Marc-Alexandre Côté

Microsoft Research - Montréal	Senior Researcher macote@microsoft.com

Research Interests

- Deep reinforcement learning.
- Natural language understanding.
- Graph representation learning.
- Generative models for structured output.

Recent Work Experience

2017- | Researcher at Microsoft Research, *Montréal*
- Reinforcement learning applied to natural language.
- Graph representation learning for planning.
- Creator of TextWorld – a framework to study RL within interactive text-environments.

2012-2015 | Teaching assistant for the AI course at Université de Sherbrooke, *Sherbrooke*
- Marked assignments and answered student questions.
- Taught Introduction to Python course.

Education

2012–2017 Ph.D. in Computer Science, **Université de Sherbrooke**
Subject: "Machine learning applied to neuroimaging"
Advisors: Pr Hugo Larochelle & Pr Maxime Descoteaux
Scholarship: NSERC (2012-2015)

2010–2012 M.Sc. in Computer Science, **Université de Sherbrooke** (GPA: 4.24/4.3)
Thesis: "Segmentation des fibres de la matière blanche"
Advisors: Pr Shengrui Wang & Pr Maxime Descoteaux
Scholarships: FQRNT (2010), NSERC (2011)

2007–2010 B.Sc. in Computer Science, **Université de Sherbrooke** (GPA: 4.11/4.3)
Specialization in Artificial Intelligence

2004–2007 DEC, Techniques de l'informatique, **Cégep de Saint-Jean-sur-Richelieu**

Professional Service

Workshop Co-organizer

[2021] Novel Ideas in Learning-to-Learn through Interaction (EMNLP)
[2020] Knowledge Based Reinforcement Learning (IJCAI-PRICAI)
[2020] Wordplay: When Language Meets Games (NeurIPS)
[2018] Wordplay: Reinforcement and Language Learning in Text-based Games (NeurIPS)

Reviewer

Conferences NeurIPS (2017-2019), ICLR (2018-2019), ICML (2017,2020), MICCAI (2016), ISMRM (2015-2016)
Journals Applied Soft Computing Journal (2019-2020), Machine Learning by Springer (2017)

Publications

Journals

1. Maier-Hein, K. H., P. F. Neher, J.-C. Houde, **Marc-Alexandre Côté**, E. Garyfallidis, J. Zhong, M. Chamberland, F.-C. Yeh, Y.-C. Lin, Q. Ji, et al. (2019). The challenge of mapping the human connectome based on diffusion tractography. *Nature communications* **10**.
2. Garyfallidis, E., **Marc-Alexandre Côté**, F. Rheault, J. Sidhu, J. Hau, L. Petit, D. Fortin, S. Cunanne, and M. Descoteaux (2018). Recognition of white matter bundles using local and global streamline-based registration and clustering. *NeuroImage* **170**, 283–295.
3. **Marc-Alexandre Côté**, Á. Kádár, X. Yuan, B. Kybartas, T. Barnes, E. Fine, J. Moore, M. Hausknecht, L. E. Asri, M. Adada, et al. (2018). TextWorld: A Learning Environment for Text-based Games. *arXiv preprint arXiv:1806.11532*.
4. Chekir, A., S. Hassas, M. Descoteaux, **Marc-Alexandre Côté**, E. Garyfallidis, and F. Oulebsir-Boumghar (2017). 3d-ssf: A bio-inspired approach for dynamic multi-subject clustering of white matter tracts. *Computers in biology and medicine* **83**, 10–21.
5. Cousineau, M., P.-M. Jodoin, E. Garyfallidis, **Marc-Alexandre Côté**, F. C. Morency, V. Rozanski, M. Grand'Maison, B. J. Bedell, and M. Descoteaux (2017). A test-retest study on Parkinson's PPMI dataset yields statistically significant white matter fascicles. *NeuroImage: Clinical* **16**, 222–233.
6. Maier-Hein, K. H., P. F. Neher, J.-C. Houde, **Marc-Alexandre Côté**, E. Garyfallidis, J. Zhong, M. Chamberland, F.-C. Yeh, Y.-C. Lin, Q. Ji, et al. (2017). The challenge of mapping the human connectome based on diffusion tractography. *Nature communications* **8**(1), 1349.
7. Neher, P. F., **Marc-Alexandre Côté**, J.-C. Houde, M. Descoteaux, and K. H. Maier-Hein (2017). Fiber tractography using machine learning. *Neuroimage* **158**, 417–429.
8. **Marc-Alexandre Côté** and H. Larochelle (2016). An Infinite Restricted Boltzmann Machine. *Neural Computation* **28**(7). [PDF].
9. Uria, B., **Marc-Alexandre Côté** Karol Kregor, I. Murray, and H. Larochelle (Accepted). Neural Autoregressive Distribution Estimation. *Journal of Machine Learning Research*. [PDF].
10. **Marc-Alexandre Côté**, G. Girard, A. Boré, E. Garyfallidis, J.-C. Houde, and M. Descoteaux (2013). Tractometer: Towards validation of tractography pipelines. *Medical Image Analysis* **17**(7). [PDF].

Conference papers

1. Shridhar, M., X. Yuan, **Marc-Alexandre Côté**, Y. Bisk, A. Trischler, and M. Hausknecht (2021). ALFWorld: Aligning Text and Embodied Environments for Interactive Learning. In: *Proceedings of the International Conference on Learning Representations (ICLR)*. `https://arxiv.org/abs/2010.03768`.
2. Adhikari, A., X. Yuan, **Marc-Alexandre Côté**, M. Zelinka, M.-A. Rondeau, R. Laroche, P. Poupart, J. Tang, A. Trischler, and W. L. Hamilton (2020). Learning Dynamic Belief Graphs to Generalize on Text-Based Games. In: *Advances in neural information processing systems*.
3. Anand, A., E. Racah, S. Ozair, Y. Bengio, **Marc-Alexandre Côté**, and R. D. Hjelm (2019). Unsupervised State Representation Learning in Atari. In: *Advances in neural information processing systems*.
4. Hausknecht, M., P. Ammanabrolu, **Marc-Alexandre Côté**, and X. Yuan (2019). Interactive fiction games: A colossal adventure. In: *Thirty-forth AAAI Conference on Artificial Intelligence (AAAI-20)*.
5. Kádár, Á., D. Elliott, **Marc-Alexandre Côté**, G. Chrupała, and A. Alishahi (2018). Lessons Learned in Multilingual Grounded Language Learning. In: *Proceedings of the 22nd Conference on Computational Natural Language Learning*, pp.402–412.
6. Kádár, Á., **Marc-Alexandre Côté**, G. Chrupała, and A. Alishahi (Aug. 2018). Revisiting the Hierarchical Multiscale LSTM. In: *Proceedings of the 27th International Conference on Com-*

putational Linguistics. Santa Fe, New Mexico, USA: Association for Computational Linguistics, pp.3215–3227.

7. Goyal, A. G. A. P., A. Sordoni, **Marc-Alexandre Côté**, N. R. Ke, and Y. Bengio (2017). Z-forcing: Training stochastic recurrent networks. In: *Advances in neural information processing systems*, pp.6713–6723.
8. Poulin, P., **Marc-Alexandre Côté**, J.-C. Houde, L. Petit, P. F. Neher, K. H. Maier-Hein, H. Larochelle, and M. Descoteaux (2017). Learn to track: Deep learning for tractography. In: *International Conference on Medical Image Computing and Computer-Assisted Intervention*. Springer, Cham, pp.540–547.
9. Cousineau, M., E. Garyfallidis, **Marc-Alexandre Côté**, P.-M. Jodoin, and M. Descoteaux (2016). Tract-profiling and bundle statistics: a test-retest validation study. In: *International Society of Magnetic Resonance in Medicine – ISMRM 2016*.
10. Garyfallidis, E., **Marc-Alexandre Côté**, F. Rheault, and M. Descoteaux (2016). QuickBundlesX: Sequential Clustering of Millions of Streamlines in Multiple Levels of Detail at Record Execution Time. In: *International Society of Magnetic Resonance in Medicine – ISMRM 2016*.
11. Garyfallidis, E., **Marc-Alexandre Côté**, J. Hau, G. Perchey, L. Petit, S. C. Cunnanne, and M. Descoteaux (2015). Recognition of bundles in healthy and severely diseased brains. In: *International Society of Magnetic Resonance in Medicine – ISMRM 2015*.
12. Houde, J.-C., **Marc-Alexandre Côté**, and M. Descoteaux (2015). How to avoid biased streamlines-based metrics for streamlines with variable step sizes. In: *International Society of Magnetic Resonance in Medicine – ISMRM 2015*.
13. **Marc-Alexandre Côté**, E. Garyfallidis, H. Larochelle, and M. Descoteaux (2015). Cleaning up the mess: tractography outlier removal using hierarchical QuickBundles clustering. In: *International Society of Magnetic Resonance in Medicine – ISMRM 2015*.
14. Chekir, A., M. Descoteaux, E. Garyfallidis, **Marc-Alexandre Côté**, and F. Oulebsir-Boumghar (2014). A Hybrid Approach for Optimal Automatic Segmentation of White Matter Tracts in HARDI. In: *IEEE Conference on Biomedical Engineering and Sciences*, pp.177 –180.
15. **Marc-Alexandre Côté**, A. Boré, G. Girard, J.-C. Houde, and M. Descoteaux (2012). Tractometer: Online Evaluation System for Tractography. In: *Medical Image Computing and Computer-Assisted Intervention – MICCAI 2012*. Vol. 7510. Springer Berlin Heidelberg, pp.699–706.

Workshop papers

1. Zelinka, M., X. Yuan, **Marc-Alexandre Côté**, R. Laroche, and A. Trischler (2019). Building Dynamic Knowledge Graphs from Text-based Games. *arXiv preprint arXiv:1910.09532*.
2. Tao, R. Y., **Marc-Alexandre Côté**, X. Yuan, and L. E. Asri (2018). Towards solving text-based games by producing adaptive action spaces. *arXiv preprint arXiv:1812.00855*.
3. Yuan, X., **Marc-Alexandre Côté**, A. Sordoni, R. Laroche, R. T. d. Combes, M. Hausknecht, and A. Trischler (2018). Counting to Explore and Generalize in Text-based Games. *arXiv preprint arXiv:1806.11525*.

PhD thesis

1. **Marc-Alexandre Côté** (2017). "Réseaux de neurones génératifs avec structure". PhD thesis. Université de Sherbrooke.

Master thesis

1. **Marc-Alexandre Côté** (2012). "Segmentation des fibres de la matière blanche". [PDF]. MA thesis. Université de Sherbrooke.

Research reports

1. **Marc-Alexandre Côté**, G. Girard, S. Wang, and M. Descoteaux (2010). *Représentation et segmentation des fibres de matiere blanche basées sur les zéros de la transformée en ondelettes et sur l'alignement de séquences*. Tech. rep. 32. Université de Sherbrooke.

Miscellaneous

1. Al-Rfou, R. et al. (May 2016). Theano: A Python framework for fast computation of mathematical expressions. *arXiv e-prints arXiv:1605.02688*. [PDF].
2. Brett, M. et al. (Aug. 2016). *nibabel: 2.1.0*. `http://dx.doi.org/10.5281/zenodo.60808`.