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THESIS ARTIFACT SUBMISSION ONE

UNFINISHED LECTURE NOTES

Instructions

Instructions for Writing a Research Proposal

WRITE AN INTRODUCTION AND MOTIVATION that briefly presents the research topic, explains its significance, and clearly providing the context for your thesis work. Half a page to one page should suffice.

WRITE YOUR PROBLEM STATEMENT by reviewing the literature, current work and identify and pinpoint any gaps or unresolved issues or open questions that remain or emerge from the current state of the art.

STATE YOUR RESEARCH OBJECTIVES OR QUESTIONS. Explain the expected outcomes and discuss what you hope to find or achieve and the potential impact of your contributions.

PROVIDE A REALISTIC TIMELINE for completing each stage of your thesis work.

FOLLOW THIS TEMPLATE, ITS STRUCTURE AND FORMAT, ensure your proposal is logically structured, and proofread your work before submission. Keep your page count below 4 pages. It might be obvious, but worth mentioning, that this submission can be repurposed as part of your first chapter of your thesis later on.

THESE SUBMISSIONS ARE NOT AN END IN THEMSELVES, but rather a means to an end. They serve as a scaffold for your thesis work, giving you a helpful yet decisive nudge to structure.

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Introduction

Every Chapter, starts with a block of text, which introduces the chapter and its role in the overall thesis structure. At the same time this block of text opens up potential sections within the chapter. As for the introduction this first block takes care of the context and motivation, of your thesis. The introduction is $20 - 30\%$ of the total thesis length.

1.1 *Problem Statement*

Why is this specific field of research important, now? Then, quickly narrow down to the specific field you will be addressing. Broadly outline the current state of the art in this field, meaning all relevant fields for that matter, and how they relate to reach other. Be diligent in preparing the ground for pointing out gaps you identified in existing knowledge or limitations in current approaches and the overarching problems that arise from the field. These gaps are often a combination of several factors, such as limitations of current approaches, gaps in theoretical knowledge, constraints in applications, or emerging developments that necessitate further investigation.

Citations are essential in academic writing to give credit to original sources. In your proposal citations will all show up in the margin-notes like so [1]. This is achieved by use of the \cite{} command. This also means that you should limit yourself and focus on the most relevant works. Later in your thesis you will have a full reference section at the end of your document, and this section will be brimming with citations.

Lengthy motivation sections covering how autonomous driving brings down traffic accidents by 90%, reiteration of other broad concepts, or humble bragging in favor of your industrial partner, or similar topics, are to be avoided - A short single sentence will do. Then focus on motivating your specific field and research problem, this is in its own right a broad field.

[1] M. Schutera, T. Dickmeis, M. Mione, R. Peravali, D. Marcato, M. Reischl, R. Mikut, and C. Pylatiuk. Automated phenotype pattern recognition of zebrafish for high-throughput screening. *Bioengineered*, 7(4):261–265, 2016. doi: 10.1080/21655979.2016.1197710. URL https://doi.org/10.1080/21655979.2016.1197710. PMID: 27285638

1.2   Objectives

OPEN THIS with a 3-5 sentences which distill the derived problem statement. Then clearly (in 3-5 bullet points) outline the problem statement and articulate the contributions you will be making.

THE CONTRIBUTIONS should be:

- Specific: Clearly define what you aim to contribute.

- Measurable: Ensure that your contributions can be evaluated.

- Achievable: Set goals that are realistic to be accomplished.

- Relevant: Align your contributions with the problem statement.

- Time-bound: Specify a timeline for achieving each contribution.

SCHÖPFUNGSHÖHE, a certain level of originality and creativity required in academic work, is closely linked to the nature of your contributions. You will soon find yourself trading off between high-risk-high-impact ideas and more conservative incremental objectives. I advise to aim for a mix when defining your contributions: A workhorse (driven by execution and rigor), a staircase (small incremental improvement on a known method), a moonshot (high-impact idea or novel recombination, which might fail).

1.3   Timeline

PRESENT A TIMELINE that outlines the key milestones and deadlines for your research project. You can make use of Table 1.1 as a reference for structuring your own timeline. Make sure to update the descriptions to make them actionable for your work. The table does not count into your page limit, you will benefit from greater detail here.

SPECIFIC CONTRIBUTIONS, could sound like: A new method for X, More sensitive metrics for Y, an empirical study on Z, a curated dataset for X, a data-driven analysis of Y, or an application of Z for a new domain. After reading the bullet points, the reader should be able to clearly understand what you are trying to achieve and what he will be walking away with.

Milestone	Description	Timeline
Review	Survey recent and seminal works, identify gaps and relevant ressources.	Week 1
Definition*	Formulate research questions and hypotheses based on literature findings.	Week 2
Development	Prepare data, develop methods, and conduct experiments.	Week 3–9
Evaluation	Analyze results, compare with baselines, and interpret findings.	Week 7–11
Submission	Document methods, results and conclusions; polish for thesis submission.	Week 10–12

Table 1.1: Project timeline and milestones for a 12-week research project (e.g. Bachelor Thesis).

*WITH THIS SUBMISSION you complete the second milestone.

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Bibliography

[1] M. Schutera, T. Dickmeis, M. Mione, R. Peravali, D. Mar-
cato, M. Reischl, R. Mikut, and C. Pylatiuk. Automated
phenotype pattern recognition of zebrafish for high-
throughput screening. *Bioengineered*, 7(4):261–265, 2016. DOI:
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