NLP-KI-Seminar 2025

Robert Haase

NLP KI Seminar

Durch *aktive* Teilnahme am Seminarmodul „NLP-KI" erlangen die Studierenden einen guten Überblick über aktuelle Techniken des Prompt-Engineering zur Verarbeitung natürlicher Sprache. Sie sind dann darüber hinaus in der Lage, die wichtigsten Inhalte wissenschaftlicher Veröffentlichungen zu identifizieren, zusammenzufassen und verständlich zu erklären. Sie können diese Inhalte in Form einer wissenschaftlichen Arbeit niederschreiben, die den formellen Anforderungen einer Konferenz entsprechen würde. Außerdem können sie die Inhalte in einem wissenschaftlichen Vortrag präsentieren. Die Studierenden sind in der Lage, die Inhalte wissenschaftlicher Texte kritisch zu hinterfragen und mit anderen Studierenden zu diskutieren.

Through *active* participation in the seminar module "NLP-AI", students gain a solid overview of current prompt engineering techniques for natural language processing. Furthermore, they are able to identify, summarize, and clearly explain the key content of scientific publications. They can write this content in the form of a scientific paper that meets the formal requirements of a conference. In addition, they are capable of presenting the content in a scientific talk. Students are also able to critically reflect on the content of scientific texts and discuss it with their peers.

25-30 min presentation + 15 min questions / discussion

About 5 pages excluding title page and references

Presenting a scientific topic

- Have a red line of the story

- Outline:
  - Background (25-33%)
  - Methods / experiments (25-33%)
  - Results / discussion (25-33%)
  - Blow audience away with amazing related stuff (< 5%)

- Use professional language

- Explain Figures well

- If you used Generative AI, disclose for what and how you used it.

- > 50% of the written words must be done without Generative AI.

Presenting a scientific topic

Grade for

- the presentation
  - Topic well explained
  - Cited sources properly
  - Stay in time (25-30 min)
  - Questions answered correctly

  12.5% of the grade each

- written part
  - Slides in PDF format
  - about 5 pages (including additional research / answers) in PDF-format

  25% of the grade each

Must be in the same language: English or German

Registration

You register for up to five potential topics. *First come, first serve.* Maximum 22 students.

Registration: April 14th, 0:00 – 23:59 CEST to:

robert.haase@uni-leipzig.de

Examples:

> First has the free choice, but A. has to give talk April 25th.

```
7:03:20
Dear Dr. Haase,

I would like to present
any one of these:

2203.17274v2
2005.14165v4
2311.09277v1

Best,
A
```

```
7:03:22
Dear Dr. Haase,

I would like to present
and one of these:

2203.17274v2
2005.14165v4
2311.09277v1

Best,
B
```

> Second cannot choose same paper. B. presents April 25th.

```
12:00:00
Dear Dr. Haase,

I would like to present
any one of these:

2203.17274v2
2005.14165v4
2311.09277v1

Best,
C
```

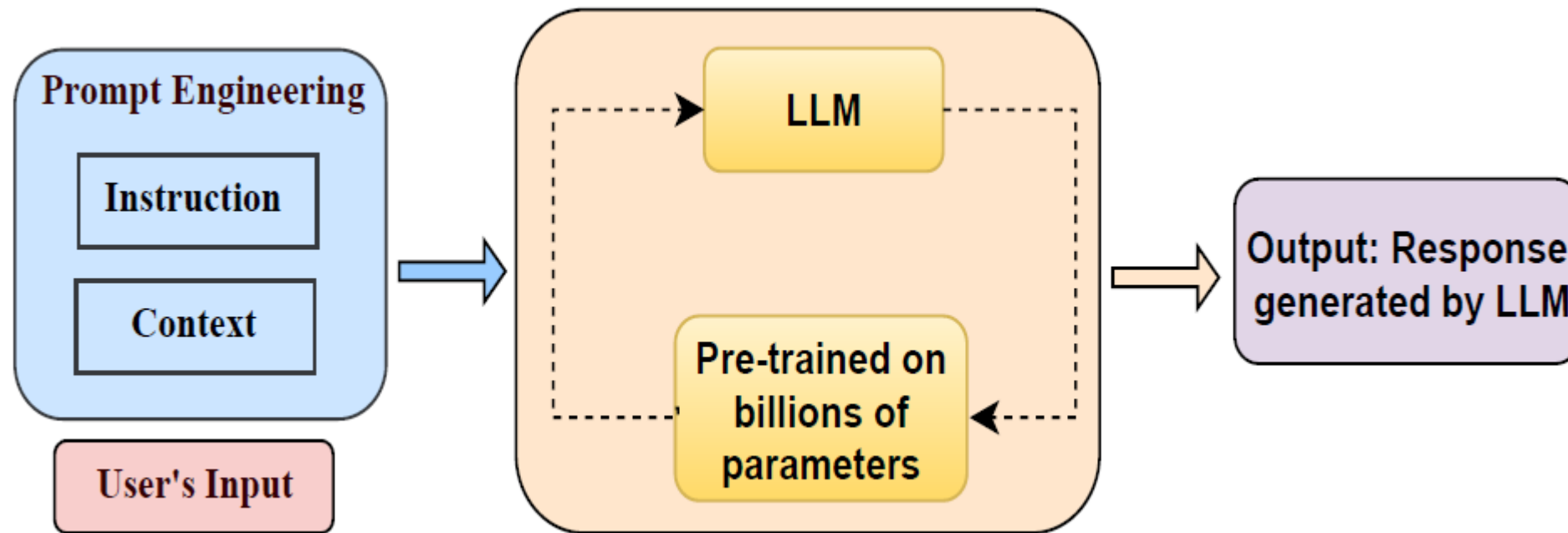> 10th student gives 10th talk (Mid May).

Registration

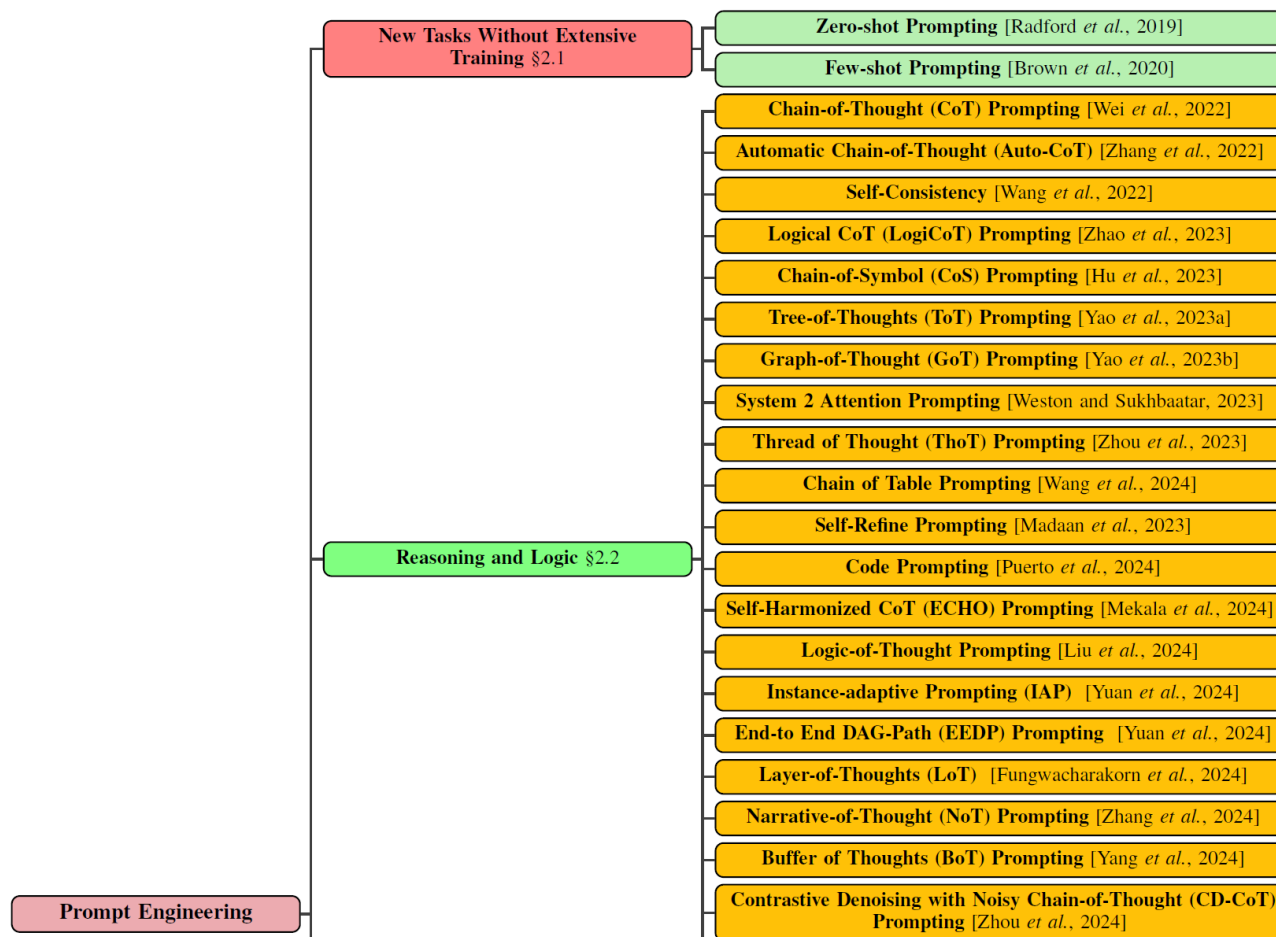Announcement of chosen topics before April 15th 23:59:00

https://github.com/ScaDS/NLP-KI-Seminar-2025

Topic

Large Language Models for Natural Language Processing / Prompt Engineering

Source: Sahoo et al (2024), licensed CC-BY 4.0
http://arxiv.org/abs/2402.07927v2

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Topic

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Topic

Large Language Models for Natural Language Processing / Prompt Engineering

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Robert Haase
@haesleinhuepf
April 11th 2025

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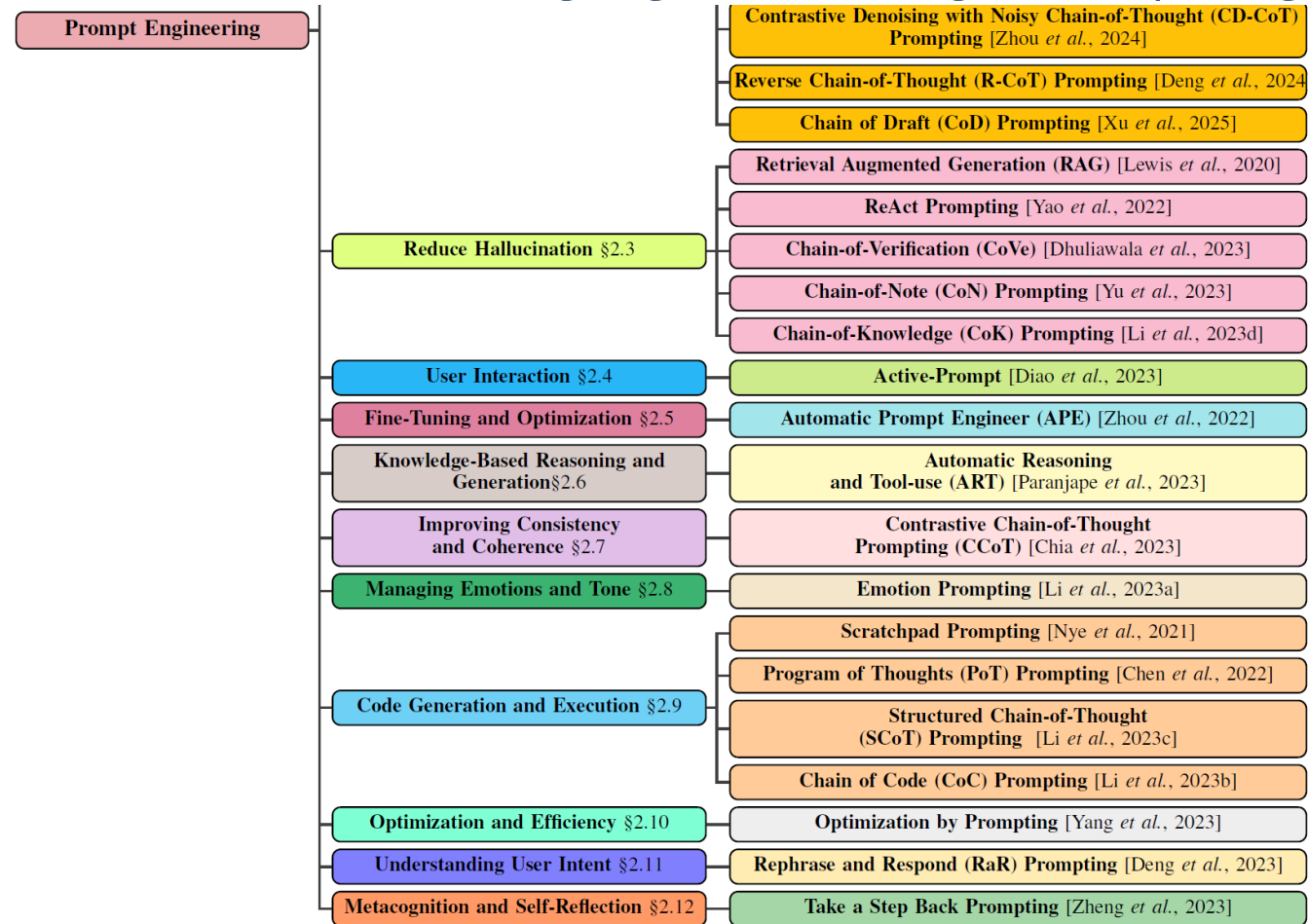
Available Topics

- Hyojin Bahng et al. 'Exploring Visual Prompts for Adapting Large-Scale Models' https://arxiv.org/abs/2203.17274v2
- Tom B. Brown et al. 'Language Models are Few-Shot Learners' https://arxiv.org/abs/2005.14165v4
- Wenhu Chen et al. 'Program of Thoughts Prompting: Disentangling Computation from Reasoning for Numerical Reasoning Tasks' https://arxiv.org/abs/2211.12588v4
- Yew Ken Chia et al. 'Contrastive Chain-of-Thought Prompting' https://arxiv.org/abs/2311.09277v1
- Yihe Deng et al. 'Rephrase and Respond: Let Large Language Models Ask Better Questions for Themselves' https://arxiv.org/abs/2311.04205v2
- Linger Deng et al. 'R-CoT: Reverse Chain-of-Thought Problem Generation for Geometric Reasoning in Large Multimodal Models' https://arxiv.org/abs/2410.17885v2
- Shehzaad Dhuliawala et al. 'Chain-of-Verification Reduces Hallucination in Large Language Models' https://arxiv.org/abs/2309.11495v2
- Shizhe Diao et al. 'Active Prompting with Chain-of-Thought for Large Language Models' https://arxiv.org/abs/2302.12246v5
- Wachara Fungwacharakorn et al. 'Layer-of-Thoughts Prompting (LoT): Leveraging LLM-Based Retrieval with Constraint Hierarchies' https://arxiv.org/abs/2410.12153v1
- Hanxu Hu et al. 'Chain-of-Symbol Prompting Elicits Planning in Large Langauge Models' https://arxiv.org/abs/2305.10276v7
- Patrick Lewis et al. 'Retrieval-Augmented Generation for Knowledge-Intensive NLP Tasks' https://arxiv.org/abs/2005.11401v4
- Cheng Li et al. 'Large Language Models Understand and Can be Enhanced by Emotional Stimuli' https://arxiv.org/abs/2307.11760v7
- Chengshu Li et al. 'Chain of Code: Reasoning with a Language Model-Augmented Code Emulator' https://arxiv.org/abs/2312.04474v4
- Jia Li et al. 'Structured Chain-of-Thought Prompting for Code Generation' https://arxiv.org/abs/2305.06599v3
- Xingxuan Li et al. 'Chain-of-Knowledge: Grounding Large Language Models via Dynamic Knowledge Adapting over Heterogeneous Sources' https://arxiv.org/abs/2305.13269v4
- Tongxuan Liu et al. 'Logic-of-Thought: Injecting Logic into Contexts for Full Reasoning in Large Language Models' https://arxiv.org/abs/2409.17539v2
- Jieyi Long et al. 'Large Language Model Guided Tree-of-Thought' https://arxiv.org/abs/2305.08291v1
- Aman Madaan et al. 'Self-Refine: Iterative Refinement with Self-Feedback' https://arxiv.org/abs/2303.17651v2
- Rajasekhar Reddy Mekala et al. 'EchoPrompt: Instructing the Model to Rephrase Queries for Improved In-context Learning' https://arxiv.org/abs/2309.10687v3
- Maxwell Nye et al. 'Show Your Work: Scratchpads for Intermediate Computation with Language Models' https://arxiv.org/abs/2112.00114v1

Available Topics

- Bhargavi Paranjape et al. 'ART: Automatic multi-step reasoning and tool-use for large language models' https://arxiv.org/abs/2303.09014v1
- Haritz Puerto et al. 'Code Prompting Elicits Conditional Reasoning Abilities in Text+Code LLMs' https://arxiv.org/abs/2401.10065v3
- Xuezhi Wang et al. 'Self-Consistency Improves Chain of Thought Reasoning in Language Models' https://arxiv.org/abs/2203.11171v4
- Zilong Wang et al. 'Chain-of-Table: Evolving Tables in the Reasoning Chain for Table Understanding' https://arxiv.org/abs/2401.04398v2
- Jason Wei et al. 'Chain-of-Thought Prompting Elicits Reasoning in Large Language Models' https://arxiv.org/abs/2201.11903v6
- Jason Weston et al. 'System 2 Attention (is something you might need too)' https://arxiv.org/abs/2311.11829v1
- Silei Xu et al. 'Chain of Draft: Thinking Faster by Writing Less' https://arxiv.org/abs/2502.18600v2
- Chengrun Yang et al. 'Large Language Models as Optimizers' https://arxiv.org/abs/2309.03409v3
- Ling Yang et al. 'Buffer of Thoughts: Thought-Augmented Reasoning with Large Language Models' https://arxiv.org/abs/2406.04271v2
- Shunyu Yao et al. 'ReAct: Synergizing Reasoning and Acting in Language Models' https://arxiv.org/abs/2210.03629v3
- Shunyu Yao et al. 'Tree of Thoughts: Deliberate Problem Solving with Large Language Models' https://arxiv.org/abs/2305.10601v2
- Yao Yao et al. 'Beyond Chain-of-Thought, Effective Graph-of-Thought Reasoning in Language Models' https://arxiv.org/abs/2305.16582v2
- Wenhao Yu et al. 'Chain-of-Note: Enhancing Robustness in Retrieval-Augmented Language Models' https://arxiv.org/abs/2311.09210v2
- Xiaosong Yuan et al. 'Instance-adaptive Zero-shot Chain-of-Thought Prompting' https://arxiv.org/abs/2409.20441v3
- Zhuosheng Zhang et al. 'Automatic Chain of Thought Prompting in Large Language Models' https://arxiv.org/abs/2210.03493v1
- Xinliang Frederick Zhang et al. 'Narrative-of-Thought: Improving Temporal Reasoning of Large Language Models via Recounted Narratives' https://arxiv.org/abs/2410.05558v2
- Xufeng Zhao et al. 'Enhancing Zero-Shot Chain-of-Thought Reasoning in Large Language Models through Logic' https://arxiv.org/abs/2309.13339v4
- Huaixiu Steven Zheng et al. 'Take a Step Back: Evoking Reasoning via Abstraction in Large Language Models' https://arxiv.org/abs/2310.06117v2
- Yongchao Zhou et al. 'Large Language Models Are Human-Level Prompt Engineers' https://arxiv.org/abs/2211.01910v2
- Yucheng Zhou et al. 'Thread of Thought Unraveling Chaotic Contexts' https://arxiv.org/abs/2311.08734v1
- Zhanke Zhou et al. 'Can Language Models Perform Robust Reasoning in Chain-of-thought Prompting with Noisy Rationales?' https://arxiv.org/abs/2410.23856v1

Optional: run you own experiments

You can use open-weight LLMs for free if you would like to run your own experiments within the scope of the paper you present (optional!).

LLM Service providers
- Blablador:
https://sdlaml.pages.jsc.fz-juelich.de/ai/guides/blablador_api_access/

- KISSKI:
https://kisski.gwdg.de/leistungen/2-02-llm-service/

```python
import os
import openai
openai.__version__
```

```
'1.58.1'
```

```python
def prompt_kisski(message:str, model="meta-llama-3.1-70b-instruct"):
    """A prompt helper function that sends a message to KISSKI Chat AI API
    and returns only the text response.
    """
    import os

    # convert message in the right format if necessary
    if isinstance(message, str):
        message = [{"role": "user", "content": message}]

    # setup connection to the LLM
    client = openai.OpenAI()
    client.base_url = "https://chat-ai.academiccloud.de/v1"
    client.api_key = os.environ.get('KISSKI_API_KEY')

    response = client.chat.completions.create(
        model=model,
        messages=message
    )

    # extract answer
    return response.choices[0].message.content
```

```python
prompt_kisski("Hi!")
```

```
'Hello. Is there something I can help you with, or would you like to explore a specific topic or ask
```

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April 11th 2025

https://scads.github.io/generative-ai-notebooks/15_endpoint_apis/06_kisski_endpoint.html

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ScaDS.AI DRESDEN LEIPZIG

TECHNISCHE UNIVERSITÄT DRESDEN

UNIVERSITÄT LEIPZIG

Schedule

Fridays 13:15-14:45

SG 314

	Speaker 1	Speaker 2
11.4.2025	R. Haase	R. Haase
18.4.2025	Good Friday	
25.4.2025		
2.5.2025		
9.5.2025		
16.5.2025		
23.5.2025		
30.5.2025		
6.6.2025		
13.6.2025		
20.6.2025		
27.6.2025		
4.7.2025		
11.7.2025		

Deadlines

- Talk topic registration period: April 14th, 0:00 – 23:59 CEST to: robert.haase@uni-leipzig.de

- Written report submission: 4 weeks after your talk, by the end of the day to: robert.haase@uni-leipzig.de

Questions?