FACULDADE DE ENGENHARIA DA UNIVERSIDADE DO PORTO

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<Author's Full Name>

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Mestrado em Engenharia Eletrotécnica e de Computadores

Supervisor: Prof. <Name of the Supervisor>

Second Supervisor: Prof. <Name of the Supervisor>

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Resumo

Este documento ilustra o formato a usar em dissertações na Faculdade de Engenharia da Universidade do Porto (FEUP). São dados exemplos de margens, cabeçalhos, títulos, paginação, estilos de índices, etc. São ainda dados exemplos de formatação de citações, figuras e tabelas, equações, referências cruzadas, lista de referências e índices. Este documento não pretende exemplificar conteúdos a usar. É usado o *Loren Ipsum* para preencher a dissertação. Lorem ipsum dolor sit amet, FEUP consectetuer adipiscing elit. Etiam vitae quam sed mauris auctor porttitor. Mauris porta sem vitae arcu sagittis facilisis. Proin sodales risus sit amet arcu. Quisque eu pede eu elit pulvinar porttitor. Maecenas dignissim tincidunt dui. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Donec non augue sit amet nulla gravida rutrum. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Nunc at nunc. Etiam egestas. Donec malesuada pede eget nunc. Fusce porttitor felis eget mi mattis vestibulum FEUP. Pellentesque faucibus. Cras adipiscing dolor quis mi. Quisque sagittis, justo sed dapibus pharetra, lectus velit tincidunt eros, ac fermentum nulla velit vel sapien. Vestibulum sem mauris, hendrerit non, feugiat ac, varius ornare, lectus. Praesent urna tellus, euismod in, hendrerit sit amet, pretium vitae, nisi. Proin nisl sem, ultrices eget, faucibus a, feugiat non, purus. Etiam mi tortor, convallis quis, pharetra ut, consectetuer eu, orci. Vivamus aliquet. Aenean mollis fringilla erat. Vivamus mollis, purus at pellentesque faucibus, sapien lorem eleifend quam, mollis luctus mi purus in dui. Maecenas volutpat mauris eu lectus. Morbi vel risus et dolor bibendum malesuada. Donec feugiat tristique erat. Nam porta auctor mi. Nulla purus. Nam aliquam.

Palavras-chave: keyword1 • keyword2 • keyword3 • keyword4

Abstract

Here goes the abstract written in English. Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Sed vehicula lorem commodo dui Faculdade de Engenharia da Universidade do Porto (FEUP). Fusce mollis feugiat elit. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Donec eu quam. Aenean consectetuer odio quis nisi. Fusce molestie metus sed neque. Praesent nulla. Donec quis urna. Pellentesque hendrerit vulputate nunc. Donec id eros et leo ullamcorper placerat. Curabitur aliquam tellus et diam. Ut tortor. Morbi eget elit. Maecenas nec risus. Sed ultricies. Sed scelerisque libero faucibus sem FEUP. Nullam molestie leo quis tellus. Donec ipsum. Nulla lobortis purus pharetra turpis. Nulla laoreet, arcu nec hendrerit vulputate, tortor elit eleifend turpis, et aliquam leo metus in dolor. Praesent sed nulla. Mauris ac augue. Cras ac orci. Etiam sed urna eget nulla sodales venenatis. Donec faucibus ante eget dui. Nam magna. Suspendisse sollicitudin est et mi. Fusce sed ipsum vel velit imperdiet dictum. Sed nisi purus, dapibus ut, iaculis ac, placerat id, purus. Integer aliquet elementum libero. Phasellus facilisis leo eget elit. Nullam nisi magna, ornare at, aliquet et, porta id, odio. Sed volutpat tellus consectetuer ligula. Phasellus turpis augue, malesuada et, placerat fringilla, ornare nec, eros. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos himenaeos. Vivamus ornare quam nec sem mattis vulputate. Nullam porta, diam nec porta mollis, orci leo condimentum sapien, quis venenatis mi dolor a metus. Nullam mollis. Aenean metus massa, pellentesque sit amet, sagittis eget, tincidunt in, arcu. Vestibulum porta laoreet tortor. Nullam mollis elit nec justo. In nulla ligula, pellentesque sit amet, consequat sed, faucibus id, velit. Fusce purus. Quisque sagittis urna at quam. Ut eu lacus. Maecenas tortor nibh, ultricies nec, vestibulum varius, egestas id, sapien. Donec hendrerit. Vivamus suscipit egestas nibh. In ornare leo ut massa. Donec nisi nisl, dignissim quis, faucibus a, bibendum ac, diam. Nam adipiscing hendrerit mi. Morbi ac nulla. Nullam id est ac nisi consectetuer commodo. Pellentesque aliquam massa sit amet tellus. Vivamus sodales aliquam leo.

Keywords: keyword1 • keyword2 • keyword3 • keyword4

The United Nations Sustainable Development Goals

The United Nations Sustainable Development Goalss (SDGs) provide a global framework for achieving a better and more sustainable future for all. It includes 17 goals (`https://sdgs.un.org/goals`) to address the world's most pressing challenges, including poverty, inequality, climate change, environmental degradation, peace, and justice.

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The specific Sustainable Development Goals mentioned have the following names:

SDG 7 Ensure access to affordable, reliable, sustainable and modern energy for all

SDG 8 Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

SDG	Target	Contribution	Performance Indicators and Metrics
7	7.1	Enhancing the efficiency of SCADA systems improves the reliability and performance of solar energy production, supporting universal access to clean and affordable energy.	Percentage of solar plants with . . .
	7.2	Improved management of solar plants increases operational efficiency and reliability, contributing to a higher share of renewable energy in the energy mix.	Increase in renewable energy share . . .
8	8.1	Strengthening renewable energy infrastructure enhances resilience to climate-related hazards and supports sustainable, long-term energy systems.	Improvement in infrastructure . . .

Acknowledgements

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<O Nome do Autor>

Declaração de Honra

Declaro que a presente dissertação é de minha autoria e não foi previamente apresentada e avaliada nesta ou em outra instituição. As referências a outros autores (afirmações, ideias, pensamentos), assim como a utilização de trabalhos publicados respeitam escrupulosamente as regras da atribuição, e encontram-se devidamente indicadas no texto e nas referências bibliográficas, de acordo corn as normas de referenciação. Tenho consciência de que a prática de plágio ou de autoplágio constituem ilícitos académicos, conforme estabelecido no Código de Ética da U.Porto.

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Declaro, ainda, que utilizei ferramentas de Inteligência Artificial para a realização de parte(s) da presente dissertação, e essa utilização e os seus resultados estão devidamente assinalados e foram objeto de cuidada verificação para deteção de erros, imprecisões, atribuições infundadas ou outras formas de enviesamento de conteúdos e argumentos, bem como de determinação de autoria.

<The Full Name of the Author>

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List of Acronyms

AI   Artificial Intelligence

FEUP Faculdade de Engenharia da Universidade do Porto

GPU   Graphics Processing Unit

ML   Machine Learning

NLP   Natural Language Processing

SDG   Sustainable Development Goals

Chapter 1

Introduction

This document illustrates the format to be used for dissertations at FEUP. Examples of margins are given, headings, titles, pagination, index styles, etc. are given. It also gives examples of formatting citations, figures and tables, equations, cross-references, reference lists and indexes. This document is not intended to exemplify content to be used.

This first chapter illustrates the use of citations and references.

1.1 Section Example

As well as giving an example of how to use a quotation, the following paragraph introduces a reference that can be consulted, among many other interesting bibliographical references [1], [2].

> "Like the Abstract, the Introduction should be written to engage the interest of the reader. It should also give the reader an idea of how the dissertation is structured, and in doing so, define the thread of the contents." [1, chap. Introduction]

Lipsum [3] dolor sit amet, consectetuer adipiscing elit. Sed eget nunc. Phasellus interdum, risus viverra mollis laoreet, felis justo iaculis ante, eget ornare purus augue non urna. Nam in magna. In a est. Phasellus a tellus vitae enim vehicula imperdiet. Etiam sit amet elit. In hac habitasse platea dictumst. Quisque eget turpis vel felis elementum tempus. Curabitur sit amet tortor id libero dapibus pretium. Integer mattis eros eu lorem. Duis erat tellus, porttitor sed, blandit eget, fringilla et, lacus. Phasellus tristique nibh nec orci. Mauris sed leo. Suspendisse fringilla tempor dolor. Donec sapien enim, congue in, porta et, sollicitudin in, quam. Curabitur semper, mauris ut vestibulum eleifend, diam ipsum tincidunt quam, et vestibulum velit mauris ut risus.

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1.2   Section Example

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1.5   Dissertation Structure

In addition to the introduction, this dissertation contains x more chapters.

In Chapter 2, the state of the art is described and related work is presented. Chapter 3, ipsum dolor sit amet, consectetuer adipiscing elit.

Chapter 2

Chapter Example

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2.2.1   Subsection Example

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[1]Example of a footnote.

2.3   Summary

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Chapter 3

Chapter WITH Examples

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3.1 Introduction

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$$CIF_2: \quad F_1^j(a) \quad = \quad \frac{1}{2\pi\iota} \oint_\gamma \frac{F_0^j(x)}{x-a} dx \qquad (3.2)$$

Equação 3.2 lorem ipsum dolor sit amet, consectetuer adipiscing elit. Suspendisse tincidunt viverra elit. Donec tempus vulputate mauris. Donec arcu. Vestibulum condimentum porta justo. Curabitur ornare tincidunt lacus. Curabitur ac massa vel ante tincidunt placerat. Cras vehicula semper elit. Curabitur gravida, est a elementum suscipit, est eros ullamcorper quam, sed cursus velit velit tempor neque. Duis tempor condimentum ante. Nam sollicitudin. Vestibulum adipiscing, orci eu tempor dapibus, risus sapien porta metus, et cursus leo metus eget nibh.

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[1]https://en.wikipedia.org/wiki/Equation
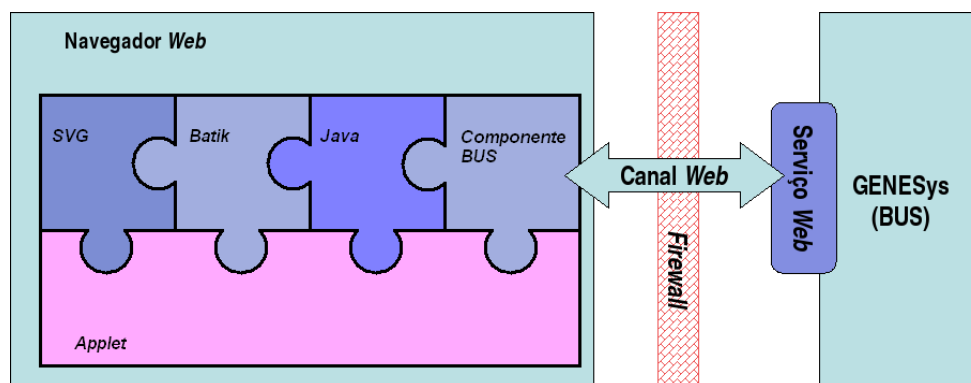[2]https://www.overleaf.com/learn/latex/Mathematical_expressions

Figure 3.1: A figure, caption below

3.2 Section Example

Curabitur ac massa vel ante tincidunt placerat [9]:

- **Components** — Suspendisse auctor mattis augue *push*;

- **Praesent** — Sit amet sem maecenas eleifend facilisis leo;

- **Pellentesque** — Habitant morbi tristique senectus et netus.

3.2.1 Subsection Example — Figures

Suspendisse elementum sodales felis Figure 3.1 on page 8 is a floating figure[3].

Loren ipsum dolor sit amet, consectetuer adipiscing elit. Praesent sit amet sem. Maecenas eleifend facilisis leo. Vestibulum et mi. Aliquam posuere, ante non tristique consectetuer, dui elit scelerisque augue, eu vehicula nibh nisi ac est. Nullam laoreet fermentum urna.

Duis eget diam. In est justo, tristique in, lacinia vel, feugiat eget, quam. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Fusce feugiat, elit ac placerat fermentum, augue nisl ultricies eros, id fringilla enim sapien eu felis. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Sed dolor mi, porttitor quis, condimentum sed, luctus in.

3.2.2 Subsection Example — Tables

Suspendisse elementum sodales felis Table 3.1 is a floating table.

Loren ipsum dolor sit amet, consectetuer adipiscing elit. Praesent sit amet sem. Maecenas eleifend facilisis leo. Vestibulum et mi. Aliquam posuere, ante non tristique consectetuer, dui elit scelerisque augue, eu vehicula nibh nisi ac est. Suspendisse elementum sodales felis. Nullam laoreet fermentum urna.

Duis eget diam. In est justo, tristique in, lacinia vel, feugiat eget, quam. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Fusce feugiat, elit ac

---

[3]https://tex.stackexchange.com/questions/381426/advantage-of-floating-figures

Table 3.1: A table, caption on top

Iteration k de $f(x_n)$				
k	x_1^k	x_2^k	x_3^k	comments
0	-0.3	0.6	0.7	-
1	0.47102965	0.04883157	-0.53345964	$\delta < \varepsilon$
2	0.49988691	0.00228830	-0.52246185	$\delta < \varepsilon$
3	0.49999976	0.00005380	-0.523656	N
4	0.5	0.00000307	-0.52359743	
$\vdots$	$\vdots$	$\ddots$	$\vdots$	
7	0.5	0.0	**-0.52359878**	$\delta < 10^{-8}$

placerat fermentum, augue nisl ultricies eros, id fringilla enim sapien eu felis. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Sed dolor mi, porttitor quis, condimentum sed, luctus in.

3.2.3   Subsection Example — SI

Always use the `siunitx` package to write values, units, etc. according to the International System of Units convention rules and style conventions (see https://physics.nist.gov/cuu/Units/checklist.html).

For example: 50 kg, 15 °C, 20.01 m s^{-1}, 120 kB s^{-1}, 34 %, 289 300.00 €, 10 245.450 234.

Table 3.2 serves to exemplify the alignment in the columns with numbers, and has nothing to do with any numerical data associated with FEUP's resources and investments in 2025.

Loren ipsum dolor sit amet, consectetuer adipiscing elit. Praesent sit amet sem. Maecenas eleifend facilisis leo. Vestibulum et mi. Aliquam posuere, ante non tristique consectetuer, dui elit scelerisque augue, eu vehicula nibh nisi ac est. Suspendisse elementum sodales felis. Nullam laoreet fermentum urna.

Duis eget diam. In est justo, tristique in, lacinia vel, feugiat eget, quam. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Fusce feugiat, elit ac placerat fermentum, augue nisl ultricies eros, id fringilla enim sapien eu felis. Vestibulum ante

Table 3.2: Physical Resources of FEUP [10].

Some Values
2.3456
34.2345
-6.7835
90.473
5642.5
1.2×10^3
10^4

ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Sed dolor mi, porttitor quis, condimentum sed, luctus in[4].

3.2.4 Subsection Example — Acronyms

This section shows how to use the acronyms Artificial Intelligence (AI) and Machine Learning (ML). Later we can simply refer to AI or ML without expansion.

In modern technology, Natural Language Processing (NLP) plays a crucial role in virtual assistants and chatbots. We also rely on Graphics Processing Unit (GPU) hardware for deep learning models.

3.2.4.1 Special use in titles as FEUP

Acronyms can also be made plural: GPUs are widely used in high-performance computing. Possessive forms are supported too: AI's impact on society is profound at Faculdade de Engenharia da Universidade do Porto (FEUP).

3.3 Summary

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Fusce feugiat, elit ac placerat fermentum, augue nisl ultricies eros, id fringilla enim sapien eu felis. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Sed dolor mi, porttitor quis, condimentum sed, luctus in.

---

[4]The `siunitx` package Manual is available at `https://ctan.org/pkg/siunitx`.

Chapter 4

Another chapter

Integer nec quam. Sed fermentum. Nunc vitae leo. Etiam sit amet quam. Nunc vestibulum massa in mauris. Duis eget nulla.

4.1 Section Example

Fusce ultricies arcu eu nibh volutpat feugiat. Maecenas urna pede, commodo quis, porta eu, bibendum elementum, pede.

4.2 Section Example

Sed eros massa, molestie eget, mattis non, rutrum ac, magna. Duis dui. Maecenas eget tortor ut dolor semper mattis. Maecenas auctor, tellus et ultricies tempor, elit est placerat lacus, in posuere mauris lorem et arcu.

4.2.1 Subsection Example

Nulla nec eros et pede vehicula aliquam. Aenean sodales pede vel ante. Fusce sollicitudin sodales lacus. Maecenas justo mauris, adipiscing vitae, ornare quis, convallis nec, eros.

4.2.2 Subsection Example

Pellentesque pulvinar fringilla dolor. In sit amet pede. Proin orci justo, semper vel, vulputate quis, convallis ac, nulla. Nulla at justo. Mauris feugiat dolor. Etiam posuere fermentum eros. Morbi nisl ipsum, tempus id, ornare quis, mattis id, dolor. Aenean molestie metus suscipit dolor. Aliquam id lectus sed nisl lobortis rhoncus. Curabitur vitae diam sed sem aliquet tempus. Sed scelerisque nisi nec sem.

4.3 Section Example

Sed eros massa, molestie eget, mattis non, rutrum ac, magna. Duis dui. Maecenas eget tortor ut dolor semper mattis. Maecenas auctor, tellus et ultricies tempor, elit est placerat lacus, in posuere mauris lorem et arcu.

4.3.1 Subsection Example

Nulla nec eros et pede vehicula aliquam. Aenean sodales pede vel ante. Fusce sollicitudin sodales lacus. Maecenas justo mauris, adipiscing vitae, ornare quis, convallis nec, eros.

4.3.2 Subsection Example

Khakipoor, Khani, and Karimian [11] and Liu, Hao, Liu, *et al.* [12] aliquam id lectus sed nisl lobortis rhoncus. Curabitur vitae diam sed sem aliquet tempus. Sed scelerisque nisi nec sem.

4.4 Section Example

Maecenas urna pede, commodo quis, porta eu, bibendum elementum, pede. Sed eros massa, molestie eget, mattis non, rutrum ac, magna. Duis dui. Maecenas eget tortor ut dolor semper mattis. Maecenas auctor, tellus et ultricies tempor, elit est placerat lacus, in posuere mauris lorem et arcu [13]–[16].

4.4.1 Subsection Example

Nulla nec eros et pede vehicula aliquam. Aenean sodales pede vel ante. Fusce sollicitudin sodales lacus. Maecenas justo mauris, adipiscing vitae, ornare quis, convallis nec, eros.

4.4.2 Subsection Example

Khakipoor, Khani, and Karimian [11] and Liu, Hao, Liu, *et al.* [12] aliquam id lectus sed nisl lobortis rhoncus. Curabitur vitae diam sed sem aliquet tempus. Sed scelerisque nisi nec sem scelerisque.

Nulla nec eros et pede vehicula aliquam. Aenean sodales pede vel ante. Fusce sollicitudin sodales lacus. Maecenas justo mauris, adipiscing vitae, ornare quis, convallis nec, eros. Etiam laoreet venenatis ipsum. In tellus odio, eleifend ac, ultrices vel, lobortis sed, nibh. Fusce nunc augue, dictum non, pulvinar sed, consectetuer eu, ipsum. Vivamus nec pede.

References

[1] M. Tham, *Writing research theses or dissertations*, 2001. [Online]. Available: `http://lorien.ncl.ac.uk/ming/dept/Tips/writing/thesis/thesis-intro.htm` (visited on 11/11/2013).

[2] E. M. Philips and D. S. Pugh, *How to Get a PhD*, Fourth. Open University Press, 2005, ISBN: 0-335-21684-6.

[3] Lipsum, *Lorem ipsum*. [Online]. Available: `http://www.lipsum.com/` (visited on 11/11/2023).

[4] F. Marinho, P. Viegas, and J. C. Lopes, "SVG na visualização de sinópticos," in *XATA2006, XML: Aplicações e Tecnologias Associadas (Portalege, 9 e 10 de Fevereiro de 2006)*, J. C. Ramalho, J. C. Lopes, and A. Simões, Eds., Universidade do Minho, 2006, pp. 99–112.

[5] World Wide Web Consortium, *W3C — SVG Specification*, 2005. [Online]. Available: `http://www.w3.org/TR/SVG11/` (visited on 11/11/2015).

[6] IBM, *Program with SVG*, 2005. [Online]. Available: `http://www-128.ibm.com/developerworks/xml/library/x-matters40/` (visited on 11/11/2013).

[7] World Wide Web Consortium, *W3C — About SVG*, 2005. [Online]. Available: `http://www.w3.org/TR/SVG/intro.html/` (visited on 11/11/2015).

[8] Apache, *Batik SVG Toolkit Architecture*, 2005. [Online]. Available: `http://xml.apache.org/batik/architecture.html%5C#coreComponents` (visited on 11/11/2015).

[9] D. J. Zukowski, A. Purakayastha, A. Mohindra, and M. Devarakonda, "Metis: A thin-client application framework," *Proceedings of the Third Conference on Object-Oriented Technologies and Systems*, pp. 103–114, 1997.

[10] FEUP, *FEUP em números*, 2023. [Online]. Available: `ttps://sigarra.up.pt/feup/pt/web_base.gera_pagina?p_pagina=258031` (visited on 11/11/2015).

[11] Y. Khakipoor, F. Khani, and G. Karimian, "A Linear Implementation of the Hodgkin–Huxley Neuron Model on FPGA Considering Its Dynamics," *Neural Processing Letters*, May 2023, ISSN: 1573-773X. DOI: `10.1007/s11063-023-11285-2`.

[12] Q. Liu, Y. Hao, W. Liu, *et al.*, "An Energy Efficient and Runtime Reconfigurable Accelerator for Robotic Localization," *IEEE Transactions on Computers*, vol. 72, no. 7, pp. 1943–1957, Jul. 2023, ISSN: 1557-9956. DOI: `10.1109/TC.2022.3230899`.

[13] M. Monopoli, L. Zulberti, G. Todaro, P. Nannipieri, and L. Fanucci, "Exploiting FPGA Dynamic Partial Reconfiguration for a Soft GPU-based System-on-Chip," in *2023 18th Conference on Ph.D Research in Microelectronics and Electronics (PRIME)*, Jun. 2023, pp. 181–184. DOI: `10.1109/PRIME58259.2023.10161859`.

[14]   Y. Zhang, A. V. Malawade, X. Zhang, *et al.*, *CARMA: Context-Aware Runtime Reconfig-uration for Energy-Efficient Sensor Fusion*, arXiv:2306.15748 [cs], Jun. 2023. DOI: `10.48550/arXiv.2306.15748`.

[15]   L. Chang, X. Zhao, and J. Zhou, "ADAS: A High Computational Utilization Dynamic Re-configurable Hardware Accelerator for Super Resolution," *ACM Transactions on Reconfig-urable Technology and Systems*, vol. 16, no. 3, 47:1–47:22, Jun. 2023, ISSN: 1936-7406. DOI: `10.1145/3570927`.

[16]   L. Guo, P. Maidee, Y. Zhou, *et al.*, "RapidStream 2.0: Automated Parallel Implementation of Latency–In-sensitive FPGA Designs Through Partial Reconfiguration," *ACM Transactions on Reconfigurable Technology and Systems*, vol. 16, no. 4, 59:1–59:30, Sep. 2023, ISSN: 1936-7406. DOI: `10.1145/3593025`.

Appendix A

Lorem Ipsum

After the conclusions and bibliographical references, the text used to complete the dissertation is presented in this numbered annex.

A.1 What is *Lorem Ipsum*?

Lorem Ipsum is simply dummy text of the printing and typesetting industry. Lorem Ipsum has been the industry's standard dummy text ever since the 1500s, when an unknown printer took a galley of type and scrambled it to make a type specimen book. It has survived not only five centuries, but also the leap into electronic typesetting, remaining essentially unchanged. It was popularised in the 1960s with the release of Letraset sheets containing Lorem Ipsum passages, and more recently with desktop publishing software like Aldus PageMaker including versions of Lorem Ipsum [3].

A.2 Where does *Lorem* come from?

Contrary to popular belief, Lorem Ipsum is not simply random text. It has roots in a piece of classical Latin literature from 45 BC, making it over 2000 years old. Richard McClintock, a Latin professor at Hampden-Sydney College in Virginia, looked up one of the more obscure Latin words, consectetur, from a Lorem Ipsum passage, and going through the cites of the word in classical literature, discovered the undoubtable source. Lorem Ipsum comes from sections 1.10.32 and 1.10.33 of "de Finibus Bonorum et Malorum" (The Extremes of Good and Evil) by Cicero, written in 45 BC. This book is a treatise on the theory of ethics, very popular during the Renaissance. The first line of Lorem Ipsum, "Lorem ipsum dolor sit amet. . . ", comes from a line in section 1.10.32.

The standard chunk of Lorem Ipsum used since the 1500s is reproduced below for those interested. Sections 1.10.32 and 1.10.33 from "de Finibus Bonorum et Malorum" by Cicero are also reproduced in their exact original form, accompanied by English versions from the 1914 translation by H. Rackham.

A.3 Why is *Lorem* used?

It is a long established fact that a reader will be distracted by the readable content of a page when looking at its layout. The point of using Lorem Ipsum is that it has a more-or-less normal distribution of letters, as opposed to using "Content here, content here", making it look like readable English. Many desktop publishing packages and web page editors now use Lorem Ipsum as their default model text, and a search for "lorem ipsum" will uncover many web sites still in their infancy. Various versions have evolved over the years, sometimes by accident, sometimes on purpose (injected humour and the like).

A.4 Where can you find examples?

There are many variations of passages of Lorem Ipsum available, but the majority have suffered alteration in some form, by injected humour, or randomised words which don't look even slightly believable. If you are going to use a passage of Lorem Ipsum, you need to be sure there isn't anything embarrassing hidden in the middle of text. All the Lorem Ipsum generators on the Internet tend to repeat predefined chunks as necessary, making this the first true generator on the Internet. It uses a dictionary of over 200 Latin words, combined with a handful of model sentence structures, to generate Lorem Ipsum which looks reasonable. The generated Lorem Ipsum is therefore always free from repetition, injected humour, or non-characteristic words etc.