Writing a Research Proposal

A proposal is a special type of scientific article, as it describes what shall be done in the future.

For sure you will have to write a proposal for your master's thesis (now or later). Furthermore, both in academic research and in industrial practice, proposals are required if one wants to apply for funding for a project. The specific guidelines are, of course, very different, but all research proposals must more or less contain the following items, in an appropriate order:

- Summarize(!) the background and the current state, witnessed by some key references. But do not start from the Big Bang. Instead, restrict this summary to the points that are really necessary to understand your proposal.

- Specify at least one *clearly defined research question.* Actually this is the core of a proposal. If you want to devote special efforts to only one part of the proposal, then it should be this one.

- Motivate why the planned project is important at all. (For funding applications one can put it this way: Why should the financer give money for it?)

- Argue why the planned research is a significant step (and not only some routine work) and will increase the knowledge or the repository of methods in this field of work. Specify the scientific challenges: What is difficult and non-obvious, what is new terrain, etc.?

- Describe as clearly as possible what shall be done and accomplished. In particular: What problems exist, what are current solution methods, what are their limitations or drawbacks, etc.?

- As far as possible, describe specifically the approach(es) to be taken, and motivate your choice. In this way convince the reviewer that you have a solid and clear idea of your project, and that it is manageable and realistic. (For instance, it is not enough to say that "we will use some machine learning".)

- Also give a backup plan for the case of unexpected hurdles and difficulties. What would be the minimum achievements one can nevertheless expect from your project?

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- Give delimitations: What is out of scope and will not be considered in this work?

A proposal must be understandable also for reviewers (who decide on the acceptance!) that are, in general, not exactly experts in the specific domain.

An obvious objection is that the result of research cannot be predicted (otherwise it would not be research). But the understanding is that a proposal reflects the current knowledge, plans, and expectations. During the actual work, the initial plan can always be adjusted due to unexpected findings. This does not speak against having a plan.

Proposal Exercise

This exercise is not divided in a sequence of extension steps, because your time planning can depend very much on external factors. So you have to write more independently. (But it is good to keep the lessons from the summary exercise in mind.)

Your task is simply: **Write a proposal** for a research or development project in CS. In detail:

If you are in the process of preparing your master's thesis proposal, you should use this exercise for this purpose!

Otherwise, you may instead write a fictive (yet meaningful and realistic) proposal, just for practicing. Start from a subject from an article, from a technical talk, from a research seminar you may have attended, or from any other subject of current interest.

Indicate whether your proposal is real or fictive. In the former case, mention the colloboration partners (company, etc.). If you prepare a master's thesis proposal in a group of two students (the usual case), you also do this exercise as a group of two.

As for the contents, see the section "Writing a research proposal". Clarity of the problem and approach are most important. You are also strongly encouraged to use already the proposal template and guidelines from the CSE department. Then you need not reformat your text later.

Proposal Exercise versus Thesis Proposal

Just in case, here a few remarks to prevent possible misunderstandings. This proposal exercise and the actual master's thesis proposal are formally two independent items in two different courses (even though the former supports the latter, and they may be text-wise more or less identical).

Passing this exercise, which is about the scientific writing aspects, is no guarantee that your thesis proposal will pass, too. Supervisors and examiners might still have objections regarding the scientific content of the planned project as such. In principle, the opposite case is also possible: Your thesis proposal has passed and you can start your project, but we have objections regarding the quality of writing, and you may still have to work on the exercise.

The final version of your exercise submission shall also contain a section on ethical and societal aspects. Instructions will be given separately. This section is only part of the Proposal Exercise, but **not** part of the actual master's thesis proposal. However, the idea is that you can (and should) insert these considerations later in your thesis report. Usually they depend on the subject rather than on your coming project results, therefore you can address them already now, before the project starts.