

Masterarbeit

ORIGINAL FORMAT for the title of the work

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## **Abstract**

The function of the abstract is to summarize, in one or two paragraphs, the major aspects of the entire bachelor or master thesis. It is usually written after writing most of the chapters.

It should include the following:

- Definition of the problem (the question(s) that you want to answer) and its purpose (Introduction).
- Methods used and experiments designed to solve it. Try to describe it basically, without covering too many details.
- Quantitative results or conclusions. Talk about the final results in a general way and how they can solve the problem (how they answer the question(s)).

Even if the Title can be a reference of the work's meaning, the Abstract should help the reader to understand in a quick view, the full meaning of the work. The abstract length should be around 300 words.

Abstracts are protected under copyright law just as any other form of written speech is protected. However, publishers of scientific articles invariably make abstracts publicly available, even when the article itself is protected by a toll barrier. For example, articles in the biomedical literature are available publicly from MEDLINE which is accessible through PubMed. It is a common misconception that the abstracts in MEDLINE provide sufficient information for medical practitioners, students, scholars and patients[citation needed]. The abstract can convey the main results and conclusions of a scientific article but the full text article must be consulted for details of the methodology, the full experimental results, and a critical discussion of the interpretations and conclusions. Consulting the abstract alone is inadequate for scholarship and may lead to inappropriate medical decisions[2].

An abstract[IGM97, Lev65, MAdR02, Sal89] allows one to sift through copious amounts of papers for ones in which the researcher can have more confidence that they will be relevant to his research. Once papers are chosen based on the abstract, they must be read carefully to be evaluated for relevance. It is commonly surmised that one must not base reference citations on the abstract alone, but the entire merits of a paper.



# Kapitel 1

## Introduction

[You should answer the question: What is the problem?]

This paragraph should establish the context of the reported work. To do that, authors discuss over related literature (with citations<sup>1</sup>) and summarize the knowledge of the author in the investigated problem.

**ToDo:** how to make citations

An introduction should answer (most of) the following questions:

- What is the problem that I want to solve?
- Why is it a relevant question?
- What is known before the study?
- How can the study improve the current solutions?

To write it, use if possible active voice:

- We are going to watch a film tonight (Active voice).
- A film is going to be watched by us tonight (Passive voice).

The use of the first person is accepted.

### 1.1 Motivation

A good introduction usually starts presenting a general view of the topic and continues focusing on the problem studied. Begin it clarifying the subject area of interest and establishing the context (remember to support it with related bibliography).

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<sup>1</sup>To cite a work in latex

## **1.2 Problem definition**

Additionally, focuses the text on the relevant points of your investigation and problems that you want to solve, relating them with the first part.

## **1.3 Thesis/Diplom/Bachelor/Master Structure**

Present your work to the reader giving a brief overview of what is going to cover every chapter. Write only general concepts, no more than one or two sentences per chapter should be necessary.



# Kapitel 2

## Materials and Methods

This section is to clarify the pre-existing tools, defining what was developed in this field until now, and why this tool was used instead of others.

The general structure is the following:

- Definition of the specific tool(s) studied (robots, sensor nodes, smart-phones).  
When relevant, pre-existing experiments.
- Definition of the context of use (indoor/outdoor, humans/animals/robots, with/without connection).
- Definition of used protocols (How the data are collected, when, etc.)



# Kapitel 3

## Approach

Describe the performed solution with all possible details. Define necessary parameters, inputs, outputs and context of use, possible problems and when they can be applied.

Remember to define necessary concepts before using them, building the text from easiest definitions (not depending on previous definitions) to complex definitions (depending on previous definitions).

E.g:

- Lost Communication: a lost communication occurs when the conditions of the environment are not sufficient or the distance between sender and receiver is too high to transmit information.
- Wait until rescue: when the robot loses its communication, the pre-designed state machine will stop the motors to keep the actual position. Energy safe mode will be enabled, at the same time that a channel transceiver daemon will send SOS messages every  $T$  and wait for reply during  $T$  sec.

The challenge is how to coordinate multiple robots to execute a set of tasks. To tackle this problem, a communication efficient central scheduler is designed, where each robot autonomously request task from the centralized scheduler and centralized scheduler response with a set of suitable tasks. The architecture of this centralized scheduler is shown in Fig



# Kapitel 4

## Implementation

Explain what you did to implement your solution, problems that occurred and how you fixed them. If they are interesting, include some relevant parts of the implementation (most relevant pieces of code and so on).



# Kapitel 5

## Evaluation

In this chapter you should describe the previous (if possible) and final experiments performed on the implementation.

Every single experiment should be explained individually, providing to the reader information about the meaning of the experiment, the expected (theoretical) results, the final results, the comparison between them and others (if possible) and the conclusions.

Each experiment should include a description, covering (when possible) the following information:

- Significant physical features (obstacles present on the environment, human presence, temperature, humidity, possible noise sources, computational speed of the machine, etc.)
- The precise location of the experiment (latitude and longitude, room number or citation to a description of the used laboratory).
- Sampling design (variable(s) measured, transformation performed to the data, samples collected, replication, comparative with a Ground Truth system, collecting data protocol).
- Analysis design (how the data are processed, statistical procedures used, statistical level to determine significance).

The provided information should be sufficient to allow other scientists to repeat your experiment in the same conditions. Thus, the use of standard and well-known equipment could only be represented by a simple sentence, but the non-standard equipment should be described in detail, citing the source (vendor) and most important characteristics.

To write it, try to use the third person when describing the experiments and results. Avoid to use first person. Past tense should be the dominant conjugation (the work is done and was performed in the past).

Note: Graphics represent really well data, use them! (Matlab or Octave could be useful for that).





# Kapitel 6

## Discussion

The meaning of this paragraph is to interpret the results of the performed work. It will always connect the introduction, the postulated hypothesis and the results of the thesis/bachelor/master.

It should answer the following questions:

- Could your results answer your initial questions?
- Did your results agree with your initial hypothesis?
- Did you close your problem, or there are still things to be solved? If yes, what will you do to solve them?



# Kapitel 7

## Acknowledgements

(This part is optional, and it could be completely excluded by deleting  
`\include {content/chapters/chapter7}`  
from the `Firstname_Lastname_Diplom_Master_arbeit.tex` file)

This paragraph could mention people or institutions that supported you to some extent  
with your work or friends and relatives that supported you during your study period.



# Literaturverzeichnis

- [IGM97] IKEDA, MITSURU, SHOGO GO und RICHIRO MIZOGUCHI: *Opportunistic Group Formation*. In: *Proceedings of the Conference on Artificial Intelligence in Education (AI-ED)*, Seiten 167–174, Amsterdam, 1997. IOS Press.
- [Lev65] LEVENSTHEIN, VLADIMIR I.: *Binary codes capable of correcting spurious insertions and deletions of ones*. Problems of Information Transmission, 1:8–17, 1965.
- [MAdR02] MIDDLETON, S. E., H. ALANI und D. C. DE ROURE: *Exploiting Synergy between Ontologies and Recommender Systems*. In: *Proceedings of the Semantic Web Workshop at the WWW Conference*, Honolulu, HI, 2002.
- [Sal89] SALTON, GERARD: *Automatic text processing — the transformation, analysis, and retrieval of information by computer*. Addison-Wesley series in computer science. Addison-Wesley, 1989.



## **Versicherung an Eides Statt**

### *German*

Hiermit versichere ich, dass ich die vorliegende Bachelor(Master)arbeit selbständig - mit Ausnahme der Anleitung durch die Betreuer - verfasst, keine anderen als die angegebenen Quellen und Hilfsmittel benutzt, sowie Zitate kenntlich gemacht habe. Ich versichere dass ich alle entsprechenden Angaben nach bestem Wissen und Gewissen vorgenommen habe, dass sie der Wahrheit entsprechen und dass ich nichts verschwiegen habe. Mir ist bekannt, dass eine falsche Versicherung an Eides Statt nach §156 und nach §163 Abs. 1 des Strafgesetzbuches mit Freiheitsstrafe oder Geldstrafe bestraft wird.

### *English*

I hereby declare that I have written this Bachelor (Master) thesis - except for the guidance of the supervisor - independently, using no other than the specified sources and resources, and that all quotations have been indicated. I declare that I have reported to the best of my knowledge all the relevant information, that it is true and that I concealed nothing. I am aware that a false declaration will be punished according to §156 and §163 par. 1 of the criminal code with a prison sentence or a monetary penalty.

Essen, 15. September 2020  

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(Ort, Datum)

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