TDT4173: Machine Learning and Case-Based Reasoning

Assignment 3

February 25, 2016

- **Delivery deadline: March 10, 2016** by 22:00.
- You can work on your own or in groups of two people.
- Deliver your essay on *itslearning* before the deadline.
- Please upload the essay as a PDF file.

Learning Objectives: Gain experience with (a) reading scientific papers, and (b) how to write a short essay.

1 Essay

For this assignment, you will be writing an essay about one of three recent scientific papers in machine learning. The essay should be between **3 and 5 pages** long, covering **one** of the papers outlined in section 2. You can choose to write the essay in either Norwegian or English.

Your essay must answer the following set of questions:

1. **What is this paper about?** Summarise the content of the paper.
2. **Research goals.** What are the specific research goals (implicit or explicit)? Identify what the author(s) are trying to prove/show/investigate.
3. **Research methodology.** What is the research methodology? Describe how the author(s) address their research goals, e.g. theoretical, experimental, analytic, literature review. This depends on the paper you are writing about.
4. **Results.** Describe the research results reported in the paper.
5. **Evaluation.** How are the results evaluated, and what is the outcome of the evaluation? Describe how the author(s) justify their results. Do you think their justification is reasonable?
6. **Discussion.** How do the author(s) discuss their results? Are both strengths and weaknesses discussed?
7. **Did you like the paper?** Include both what you liked and what you did not like.

Not all of these questions may be relevant for all three papers.

2 Papers

Select **one** of the following papers[1]:

Paper I – Case-based reasoning and recommender systems

Music Recommendation: Audio Neighbourhoods to Discover Music in the Long Tail
by Susan Craw, Ben Horsburgh, and Stewart Massie (2015)[1]

Paper II – Computer vision and deep convolutional neural networks

Spatial Pyramid Pooling in Deep Convolutional Networks for Visual Recognition
by Kaiming He et al. (2015, TPAMI)[2]

Paper III – Inductive logic programming (ILP)

Structured machine learning: the next ten years
by Thomas G. Dietterich et al. (2008)[3]

References

[1] Susan Craw, Ben Horsburgh, and Stewart Massie "Music Recommendation: Audio Neighbourhoods to Discover Music in the Long Tail" in: *Case-Based Reasoning Research and Development* Springer, 2015, pp. 73–87 (cit. on p. 2)

[2] Kaiming He, Xiangyu Zhang, Shaoqing Ren, and Jian Sun "Spatial pyramid pooling in deep convolutional networks for visual recognition" in: *Pattern Analysis and Machine Intelligence, IEEE Transactions on* 37.9 (2015), pp. 1904–1916 (cit. on p. 2)

[3] Thomas G Dietterich, Pedro Domingos, Lise Getoor, Stephen Muggleton, and Prasad Tadepalli "Structured machine learning: the next ten years" in: *Machine Learning* 73.1 (2008), pp. 3–23 (cit. on p. 2)

[1] You may need to connect to the NTNU network to gain access to the papers via, for example, Google Scholar. Use VPN (virtual private network) if you need access to the NTNU network from home (see `https://innsida.ntnu.no`).