UNIVERSITY OF HOHENHEIM

Guidelines for Writing a Bachelor's/Master's Thesis at the Department of Food Informatics

Institute of Food Science and Biotechnology
Department of Food Informatics

Jun.-Prof. Dr. Christian Krupitzer

Last updated:
June 11, 2025

https://foodinformatics.uni-hohenheim.de/

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Abstract

These guidelines give a general overview of the requirements of a Bachelor's/Master's thesis at the Department of Food Informatics. This introduction does not claim to be exhaustive. It does not relieve you from your responsibility to inform yourself about the requirements of scientific work and requirements regarding your examination regulations ("Prüfungsordnung"). Your advisor is always your first contact in case of questions or ambiguities. The objective of a Bachelor's/Master's thesis is to elaborate a written report on a predefined topic and give at least one presentation on your findings.

1.Course

This section explains the general procedure for a Bachelor's/Master's thesis, from the preliminary discussion to the final presentation.

1.1. General Remarks

The following remarks regarding thesis supervision and the written report are valid for all types of scientific work.

1.1.1. Prerequisites

To write a Bachelor's/Master's thesis in our department, we expect you to have basic knowledge in informatics, e.g., through participation in one of our department's modules. Depending on the specific topic of interest, knowledge of statistics and participation in modules at the Institute of Food Science and Biotechnology can be beneficial. Concerning Bachelor's theses, we recommend further participating in our Seminar "Introduction to Scientific Working" to get more details regarding our working methods and expectations on writing and presentations.

1.1.2. The Advisor

The Bachelor's/Master's thesis is your work. Hence, you are responsible for the final result that you submit. However, you are assigned an advisor along with your topic who will help you in case of questions regarding your topic or the formal regulations. Please note that every advisor has an individual concept of how to advise you. In general, the advisor encourages you to work independently. The advisor is not responsible for checking all partial results and confirming every progress. However, we strive for a cooperative approach, i.e., trying to support students as best as possible. This also includes reading parts of your thesis regularly and recommending possible improvements.

Since the Bachelor's/Master's thesis is your work, you are responsible for arranging meetings with your advisor. Your advisor is generally not in charge of informing you or scheduling meetings with you. We recommend arranging meetings at an early stage if you have any need for support. Further, you should prepare meetings to optimize them, i.e., inform your advisor in advance about your questions, issues, or current state (e.g., via e-mail). Additionally, preparing slides or sketches might assist your supervisor to follow and capture your ideas and questions. If you are unsure about formal processes or formatting, check your related examination regulations ("Prüfungsordnung") and these guidelines first. If you are still unsure or have questions regarding your topic or the content, your advisor is your first contact person.

1.1.3. Document Submission

You have to submit a PDF document of your work to pruefungsamt@uni-hohenheim.de via your *university e-mail address* following the examinations office regulations. Please note that your examination regulations might require printed copies. In this case, please submit only the required number of copies. The thesis should be printed double-sided and

must be bound in spiral binding or adhesive binding ("Kaltleimbindung"). The binding should not allow replacing pages. Hence, simple plastic bindings are not accepted. Please contact your advisor before submitting to ask for personal preferences for the binding.

For all works, you must hand in a digital submission as a CD/DVD, USB flash drive, or digital copy (web storage or GitLab). The digital submission must present a comprehensive documentation of your work. Hence, the digital submission must contain

- your submitted digital copy (.pdf file),
- raw files of the thesis (e.g., .tex or .doc files),
- digital copies of the sources (especially of web pages, but also of other publications) as .pdf files,
- source code of the implementation (if applicable),
- raw data,
- (pre-)processed data,
- raw evaluation results (if applicable),
- figures (if applicable), and
- presentations.

Online resources may be unavailable after the access date. Thus, you must download online resources and make them available to your advisor with your digital submission. Name the files according to the respective reference – we recommend following the format "AuthorYear_Shorttitle", e.g., this document "Krupitzer2023_Guidelines for Writing a Thesis.pdf". Any source code should contain a README.txt file with a manual on configuring and running the implementation. Additionally, you must provide your presentations as .pptx and .pdf files. Please structure your digital submissions using folders.

1.1.4. Grading

Your final grade is mainly based on the written submission. However, the final presentation could be considered for Bachelor's/Master's theses – depending on the examination regulations and registration.

In general, submitting the work on time and passing the plagiarism check are essential requirements for it to become graded. Furthermore, we value compliance with the format of the written report, content having a red thread, clean referencing and complete bibliography, and autonomous work ("Eigenständigkeit"). Regarding the format and referencing, please check carefully Sec. 3 and Sec. 4, respectively.

Creating a red thread is often more complex. While working on your topic, you might gain a much broader knowledge than relevant to the thesis.

Although the thesis is your work, and you are responsible for what you submit, this does not mean you have to solve any issue on your own about autonomous work. Principally, we expect you to ask actively for assistance, to transfer advice from your advisor on similar issues or tasks, to work carefully, and to be reliable concerning appointments and agreements.

1.2. Thesis Procedure

This section describes the procedure of writing a thesis at the Department of Food Informatics.

1.2.1. Topic and Application

If you are interested in writing your thesis in our department, you should first become familiar with our current research topics as well as the thesis topics we offer. You can find an overview on our website. Contact the team member responsible for the project/topic you are interested in and arrange an appointment to discuss possible thesis topics. Please refer to our website for up-to-date information on topics and processes.

1.2.2. Exposé

Before you start working on your thesis, you might write an exposé that specifies the topic and shows a preliminary structure of the thesis. This exposé clarifies the expectations of both you and your advisor towards the deliverables of the thesis — comparable to a contract. The advisor decides whether it is necessary for you to provide this exposé.

Therefore, the exposé should contain a thesis timeline, specify the research question you want to answer, state relevant background information, discriminate related work, and sketch your approach. The timeline helps to depict the various work packages you have identified. You should especially consider the time you will need to work on the topic for your literature research and for writing the thesis. This helps to avoid an underestimation of the complexity of specific work packages. Discussing these topics with your advisor immediately is a good way to avoid misunderstandings.

Your supervisor will review the exposé and provide feedback. However, the exposé will not be graded. Hence, you can use the exposé as the foundation for your thesis, especially the parts introduction, background, and related work.

1.2.3. Proposal Presentation

You will have your proposal presentation ("Antrittvortrag") before the registration and during the proposal. This presentation includes up to 15 minutes of presentation of your work and 10 minutes of discussion. This helps to work out a clear proposal for your thesis. The presentation should provide an overview of your planned work, including research questions, your approach, and a timeline. For further details, see the Style Guide for Presenting, found in the Appendices, Chapter B. Please adhere to the given tips and instructions.

Your presentation will be held in our department's colloquium. Since exchanging ideas is an important part of research, attendance at all colloquia is mandatory. You must inform your advisor if you cannot attend due to study or work.

1.2.4. Registration

Once you have agreed on a topic and finalized the proposal phase in consultation with the advisor, the department will transmit your registration for the thesis module to the university administration.

1.2.5. Working on your thesis

After the registration, you will work on your topic. Regarding organizational aspects and instructions, your advisor is your first contact person. You should regularly inform your

advisor to ensure that you comply with the timeline and topic scope. In general, we expect you to work approximately 30 hours per week, which is in line with the officially assigned workload in terms of ECTS points.

1.2.6. Final Presentation

After completing your thesis, you have to present your findings in the colloquium in front of the chair, our current thesis students, and possibly other interested parties. The presentation consists of a talk and a subsequent discussion of your work (20+10 minutes). The time slots might be adjusted in case the study regulations of your course of study might have other values, e.g., in the case of a defense. You should discuss the details of the presentation, such as content and focus, with your advisor. In addition, please ensure that you follow the tips and conventions outlined in the Style Guide for Presenting, found in the Appendices, Chapter B.

2.Format of the Written Report

You can find a LaTeXtemplate for the thesis on the department's website. This template meets the requirements regarding formatting. Please discuss derivations from the template with your advisor. In addition to the writing instructions provided below, make sure to follow the tips and guidelines outlined in the Style Guide for Writing, available in the Appendices, Chapter A.

2.1. General Format

Extent: *(exclusive all indexes, exclusive appendix)*
Bachelor's thesis: 30-40 pages
Master's thesis: 60-80 pages
Please discuss any deviations with your advisor.

Font: Font with serifs (in all parts of the report: headings, text, figures, etc.)

Font size: 11pt in text
11pt italic in page header
14pt bold in 1st order headings
12pt bold in 2nd order headings
11pt bold in 3rd order headings
10pt in figures and tables
We highly recommend to use the provided LaTeX template.

Format: Justification, 1.5 line space, paragraphs are divided by a small margin
Margin left and right: 3cm; margin top and bottom: 1 cm
At maximum one level of bullet points
Page break before each new chapter

Numbering: *(centered at the bottom of the page)*
Text pages: Continuous numbering with Arabic numbers
Indexes: Roman numbers
Appendix: Capital letters

2.2. Section Numbers

Sections are numbered consecutively using Arabic numbers, e.g., “Section 2.2” for the second subsection in the second section. Sections can be subdivided up to the third level, i.e., up to Section 2.2.1. Dividing a section into subsections is possible if more than one subsection is present.

2.3. Tables and Figures

Tables and figures must be described in the text and are consecutively numbered in the order in which they are referenced in the chapter, e.g., “Figure 2.1” for the first figure in Chapter 2. Tables and figures each have separate numbers. Tables and figures are captioned. The captions are placed *above* tables and *below* figures. Figures that have been retrieved/adapted from another source need to provide the references in the caption (see Figure 2.1). Tables and figures are preferable to be placed at the top or bottom of a page.

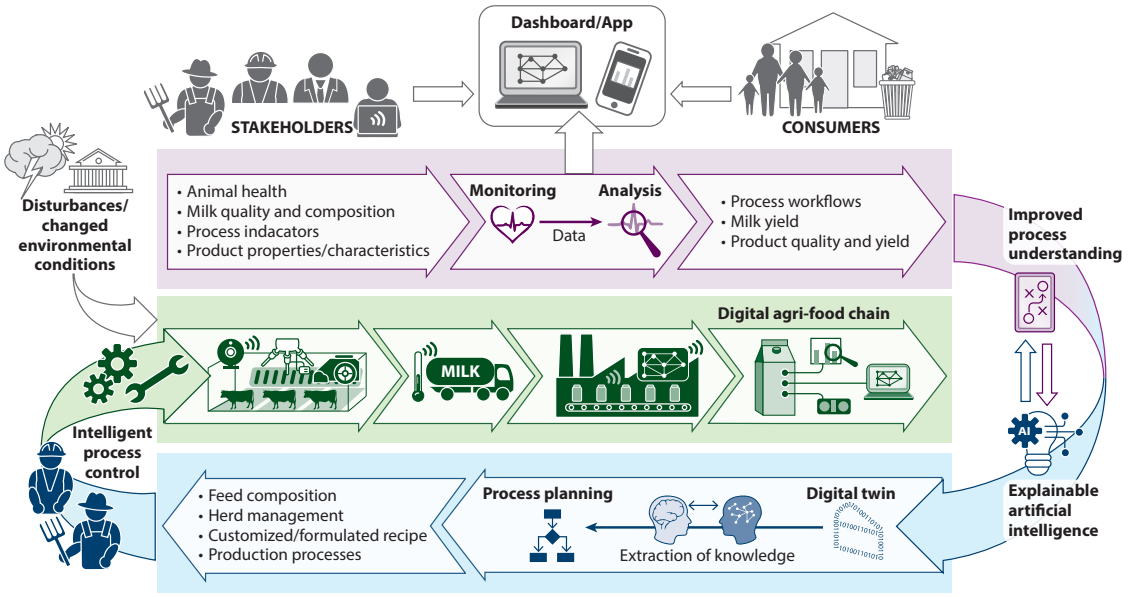

Figure 2.1.: The vision of the digitalized agri-food chain [1].

Table 2.1.: An exemplary table

Given name	Name
Christian	Krupitzer

2.4. Listings

Listings should be described in the text and are consecutively numbered in the order in which they are referenced in the chapter (e.g., "Listing 2.1" for the first listing in Chapter 2). Listings are captioned *above* the listing, they are framed, and line numbers are placed on the left.

```
1 def greet():
2     print("Hello␣world!")
```

Listing 2.1: Hello World Program in Python.

2.5. Equations

Equations should be explained in the text and are consecutively numbered in the order in which they are referenced in the chapter (e.g., "Equation 2.1" for the first equation in Chapter 2). The numbering is right-aligned and presented in parentheses.

$$a^2 + b^2 = c^2 \tag{2.1}$$

2.6. Tense

The generally used tense is present. In some parts, you might also use past and, unusually, future. In all cases, simple tenses should be used, thus avoiding passive forms.

The present is used for all statements that are still considered valid, e.g., your problem statement in the introduction, your results, and your interpretation. Also, within the background, definitions, basic concepts, or related works are presented in the present, e.g., Food Informatics is defined as "the collection, preparation, analysis and smart use of data from agriculture, the food supply chain, food processing, retail, and smart (consumer) health for knowledge extraction to conduct an intelligent analysis and reveal optimizations to be applied to food production, food consumption, for food security, and the end of life of food products" [2].

Past is used for everything that happened, e.g., the description of your research methodology or related works – the authors of [3] showed the relevance of context for self-adaptive systems. Additionally, the past is used if statements are not valid anymore. However, if related work is still up to date, present must be used, e.g., the work of [3] provides an overview of engineering approaches for self-adaptive systems.

Future is used exceptionally, e.g., to describe your work's aim or to provide an outlook on your work. Further, the future might be used when presenting future work. However, use it carefully – it could be beneficial to make suggestions instead (using "could").

2.7. Spelling and Grammar

Working carefully is fundamental for scientific works. This includes spelling and grammar. We expect you to check both before providing your drafts to your advisor for feedback. If writing in English, please apply American English. Concerning grammar, you might use artificial intelligence (AI) assisted typing assistant such as Grammarly – for details regarding the use of AI assistance, see Section 2.8.

2.8. Generative AI

Using generative AI systems is allowed for writing Bachelor's/Master's theses. Generative AI means AI-based systems that generate new, similar data using statistical techniques and based on training data, e.g., texts, images, or program code. You need to submit an extended declaration of originality with your written work, in which you document exactly how you have used the AI systems in the individual tasks. *Nevertheless, you are fully responsible for the academic accuracy of your written work.*

Note that the spelling and grammar check in Microsoft Word or tools like DeepL or Grammarly are AI-based systems. For further information, please see `https://www.uni-hohenheim.de/einsatz-von-generativer-ki-in-pruefungen` and ask your advisor in the case of questions.

3.Structure of a Scientific Paper

This section describes the requirements regarding the structure of a scientific work. The LaTeX thesis template provided by the department meets these requirements.

3.1. Title Page

The title page should include the following information:

- Name of the University
- Institute and department
- Full name and title of the reviewer(s) and the advisor(s)
- Type of the paper (Bachelor's Thesis / Master's Thesis)
- Topic (Title, Subtitle)
- First name and surname of the author
- Matriculation number and course of study
- Submission date

3.2. Indexes

This section describes parts placed before the work's main part (text).

3.2.1. Declaration of Originality ("Eidesstattliche Erklärung")

Each candidate has to make the declaration of originality stating that the paper/ thesis is self-penned:

> Hiermit erkläre ich, Vorname Name (Matrikelnummer), dass ich bei der vorliegenden Bachelor-Thesis/Master-Thesis die Regeln guter wissenschaftlicher Praxis eingehalten habe. Ich habe diese Arbeit selbständig verfasst und keine anderen als die angegebenen Quellen und Hilfsmittel benutzt und die wörtlich oder inhaltlich übernommenen Stellen als solche kenntlich gemacht. Sämtliche Sekundärliteratur und sonstige Quellen sind nachgewiesen und in der Bibliographie aufgeführt. Das Gleiche gilt für graphische Darstellungen und Bilder sowie für alle Internet-Quellen.
>
> Ich erkläre weiterhin, dass ein unverschlüsseltes digitales Textdokument der Arbeit übermittelt wurde. Ich bin damit einverstanden, dass diese elektronische Form anhand einer Analyse-Software auf Plagiate überprüft wird. Weiter erkläre ich, dass ich zur Kenntnis genommen haben, dass die beim Prüfungsamt zuerst eingereichte Abschlussarbeit die finale Version ist. Ich habe verstanden, dass ich keine Korrektur nachreichen kann.

English version (not legally binding):

> I, first name and last name (matriculation number), declare that I have followed the Principles of Good Scientific Practice while writing the present Bachelor's thesis/Master's thesis. I have written the thesis independently and have used no other sources

or aids than those given and have marked the passages taken from other works word-for-word or paraphrased. The same applies to graphical representations and images as well as to all thesis sources.

I furthermore declare that the submitted unencrypted electronic document. I give my consent to this electronic version being checked for plagiarism with analytical software. Furthermore, I declare that I understood that the thesis submitted first to the examination office is the final version. I acknowledge that I will not be able to submit corrections later.

The declaration is completed with the author's signature.

3.2.2. Declaration of the Use of Generative AI Systems ("Erklärung zur Verwendung generativer KI-Systeme")

If you used generative AI systems, you have to disclose the use of these. You can omit this section if you have not used generative AI systems.

Bei der Erstellung der Arbeit habe ich die folgenden auf künstlicher Intelligenz (KI) basierten Systeme benutzt:

1. ... (Aufzählung)

Ich erkläre weiterhin, dass ich mich aktiv über die Leistungsfähigkeit und Beschränkungen der oben genannten KI-Systeme informiert habe, die aus den oben angegebenen KI-Systemen übernommenen Passagen gekennzeichnet habe, die mithilfe der oben genannten KI-Systeme generierten und von mir übernommenen Inhalte auf ihre faktische Richtigkeit überprüft habe, und mir bewusst bin, dass ich als Autor:in dieser Arbeit die Verantwortung für die in ihr gemachten Angaben und Aussagen trage.

Die oben genannten KI-Systeme habe ich wie im Folgenden dargestellt eingesetzt.

Arbeitsschritt	**Eingesetzte(s) KI-System(e)**	**Beschreibung der Verwendungsweise**

English version:

I used the following artificial intelligence (AI)-based systems to create the thesis:

1. ... (enumeration)

I further declare that I have actively informed myself about the capabilities and limitations of the AI systems mentioned above, have marked the passages taken from the AI systems mentioned above, have checked the content generated with the help of the AI systems mentioned above, and adopted by me for factual accuracy, and am aware that I as the author responsible for the information and statements made in this work.

I have used the AI systems mentioned above as described below.

Working step	**Used AI system(s)**	**Description of the use**

The declaration is completed with the author's signature.

3.2.3. Abstract and German Summary

Each thesis should contain a short abstract in English and a German summary. If the thesis is written in English, the summary in German ("Zusammenfassung") should be at least one page long. The English and the German versions should contain the same content. Furthermore, no additional content should be introduced in either the abstract or the summary that is not discussed in the main body of the thesis.

3.2.4. Table of Contents

The table of contents represents the logical structure of a scientific paper. The depth of the structure should be in relation to the requirements and the scope of the text. The chapters must be enumerated continuously, and the page number for each chapter must be declared. The hierarchical structure of the list of contents must be clearly visible by indenting the chapters. Each section should have none or at least two subsections.

3.2.5. List of Abbreviations

This list contains all acronyms in alphabetical order and their explanation (e.g., DFS: Depth-First Search). Additionally, all formula signs and parameters, including their units, might be listed here – also in alphabetical order and their explanation. The list could be further subdivided into smaller sections for a better overview.

3.3. Main Part – Text

Aside from the scientific quality, linguistic presentation and comprehensibility influence the grade for your work. The language should be objective and neutral. Avoid writing in the first person. Expressions like: "we made" and "I think" should not be used. Use short and concise sentences and avoid nested sentences/ footnotes to make the paper more comprehensible. Spelling and punctuation errors can negatively affect the grade. Proofreading by a third person is therefore recommended. The level of abstraction and detail must be appropriate for the topic and scope of your work. An objective presentation and critical reflection of your work, including advantages and disadvantages, is crucial. Explain technical terms at their first appearance and use them consistently.

There are further formalities when writing scientific works. In the following, we will address a few of the most important points. These include formatting or emphasizing formula signs and parameters in math mode, e.g., the variable x or the mass m. Formula signs, parameters, and abbreviations should be noted in the *List of Abbreviations*. Additionally, it is important to ensure that in the text, neither values and units nor types and numbers nor references are separated by a line or page break. Therefore, protected spaces can be used, in LaTeX by inserting a tilde (~), e.g., "`Food Informatics~\cite{Krupitzer2021}`" produces a protected space before a reference "Food Informatics [2]".

Computer science works are generally structured as follows. Worth mentioning is that the structure of your work is not fixed. Details should be discussed with your supervisor.

1. Introduction
2. Theoretical Foundations
3. Related Work

4. Methodology
5. Main part: Approaches, models, implementation...
6. Evaluation
7. Discussion
8. Conclusion

The introduction motivates your work. The objective is formulated, the current problem, your approach, your contributions, and the content of the paper (outline) are presented. All background information is required to understand your work, and the discussion within the theoretical foundations is provided for the unknown reader. The related work distinguishes your work from similar publications. The methodology describes how you conduct your research, and the main part presents what you have done. The evaluation presents your results, which are subsequently discussed. The discussion places your results in the research landscape. Further, *threats to validity* are discussed where you consider what your research misses and how you tried to mitigate these gaps. Finally, your work concludes with the takeaway message.

3.4. Closing Part

This section describes parts that are placed after the work's main part (text).

3.4.1. List of Figures

This list contains the number, the caption, and the page number of each figure.

3.4.2. List of Tables

This list contains the number, the caption, and the page number of each table.

3.4.3. List of Listings

This list contains the number, the caption, and the page number of each code listing.

3.4.4. Bibliography

The bibliography must contain all references. For further details on referencing and the bibliography, see Section 4.3.

3.4.5. Appendix

The appendix contains figures, tables, etc., that are not required for general comprehension but provide a valuable contribution to your work. The appendix is optional. Core parts of a thesis should not be moved to the appendix.

4.References and Bibliography

This section provides information about finding literature for a thesis, correctly citing, and creating a bibliography.

4.1. Literature Research

Literature research is a substantial part of scientific writing. Thus, it is highly important to dedicate sufficient time to it and accurately perform the literature research. One of the major sources of information is the Internet. However, not all sources are reputable and can be cited in a scientific work. Although scientific papers are generally preferred over company publications, so-called 'white papers' or product descriptions may be helpful in presenting the state-of-the-art.

Digital libraries such as ACM Digital Library (dl.acm.org), IEEE Xplore (ieeexplore.ieee.org), and Springer Link (link.springer.com) provide good sources in the area of computer science and food science/food technology. The University of Hohenheim has the licenses to access major parts of these libraries. Publications can be accessed free of charge via the university's intranet (using the VPN client). Publications can be either found directly on the libraries' websites or via a search engine such as Google Scholar (scholar.google.com).

4.2. Citations

Citations encompass, for example, other peoples' thoughts, ideas, results, and opinions, recited word by word or referenced inside a text. Each citation needs to be verifiable. Hence, it is indispensable to add a reference to each citation. Parts of the text without references are considered as the author's original work. Each proposition in your work needs to be proved by referencing a public source or by the author's work. Citations in the text comprise the author(s) and the year of publication. The bibliography contains the details of all sources that were used in the scientific work.

4.2.1. Direct Citations

When you use parts of existing literature word by word, you have to put the citation into quotation marks. After the direct citation, you provide the reference, including the page number. In this case, you have to use the exact wording of the source. However, the usage of direct citations is rather uncommon. Use references to the context of a text whenever possible.

Example: The participants of the first Dagstuhl seminar on *Software Engineering for Self-adaptive Systems* agreed on the following quite generic definition:

> [Self-adaptive systems] are able to adjust their behavior in response to their perception of the environment and the system itself. [4, p. 1]

4.2.2. Omissions in Literal Citations

The symbol [...] indicates the position in the text where a part of the original text is omitted.

Example: Additionally, the participants of the Dagstuhl seminar clarified the term *self*: The "self" prefix indicates that the systems decide autonomously [...] how to adapt or organize to accommodate changes in their contexts and environments. [5, p. 49]

4.2.3. Indirect Citations

Quotations of ideas require stating the original source as well. These quotations are used to integrate ideas from published texts into your own work. The page number is only required if the reference of the quotation is a long text, such as an entire book.

Example: Whereas most approaches monitor the context, an explicit adaptation of context is often not included, and the environment remains uncontrollable for the adaptation logic [6].

4.3. Bibliography

The bibliography contains complete information about all sources referenced in the work. We apply the IEEE style for numbering citations.

The IEEE style is a numeric style, where citations are numbered in the order of appearance. This citation leads the reader to a complete reference to the source in the list of references at the end of your work. Each citation number should be enclosed in square brackets on the same line as the text, before any punctuation, with a space before the bracket. Once a source has been cited, the same number is re-used for all subsequent citations to the same source.

5.Software for Writing the Thesis

This section provides advice for writing your thesis. In general, you are free to choose your preferred software. However, we highly recommend the use of LaTeX for which we provide a thesis template at our department's website. The ZIP file can be downloaded via this link: `https://foodinformatics.uni-hohenheim.de/fileadmin/einrichtungen/foodinformatics/Lehre/Theses/thesis-latex_template.zip`

5.1. LaTeX

In contrast to "What You See Is What You Get" word processors like Microsoft Word, OpenOffice, LibreOffice Writer, and Apple Pages, you write commands in a special syntax for assigning special types of text in LaTeX. The code is compiled into the final document (often a PDF) using formatting guidelines.

5.1.1. Software

For using LaTeX, you need a LaTeXdistribution (e.g., MiKTeX at `http://miktex.org/`) as base to produce an output file and a LaTeXeditor (e.g., TeXnicCenter at `http://www.texniccenter.org/` or TeXStudio at `https://texstudio.org/`). Alternatively, you can use an online editor (e.g., Overleaf). There exist many tutorials, which might be helpful at the beginning, e.g., `http://latex.tugraz.at/latex/tutorial` and `https://www.overleaf.com/learn/latex/Learn_LaTeX_in_30_minutes`.

Further, in case of problems, just google the error message! You will definitely find some information, e.g., in forums like *stack exchange* or *stack overflow*. Additionally, ChatGPT might also help find solutions in case of errors.

5.1.2. Included Packages

The provided template already contains the following packages. Regarding the usage of the packages and commands, see their related documentation!

Package	Purpose
`inputenc`	encoding of standard ASCII, e.g., for German Umlaute
`fontenc`	encoding for German Umlaute
`babel`	enables LaTeXto typeset in many different languages
`graphicx`	integration of graphics or images
`subfigure`	include figures with multiple images
`url`	inclusion of web addresses that allow linebreaks at certain characters
`tikz`	creating graphic elements
`listings`	source code typesetting environment
`algorithm`	float wrapper for algorithms
`algorithmic`	algorithm typesetting environment
`acronym`	automated use of acronyms and creation of a list of acronyms
`hyperref`	handling of cross-referencing commands producing hypertext links
`xcolor`	easy driver-independent access to colors
`rotating`	perform all the different sorts of rotation, including complete figures and tables
`tabularx`	modifies the widths of certain columns to set the table with the requested total width
`arydshln`	dashed lines in arrays and tabulars

5.1.3. Additional Packages

In addition to the previously mentioned packages, we propose some further packages the department's employees have used in the past and considered valid. Please note that many more packages exist, even to achieve issues that have already been addressed with the following.

Package	Purpose
`booktabs`	creating fancy tables, e.g., see Table 2.1
`fancyref`	cross-referencing with automatically assigning the type
`mhchem`	using chemical formulas
`multirow`	creating tables containing cells covering multiple columns or rows
`todonotes`	insert to–do items
`verbatim`	reimplements the LaTeXverbatim environments (default tool to display code) and provides further a comment environment

5.1.4. Some Tips and Tricks

LaTeX is a powerful and comprehensive tool for typesetting scientific publications. The possibilities are almost unlimited.

In general, many special characters are used for typesetting, e.g., `%` marks comments or `&` is the column delimiter in tables. To print these characters in the text, insert a backslash

ahead, e.g., `\%` for % or `\&` for &. Further, there are commands for Greek letters or some units, e.g., `\alpha` for α or `\textcelsius` for ℃.

Regarding Overleaf, you can find some helpful keyboard shortcuts here: `https://www.overleaf.com/learn/how-to/Hotkeys`. Creating the bibliography, setting an extra {} around titles or names leads to capitalization or full name printing, respectively, if required.

5.2. Microsoft Word or similar

You are free to use "What You See Is What You Get" word processors like Microsoft Word, OpenOffice, LibreOffice Writer, and Apple Pages. However, we currently do not provide any templates for this. Therefore, you need to ensure compliance with the formalities on your own.

5.3. Literature Management

Literature management programs help to order your literature and provide interfaces for integrating the literature sources into your work. The University of Hohenheim also offers licenses for Citavi and Zotero, which we recommend for usage.

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Appendices

A.Style Guide for Writing

This guide is designed to ensure consistency in the structure and design of your thesis. Please adhere to the following principles and re-check your document before submitting to ensure a neat and structured thesis:

Formatting Conventions

- Use presence tense (mostly) and try to avoid passive forms

Do	Don't
Section 1 presents XYZ.	In Section 1, XYZ is presented.

- Properly use commas after adverbs (therefore, however,...), when using "e.g." or "i.e.".
- Use the Oxford comma: Place a comma before the conjunction in a list of three or more items.

Do	Don't
... X, Y, and Z...	... X, Y and Z...

- Nice to have: italic representation of "et al." and terms/project names
- Prevent *widows* (single line of a paragraph stranded at the top of a new page) and *orphans* (single line left at the bottom of a page).
- Abbreviations must be listed alphabetically in the list of abbreviations.
- Avoid using 'Name (Year)' in the text. Instead of 'Krupitzer et al. (2023)...', use 'Krupitzer et al. [X]...'.
- Write short and concise sentences. One paragraph per idea—but: avoid single-sentence paragraphs.
- Place captions always above tables and below figures.
- Place figures and tables close to their corresponding reference in the text.
- Use fully written and capitalized Section, Figure, and Table titles for referencing (However, when using these terms in general, do not capitalize them):

Do	Don't
The types of electromagnetic radiation are explained in Section 1.	The types of electromagnetic radiation are explained in sec. 1.
Figure 1 displays the electromagnetic spectrum, the corresponding wavelengths are listed in Table 1.	Fig. 1 displays the electromagnetic spectrum, the corresponding wavelengths are listed in table 1.
The following sections describe the model in detail.	The following Sections describe the model in detail.

- Check the quality of your figures, don't include them, if they are of a low-quality or blurry. Instead, recreate the respective figure on your own using tools such as "*draw.io*".

- In tables that display evaluation results, highlight the best value, e.g., by shading it in gray.
- Avoid consecutive headings and ensure that headings are always separated by supplementary text.
- Headings (chapters, sections,...) should all have the same capitalization. Either all upper case, e.g., Machine Learning Algorithms, or all lower case, e.g., Machine learning algorithms.
- Avoid single sub-sections within a section.

Do	Don't
1. Machine Learning Text for Section 1. **1.1. Supervised Learning** Some details about supervised learning. **1.2. Unsupervised Learning** Some details about unsupervised learning.	**1. Machine Learning** Text for Section 1. **1.1. Supervised Learning** Some details about supervised learning. **2. Unsupervised Machine Learning** Some details about unsupervised learning.

Latex Conventions

- Write everything into one file—simplifies searching
- For long captions, e.g., for a figure, you can additionally define a short version for the list (e.g., List of Figures):

```
\caption[short_version_for_list]{long_version_for_text}
```

- Use references, i.e. label `\label{...}` all figures, sections, tables, equations,... and then use `\ref{...}` whenever you refer to them later. Stick to the following scheme when naming the labels: fig:V, sec:W, tab:x, eq:y, lis:z.

```
Parameter a is calculated using Equation~\ref{eq:a}.
\begin{equation}
\label{eq:a}
    a = b + c
\end{equation}
```

Parameter a is calculated using Equation A.1.

$$a = b + c \tag{A.1}$$

- Use non-breaking spaces (“~”) where appropriate to avoid undesired line breaks (e.g., when adding citations, references, or units):

```
Electromagnetic radiation is explained in Section~\ref{sec:Y}.
The wavelength of visible light starts at 380~nm~\cite{paper}.
```

- Make sure that you've used the correct quotation marks:

Do	Don't
``quotation marks"	"quotation marks"
“quotation marks”	”quotation marks”

- Add a linebreak after each sentence. Although there are multiple ways to create a line break in a LaTeX script, stick to the following throughout your document:

Do	Don't
Leave one empty line to create a line break.	Don't do this \newline or this \\ to create a line break.
Leave one empty line to create a line break.	Don't do this or this to create a line break.

- Incorporate references into sentences:

Do	Don't
The wavelength of visible light ranges from 380 nm to 750 nm [1].	The wavelength of visible light ranges from 380 nm to 750 nm. [1]

  Connect references (using, e.g., \cite{a,b,c}).

  Hint: When citing multiple references, the command `\mbox{}` *prevents line breaks from separating them.*

Content Conventions

- Include a profound literature review: Know your field! Are your ideas new? Clearly distinct your work! Present a clear concept and problem definition. State your challenges and your assumptions.
- Cite properly—Never think: ”I will add the reference later”. Provide a spectrum of related work (old vs. new; peer-reviewed vs. technical reports)
- Define important concepts with accepted definitions/references!
- Present your system model/assumptions. Discuss the appropriateness.
- Provide a clear description of your evaluation settings, including datasets, sample sizes, and information about the hardware and software used, e.g., package versions. The reader must be able to understand what you did and how you did it.

- Design/Approach versus Implementation: Please clearly separate the design of the system and the implementation into two chapter. The design describes the relevant elements of the system on an implementation-independent level, i.e., not specific to any programming language. The implementation describes relevant details on how the design is implemented, e.g., which frameworks or code module have been used.
- Evaluation and (critical) reflection of own work—What have you learned? What should the reader learn? What were alternatives? Include threats to validity!
  → Always reason your statements and present/discuss the alternatives.
- Check your list of references! Is the information complete? Is it consistent?
- Whenever you explain something (e.g., in your Background Section), start with a high-level overview and gradually narrow down. Example: First, explain Artificial Intelligence, then Machine Learning, then Neural Networks, and last Convolutional Neural Networks.
- Write for the stupid reader.
- Discuss all figures, tables, and code listings in the text.
- Explain all abbreviations at their first use in the text. Example: "Artificial Intelligence (AI) is a broad field. AI techniques include..."

  Hint: You can use the `\ac{}` *command for that.*
- Avoid colloquial language.

Do	Don't
... one that is not noise.	... one that isn't noise.

- Your work has to be read by your supervisor!

B.Style Guide for Presenting

This guide is designed to ensure consistency in the structure and design of your presentation slides, as well as your presentation style. Please follow the principles below and review your slides carefully before presenting to ensure a strong presentation:

Content of your Presentation

Adjust order if necessary.

1. Motivation / Problem Statement
2. Research Question
3. Background
4. Related Work
5. Methodology
6. Implementation
7. Evaluation
8. Discussion
9. Conclusion and Future Work
10. Summary Slide (for an example, see Figure B.1)
11. References

Focus on points 1 to 5 in your proposal presentation and on points 6 to 9 in your final presentation.

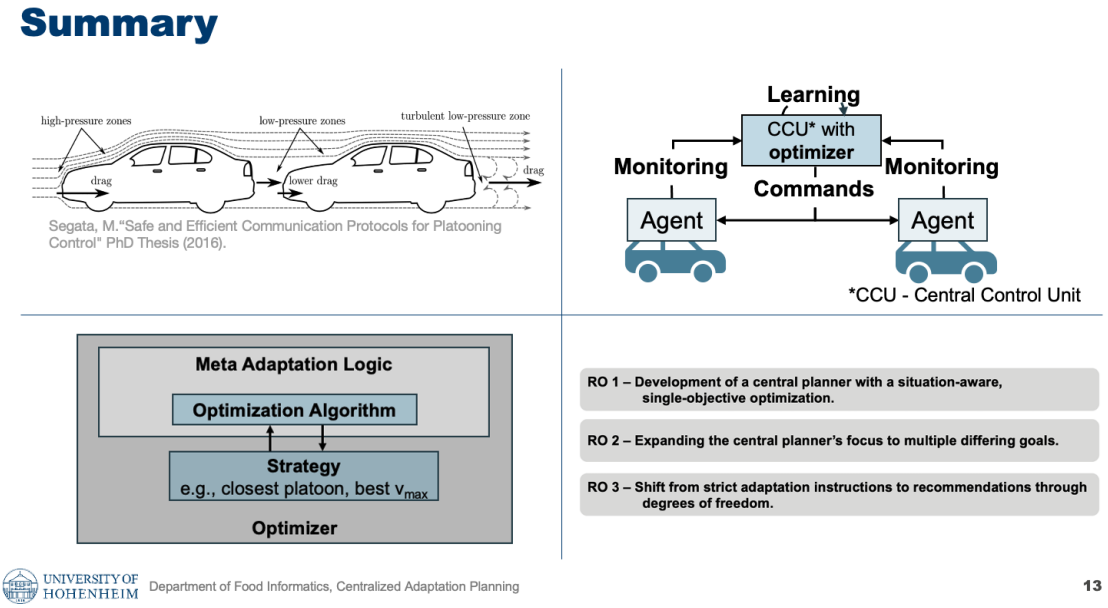

Figure B.1.: Example of a summary slide. Present four key aspects of your presentation.

Style of your slides

- Maintain a uniform design by using either the university's corporate design (available on the website) or the department's designated layout (your supervisor can provide you with this).
- Font size at least 16 (except for references and caption).
- Pay attention that applied colors need to be complementary and clearly visible, even with poor contrast.
- Consistent placement of headings, graphics, etc. (if possible, maintain alignment).
- Graphics should be sharp and font size legible.
- Avoid large blocks of text.
- Try to graphically represent relationships.
- Apply animations sparingly and targeted.
- Include slide numbers.
- Don't forget axis labeling for graphs and mark the most important points if necessary.
- Beginning of bullet point standardized, e.g., always with capital letter.
- Specifications for references (on slides and in the bibliography).
- Standardized capitalization of headings in English.

Style of your presentation

- Make your central theme stand out and ensure your message is concise and clear.
- Do not aim to present all your findings; instead, prepare content in backup if necessary.
- Speak clearly and at a steady pace, ensuring your words are distinct and easy to follow.
- Adhere to the given time limit:
  - Adapt your content accordingly.
  - Present not too many slides and not too much content — keep aspects as backup slides ready and only mention in the presentation that it was done in the work.
- Maintain a professional appearance by avoiding overly casual clothing.
- Pay attention to your body language:
  - Maintain good posture with body tension and a confident stance.
  - Engage with your audience by looking towards them.
  - Use purposeful gestures to emphasize key points while keeping other movements minimal.
- Aim to speak naturally/freely.
- Do not 'jump' over slides - allow your audience time to read/view the content → leave out agenda slides between sections → work with graphics—not everything that is said has to be in text form on the slides!

Useful Links

In the following, you can find some useful links that might be helpful when preparing and holding your presentation.

Presentation content: `https://www.indeed.com/career-advice/career-development/tips-for-giving-a-great-presentation`

Powerpoint usage: `https://mtss.tcnj.edu/other-services/teaching-with-technology/7-tips-for-designing-and-delivering-powerpoint-presentations/`

Outfit: `https://presentationgeeks.com/blog/presentation-outfit-style-guide/`