A Very Long MSc Dissertation With a Long Title

by

Joseph Thomas Bloggs

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Abstract

Your dissertation abstract goes here. This should be a single paragraph. Try to keep it as brief as possible (less than 200 words — if this abstract page runs onto a second page, it needs shortening), while keeping in mind that it should touch on all the important aspects of your research — consider whether someone unfamiliar with your research area would be able to determine whether your research is relevant to them, or not. Keep in mind that the abstract may be the only thing someone reads before choosing to either discard your work, or keep reading. Also, make sure that there are no references in the abstract. The keywords list should include no more than ten keywords. Keywords may be single words, or multi-word terms (such as "neural networks" or "particle swarm optimisers"). When choosing keywords, consider terms that are descriptive of your research, and are likely to be used in search queries that should find your work.

Keywords: First keyword, second keyword, final keyword.

Supervisors : Prof. S. U. P. Visor

Dr. A. N. Other

Department : Department of Computer Science

Degree   : Master of Science

"An interesting quotation (preferably related to the theme of your research) if you would like to include one. If you choose not to include a quotation (or can't find anything relevant), remove this page."

Quote attribution or source (1892)

"Another quote, if you feel like it..."

Another Quote attribution or source (1890)

Acknowledgements

If you wish to include any acknowledgements to anyone you feel was instrumental in the completion of the dissertation (or your continued survival through it's completion):

- First person (or institution) you'd like to thank, and reasons;

- Second person (or institution), and reasons;

- Final person (or institution), and reasons.

Contents

List of Figures

List of Graphs

List of Algorithms

List of Tables

Chapter 1

Introduction

You may place a brief sketch of the scenario that inspired the research here (you may also choose to leave it out). For example, if you are writing about ACOs, you might write something about the simplicity and efficiency of an ant colony. This may be relatively informal (but not colloquial). Avoid references here. Refer to some of the dissertations on the CIRG website for some ideas on what you might include.

Place some very general background information here, setting the scene for where your work fits in tot he broader scheme of things.

For instance, give a very broad overview of the field of CI-based function optimisation. You should already provide some references (here's an example of a reference [6]).

1.1 Motivation

Provide a more specific background to your specific approach or focus area. Give specific references. Explain why this area justifies investigation (this would probably include a description of shortcomings or gaps in the field).

1.2 Objectives

Introduce the research objectives of your work. It is quite likely that these may only become clear after you have completed the rest of the dissertation, so revisit this list once you have finished everything else. Include broad objectives, like "conduct a survey of available techniques in the field of . . . ", or "present practical case studies in the realm of . . . ". You should use a bulleted list, as follows:

- First objective here.

- Then, second objective here.

- Third objective here, and so on.

1.3 Contributions

Enumerate the novel contributions that your work sets out to make to the field. Include specific novel contributions to the field, such as taxonomies, or empirical results. These will be quite closely related to the objectives listed in Section 1.2. You may also use a bulleted list here.

1.4 Dissertation Outline

Introduce a list of the remaining chapters of your work, in which a brief (two to three line) description of the material covered in each is included:

- **Chapter 2** focusses on . . . .

- **Chapter 3** covers . . . .

- **Chapter 4** gives . . . .

You might also include a page reference to the index (if you decide to include one) here, as follows: page **??**.

Please refer to the bibliography database (in the file `bibliography.bib`) for a skeleton of how you would add references to your work. You cite them in your text, in any order you need, as follows: [3], [2], [10], [4], [9], [7], [8] and [1]. You may include extra page information as follows: [5][page 82]. Note that references will only show up in the bibliography once you actually cite them in the document. The entries will also be alphabetised automatically.

Make sure that the bibliographic information is as accurate as possible. Provide full author names, as they appear on the paper. Make sure you provide as much information as possible, but try to keep it relatively brief as well (for example, include minimal information in the address field). Make absolutely sure that references are correct, since there are a large number of incorrect ones listed in published articles.

Note that references to online resources should only be provided in instances when a document's primary publication method is online. You may also provide a reference to a Digital Object Identifier (DOI)[1] if one is available, but this should always be provided in conjunction with the physical publication details (note that many journals and conferences will still have a problem with DOIs being cited, since they are online documents, even though they are persistent).

After you have discussed the chapters, provide a brief introduction for the list of appendices:

- **Appendix A** describes ....

- **Appendix B** covers ....

- **Appendix C** provides a list of the important acronyms used or newly defined in the course of this work, as well as their associated definitions.

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[1]A DOI is a unique alphanumeric identification string for a digital object, providing a persistent link to it. It represents a permanent URL kept the same way a domain name is. For further information on DOI, see http://www.doi.org. Publication DOIs are provided in the CrossRef framework. CrossRef is a non-profit network providing infrastructure for linking online citations, using the DOIs of documents that are available electronically. CrossRef DOIs looks something like `doi:10.1234/5678`, and work like standard hyperlinks in most web browsers (you can past them into the address bar of a browser and you will be taken directly to the online document). DOIs may also be manually resolved via http://dx.doi.org. For more information on CrossRef, see http://www.crossref.org.

- **Appendix D** lists and defines the mathematical symbols used in this work, cate-
gorised according to the relevant chapter in which they appear.

- **Appendix E** lists the publications derived from this work.

If you provide an index, you may provide a page reference here, indicating that it
begins on page **??** of the text.

Chapter 2

The First Chapter

Explain what the chapter focusses on. Be brief, and only focus on the main theme of the chapter. Also reference any previous chapters that link to the theme of this chapter.

Then, outline the remaining sections and what each covers in a broad sense. Use labeled references like these: Section 2.1, Section 2.2 and Section 2.3. Note that all labels in this document follow a convention, but you are free to choose whatever labels you want to.

2.1 A First Section

The text may include sections, subsections and sub-subsections. Refer to the "Not So Short Introduction to LaTeX 2_ε" for more details on what types of organisation are available to you. Include labels for each section, subsection and sub-sub-section, so that you can easily reference them in your text, as was shown in the previous section (this also ensures that your numbering will still be correct, even if you add additional sections and subsections at a later date). Any undefined labels that you reference will not cause the document build process to fail. Instead, they are replaced by question marks, and will generate warnings while compiling. Watch out for these before you submit work.

Equations are included as follows:
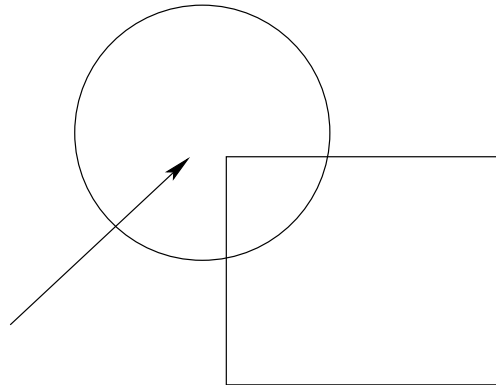
$$\eta(t) = t + c \tag{2.1}$$

Figure 2.1: A long caption, for under the figure.

Make sure that you define all the symbols you use in your equations. Equations are referenced in the text as follows: Equation (2.1).

You may include figures, such as Figure 2.1. Note the short caption has no period at the end of it, while the long caption does (in other words, always provide the short caption without the period, even if the text is the same as the long caption). We recommend using Xfig (which is an open source tool) if you can for your diagrams. Make sure that the files you create are in encapsulated postscript (eps) format. Note that you must not specify the file extension when including the image (this is because PDF generation automatically converts eps image files to PDF files).

You may also provide graphs, such as Graph 2.1. The captions follow the same principal as for figures. We recommend using the very flexible gnuplot (which is open source software) to generate your graphs.

You may include tables, such as Table 2.1. The captions follow the same principal as for figures and graphs. You may use a package called `hhline` to add fancy borders to your tables. Please refer to the package documentation for details.

Finally, you may add algorithms, such as Algorithm 2.1. You are free to typeset these as you see fit, or use one of the many algorithm-related packages that are available. In the future, we will try to develop a nice way of generating pseudocode in a standard format like what you see in Algorithm 2.1. Again, the captioning conventions are the same as for figures, graphs and tables.

All floating bodies (i.e. figures, graphs, tables and algorithms) are automatically
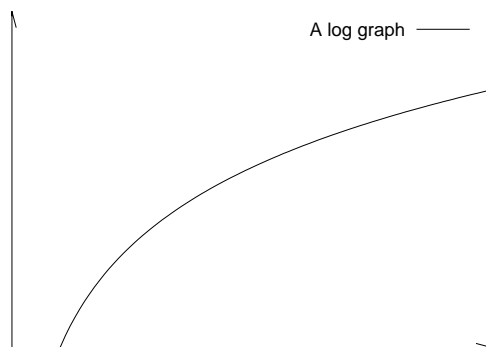
Graph 2.1: A long graph caption.

positioned by LaTeX. You can change this behaviour by modifying a number of fractions that govern when and where LaTeX can position floating bodies. These are located in `dissertation.tex`, and there are a several you can modify (e.g. `topfraction`, `bottomfraction`, `textfraction` and `floatpagefraction`). Note that any floating bodies that cannot be placed throughout the text will group together on "float pages".

2.2   A Second Section

This is how a second section would appear in your document. You cannot nest sections in one another (to get that effect, use sub-section). It may improve the flow of your writing if you introduce the subsections before jumping into them, so that the reader has an idea of what is coming. Again, use the subsection's labels to ensure that the correct numbering is used throughout.

2.2.1   A Subsection

You may place subsections as well. Again, these cannot be nested in one another. Consider the overall structure of your dissertation very carefully before writing. Try to avoid too many short subsections, and split your discussion logically between sections and subsections.

Table 2.1: A long table caption.

Parameter	Symbol	Domain
First	A	$[2, \infty)$
Second	B	$[0.0, \infty)$
Third	C	$(0.0, \infty)$

A Sub-Subsection

You may even add a third level of headings, called sub-subsections (although these are not numbered, or listed on the contents page). It pays to carefully consider whether you will be including sub-subsections. If the text for such a section is short, and there aren't many topics to cover, bulleted lists often look better. However, if the text needs to be broken up into paragraphs, rather use sub-subsections. Also, try to avoid too many sub-subsections, since they cannot be referenced properly, and may become confusing to the reader if they stretch over too many pages. Also, note that while you can label a sub-subsection (just like a section or subsection), referencing the label will simply provide the number of the subsection within which the sub-subsection is located.

You can include acronyms in your dissertation as follows: Artificial Intelligence (AI), Artificial Neural Network (ANN) and Computational Intelligence (CI). The acronyms should all be defined in `dissertation.tex`, using `newacronym`. Note that on the first use of the acronym, the full term is used, with the acronym following it in parentheses. On subsequent uses (such as AI), only the acronym is given.

While it is not at all necessary, you might like to include index terms in your dissertation. You can do this by providing index terms in the text when you mention the topic (e.g. widgets). You can make an index term bold in the index if it's a primary page reference (e.g. for artificial intelligence). If you index the same term again, it will show up as a non-bold secondary reference. You can provide references to other index terms in the `dissertation.tex` file. There are many more options, but these are outlined properly in the `makeindx` documentation.

Initialise all variables
repeat:
      Select a pattern, and load it
      for all *values v in the pattern* **do**
          Analyse the pattern
      end for
until *stopping criteria are met*

Algorithm 2.1: A long algorithm caption.

2.3   Summary

This section should follow all the previous ones forming the main body of the chapter. Provide an outline of the previous sections of this chapter, explaining what each dealt with. Provide section references using labels, as you did for the outline at the start of the chapter.

Give a brief synopsis of what the following chapter will cover, in a general sense. This will improve the logical flow of your work from one chapter to the next.

Chapter 3

The Second Chapter

The same structure as before, including section, subsections and sub-subsections. Make sure that you follow the same conventions throughout, to avoid confusing the reader. Always remember to include a summary.

3.1 The First Section

3.2 The Second Section

3.2.1 A Subsection

3.2.2 Another Subsection

3.3 Summary

Chapter 4

Conclusions

Provide an introduction, stating that this chapter summarises the conclusions of your work, and consider future directions that related research could take. Again, reference Sections 4.1 and 4.2.

4.1 Summary of Conclusions

Summarise your conclusions here. You should consider each of the objectives you listed in the introduction, and explain how each was met, providing a discussion on what your specific findings were for each. Also mention what novel contributions (these might include a new taxonomy, model, algorithm, or empirical results not previously published) your work has introduced to the field while the various objectives were being addressed.

4.2 Future Work

Enumerate the future work that you could foresee developing from the work you have done here. Mention areas you could not focus on, or possible extensions to your work. It is a good idea to be thorough, since you increase your chances of being referenced by other researchers who follow up on your work, even if you do not do so yourself. You may consider writing this as a bulleted list, if you mention many aspects.

Bibliography

[1] David W. Aha, Catherine L. Blake, Seth J. Hettich, Eamonn J. Keogh, Christopher J. Merz, and Patrick M. Murphy. UCI repository of machine learning databases, 1998. Department of Information and Computer Sciences, University of California, Irvine, United States of America. Available online: [http://www.ics.uci.edu/~mlearn/MLRepository.html] (Accessed: 13 February 2004).

[2] Damminda Alahakoon, Saman K. Halgamuge, and Bala Srinivasan. Dynamic self-organizing maps with controlled growth for knowledge discovery. *IEEE Transactions on Neural Networks*, 11(3):601–614, May 2000. Available online: [doi:10.1109/72.846732].

[3] Esa Alhoniemi, Johan Himberg, and Juha Vesanto. Probabilistic measures for responses of Self-Organizing Map units. In *Proceedings of the International ICSC Congress on Computational Intelligence Methods and Applications (CIMA'99)*, pages 286–290. ICSC Academic Press, 1999.

[4] Esa Alhoniemi, Jaakko Hollmén, Olli Simula, and Juha Vesanto. Process monitoring and modeling using the self-organizing map. *Integrated Computer-Aided Engineering*, 6(1):3–14, 1999.

[5] Peter Clark. Knowledge representation in machine learning. In Yves Kodratoff and Alan Hutchinson, editors, *Machine and Human Learning*, pages 35–49. Kogan Page, London, England, 1989.

[6] Andries P. Engelbrecht. *Computational Intelligence: An Introduction*. John Wiley & Sons, Chichester, England, December 2002.

[7] Daniel Fasulo. An analysis of recent work on clustering algorithms. Technical Report 01-03-02, Department of Computer Science and Engineering, University of Washington, Seattle, Washington, United States of America, 26 April 1999.

[8] Samuel Kaski. *Data Exploration Using Self-Organizing Maps*. Doctoral thesis, Acta Polytechnica Scandinavica, number 82 of *Mathematics, Computing and Management in Engineering Series*, Helsinki University of Technology, Department of Computer Science and Engineering, Espoo, Finland, February 1997. Published by the Finnish Academies of Technology.

[9] S. Kaski and T. Kohonen. Exploratory data analysis by the self-organizing map: Structures of welfare and poverty in the world. In Apostolos-Paul N. Refenes, Yaser Abu-Mostafa, John Moody, and Andreas Weigend, editors, *Neural Networks in Financial Engineering: Proceedings of the Third International Conference on Neural Networks in the Capital Markets*, pages 498–507, London, England, 11–13 October 1995. World Scientific.

[10] Merja Oja, Samuel Kaski, and Teuvo Kohonen. Bibliography of Self-Organizing Map (SOM) papers: 1998–2001 addendum. *Neural Computing Surveys*, 3:1–156, 2003. Electronic journal. Available online: [http://www.cse.ucsc.edu/NCS/vol3.html] (Accessed: 21 July 2003).

Appendix A

The First Appendix

Appendices follow exactly the same structure as chapters. They are used to describe aspects that are not central to the dissertation (for example, an algorithm that you benchmark against, but do not focus on in the main text, or a discussion on the sample datasets you test your algorithm on).

A.1   Summary

As always, provide a summary at the end.

Appendix B

The Second Appendix

Appendices follow exactly the same structure as chapters. They are used to describe aspects that are not central to the dissertation (for example, an algorithm that you benchmark against, but do not focus on in the main text, or a discussion on the sample datasets you test your algorithm on).

B.1   Summary

As always, provide a summary at the end.

Appendix C

Acronyms

Appendix D

Symbols

Provide a brief introduction, in which you explain that all the symbols used throughout the dissertation are defined in this appendix, under the chapter in which they first appear. Also mention that re-definitions of symbols are introduced in the chapters in which they occur (but try very hard to avoid this). Do not repeat symbol definitions in later chapters. Try to keep definitions as short as possible (try not to wrap onto the next line). You may play with the length called `namewidth` (defined in `dissertation.tex`) to make sure that all the symbols fit properly throughout this list. Provide the chapter name in each section, as appropriate. Leave out chapters with no symbol definitions. Also note that you may provide a reference to an equation defining a symbol if you choose to (although this limits the space you have to work with) — decide if you want to do this, or not, and stick to either one or the other:

D.1   Chapter 2: The First Chapter

$\mathcal{A}$ Some symbol that we use

m Another symbol we use

t_i The ith something

D.2 Chapter 3: The Second Chapter

β Yet another symbol

$\eta(t)$ And another one   [Eq. (2.1), pg. 5]

Appendix E

Derived Publications

Explain that the following list includes a list of the publications derived from this dissertation. You may list already accepted publications, as well as ones that are currently under review. Make sure that the format is the same as that produced by BIBTEX (we will hopefully release an automated way of generating this list some time in the future), and that the references are all correct.

- First reference.

- Second reference.

- Third reference.