

Load Disaggregation Using Machine Learning



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Load Disaggregation Using Machine Learning

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Declaration

I declare that the work contained in this thesis is my own, except where explicitly stated otherwise. In addition this work has not been submitted to obtain another degree or professional qualification.

Signed: _____

Date: _____

Acknowledgments

The acknowledgements and the people to thank go here, don't forget to include your project advisor...

For/Dedicated to/To my...

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Abbreviations

LAH List Abbreviations Here

Abstract

The Thesis Abstract is written here (and usually kept to just this page). The page is kept centered vertically so can expand into the blank space above the title too...

Chapter 1

Project Report/Thesis Structure

The flow of information provided in a thesis depends on its structure. The parameters defining the structure of a thesis are discussed in [2] and are quoted below:

“The structure of a thesis is governed by logic and is invariant with respect to subject. The substance varies with subject, and its quality is determined by the technical knowledge and mastery of essentials exhibited by the student. Style has two components: language and layout. The former deals with the usage of English as a medium of sound technical communication; the latter with the physical presentation of the thesis on paper. All three components structure, substance and style influence one another.”

There is no definite structure for a thesis. The author is the best judge. One possible structure of a thesis can be:

- *Chapter 1*: Introduction
- *Chapter 2*: Motivations, Related Literature and Problem Statement
- *Chapter 3*: Proposed Approach
- *Chapter 4*: Implementation and/or Experimentation
- *Chapter 5*: Conclusions and Future Directions

The purpose of the introduction is to provide an outline of your project in a contextual framework systematically. The introduction should be kept short and to the point.

Depending on the substance, you can break Chapter 2 suggested above into separate chapters. For instance, *motivation and related literature* can be one chapter and *problem statement* can be a separate chapter. This is flexible and is decided while writing the thesis.

The rationale behind the structure selected above is to meet the objective of telling a story as clearly and convincingly as possible. We have adapted the following table from [1] to show the flow in the logic:

Introduction/Aim	What did you do and why?
Materials and Methods	How did you do it?
Observations/Results	What did you find?
Discussion	What do your results mean to you and why?
Conclusions	What new knowledge is extracted from experiment?

There are a number of guiding documents e.g. [5], [4], as well as some documents available online, which can be helpful in writing the thesis. Two such documents outlining some general guidelines are [3], [2].

Finally here is a list of words that you should try avoid while writing the thesis: “very much”, “interesting”, “good”, “fun”, “exciting”, “very”, “too much”.

Chapter 2

Motivations and Problem Statement

The flow of information provided in a thesis depends on its structure. The parameters defining the structure of a thesis are discussed

Chapter 3

Methodology

The flow of information provided in a thesis depends on its structure. The parameters defining the structure of a thesis are discussed

Appendix A

Introduction to Latex

The material provided in this appendix is taken from
<http://www.sunilpatel.co.uk/thesistemplate.php>

A.1 Learning L^AT_EX

L^AT_EX is not a WYSIWYG (What You See is What You Get) program, unlike word processors such as Microsoft Word or Corel WordPerfect. Instead, a document written for L^AT_EX is actually a simple, plain text file that contains *no formatting*. You tell L^AT_EX how you want the formatting in the finished document by writing in simple commands amongst the text, for example, if I want to use *italic text for emphasis*, I write the ‘\emph{}’ command and put the text I want in italics in between the curly braces. This means that L^AT_EX is a “mark-up” language, very much like HTML.

A.1.1 A (not so short) Introduction to L^AT_EX

If you are new to L^AT_EX, there is a very good eBook – freely available online as a PDF file – called, “The Not So Short Introduction to L^AT_EX”. The book’s title is typically shortened to just “lshort”. You can download the latest version (as it is occasionally updated) from here:

<http://www.ctan.org/tex-archive/info/lshort/english/lshort.pdf>

It is also available in several other languages. Find yours from the list on this page:

<http://www.ctan.org/tex-archive/info/lshort/>

It is recommended to take a little time out to learn how to use L^AT_EX by creating several, small ‘test’ documents. Making the effort now means you’re not stuck learning the system when what you *really* need to be doing is writing your thesis.

A.1.2 A Short Math Guide for L^AT_EX

If you are writing a technical or mathematical thesis, then you may want to read the document by the AMS (American Mathematical Society) called, “A Short Math Guide for L^AT_EX”. It can be found online here:

<http://www.ams.org/tex/amslatex.html>

under the “Additional Documentation” section towards the bottom of the page.

A.1.3 Common L^AT_EX Math Symbols

There are a multitude of mathematical symbols available for L^AT_EX and it would take a great effort to learn the commands for them all. The most common ones you are likely to use are shown on this page:

<http://www.sunilpatel.co.uk/latexsymbols.html>

You can use this page as a reference or crib sheet, the symbols are rendered as large, high quality images so you can quickly find the L^AT_EX command for the symbol you need.

A.1.4 Figures

There will hopefully be many figures in your thesis (that should be placed in the ‘Figures’ folder). The way to insert figures into your thesis is to use a code template like this:

```
\begin{figure}[htbp]
  \centering
  \includegraphics[width = 1.5in]{./Figures/uet_logo.pdf}
  \rule{35em}{0.5pt}
  \caption{The UET Laore logo.}
  \label{fig:uet_logo}
\end{figure}
```

Also look in the source file. Putting this code into the source file produces the picture of the UET logo that you can see in the figure below.



FIGURE A.1: The MNS UET Multan logo.

Sometimes figures don’t always appear where you write them in the source. The placement depends on how much space there is on the page for the figure. Sometimes there is not enough room to fit a figure directly where it should go (in relation to the text) and so L^AT_EX puts it at the top of the next page. Positioning figures is the job of L^AT_EX and so you should only worry about making them look good!

Figures usually should have labels just in case you need to refer to them (such as in figure A.1). The ‘`\caption`’ command contains two parts, the first part, inside the square brackets is the title that will appear in the ‘List of Figures’, and so should be short. The second part in the curly brackets should contain the longer and more descriptive caption text.

The ‘`\rule`’ command is optional and simply puts an aesthetic horizontal line below the image. If you do this for one image, do it for all of them.

The L^AT_EX Thesis Template is able to use figures that are either in the PDF or JPEG file format. It is recommended that you read this short guide on how to get the best out of figures in L^AT_EX, available here:

<http://www.sunilpatel.co.uk/texhelp5.html>

Though it is geared more towards users of Mac and OS X systems, much of the advice applies to creating and using figures in general. It also explains why the PDF file format is preferred in figures over JPEG.

A.1.5 Typesetting mathematics

If your thesis is going to contain heavy mathematical content, be sure that L^AT_EX will make it look beautiful, even though it won’t be able to solve the equations for you.

The “Not So Short Introduction to L^AT_EX” (available [here](#)) should tell you everything you need to know for most cases of typesetting mathematics. If you need more information, a much more thorough mathematical guide is available from the AMS called, “A Short Math Guide to L^AT_EX” and can be downloaded from:

<ftp://ftp.ams.org/pub/tex/doc/amsmath/short-math-guide.pdf>

There are many different L^AT_EX symbols to remember, luckily you can find the most common symbols [here](#). You can use the web page as a quick reference or crib sheet and because the symbols are grouped and rendered as high quality images (each with a downloadable PDF), finding the symbol you need is quick and easy.

You can write an equation, which is automatically given an equation number by L^AT_EX like this:

```
\begin{equation}
E = mc^{2}
\label{eqn:Einstein}
\end{equation}
```

This will produce Einstein’s famous energy-matter equivalence equation:

$$E = mc^2 \tag{A.1}$$

All equations you write (which are not in the middle of paragraph text) are automatically given equation numbers by L^AT_EX. If you don't want a particular equation numbered, just put the command, '`\nonumber`' immediately after the equation.

A.2 Sectioning and Subsectioning

You should break your thesis up into nice, bite-sized sections and subsections. L^AT_EX automatically builds a table of Contents by looking at all the '`\chapter{}`', '`\section{}`' and '`\subsection{}`' commands you write in the source.

The table of Contents should only list the sections to three (3) levels. A '`\chapter{}`' is level one (1). A '`\section{}`' is level two (2) and so a '`\subsection{}`' is level three (3). In your thesis it is likely that you will even use a '`\subsubsection{}`', which is level four (4). Adding all these will create an unnecessarily cluttered table of Contents and so you should use the '`\subsubsection*{}`' command instead (note the asterisk). The asterisk (*) tells L^AT_EX to omit listing the subsubsection in the Contents, keeping it clean and tidy.

References

- [1] R. Barrass. *Scientists must write: a guide to better writing for scientists, engineers and students*. RoutledgeFalmer, 2002.
- [2] R. Chandrasekhar. *How to Write a Thesis: A Working Guide*. <http://ciips.ee.uwa.edu.au/pub/HowToWriteAThesis.pdf>, Last accessed on May 19, 2010.
- [3] S. Easterbrook. *How Thesis Get Written*. <http://www.cs.toronto.edu/~sme/presentations/thesiswriting.pdf>, Last accessed on May 19, 2010.
- [4] D. Evans and P. Gruba. *How to write a better thesis*. Melbourne University Publishing, 2003.
- [5] R. Murray. *How to write a thesis*. Open Univ Press, 2006.