Andreas Christian Müller

Machine Learning Scientist

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Education and Qualifications

2009 Diploma in Mathematics, University of Bonn
Thesis: "Singularities of Minimal Degenerations in Affine Grassmannians"
2014 PhD in Computer Science, University of Bonn
Thesis: "Methods for Learning Structured Prediction in Semantic Segmentation"

Current Position

since 2020 **Principle Research SDE at Microsoft**
Research and open source activities in the Gray Systems Lab.

Past Positions

2010–2013	**PhD Student at the Department of Computer Science, University of Bonn, Germany** Advisor: Prof. Sven Behnke.
2010–2013	PhD Scholarship of the B-IT, Bonn/Aachen, Germany
2011 and 2013	Lecture Assistant at the Department of Computer Science, University of Bonn, Germany
2013–2014	**Machine Learning Scientist at Amazon Development Center Germany** Design and implementation of large-scale machine learning and computer vision applications.
2014–2016	**Research Engineer at the NYU Center for Data Science** Development of open source tools for machine learning and data science.
2016–2020	**Lecturer in Discipline, Associate Research Scientist at Columbia University** Teaching in the Data Science Master program, scikit-learn development and various research activities.

Awarded Grants

- *Scikit-learn maintenance and enhancement to gradient boosting and search* (PI). Chan-Zuckerberg Initiative $150k. 2019-2020.
- *Extension & Maintenance of Scikit-learn* (PI). Alfred P. Sloan Foundation. $313k. 2017-2019.
- *Analysis and Extension of Scikit-learn* (PI). Bloomberg. $63k. 2017-2018.
- *SI2-SSE: Improving Scikit-learn usability and automation* (PI). NSF. $400k. 2017-2020.
- *Big Data Map and Assets Platform (BDMAP) Phase I - Collaborative Resource and Understanding eXchange (CRUX)* (senior personel, project lead). NSF. $100k. 2017-2018.
- *Building blocks and Search Improvements for Automated Machine Learning Model Selection* (PI). DARPA. $351k. 2018.

Open Source Contributions

- Core developer and member of the Technical Committee for the Python machine learning package "scikit-learn"[1].
- Creator and maintainer of the Python package "PyStruct"[2] for structured prediction.
- Co-author of "CUV", a C++ and Python interface for CUDA, targeted at deep learning.[3]
- Contributor to the Python computer vision package "scikit-image"[4].

[1] http://scikit-learn.org/
[2] http://pystruct.github.org/
[3] https://github.com/deeplearningais/CUV
[4] http://scikit-image.org/

Professional Activities

Journal Editorial Board

- Action Editor, Journal of Machine Learning Research, OSS Track

Journal and Converence Reviewing

- Nature
- Neural Information Processing System
- International Conference of Machine Learning
- European Conference of Computer Vision
- Journal of Statistical Software
- Journal of Machine Learning Research
- Journal of Pattern Analysis and Machine Intelligence

Postdoctoral Fellows

- Jan van Rijn
- Nicolas Hug

Advising and Consulting

- Scientific Advisor, Life Epigenetics
- Scientific Advisor, Ocean Protocol Foundation Ltd
- Advisory board, Scikit-learn @ Inria Foundation

Publications

Books

1. Müller, A and Guido, S. (2016). *Introduction to Machine Learning with Python*. O'Reilly.

Journal Publications

1. Schulz, H., A. Müller, and S. Behnke (2011). Exploiting local structure in Boltzmann machines. *Neurocomputing* **74**(9), 1411–1417. ISSN: 0925-2312.
2. Abraham, A., F. Pedregosa, M. Eickenberg, P. Gervais, A. Müller, J. Kossaifi, A. Gramfort, B. Thirion, and G. Varoquaux (2014). Machine learning for neuroimaging with scikit-learn. *Frontiers in Neuroinformatics*.
3. Müller, A. and S. Behnke (2014b). PyStruct: Structured Prediction in Python. *Journal of Machine Learning Research*.
4. Varoquaux, G., L. Buitinck, G. Louppe, O. Grisel, F. Pedregosa, and A. Müller (2015). Scikit-learn: Machine Learning Without Learning the Machinery. *GetMobile: Mobile Computing and Communications* **19**(1), 29–33.
5. Huppenkothen, D., L. M. Heil, D. W. Hogg, and A. Mueller (2016). Using machine learning to explore the long-term evolution of GRS 1915+ 105. *Monthly Notices of the Royal Astronomical Society* **466**(2), 2364–2377.
6. Severin, R. K., X. Li, K. Qian, A. C. Mueller, and L. Petukhova (2017). Computational derivation of a molecular framework for hair follicle biology from disease genes. *Scientific reports* **7**(1), 16303.

Conference Publications

1. Müller, A., H. Schulz, and S. Behnke (2010). Topological Features in Locally Connected RBMs. In: *Proceedings of the International Joint Conference on Neural Networks (IJCNN)*.
2. Scherer, D., A. Müller, and S. Behnke (2010). Evaluation of pooling operations in convolutional architectures for object recognition. In: *Proceedings of the Interntional Conference on Artificial Neural Networks (ICANN)*. Springer, pp.92–101.

3. Schulz, H., A. Müller, and S. Behnke (2010a). Exploiting local structure in stacked Boltzmann machines. In: *European Symposium on Artificial Neural Networks, Computational Intelligence and Machine Learning (ESANN)*.
4. Müller, A., S. Nowozin, and C. Lampert (2012). Information Theoretic Clustering Using Minimum Spanning Trees. In: *Proceedings of DAGM / OAGM*, pp.205–215.
5. Müller, A. and S. Behnke (2014a). Learning Depth-Sensitive Conditional Random Fields for Semantic Segmentation of RGB-D Images. In: *Proceedings of the International Conference of Robotics and Automation (ICRA)*.

Workshop Publications

1. Schulz, H., A. Müller, and S. Behnke (2010b). Investigating Convergence of Restricted Boltzmann Machine Learning. In: *Advances in Neural Information Processing Systems (NIPS), Deep Learning and Unsupervised Feature Learning Workshop*.
2. Müller, A. and S. Behnke (2011). Multi-Instance Methods for Partially Supervised Image Segmentation. In: *IAPR TC3 Workshop on Partially Supervised Learning*.
3. Buitinck, L., G. Louppe, M. Blondel, F. Pedregosa, A. Müller, O. Grisel, V. Niculae, P. Prettenhofer, A. Gramfort, J. Grobler, et al. (2013). API design for machine learning software: experiences from the scikit-learn project. *ECML PKDD 2013 Workshop on Languages for Data Mining and Machine Learning*.