International Master in Data Analytics
MS Thesis kickoff

Prof. Dr. Dr. Lars Schmidt-Thieme

Information Systems and Machine Learning Lab (ISMLL)
University of Hildesheim, Germany

August 20, 2018

Outline

1. Introduction

2. Timeline

3. Thesis Writing

MS Thesis: Data Analytics

for whom?

- International Master in Data Analytics (mandatory)
- all IT Master and Bachelor programs (mandatory)
    - Applied Computer Science
    - Information Management and Information Technology (IMIT)
    - Information Systems

Outline

Aims

1. Students conduct a well-defined research thesis.
   - each student works on an Individual topic,
   - under supervision of a PhD student, postdoc or professor,
   - can be a collaborative work with other department and/or industry.

2. Students read the literature and comprehend the state-of-the-art in a specific subject of data analytics.

3. Students conduct a computational experiment on their own.

4. Students have the opportunity to extend the state-of-the-art with an own innovation.

Work Load

- ▶ 30 ECTS, one term (6 months)

- ▶ 30 × 30h / student = 600h / student

- ▶ 6 person months

How to Start

1. a list of thesis topics is provided at
   https://www.ismll.uni-hildesheim.de/master/master_en.html
2. familiarize yourself with the given initial papers
3. understand
   - ▶ the problem of the papers, conceptually and formally,
   - ▶ the method of the papers and
   - ▶ the evidence for the claim of the papers,

   best collecting your findings in a discussion document
4. understand the general embedding of the problem in machine learning problems
   - ▶ what type of problem is it?
5. research the state-of-the-art of the problem
6. make a plan breaking the work into tasks and timing the tasks

How to Start (continue)

7. select the strongest and/or most suited papers
    ▶ not necessarily identical with the papers provided initially
8. implement the methods and
   reproduce some of the experiments of the selected papers
9. from good or excellent theses we expect:
    ▶ combine the ideas of some papers to something novel,
    ▶ have an own idea on top of the existing contributions,
    ▶ run additional experiments that provide additional insights,
    ▶ make a more in-depth analysis of the results and explain why they are
      as they are.
10. submit your findings in form of a paper to a workshop/ conference

Outline

1. Introduction

2. Timeline

3. Thesis Writing

Timeline

1 Month before start

- look into thesis topics
- discuss with supervisors & register interest

Thesis Start— Register your thesis

- formally register your thesis with the examination office
- start working on your thesis

1 Month after the start — First Idea Talks

- work on your thesis
- master seminar

5 to 6 Months after the start — thesis submission deadline

- submit directly to the examination office

1 or 2 weeks after the submission — Thesis defense

Timeline: An Example

1st September

- look into thesis topics
- discuss with supervisors & register interest

1st October (Thesis Start)— Register your thesis

- formally register your thesis with the examination office
- start working on your thesis

20th or 30th October — First Idea Talks
- work on your thesis
- master seminar

31st March — thesis submission deadline

- submit directly to the examination office

10th April — Thesis defense

Thesis bidding process

1. to be eligible to start the thesis,
   - you need to have completed 80 ECTS already (recommended).

2. available topics can be found on the master thesis webpage:
   https://www.ismll.uni-hildesheim.de/master/master_en.html

3. please look into these topics, read the related papers and talk to the supervisor.

4. bidding for a thesis topic
   - available topics can be found on the master thesis webpage:
   - a topic will be assigned based on
     - your priority
     - courses studied related to the topic (Please provide an up-to-date transcript)
     - supervisor's opinion if the topic is suitable for you

Registration

- ▶ Once your thesis topic has been assigned,
  you have to formally register it with the examination office
    - ▶ fill the respective form
      https://www.uni-hildesheim.de/media/dez3/Pruefungsaemter/Pruefungsamt_4/IMIT/Master_IMIT/
      MSc_IMIT_AntrZulAbschl2008.pdf
        - ▶ working title
        - ▶ start date
        - ▶ main supervisor and co-supervisor
    - ▶ submit it to Mrs Hinze-Melching (C205, Spl)
    - ▶ You must have complete atleast 60 ECTS to register your Thesis with
      the examination office.

- ▶ more information about the examination office:
  https://www.uni-hildesheim.de/dez3/pruefungsamt/pruefungsamt-4/

First Idea Talk (Master Thesis Seminar)

1. In the First Idea Talk you should
   - ▶ describe your understanding of the problem, including
     - ▶ formal problem statement
     - ▶ main methods from related work
     - ▶ experimental protocols, incl. datasets
   - ▶ your first idea how to solve it and
   - ▶ a plan how to put this idea into action.

2. approx. 15 minutes talk plus 10-15 minutes discussion.

3. usually held approx. 3 weeks after you started your thesis.

Supervision and Master Thesis Seminar

- ▶ accompanying to your work we have a master thesis seminar for all students working on a thesis
  - ▶ attendance is useful

- ▶ brief intermediate progress reports

- ▶ discussions

- ▶ reading papers

- ▶ besides the master thesis seminar, you should see your supervisor regularly
  - ▶ at least every second week

Supervision and Master Thesis Seminar

- ▶ accompanying to your work we have a master thesis seminar for all students working on a thesis
  - ▶ attendance is useful & mandatory

- ▶ brief intermediate progress reports

- ▶ discussions

- ▶ reading papers

- ▶ besides the master thesis seminar, you should see your supervisor regularly
  - ▶ at least every second week

Thesis Submission

1. hand in three bound paper copies of the thesis
   - to the examination office, not to the supervisor or our secretary.
   - the deadline is strict: exactly 6 months after formal registration !
     - it can be extended, but not in hindsight!
       — if you run late, ask your supervisor for an extension at least two weeks in advance.

2. a digital copy including
   - the PDF of the final version,
   - the source documents (usually in LaTeX)
   - the program sources
   - the datasets
   - all experimental data

   must be committed to ISMLL student git.
   - a complete list of references including PDFs should be uploaded to ISMLL student zotero.

Final Thesis Defense (Oberseminar)

1. In the defense you should thoroughly describe
   - the problem addressed,
   - the method you propose to solve it,
   - the experimental evidence you have that it works
     - better than existing solutions
   - any open/next questions

2. defense talks are 30 minutes presentation plus 15 minutes discussion.

3. PDF and sources of the presentation should also be submitted to the ISMLL student git.

Outline

Tool Recommendations

- ▶ how to write and format your thesis is up to you

- ▶ we recommend LaTeX for writing technical documents such as a thesis
    - ▶ a suitable document template will be provided soon

- ▶ we recommend google scholar to find literature
    - ▶ and dblp, ACM digital library and IEEE xplore as sources for bibliographic data

- ▶ we recommend zotero to manage literature
    - ▶ also get the betterbibtex plugin
    - ▶ you can export to bibtex and use from LaTeX seamlessly

Useful LaTeX Packages

- the lstlisting package is useful to represent pseudocode and program fragments.

- a list of mathematical symbols can be found here: http://oeis.org/wiki/List_of_LaTeX_mathematical_symbols

Sample Outline

- – Abstract
1. Introduction
2. Formale Problem Statement
3. Related Work
4. Proposed Method
5. Experiments
6. Conclusion and Future Work
7. References