School of Computer Science and Engineering

Faculty of Engineering

The University of New South Wales

Smart Home

by

Jake Palandri

Thesis submitted as a requirement for the degree of

Bachelor of Engineering in Software Engineering

Submitted: April 2024

Supervisor: Prof. Claude Sammut Student ID: z5313097

Abstract

This document describes the requirements to theses submitted for the Bachelor of Engineering in Software Engineering degree at the School of Computer Science and Engineering. Requirements described are that of both of context and layout of the theses. The document is written using the LaTeX template provided by the school.

Acknowledgements

This work has been inspired by the labours of numerous academics in the Faculty of Engineering at UNSW who have endeavoured, over the years, to encourage students to present beautiful concepts using beautiful typography.

Further inspiration has come from Donald Knuth who designed TEX, for typesetting technical (and non-technical) material with elegance and clarity; and from Leslie Lamport who contributed LATEX, which makes TEX usable by mortal engineers.

John Zaitseff, an honours student in CSE at the time, created the first version of the UNSW Thesis LATEX class and the author of the current version is indebted to his work.

Abbreviations

BE Bachelor of Engineering

LaTeX A document preparation computer program

PhD Doctor of Philosophy

Contents

List of Figures

List of Tables

Chapter 1

Introduction

Having a set of clear requirements to their thesis is important to student finalising their BE, or other, degree. Such requirements are both in relation to the physical appearance of the thesis, as well as the writing style and organisation. The present document tries to concisely state the theses requirements while appearing in layout and structure as a thesis itself.

Chapter **??** explains the background for this document. Chapter **??** states the style and submission related requirements to theses submitted at the school. Chapter **??** explains content related requirements to theses. Chapter **??** evaluates the thesis requirements template. Finally, Chapter 5 draws up conclusions and suggest ways to further improve the thesis requirements template.

Chapter 2

Literature Review

2.1 Background

2.2 Review of Existing Literature

2.3 Gaps in Literature

2.4 Problem Statement (Draft)

Smart homes today promise enhanced convenience, safety, and security through automation and connectivity. However, several critical challenges hinder the industry's growth and its overall effectiveness as a tool.

Interoperability issues between devices and existing platforms, the lack of genuine "intelligence" in these automated systems, and the constant reliance on internet access pose significant obstacles to realising the true potential of smart home technology.

In response to these challenges, this thesis aims to develop an entirely custom and customisable, intelligent environment where a user's movements can accurately predict

how to control devices within the home. Utilising local processing and sensor data, this system seeks to enhance convenience, safety, and security without relying on internet connectivity or support from third-party companies to allow interoperability.

The research objectives include designing and implementing artificial intelligence and computer vision for movement prediction and gesture recognition, integrating these into existing smart home infrastructure, and evaluating the performance and user experience of the environment.

The anticipated outcomes of this research include advancements in smart home technology, improved user experiences, and insights into addressing the broader challenges in the field as outlined in the literature review. While the research focuses on addressing specific aspects of smart home functionality, certain limitations, such as device compatibility and privacy concerns, will be acknowledged and considered throughout the study.

Overall, this research endeavours to contribute to the evolution of smart homes by introducing innovative approaches to enhance their intelligence and autonomy, ultimately improving the quality of life for users.

2.5 Aims and Outcomes

Chapter 3

Project Plan

3.1 Methodology and Approach

3.2 Timeline

3.3 Required Training and Upskilling

Chapter 4

Project Preparations

4.1 Progress and Roadblocks

Chapter 5

Conclusion

A thesis requirements/template document has been created. This serves the dual purposes of giving students specific requirements to their theses — both style and content related — while providing a typical thesis structure in a LaTeX template.

5.1 Future Work

Extract the requirements from the template in order to have very concise requirements.

References

Appendix 1

This section contains the options for the UNSW thesis class; and layout specifications used by this thesis.

A.1 Options

The standard thesis class options provided are:

undergrad	default
hdr	
11pt	default
12pt	
oneside	default for HDR theses
twoside	default for undergraduate theses
draft	(prints DRAFT on title page and in footer and omits pictures)
final	default
doublespacing	default
singlespacing	(only for use while drafting)

A.2 Margins

The standard margins for theses in Engineering are as follows:

	U'grad	HDR
`\oddsidemargin`	40 mm	40 mm
`\evensidemargin`	25 mm	20 mm
`\topmargin`	25 mm	30 mm
`\headheight`	40 mm	40 mm
`\headsep`	40 mm	40 mm
`\footskip`	15 mm	15 mm
`\botmargin`	20 mm	20 mm

A.3 Page Headers

A.3.1 Undergraduate Theses

For undergraduate theses, the page header for odd numbers pages in the body of the document is:

Author's Name *The title of the thesis*

and on even pages is:

The title of the thesis Author's Name

These headers are printed on all mainmatter and backmatter pages, including the first page of chapters or appendices.

A.3.2 Higher Degree Research Theses

For postgraduate theses, the page header for the body of the document is:

The title of the chapter or appendix

This header is printed on all mainmatter and backmatter pages, except for the first page of chapters or appendices.

A.4 Page Footers

For all theses, the page footer consists of a centred page number. In the frontmatter, the page number is in roman numerals. In the mainmatter and backmatter sections, the page number is in arabic numerals. Page numbers restart from 1 at the start of the mainmatter section.

If the **draft** document option has been selected, then a "Draft" message is also inserted into the footer, as in:

	14	**Draft:** April 24, 2024

or, on even numbered pages in two-sided mode:

Draft: April 24, 2024	14	

A.5 Double Spacing

Double spacing (actualy 1.5 spacing) is used for the mainmatter section, except for footnotes and the text for figures and table.

Single spacing is used in the frontmatter and backmatter sections.

If it is necessary to switch between single-spacing and double-spacing, the commands `\ssp` and `\dsp` can be used; or there is a `sspacing` environment to invoke single spacing and a `spacing` environment to invoke double spacing if double spacing is used for the document (otherwise it leaves it in single spacing). Note that switching to single spacing should only be done within the spirit of this thesis class, otherwise it may breach UNSW thesis format guidelines.

A.6 Files

This description and sample of the UNSW Thesis LaTeX class consists of a number of files:

unswthesis.cls	the thesis class file itself
crest.pdf	the UNSW coat of arms, used by `pdflatex`
crest.eps	the UNSW coat of arms, used by `latex` + `dvips`
dissertation-sheet.tex	formal information required by HDR theses
library.bib	reference details for use in the bibliography
sample-thesis.tex	the main file for the thesis

The file sample-thesis.tex is the main file for the current document (in use, its name should be changed to something more meaningful). It presents the structure of the thesis, then includes a number of separate files for the various content sections. While including separate files is not essential (it could all be in one file), using multiple files is useful for organising complex work.

This sample thesis is typical of many theses; however, new authors should consult with their supervisors and exercise judgement.

The included files used by this sample thesis are:

definitions.tex	mywork.tex
abstract.tex	evaluation.tex
acknowledgements.tex	conclusion.tex
abbreviations.tex	appendix1.tex
introduction.tex	appendix2.tex
background.tex	

These are typical; however the concepts and names (and obviously content) of the files making up the matter of the thesis will differ between theses.