TDT4173: Machine Learning and Case-Based Reasoning

Assignment 2

Monday 16th September, 2019

- **Delivery deadline: Oct 4, 2019** by 23:59.
- **This assignment counts towards 3 % of your final grade.**
- **You can work on your own or in a group of two persons (including yourself), but submit individually on the Blackboard.**
- **Note: If you are working in a group, you (both) must mention your group member's full name, user name, and student ID number on the report's first page along with your name.**
- Deliver your essay on *Blackboard* before the deadline.
- Please upload the essay as a PDF file.

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

1 Essay [3 points]

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 with a reasonably sized font (11-12 pt), covering **one** of the papers outlined in

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? What impact do you feel the paper will have on future work in the area?

7. **Did you like the paper?** Discuss both what you liked and what you did not like.

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

2 Papers

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

Paper 1 – 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, ICCBR) [Craw et al., 2015]

Paper 2 – Deep learning and computer vision

Deep Residual Learning for Image Recognition[2]
by Kaiming He, Xiangyu Zhang, Shaoqing Ren, and Jian Sun (2016, CVPR) [He et al., 2016]

Paper 3 – Literature review on transfer learning

Transfer Learning
by Lisa Torrey and Jude Shavlik (2009) [Torrey and Shavlik, 2009]

Paper 4 – A CBR Approach

Running with Cases: A CBR Approach to Running Your Best Marathon
by Barry Smyth and Pdraig Cunningham (2017) [Smyth and Cunningham, 2017]

References

[Craw et al., 2015] Craw, S., Horsburgh, B., and Massie, S. (2015). Music recommendation: Audio neighbourhoods to discover music in the long tail. In *Case-Based Reasoning Research and Development*, pages 73–87. Springer.

[He et al., 2016] He, K., Zhang, X., Ren, S., and Sun, J. (2016). Deep residual learning for image recognition. In *The IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, pages 770–778.

[Smyth and Cunningham, 2017] Smyth, B. and Cunningham, P. (2017). Running with cases: A cbr approach to running your best marathon. In Aha, D. W. and Lieber, J., editors, *Case-Based Reasoning Research and Development*, pages 360–374, Cham. Springer International Publishing.

[Torrey and Shavlik, 2009] Torrey, L. and Shavlik, J. (2009). Transfer learning. *Handbook of Research on Machine Learning Applications and Trends: Algorithms, Methods, and Techniques*, 1:242.

[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 urlhttps://innsida.ntnu.no).

[2] Please read the version that includes the appendix, i.e the arXiv version: urlhttps://arxiv.org/abs/1512.03385. The CVPR Open Access version does *not* include it.