

Research Methods in AI

Assignment 2

Assignment 2 consists of four parts (A-D). In four weeks, we go from summarizing the findings of an existing paper to creating and presenting your own research proposal.

Part A

Description

In this part, the goal is grasp and describe the research question(s), and main findings of an existing paper. To this end, you will be assigned a particular conference paper from the list below. After reading the paper individually, discuss within the group what you think are the main points of the paper. What is the research area of the paper? What is the question they want to address and how (i.e., what methodology do they use)? What do the results tell us? Summarize your answers to these questions in essay format (about 400 words).

Papers:

- De Deyne, S. (2024). Evaluating human-like similarity biases at every scale in Large Language Models: Evidence from remote and basic-level triads. Link: <https://escholarship.org/uc/item/45v7s17g>
- Leong, C. S. Y., & Lake, B. (2024). Prompting invokes expert-like downward shifts in GPT-4V's conceptual hierarchies. Link: <https://escholarship.org/uc/item/5b132892>
- Mayn, A., Loy, J., & Demberg, V. (2024). Capable but not cooperative? Perceptions of ChatGPT as a pragmatic speaker. Link: <https://escholarship.org/uc/item/1c381535>
- Niedermann, J. P., Sucholutsky, I., Marjeh, R., Celen, E., Griffiths, T., Jacoby, N., & van Rijn, P. (2023, December). Studying the effect of globalization on color perception using multilingual online recruitment and large language models. Link: <https://escholarship.org/uc/item/4hs755zz>

Hand in

There is no hand in required this week, as during next week's meeting, we will discuss and provide feedback on Assignment 1.

Homework

Take a look back at your submission for Assignment 1 so that it is fresh in your mind. In addition, complete the summary of the paper as it will be part of next week's hand in.

Part B

Description

The goal of this part is to look more critically at the assigned paper. The idea is to evaluate the paper using the following questions. Describe your answers to these questions in essay format.

- What are the strong points of the paper?
- What are some weaknesses or limitations of the paper? Are they acknowledged or did you discover them yourself?
- Many papers either use scientific artifacts (e.g., code, data, models,...), or deliver new ones, like trained models or elicited datasets. Is that the case for this paper as well? Indicate whether they are new or reused from other sources.
- Are the methods and analyses appropriate to answer the research question? If yes, briefly explain why. If not, what could have been improved?
- Is the methodology clear enough to allow someone else to *replicate* the study? If yes, briefly explain why. If not, what aspects are missing/unclear?
- Would it be possible to *reproduce* the findings? If yes, briefly explain why. If not, what aspects are missing/unclear? Make sure to make a clear distinction between replicability and reproducibility.

Hand in

Summary of the paper (see Part A) and a description of the strengths and weaknesses as a .pdf (max. 1000 words in total).

Homework

Brainstorm about a potential follow-up study. You can get inspiration for this from your evaluation of the paper, particularly the weaknesses you identified.

Part C

Description

After summarizing and evaluating the paper you were assigned to, it is time to further build on it in your very own research proposal! A research proposal is the starting point of a new study that attempts to test a new hypothesis, fill a gap in the literature, or develop a novel theory. For your final bachelor thesis you will individually write a research proposal, and on many occasions (not only academic occasions) you will find that being able to formulate a structured plan of what you will work on is a useful skill to have.

In a research proposal, you outline a research context (in this case, the paper you were assigned, but feel free to consult additional sources), define one or more research questions, and give an outline of how you will answer those research questions (study design/method). You typically also include a planning, but in this case we will not do that part.

What makes a good research proposal? Ideally, the background gives a gentle introduction to the concrete research problem and how it is embedded in a wider research context. To determine whether a research question is promising, we can use the SMART method: a research question should be Specific, Measurable, Achievable, Relevant, and Time-bound. In other words, a research question should be relevant against the research context, achievable within the project timeline, measurable by the metrics that the proposal will use and time-bound in the sense that it has a deadline. The proposal should comprise the following sections: Background/context, research question(s), contribution (what gap in existing knowledge do you address), methodology (what will you concretely do to answer your research question), expected results, and a reference section.

Hand in

First draft of your research proposal as a .pdf (max. 750 words in total, excluding references). Make sure to also include the summary and description of the strengths and weaknesses (i.e., Part A and B); those do not count towards the 750 word limit of the research proposal. Note that your proposal will be sent to another group to provide feedback on.

Homework

- Next meeting, you will present your research ideas to the other groups (for more information see Part D below). Please provide your slides as a pdf in advance of the meeting.
- You will also receive the proposal of another group. The idea is to prepare at least one point of feedback/question per group member, which you will ask/share during next week's meeting. Remember to be kind and constructive in your peer review!

Part D

Description

You will often have to present your research ideas in front of an audience, so this part is an exercise in presenting. Moreover, it is another great way to get feedback on your work! The idea is to give a presentation about your research proposal of maximally 12 minutes, leaving 3 minutes for questions from the audience. We recommend a maximum of 10 slides, and give a suggestion on how many slides per component you could use. You're allowed to deviate from this, but the 12 minute restriction is a hard restriction (make sure to practice this a few times in advance). Your presentation should cover the following components:

- Paper Summary: a short summary of the paper you read (1-2 slides)
- Problem Statement: the problem you identified and address in the research proposal (1-2 slides)
- Research Questions & Contributions: the research questions you came up with, and the contributions of your research (1 slide)
- Methodology: an outline of how you will realize the contributions and answer the research questions (2-3 slides)
- Expected Results: an explanation of what results you expect and how they answer the research question (1-2 slides)

Hand in

Assignment 2, which should include the following:

- Summary of the paper (see Part A)
- A description of the strengths and weaknesses (see Part B)
- The final version of your research proposal
- A description of the author contributions: which group member did what?

The entire document should be submitted as a .pdf (max. 2000 words in total, excluding references and the author contribution section). For all sections, please take into account the feedback you received from your peers and teachers. Your grade for Assignment 2 will be determined based on the file you hand in, and will cover all aspects, not just the research proposal.

You will receive a separate grade for the presentation and Q&A part. The latter includes the feedback you gave to another group.

Homework

Nothing. Good luck with the exams!