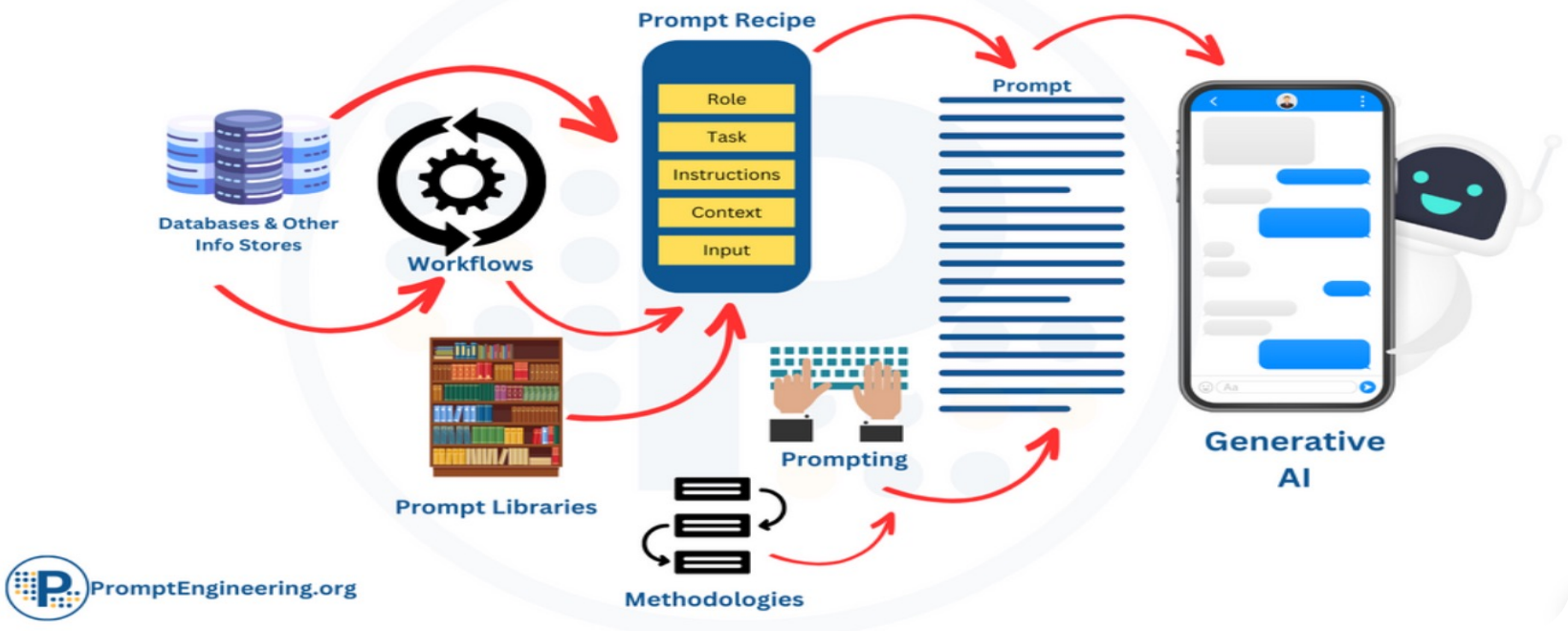
Conversations		Variation
It can maintain a conversation like a human (remember the context)	Text appears in real time, giving the feeling of a real conversation	Same questions get different answers (random sampling)

ChatGPT has been designed to provide a human experience and please us.

What is prompt engineering ?

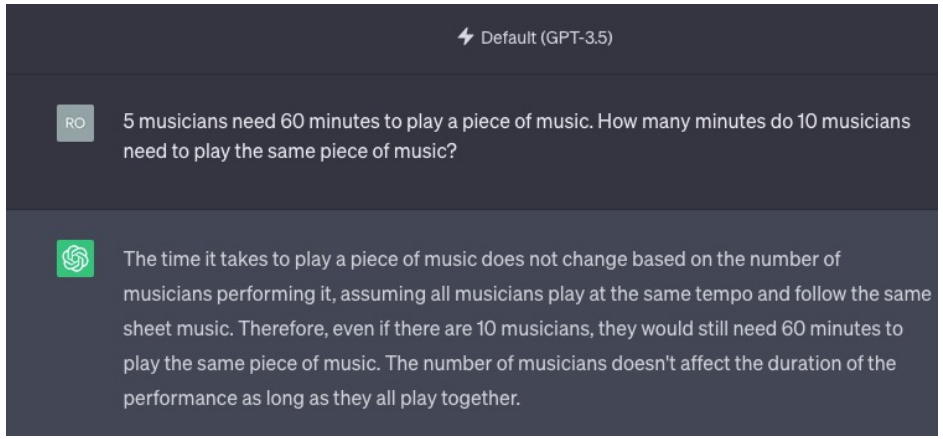
Prompt: input sequence for a generative model

Prompt Engineering refers to any process that contributes to the development of a well-crafted prompt to generate quality, useful outputs from an AI system



Prompts

Basic prompt chatGPT



Advanced prompt ChatGPT

```
delimiter = "####"
system_message = f"""

Act as a tutor who evaluates the peer review created by a student. \
The review is between {delimiter}. \
Check if the review contains suggestions on how to improve the work of the
 student who receives the peer review. \
Print out the suggestion and provide arguments why this is a suggestion. \
Suggestions are information what the student should should change in his or
 her work. \
Such as add, delete, change, etc. \
Count the number of suggestions.
"""
user_message = df["review"][0]

messages =  [
    {'role':'system',
     'content': system_message},
    {'role':'user',
     'content': f"{delimiter}{user_message}{delimiter}"},
]
response = get_completion_from_messages(messages)
print(response)
```

Effective Prompting Techniques

- Clear Instructions: be clear and specific in your prompts

  Example: **Ineffective:** “Tell me about animals.”
  Effective: “Describe the behavior of honeybees during pollination.”

- Provide more context than you do with a person

  Example: **Ineffective:** “Write a poem.”
  Effective: “Compose a romantic poem about a moonlit beach.”

- Desired Output Format: Tone and Length

  Example: “Write a short introduction for an executive conference (100-150 words) about the evolution of quantum computing. The goal is to have a persuasive text for all stakeholders.”

- Experiment and Revise

Advanced Prompt Techniques

Zero-shot Prompts

- Reasoning without seeing any examples based solely on the semantic description in the prompt

Works for

- Questions
- Summaries
- Text Completion
- Question - Answering

Best for

- Quick, general insights without context or examples

Prompt Techniques – using formula:

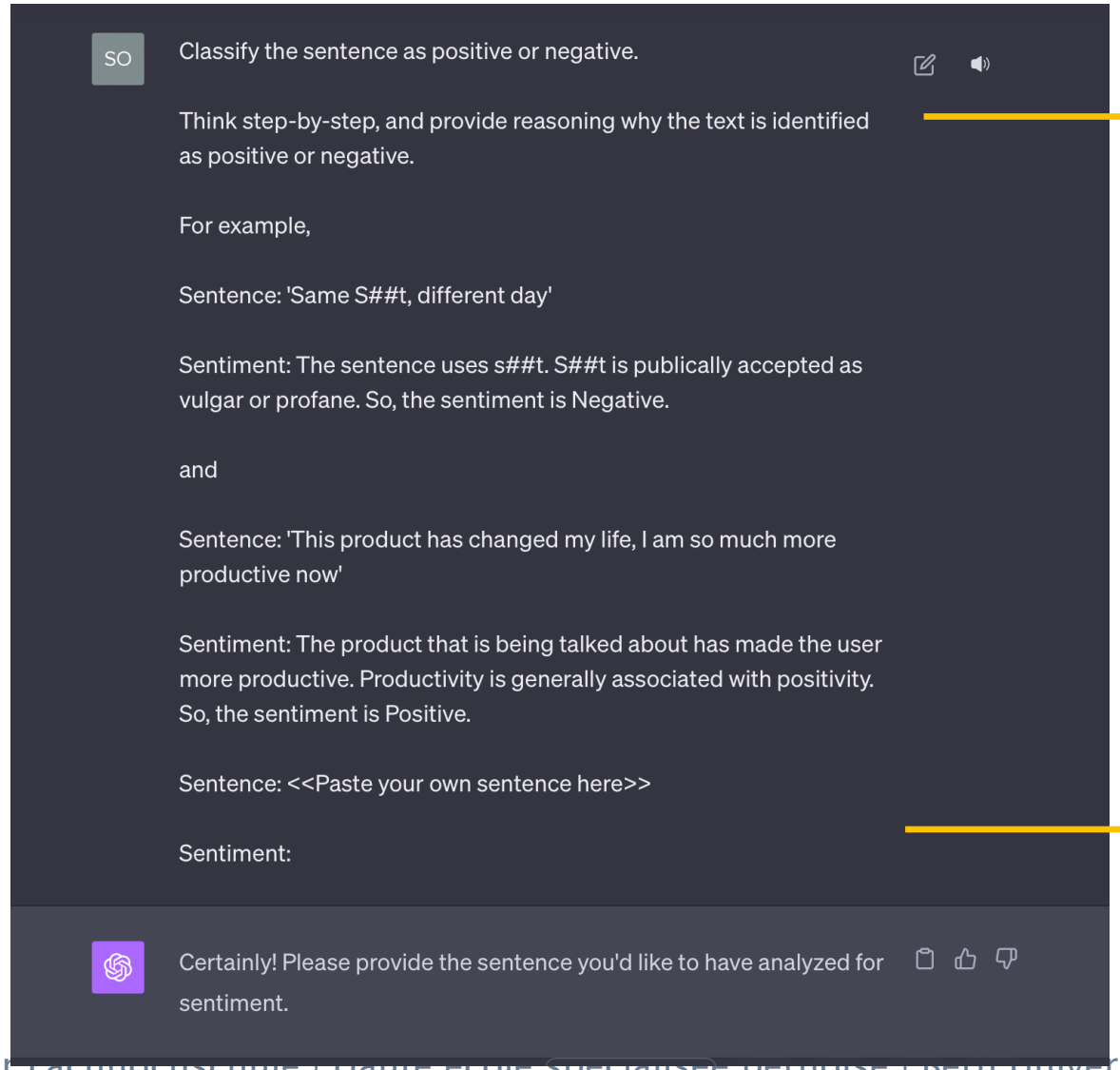
Acting as [ROLE] perform [TASK] in [FORMAT]: insert unique data

Role	Task/ Aim	Format
• Expert Science Writer • Ronald C. Kessler • Professor XYZ • Editor from [target] journal • PhD student in [specific field]	• Formulate research questions • Write an abstract • Analysis • Condense lists • Draft references	• PDF • Bullet points • Summary • Table/Chart • (MLA, APA, Chicago) citations

Advanced Prompt Techniques

	Zero-shot Prompts	Few-shot Prompts
	• Reasoning without seeing any examples based solely on the semantic description in< the prompt	• Reasoning based on given examples
Works for	• Questions • Summaries • Text Completion • Question - Answering	• Text classification • Customized content generation • Predefined pattern exists
Best for	• Quick, general insights without context or examples	• Examples to guide the model's output, especially for specific formats or content

Few-Shot Learning for Qualitative Data Analysis



Task description

Examples

Prompt

Advanced Prompt Techniques

	Zero-shot Prompts	Few-shot Prompts	Chain-of-Thought
	• Reasoning without seeing any examples based solely on the semantic description in< the prompt	• Reasoning based on given examples	Break downs a complex problem into smaller steps with detailed explanation of its reasoning process.
Works for	• Questions • Summaries • Text Completion • Question - Answering	• Text classification • Customized content generation • Predefined pattern exists	• Context Maintenance • Structured Information Retrieval • Content Creation and Storytelling
Best for	• Quick, general insights without context or examples	• Examples to guide the model's output, especially for specific formats or content	• Complex queries requiring logical progression of steps or thoughts

How to Craft Effective Prompts: Key Principles

Clarity and Understanding	Use delimiters for clarity (e.g., ### text ###)
	Consider providing examples for correct output (few-shot prompting)
Specificity and Detailing	Specify desired output format
	Specify output length. Think in natural quantities, like "a dozen".
	Be specific and precise
Context and Relevance	Define Role (e.g., "You are a translator.")
	Audience and Purpose (e.g., "Translate for an Italian audience looking for fresh products.")
Step-by-Step Guidance	Include Step-by-Step Instructions (e.g., "First, translate to Italian. Next, make it catchy.")
Conditioning for Accuracy	Condition the model's responses on the context to get more accurate results (e.g., “Base your translation on the following dictionary where appropriate: {dictionary}").

Challenges and Risks

The First Presidential Deep Fake Elections

Beware of the Limitations when using LLMs

Five limitations and concerns about generative AI and the risks for enterprises

1. Hallucinations → Libel risk

2. Bias → Reputational risk

3. Data privacy → Security, confidentiality risk

4. Unclear sourcing → Legal risk, IP/copyright

5. Deliberate misuse → Operational risk

Australian mayor readies world's first defamation lawsuit over ChatGPT content

OpenAI Chatbot Spits Out Biased Musings, Despite Guardrails

Samsung Bans Staff's AI Use After Spotting ChatGPT Data Leak

Getty Images is suing the creators of AI art tool Stable Diffusion for scraping its content

How AI is being used to spread misinformation

“Basically high-tech plagiarism!”
Noah Chomsky, 2023

Whether you're a data scientist, developer, or curious explorer, Prompt Engineering is your golden ticket to AI mastery

Learn Prompt Engineering

E.g., https://www.deeplearning.ai/short-courses/ by Andrew Ng

Prompt engineering course: https://www.deeplearning.ai/short-courses/chatgpt-prompt-engineering-for-developers/

Apply, Experiment, Collaborate

Text: https://chat.openai.com or https://platform.openai.com/playground

Image: https://clipdrop.co/stable-diffusion

Coding: https://github.com/features/copilot

You want to learn more on Generative AI and Prompt Engineering?

Prof. Dr. Roman Rietsche

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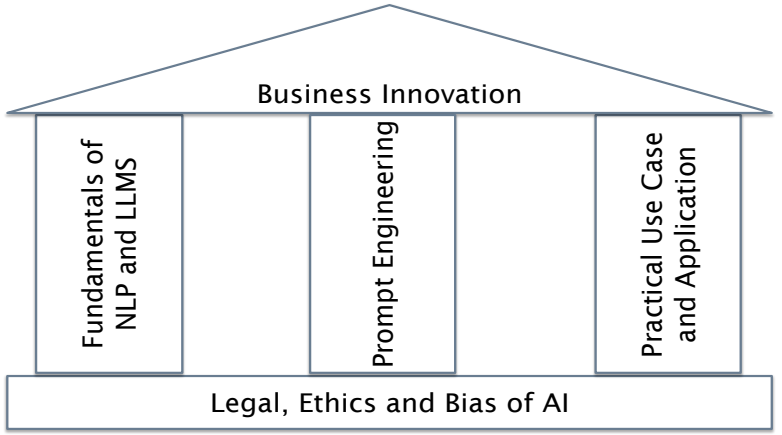
Get in contact for a follow-up workshop

2 Days Workshops on prompt engineering based on our "House of Innovation through Generative AI"

- Theoretical Foundations
- Advanced prompting techniques
- Hands-on practical examples



Ready to **transform** with **generative AI?**
Contact us today to schedule your **workshop** and **start the journey** to more efficiency and effectivity!
thiemo.wambsganssbfh.ch

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