Guidelines

Proseminar KI

1 Introduction

This documents describes the requirements for the "Proseminar ausgewählte Themen der KI" offered by the Professorship of Artificial Intelligence of the TU Chemnitz. It is however generic, as it contains general hints on writing and presenting skills which may be useful in other courses. The goal of a Proseminar is to prepare students to being able to write and talk in a scientific manner, as expected notably for a Bachelor or Master thesis.

Formally, the oral presentation should last 15 minutes, followed by maximally 5 minutes of questions from the audience. It can be done in German or English. The written report should contain 5 to 10 "useful" pages and be delivered four weeks after the presentation. The presentation and the report count equally for the final grade.

2 Research

The first step is to identify a subject. It should answer to the following question: "*What is an intelligent system for you?*". This means that your work should deal with intelligence, artificial or natural, and that your answer should be personal, i.e. related to your interests. You can address this subject through examples of existing systems, promising methods, philosophical or ethical questions. It has to be related to a current research question.

It is perfectly fine to start identifying and expanding a research theme using general sources such as Wikipedia, broad-audience journals (`wired.com`, etc) or simply googling keywords. However, you will in the end have to ground your work on scientific publications, such as books from serious authors, scientific journal articles or conference papers. The research phase is therefore important to identify those sources.

There is no definitive list of AI-related sources. There are specialized sources (Journal of Machine Learning Research, Proceedings of NIPS, KI Zeitung...) but unless you know what you are searching for, you won't find anything by just browsing them. Googling the appropriate keywords can allow you to identify:

- The main researchers in the domain. Find their homepages, read their selected papers, try to find a copy of their books, etc. If they have a blog, read it.
- The specialized conferences. Thematic workshops or conferences are regularly organized and publish their proceedings online. Sometimes, the key talks are filmed and put on Youtube.
- The forums where the community interacts. Old-school forums, Reddit or G+ communities sometimes have very interesting discussions on selected papers.
- A new trend is *awesome* curated lists, which are Github repositories where people maintain a list of relevant papers on a given theme. Google "awesome deep learning" and you will find dozens of them.

When you find an interesting source, do not forget to save it and note where you found it, with as many details

as possible: you will need that info later for your manuscript. If possible, already save the bibtex entry for that source (see later): even if you finally do not use it, it is better than having to search again for it while writing. There are nowadays nice reference managers, such as Zotero, Mendeley, Colwiz or Readcube: they allow you to save documents, including their bibtex info, annotate them, sort them thematically and so on.

When you read an article, try to maintain a log journal where you summarize the content, what it means, where you can find additional sources, etc. This log could even be the first draft of your report: it is easier to turn a bunch of unorganized notes into a final report than to start with a blank page and do everything from memory.

3 Oral presentation

Constraints

The goal of the presentation is to present the result of your research to an audience of non-specialists (but not naive either). The main difficulty is finding the correct level of complexity: be it too simple/obvious and everybody gets bored; too complex/obscure and nobody listens. Both result in a bad grade. Ask yourself: *if I were sitting in that audience without having read all these papers, would I understand / be interested by it?* As long as the answer is no, rework your presentation.

Your talk should last 15 minutes, which is both short and long: you need to have enough content to last that long, but once you get into a subject it is easy to talk about it for hours. In conferences, schedules are tight and the chair might interrupt you after 15 minutes and 1 second if you are not already at the last slide. We will apply this rule strictly for the proseminar to put you in real conditions: we will interrupt you after 15 minutes and ask you to conclude in one minute. So:

1. Keep an eye on your watch during your presentation.
2. Rehearse several times before the proseminar to be sure you fit into 15 minutes. Try to estimate at which point you should be after 10 minutes. Speed up or slow down accordingly.

A rule of thumb is "1 minute per slide" if a slide has content (not the title, table of content, reference slides). So if you have more than 15 full slides, you already know you are in trouble.

Structure

The structure of your talk should be clear: after the title slide (which you can skip immediately, everybody can read your name and title), it is customary to present the plan of your presentation. You can do it either directly after the title slide, or after one or two introduction slides explaining the global context of your talk, why are you interested in that particular subject. Avoid obvious plans (1- Introduction; 2- Methods; 3- Results; 4- Discussion): the plan must indicate precisely how you will tackle the problems, what we can expect to get from your talk. If a section is obvious (Discussion), you do not have to mention it ("Finally I will conclude." sounds lame).

The most important part of your talk is the introduction: it is where the audience decides between listening and sleeping. It must be short, catchy, but also bring all necessary information to understand the rest of your talk: historical context, open problem in the research community, type of method used, etc. It must state clearly a **scientific question**: why is it worth studying this particular problem? What does the answer bring us? Is it new? Does it have applications? Again, adapt your introduction to your audience: try to estimate what they already know and what they do not.

The second most important part is the discussion: it is often neglected because of the time pressure, but it is actually the final impression you will leave that decides of the grade. It must remind 1) what you have explained sofar in a short and concise manner, 2) how it answers the initial scientific question you presented in the introduction and (for a Bachelor/Master thesis) 3) future work. In 3), you should explain how you would go on if you were to continue research in that direction. It shows that you are not just a good soldier who does what he is told to, but a researcher who, when he solves one question, opens ten new ones and already knows what he is going to do next. This is not really applicable to a proseminar, but keep that in mind for later.

What happens in between (Methods and Results, although no results are expected in a proseminar) is subject-dependent, so we cannot really advise much. But it is the core of your work, so it is important too...

The talk should stop either on the classical "thank you for your attention" slide, followed by the references, or directly on the references, people will get the signal. You do not need to comment the references: if a reference is that important, it should be highlighted during the talk. Just leave the slide on during the discussion.

Performance

A successful talk is also a theatrical performance: your body language and the tone of your voice are almost as important as the scientific content. Some small advises:

- Control your stress (easier said than done). Stress is communicative and it is very painful to hear people whose voice is trembling or hesitate before each sentence. It gets better with experience, but the only useful trick at the beginning is to rehearse many times, so you become confident that you know everything and won't forget your speech.
- Speak loud enough to be understood from the back of the room, but do not shout either.
- Stress makes you talk faster, but it becomes hard to follow for the audience. Do not slow down too much either, it becomes boring.
- Manage micro-pauses within the talk, where you pause for two or three seconds, summarize what you have said until now, and then start again with a new concept. Being force-fed with information for 15 minutes without interruption is very difficult: your talk should have a rhythmic structure, with moments of high intensity where you bring knowledge to the audience, and low moments where they can think about it. This is where a good plan is useful: between two important parts, show again the table of contents, summarize what you have said sofar, and explain why you need to address the next part.
- Look at your audience. Try to focus on the people who seem to listen (for a reasonable duration, do not freak them out) and ignore the ones who will inevitably sleep.
- Do not stare constantly at the screen of your laptop, or worse, at the projected screen: you would show your back to the audience. The only moment when you can look at the projected screen is when you describe a figure with a laser pointer.
- **Never ever** read your slides word by word, or your notes. If your speech does not bring anything to what is written, why talk? Every sentence must feel improvised, even if you rehearsed your talk so many times that you actually know it by heart.
- If you feel safer with notes in the hand, put the structure of your talk, or the most important points you want to say. But the best is to never look at them.

Style

- The slides can be prepared with LATEX{} and beamer, Powerpoint, Notes or whatever you prefer, but it should be exported to PDF.

- Clean and sober slides are preferred. Do not use funky styles with flashy colors and animated transitions: black text on white background, with a single colour to highlight the relevant information (slide title, etc.).
- Do NOT use transition effects or unnecessary animations: this is a scientific talk, not a marketing prep talk.
- Each slide should be readable by the audience in less than 20 seconds: do not overload it with text or figures.
- But avoid slides with only two bullet points: slides should keep the audience busy.
- Use complete but simple sentences: use bullet points if you want to convey a complex message.
- Reference on the slides all materials that do not belong to you: figures you "borrow" from articles, citations. . . But do not mention them orally. When an idea comes from a paper, reference it also.
- You can use overlay (progressive revealing of the slide content) if you want, but it is not obligatory.
- A good figure is worth a thousand words, but do not hesitate to add a sentence or two next to it to ease comprehension.

4 Written report

The written report is basically a longer version of your slides. The same advises on the content, the importance of the introduction and discussion / future work, apply. If the style of the slides is free, formal requirements apply for the manuscript. To be accepted, your report must respect the following rules.

Format

The manuscript (in pdf format, DIN-A4) must have the following structure:

- The title page should contain:
  - The logo of the TU Chemnitz.
  - The title of your report.
  - Your name.
  - A mention of the Proseminar.
  - The date of submission.
- The abstract of your report on a single page.
- 5 to 10 pages of content, split into chapters, sections, subsections, etc. Roman numbering should be used. The first chapter should be "Introduction", the last one "Discussion". You can use as many chapters as needed in-between.
- A list of references, grouped in an unnumbered chapter.
- Possibly appendixes.

Your manuscript should use the Times New Roman with size 11pt. One-and-a-half line spacing should be used. Margins should not be larger than one inch. Section headings should be in bold font, with a larger size.

Figures

Graphics must be displayed in a new paragraph and be centered on the page. Beneath the graphic should be written the signal word 'Figure' ('Abbildung' in German papers), the consecutive number and the description, all in font Times New Roman non-bold and in font size 9 pt. The numbering is consecutive within a chapter with the chapter number as the prefix (e.g. Figure 4.17 is the seventeenth figure of chapter 4).on. They should be mentioned in the text as 'Fig. 4.17' or 'Abb. 4.17'.

It is your responsibility to check that figures are readable when printed. If figures are reduced in size, it is important to ensure that letters and numbers are at least 1 mm in height. If scanned figures are used, it is vital to ensure that alphanumeric characters, lines and shading are identifiable when displayed in black and white.

If the figure has been taken from a book, webpage or other external work, the source should be indicated in the description and bibliography.

Program code

Program texts are single spaced. The font used should be a traditional typewriter font (e.g. Courier), with the font size staying the same as standard text at 10 pt.

```
public class Hello {
    public static void main (String[] args) {
        System.out.println("Hello World!");
    }
}
```

If the program code has been taken from a book or other written work, the source should be indicated in the text and bibliography.

Equations

Equations should be centered on the page. They should be numbered, with the number on the right between parentheses.

$$\nabla_\theta \mathcal{J}(\theta) = \mathbf{E}_{\pi_\theta}[\nabla_\theta \log \pi_\theta(s,a) Q^{\pi_\theta}(s,a)] \tag{1}$$

Equations should be referred to as 'Eq. 1'.

References

The bibliography contains the references sorted in alphabetical order with no subdivision. The alphabetical order is determined by the authors last names and ultimately the year of publication.

Within the text, references should contain the last names of the authors and the year of publication, between parentheses (Vitay and Hamker, 2014). When referring to the authors, only the year should be between parentheses: Vitay and Hamker (2014) showed that... Authors names should be separated with "and". If there are more than three authors, only the first author's last name followed by "et al." should be used (Dinkelbach et al., 2012).

The citation style should follow the requirements of the American Psychological Association (APA, 6th edition). The style is provided by the package `apalike` of LATEX{} (or the provided `apalike.bst` in the demo) and for Office the CSL description can be found at https://github.com/robertour/apalike-zotero/blob/master/apalike.csl. Make sure you edit the line 549 to:

```
<citation et-al-min="3" et-al-use-first="1"...
```

The list of author names should be formatted as the examples at the end of this document "Lastname1, I., Lastname2, I.," followed by the year in parenthesis. Journal and conference names can be abbreviated. The necessary information depends on the document type:

Journal articles: (Vitay and Hamker, 2014; Dinkelbach et al., 2012). Not all journals define an issue number. Pages can be omitted for online journals and replaced by the DOI.

AUTHORS (YEAR). TITLE. *JOURNAL*, VOLUME(NUMBER):PAGES. DOI.

Conference proceedings: (Vitay et al., 2014)

AUTHORS (YEAR). TITLE. In *Proc. CONFERENCE*, CITY, PAGES.

Books: (**?**). The edition can be omitted if there is only one.

AUTHORS (YEAR). *TITLE*. PUBLISHER, CITY, EDITION.

Book chapters: (Vitay and Hamker, 2007)

AUTHORS (YEAR). TITLE. In EDITORS, editors, *BOOKTITLE*, volume VOLUME, pages PAGES. PUB-LISHER.

Theses: (Vitay, 2017). The type can be Master thesis, PhD thesis, Habilitation...

AUTHORS (YEAR). *TITLE*. TYPE, UNIVERSITY.

Webpages and online resources: Webpages should be referenced in a footnote[1], with an author and title. The date of the last access should be mentionned.

AUTHORS. TITLE. URL. Last accessed on DATE.

References

Dinkelbach, H. Ü., Vitay, J., Beuth, F., and Hamker, F. H. (2012). Comparison of GPU- and CPU-implementations of mean-firing rate neural networks on parallel hardware. *Network (Bristol, England)*, 23(4):212–36.

Vitay, J. (2017). *On the role of dopamine in motivated behavior: a neuro-computational approach*. Habilitation, Technische Universität Chemnitz.

Vitay, J., Dinkelbach, H. Ü., and Hamker, F. H. (2014). ANNarchy: Artificial Neural Networks architect. In *Proceedings of BCCN'14 (Bernstein Conference on Computational Neuroscience)*, Tübingen (Germany).

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Vitay, J. and Hamker, F. H. (2014). Timing and expectation of reward: A neuro-computational model of the afferents to the ventral tegmental area. *Frontiers in Neurorobotics*, 8(4).

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[1]Vitay, J., Dinkelbach, H. Ü., and Hamker, F. H. ANNarchy: Artificial Neural Networks architect. https://bitbucket.org/annarchy /annarchy. Last accessed on 06.06.2017.