



**Faculty of Science and Technology**

# MASTER'S THESIS

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Writer:	<p>.....</p> <p>(Writer's signature)</p>
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Faculty of Science and Technology  
Department of Electrical Engineering and Computer Science

# Thesis Title

Master's Thesis in Computer Science  
by

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January 22, 2022



*“Programming is a nice break from thinking.”*

Leslie Lamport

## *Abstract*

# *Acknowledgements*

I would like to thank my supervisors for their fantastic enthusiasm and help with writing this thesis.





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# Chapter 1

## Introduction

3-5 pages

### 1.1 Background and Motivation

- Awaken the reader's interest and convince her why the theme is important.
- Background information might be historical in nature, or it might refer to previous research or practical considerations.
- Provide an example or use case for the problem.
- It should be written on a level that it's understandable by anyone with a computer science master's degree.
- It might contain a small handful of citations if it is needed to justify some main claims or assumptions, but this is not the part to detail any related work and/or compare among each other.

### 1.2 Objectives

- Define the goals of your study. It might be presented as a bullet list.
- Structure your goal by Research Questions (RQs). Describe each of the problems to address in your work and formulate for it a clear research question. "The problem of bla is about. . . , We formulate the following RQ1 Can we provide a method for bla such that bla bla"

## 1.3 Approach and Contributions

- Give a brief summary of your overall approach.
- Summarize the specific contributions that you made in this thesis (e.g., a task definition, a method or model, a test collection, empirical results, analysis, etc.). It might be presented as a bullet list.

## 1.4 Outline

- Give an overview of the main points and the structure of your thesis. “Chapter 2 covers ... Chapter 3 describes ... ”
- Show in a natural way how the different parts (chapters) relate to each other.

## Chapter 2

# Related Work

10 - 15 pages

- Discuss the relevant literature related with your problem, in a coherent way to demonstrate that you have given due consideration to know: your problem and the possible sub-problems of interest in this work, the previous approaches, and their benefits and missing points or drawbacks.
- It is not about concatenating summaries of papers. Rather, it is about to discuss the problem, its details and challenges (difficulties and/or opportunities) you focus on, all this by relying on previous work, comparing what some did, what some else improved or added, what is missing, and so on.
- Moreover, mind to keep the focus in the areas you care during your discussion (since you control the story), and to remark what you consider useful, interesting, or challenging.
- In some cases it could be necessary and/or natural to have, first, an introduction (which could discuss works on more general aspects of the problem), and then split the rest of the chapter in sections, each discussing a particular aspect of the problem.
- If you define a new task, or create or improve a method, or develop a test collection, or perform a missing major evaluation, explain why it is interesting, why is different or helpful versus previous works.
- Mind that the reader may have never heard about these things. You need to discuss them in such detail that it is possible to follow later parts of the thesis without having to consult external resources.

- Always use natbib!
- Use `\citet{}` for textual citation. For example, Balog [1] proposed...
- Use `\citep{}` for parenthetical citation. For example, In [2] the idea of ..
- Here is an example of a PhD thesis: Maxwell [3]
- Here is how a Journal article would look in the Bibliography: Sanderson [4]
- Never write out Smith et al., there is a `\citeauthor{}` command for that (but most likely what you're looking for is actually `\citet{}`).

# Chapter 3

## Approach

20-30 pages

- This chapter describes your main contributions (i.e., what you did) and the decisions that went into them (i.e., why did you did it the way you did it).
- Alternative headings may be used depending on the kind of contribution(s) you make.

### 3.1 Overview

- This section should explain the high-level design
- Include possibly an architecture figure that shows how the different parts fit together and what processing/technology/tools/datasets have been used for the different components.

Name these themes based on the different components or sub-problems you are solving in your thesis.

### 3.2 Theme 1

### 3.3 Theme 2

- For larger/more complex projects, the separate themes may be chapters on their own (e.g., components in a system; sub-problems of a major evaluation study; etc.).

- Include screenshots, examples, tables, algorithms (with pseudo code), plots for some preliminary observations leading to some aspect of your approach decisions, etc. so that it's not just text.
- Always discuss the alternatives considered and the rationale for the choosing the solutions you adopted.



## Chapter 4

# Experimental Evaluation

10-15 pages

- Detail your evaluation methodology, present your results, and provide an analysis of them. Results can be quantitative and/or qualitative (from benchmark, user study, user satisfaction survey, etc.).
- It is strongly desired that you have some results, nevertheless, this may not be applicable to all types of theses.

### 4.1 Experimental Setup

- Explain the methodology used for evaluating your contribution, and the metrics used for evaluation.
- If you use any dataset, explain it, detail its version, and mention briefly some main statistics about it, of interest for your problem (e.g., size, provenience, etc.), if appropriate.
- If you collect ground truth data, describe your annotation experiment. Explain what the annotators were asked to do (and show a screenshot or schema if available). Detail the number of annotators, their nature (experts, or crowdworkers), the criteria for deciding on each annotation instance (e.g., majority class, dynamic judgments, etc.), the criteria for ensuring quality (e.g., minimum accuracy, filters). If possible, report the inter-annotator agreement coefficient and mention how strong this value means that the agreement is.

## 4.2 Experimental Results

- Present the results, using tables and (pretty) plots.

## 4.3 Analysis

Now that you presented the results, what do these results actually mean (esp. regarding the objectives you set out in the introduction)? Can you identify success and failure cases? What do the results say for individual parts you evaluate and overall in combination? Make sure you formulate clear take-home messages.

## Chapter 5

# Conclusions

3-5 pages

- Summary of the work you have done, what worked and what didn't
- Make sure it connects well with the Introduction, by answering every RQ.

### 5.1 Future Directions

Discuss potential future work that may fill gaps in your work, or approaches that seem promising to overcome problems you encountered but that you weren't able to tackle.



## **Appendix A**

# **Sample Appendix Contents**

The following may (optionally) go to an appendix chapter:

- More detailed evaluation results.
- Longer details on a possible annotation experiment.
- Hyperparameter tuning and detailed experimental setup.
- Setup and installation instructions to repeat the experiments etc.



## **Appendix B**

# **Instructions to Compile and Run System**

This appendix may contain following:

- Installation instructions
- Source code / class structure
- More detailed evaluation results





# Bibliography

- [1] Krisztian Balog. *Entity-Oriented Search*, volume 39 of *The Information Retrieval Series*. Springer, 2018.
- [2] Shuo Zhang and Krisztian Balog. Evaluating conversational recommender systems via user simulation. In *Proceedings of the 26th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining*, KDD '20, pages 1512–1520, 2020.
- [3] David Martin Maxwell. *Modelling search and stopping in interactive information retrieval*. PhD thesis, University of Glasgow, 2019.
- [4] Mark Sanderson. Test collection based evaluation of information retrieval systems. *Found. Trends Inf. Retr.*, 4(4):247–375, 2010.