COMS 4705: Project Proposal Instructions

Last updated on September 23, 2025

Adapted from Stanford CS224N Natural Language Processing with Deep Learning. Note that these guidelines may change.

Each team of **two to three students** (individual projects are not permitted) hands in **one** project proposal, which is worth 5% of your grade. This document specifies what information you should include in your proposal.

Before you start writing your project proposal, make sure that you have read through the *Practical Tips for Final Projects* document uploaded to Canvas and course website. The notes contain guidelines that will help you understand our expectations for projects, and enable you to write a better project proposal.

You are required to use Latex for your proposal and future milestones. While you may modify the template provided (linked below), please ensure that all requested elements are clearly visible to ensure proper grading and feedback:

`https://www.overleaf.com/read/fkgjygthfxkg#d6910c`

1 Key information to include

Your PDF proposal should have the following information at the top:

- **Title**: The title of your project (you can change this later).
- **Keywords**: Include 3-5 keywords describing your proposed project, such as the main task, training approach, or domain. For example: *news summarization, finetuning, faithfulness*. If you do not request a mentor, this will be used to try to match your project to the best equipped staff member.
- **Team member names**: List the names and [UNI]@columbia.edu email addresses of all of your team members. Note that teams must be at least 2 students, and at most 3.
- **(Optional) External Collaborators**: If you have any collaborators at Columbia who are not COMS 4705 students, list them.
- **Mentor**: Note that we don't expect you to already have a mentor – you will be assigned one after we receive your proposal. Depending on your situation, write either (a) 'X has already agreed to be our mentor', (b) 'We would like to request X as our mentor', or (c) 'We have no particular mentor'.
- **(Optional) Sharing Project**: If you are sharing this project between COMS 4705 and another class or as part of research outside of the course, indicate it here.

2 AI-aided literature review and critique (.5-1 page excluding literature review, 25 points)

AI-Aided Literature Review: For the first section of your proposal, you will conduct an AI-aided literature review and critique the results. First, formulate a question related to a natural language processing topic that you are interested in. This may, for example, be about the best performing approaches to a

specific task (e.g., summarization, question-answering), the strengths/weaknesses of specific training algorithms, approaches to mitigating undesirable model behaviors (e.g., biases, hallucinations) or a combination of these. Avoid questions that are too broad (e.g., "how do language models work?") or easily answerable (e.g., "when was ChatGPT released?"). Instead, your question should be open-ended or require multiple research articles to gather relevant information.

Using an LLM (e.g., ChatGPT, Claude) of your choosing, prompt the model with your formulated question and record the response. Additionally, pose your question to AI2 ScholarQA (`https://scholarqa.allen.ai`) and record one relevant section of the response. You may also rephrase your original question or ask follow-up questions, but please only include the original response in your proposal pdf.

Literature Review Critique: Critique both of the recorded responses with respect to your original question and reflect on what insights you gained from them. Select and read at least one paper from either system and consider whether it is relevant to you question. Depending on the LLM that you chose, a referenced paper may not exist, in which case you should select another one that you are able to find. Write a .5-1 page reflection on these responses and the paper you read. In particular, we will explicitly look for discussion of the following when evaluating your critique:

Chosen LLM & Responses : Also report the LLM you prompted, a copy of the LLM's response, and a copy of a section of the ScholarQA report into your proposal.

Question : Report the question you chose and a brief motivation for why you chose it. For example, why is this an interesting question to ask? Why would investigating this question be important?.

Critique of Literature Review : Summarize the strengths and weaknesses of the responses that you notice. Do they address the question you intended them to answer? Does either response seem to be missing any key related topics or details? Which do you find more helpful and why?

Chosen Article : Report and cite the article you selected to read. Include a **brief** (2-3 sentence) summary of what primary question the article aimed to study and the central findings. Was this particular article relevant to your question (why or why not)? What does it contribute in the context of the other referenced articles? Was this article appropriately discussed in the response you drew from (why or why not)?

Reflection : Discuss what you gained from reviewing these responses and the article you chose. Was there any particular approach or task mentioned that you found interesting? Was the answer or partial answer provided what you expected? What gaps in research or open questions remain that you notice? It is okay if you didn't find the responses helpful or interesting, but you should discuss why not.

Do not exceed one page in your critique and reflection. Your discussion should reflect thorough consideration of the responses and article you chose, but should remain concise. You do not need to include technical details in your discussion unless they would be necessary for a COMS 4705 classmate to understand your critique.

3 Project description (1-2 pages, 5 points)

In this section, you will describe what you plan to do for your project.

It's fine if your project eventually evolves into something different – that's a natural part of research. But your proposal should lay out a sensible and feasible initial plan. This section should answer the following questions (it's a good idea to structure your project description in this way, but you can structure differently if you like):

1. *Describe the main goal(s) of your project.* If possible, try to phrase this in terms of a scientific question you are trying to answer – e.g., your goal may be to investigate whether a particular model or technique performs well at a certain task, or whether you can improve a particular model by adding some new variant, or (for theoretical/analytical projects), you might have some particular hypothesis that you seek to confirm or disprove. Otherwise, your goal may be simply to successfully implement a complex neural model, and show that it performs well on a given task. Briefly motivate why you chose this goal

– why do you think it is important, interesting, challenging and/or likely to succeed? If you have any secondary or stretch goals (i.e., things you will do if you have time), please also describe them.

2. *What NLP task(s) will you address?* This could be similar to the question you posed in your literature review or from your chosen paper, but it doesn't have to be. Describe the task clearly (i.e., give an example of an input and an output, if applicable).

3. *What data will you use?* Specify the dataset(s) you will use (including its size), and describe any preprocessing you plan to do. If you plan to collect your own data, describe how you will do that and how long you expect it to take.

4. *What neural method(s) are you planning to use?* Describe the models and/or techniques you plan to use. If it's already described in the paper summary, no need to repeat. If you plan to explore a variant to a published method, focus on describing how your method will be different. Particularly if you are planning to replicate an existing paper, make it clear which parts you plan to implement yourself, and which parts you will download from elsewhere. If there is any part of your planned method that is original, make it clear. If you are proposing a new approach or change to an existing approach, be sure to briefly motivate why you think this will work or what benefits it offers (e.g., better performance for a given metric, more efficient, etc.).

5. *What baseline(s) will you use?* Describe what methods you will use as baselines. Baselines contextualize your results to show how your approach improves on prior or simpler approaches. For example, if you make changes to an existing model finetuned for a given task, you should evaluate the original model to show how your change impacts performance. Make it clear if these will be implemented by you, downloaded from elsewhere, or if you will just compare with previously published scores. Be sure to also briefly motivate why you chose specific baselines. For example, are they the best performing baselines comparable to your approach? What insights does comparing your proposed approach to these baselines offer?

6. *How will you evaluate your results?* Specify at least one well-defined, numerical, automatic evaluation metric you will use for quantitative evaluation. Note that often, it is appropriate to employ multiple evaluation metrics that can account for each others' weaknesses, but you need only report one in your proposal. Justify why your chosen metric or metrics are appropriate for what you intend to measure. What existing scores will you be comparing against for this metric? For example, if you're reimplementing or extending a method, state what score(s) the original method achieved; if you're applying an existing method to a new task, mention the state-of-the-art performance on the new task, and say something about how you expect your method to perform compared to other approaches. If you have any particular ideas about the qualitative evaluation you will do, you can describe that too.

7. *Why is this an appropriate and feasible project?* Briefly (a couple of sentences) justify how your proposal satisfies the expectations for the final project (see section 5). Additionally, describe what each team member will tentatively be responsible for (this can change as the project develops) and why you believe it is feasible to complete by the end of the semester.

4 Submission instructions

One team member should submit your PDF proposal on Gradescope and *make sure to tag all other team members* – only tagged team members will receive credit. Additionally, make sure to tag the correct pages for each 'question' to ensure your proposal is graded correctly.

5 What to expect

In grading the literature review critique and reflection, we will be looking for thoughtful discussion, and clear, concise writing.

We will grade your project proposals for completeness, clarity, and detail and provide brief feedback. We are primarily looking for the project you propose to satisfy the following:

- **Relevance to course material**: your project should build upon what you have learned/will learn in this course (i.e., topics related to natural language processing)
- **Technical component**: your project should involve a substantial technical/programming component that is appropriate for the last half of the semester. You should not strictly rely on existing resources and run code from repositories available online. Additionally, projects that strictly involve prompting will not be sufficient, and your project should involve a implementing a learned model.
- **Language/code/math data**: your project should involve learning from, making inferences on, or generating either (a) human language, (b) code, or (c) written math (i.e., proofs, answers to math questions) data.
- **Feasibility**: your project should reflect a sufficient amount of work for the last half of the semester. If you have 3 people in your group, there should be opportunity for each member of your group to contribute to the technical and written components of your project (i.e., one group member cannot strictly write reports). Additionally, your project should be feasible to complete with the resources available to you in the last half of the semester (we will provide feedback on whether you project appears feasible).
- ✗ **Novelty**: *your project does not need to explore a completely novel research question or idea.* While we encourage you to explore a custom project that interests you, you may instead propose to replicate or modify a set of experiments from an existing research article if it satisfies the above criteria.

Your grader for this proposal and future milestones will be your mentor. The more time and thought you put into your proposal, the more quality feedback we can give you to help you improve your final project. If there's a problem with your proposed project (e.g., it's not feasible in the given time), we may require you to submit a revised proposal – otherwise, your project is approved. Each student will be allocated Google Cloud Platform (GCP) credits for use in your final projects. We also may provide credits for other platforms and querying LLMs later in the semester. We will provide instructions to help you get started using these resources (e.g., requesting GPU's, managing allotted credits) in your projects.

If you want to discuss your proposal before submitting it, you can go to the Office Hours of a staff member. For specific feedback about experimental designs and research-related aspects of your proposed project, you can go to the Office Hours of a PhD student TA (Nick and Andrew) or John.