

Dr. Alexander Freytag

Curriculum Vitae

February 2017

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Personal

Date of birth	November 20, 1988
Place of birth	Erfurt, Germany
Name at birth	Alexander Lütz
Nationality	German
Language skills	German (mother tongue), English (fluent), French (basic)

Education and Qualifications

09/2016	Ph.D. in computer vision with honors (Dr. rer. nat., summa cum laude) supervised by Joachim Denzler	University of Jena, Germany
03/2011	Diploma degree in computer science (Dipl.-Inf.) with honors (best achievable grade in all subjects)	University of Jena, Germany
05/2006	German abitur (High School diploma equivalent), grade: 1.1 (A+ equivalent)	Albert-Schweitzer-Gymnasium Erfurt (specialized for mathematics and natural sciences), Germany

Short CV

since 10/2016	Research Scientist for Machine Learning and Computer Vision at Carl-Zeiss AG, Corporate Research and Technology
10/2014 – 09/2016	Research coordinator at the Michael Stifel Center Jena (MSCJ) for Data-driven and Simulation Science
06/2013 – 08/2013	Visiting researcher in the vision group of the International Computer Science Institute (ICSI), Berkeley, California, USA, headed by Trevor Darrell
03/2011 – 09/2016	Research associate and Ph.D. student in the Computer Vision Group Jena, Friedrich Schiller University Jena, Germany, headed by Joachim Denzler
10/2006 – 03/2011	Diploma studies in computer science (minor subject: physics), Friedrich Schiller University Jena, Germany, with focus on computer vision
05/2009 – 03/2010	Student research assistant in the Computer Vision Group, Friedrich Schiller University Jena, Germany
09/1995 – 06/2006	German abitur (High School diploma equivalent) at the Albert-Schweitzer-Gymnasium in Erfurt (specialized for mathematics and natural sciences)

Research

since 2011	Authored and co-authored 30 papers on machine learning and computer vision topics (see page 4 for a complete list)
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since 2016	Involved in several machine learning research projects in areas related to the portfolio of the Carl Zeiss Company (including common computer vision problems, <i>e.g.</i> , object detection and classification, a specific focus on deep learning techniques, novelty detection, regression, . . . , as well as more abstract machine learning scenarios, <i>e.g.</i> , time series analysis, learnable data transformations, . . .)
2016	Ph.D. thesis “Lifelong Learning for Visual Recognition Systems”
2011 – 2016	Working towards a Ph.D. at the intersection of computer vision and machine learning (including large-scale inference methods, active learning and novelty detection, deep feature learning, and machine learning in general)
2014 / 2015	Developed algorithms in application scenarios of biodiversity research and medical data analysis
2011 / 2012	Working on industry-related projects, <i>e.g.</i> , to improve id-card scanning algorithms
2011	Diploma thesis “Image based kernel functions - robust classification and semi-supervised object localization by optimization of hyperparameters”
2010 / 2011	Developed solutions for automated license plate recognition systems in an industry-collaboration project

Organized Workshops

07/2017	<i>Workshop on “Continuous and Open-Set Learning”</i> (IEEE Conference on Computer Vision and Pattern Recognition (CVPR), Honolulu, Hawaii)
09/2016	<i>Autumn School on “Dynamics of natural (eco)systems: theory and applications”</i> (Michael Stifel Center for Data-driven and Simulation Science, Jena, Germany)
02/2016	<i>Retreat on “Cross-disciplinary exchange for data-driven and simulation science”</i> (Michael Stifel Center for Data-driven and Simulation Science, Großliebringen, Germany)
06/2015	<i>Workshop on “Tag der Forschung – Wissen aus Daten, Daten aus Wissen”</i> (Friedrich Schiller University Jena, Jena, Germany)

Honors and Awards

2017	“Promotionspreis des Dekans” (award for the best dissertation in 2016 from FSU’s faculty for math and computer science)
2016	Summa cum laude for my Ph.D. Thesis (Reviewers: Prof. Dr.-Ing. Joachim Denzler, University of Jena, Germany, Prof. Dr.-Ing. Joachim Hornegger, University of Erlangen-Nuremberg, Germany, Prof. Trevor Darrell, Ph.D., University of California, Berkeley, USA)
2014	Best Poster Award on ICPR FEAST 2014
2014	<i>Magister Honestus</i> awarded by Albert-Schweitzer-Gymnasium in Erfurt
2012	Best Paper Honorable Mention Award on ACCV 2012
2012	Exam award for best diploma of the year 2011/2012

2011	Diploma with distinction and the highest grade in all subjects
2009	Award for best intermediate diploma of the year 2008

Travel Grants and Scholarships

2016	CVF grant to attend the Doctorial Consortium at the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)
2015	DAAD Travel Grant to attend the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)
2015	Volkswagen Stiftung Travel Grant to attend the Herrenhäuser Conference on Big Data in a Transdisciplinary Perspective
2013	DAAD scholarship for a research-visit of the International Computer Science Institute (ICSI), Berkeley, USA
2009 – 2011	Scholarship holder of the German National Academic Foundation

Teaching Experience

2012 – 2016	Involved in teaching at the Friedrich Schiller University (organized and supervised seminars, practical exercises, and student projects) Practical exercises and teaching assistance: Basic Computer Vision, State Estimation and Action Selection, 3D Computer Vision, Introduction to Computer Graphics and Computer Vision Projects: Intelligent Systems, 3D Computer Vision Seminars: Visual Object Recognition, Advanced Topics in Computer Visions
2012 – 2016	Supervised and co-supervised several diploma, bachelor, and master theses with topics covering machine learning and computer vision

Skills and Interests

Programming skills	C++, MATLAB, Bash, ... see also https://github.com/cvjena/
Music	Guitar, bass guitar, piano, drums, vocals ...
Sports	Bouldering, mountain hiking, ballroom dancing, skiing

Social Involvement

since 2005	Musical support for the annual “days of science and culture” (Tage der Wissenschaften und Kultur) at Albert-Schweitzer-Gymnasium Erfurt
2007 – 2011	Active member of the German Federal Agency for Technical Relief (Technisches Hilfswerk, THW)
2006 – 2008	Summer camp counselor for the German Youth Hostel Association (Deutsches Jugendherbergswerk, DJH)

List of Publications

Books

1. Freytag, A. *Lifelong Learning for Visual Recognition Systems*. ISBN 9783843929950. Verlag Dr. Hut.

Journal articles

1. Rodner, E., A. Freytag, P. Bodesheim, B. Fröhlich, and J. Denzler. **Large-Scale Gaussian Process Inference with Generalized Histogram Intersection Kernels for Visual Recognition Tasks**. *International Journal of Computer Vision (IJCV)*. 2016, pp. 1–28.
2. Lütz, A., E. Rodner, and J. Denzler. **I Want To Know More - Efficient Multi-Class Incremental Learning Using Gaussian Processes**. *Pattern Recognition and Image Analysis (PRIA)* **23**(3). 2013, pp. 402–407.

Refereed conference research papers (peer-reviewed)

1. Wojek, C., K. Ranipa, A. Rawat, T. Milde, and A. Freytag. **Image Quality Assessment of Fundus Images Using Deep Convolutional Neural Networks with Extremely Few Parameters**. In: *ARVO Annual Meeting, Global connections in vision research*. 2017. (accepted for publication).
2. Freytag, A., E. Rodner, M. Simon, A. Loos, H. Kühl, and J. Denzler. **Chimpanzee Faces in the Wild: Log-Euclidean CNNs for Predicting Identities and Attributes of Primates**. In: *German Conference on Pattern Recognition (GCPR)*. 2016, pp. 51–63.
3. Käding, C., A. Freytag, E. Rodner, A. Perino, and J. Denzler. **Large-scale Active Learning with Approximated Expected Model Output Changes**. In: *German Conference on Pattern Recognition (GCPR)*. 2016, pp. 179–191.
4. Käding, C., E. Rodner, A. Freytag, and J. Denzler. **Active and Continuous Exploration with Deep Neural Networks and Expected Model Output Changes**. In: *NIPS Workshop on Continual Learning and Deep Networks (NIPS-WS)*. 2016.
5. Käding, C., E. Rodner, A. Freytag, and J. Denzler. **Fine-tuning Deep Neural Networks in Continuous Learning Scenarios**. In: *ACCV Workshop on Interpretation and Visualization of Deep Neural Nets (ACCV-WS)*. 2016.
6. Käding, C., E. Rodner, A. Freytag, and J. Denzler. **Watch, Ask, Learn, and Improve: A Lifelong Learning Cycle for Visual Recognition**. In: *European Symposium on Artificial Neural Networks (ESANN)*. 2016.
7. Bodesheim, P., A. Freytag, E. Rodner, and J. Denzler. **Local Novelty Detection in Multi-class Recognition Problems**. In: *Winter Conference on Applications of Computer Vision (WACV)*. 2015, pp. 813–820.
8. Freytag, A., A. Schadt, and J. Denzler. **Interactive Image Retrieval for Biodiversity Research**. In: *German Conference on Pattern Recognition (GCPR)*. 2015. **Oral**, pp. 129–141.
9. Käding, C., A. Freytag, E. Rodner, P. Bodesheim, and J. Denzler. **Active Learning and Discovery of Object Categories in the Presence of Unnameable Instances**. In: *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*. 2015, pp. 4343–4352.
10. Freytag, A., E. Rodner, T. Darrell, and J. Denzler. **Exemplar-specific Patch Features for Fine-grained Recognition**. In: *German Conference on Pattern Recognition (GCPR)*. 2014. **Oral**, pp. 144–156.
11. Freytag, A., E. Rodner, and J. Denzler. **Birds of a Feather Flock Together - Local Learning of Mid-level Representations for Fine-grained Recognition**. In: *ECCV Workshop on Parts and Attributes (ECCV-WS)*. 2014.
12. Freytag, A., E. Rodner, and J. Denzler. **Selecting Influential Examples: Active Learning with Expected Model Output Changes**. In: *European Conference on Computer Vision (ECCV)*. 2014, pp. 562–577.
13. Freytag, A., J. Rühle, P. Bodesheim, E. Rodner, and J. Denzler. **Seeing through bag-of-visual-word glasses: towards understanding quantization effects in feature extraction methods**. In: *International Conference on Pattern Recognition (ICPR) - FEAST workshop*. 2014. **Best Poster Award**.

14. Göring, C., E. Rodner, A. Freytag, and J. Denzler. **Nonparametric Part Transfer for Fine-grained Recognition**. In: *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*. 2014, pp. 2489–2496.
15. Bodesheim, P., A. Freytag, E. Rodner, and J. Denzler. **Approximations of Gaussian Process Uncertainties for Visual Recognition Problems**. In: *Scandinavian Conference on Image Analysis (SCIA)*. 2013. **Oral**, pp. 182–194.
16. Bodesheim, P., A. Freytag, E. Rodner, M. Kemmler, and J. Denzler. **Kernel Null Space Methods for Novelty Detection**. In: *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*. 2013, pp. 3374–3381.
17. Freytag, A., E. Rodner, P. Bodesheim, and J. Denzler. **Labeling examples that matter: Relevance-Based Active Learning with Gaussian Processes**. In: *German Conference on Pattern Recognition (GCPR)*. 2013. **Oral**, pp. 282–291.
18. Bodesheim, P., E. Rodner, A. Freytag, and J. Denzler. **Divergence-Based One-Class Classification Using Gaussian Processes**. In: *British Machine Vision Conference (BMVC)*. 2012, pp. 50.1–50.11.
19. Freytag, A., B. Fröhlich, E. Rodner, and J. Denzler. **Efficient Semantic Segmentation with Gaussian Processes and Histogram Intersection Kernels**. In: *International Conference on Pattern Recognition (ICPR)*. 2012. **Oral**, pp. 3313–3316.
20. Freytag, A., E. Rodner, P. Bodesheim, and J. Denzler. **Beyond Classification - Large-scale Gaussian Process Inference and Uncertainty Prediction**. In: *Big Data Meets Computer Vision: First International Workshop on Large Scale Visual Recognition and Retrieval (NIPS-WS)*. 2012.
21. Freytag, A., E. Rodner, P. Bodesheim, and J. Denzler. **Rapid Uncertainty Computation with Gaussian Processes and Histogram Intersection Kernels**. In: *Asian Conference on Computer Vision (ACCV)*. 2012. **Oral, Best Paper Honorable Mention**, pp. 511–524.
22. Rodner, E., A. Freytag, P. Bodesheim, and J. Denzler. **Large-Scale Gaussian Process Classification with Flexible Adaptive Histogram Kernels**. In: *European Conference on Computer Vision (ECCV)*. 2012, pp. 85–98.
23. Lütz, A. **Robust Classification and Semi-Supervised Object Localization with Gaussian Processes**. In: *Annual Symposium of the German Association for Pattern Recognition (DAGM)*. 2011, pp. 456–461.

Non-refereed research papers and reports

1. Bodesheim, P., A. Freytag, E. Rodner, and J. Denzler. **An Efficient Approximation for Gaussian Process Regression**. Tech. rep. Technical Report TR-FSU-INF-CV-2013-01. Computer Vision Group, Friedrich Schiller University Jena, Germany. 2013.
2. Denzler, J., E. Rodner, P. Bodesheim, and A. Freytag. **Beyond the closed-world assumption: The importance of novelty detection and open set recognition**. In: *GCPR Workshop on Unsolved Problems in Pattern Recognition (GCPR-WS)*. 2013.
3. Göring, C., A. Freytag, E. Rodner, and J. Denzler. **Fine-grained Categorization - Short Summary of our Entry for the ImageNet Challenge 2012**. *arXiv:1310.4759*. 2013.
4. Lütz, A., E. Rodner, and J. Denzler. **Efficient Multi-Class Incremental Learning Using Gaussian Processes**. In: *Open German-Russian Workshop on Pattern Recognition and Image Understanding (OGRW)*. 2011. **Oral**, pp. 182–185.

Oral Presentations and Invited Talks

- 10/2016 “Tutorial on Deep Learning”
(Michael Stifel Center for Data-driven and Simulation Science, Jena, Germany)
- 09/2016 “Chimpanzee Faces in the Wild: Log-Euclidean CNNs for Predicting Identities and Attributes of Primates”
(German Conference on Pattern Recognition (GCPR), Hannover, Germany)
- 10/2015 “Interactive Image Retrieval for Biodiversity Research”
(German Conference on Pattern Recognition (GCPR), Aachen, Germany)

- 03/2015 *“Lifelong Learning using Big Data for Visual Recognition Systems”*
(Herrenhausen Conference: “Big Data in a Transdisciplinary Perspective”, Hannover, Germany)
- 01/2015 *“Active Learning (for Lifelong Learning in Visual Recognition Systems)”*
(invited talk at the 5th IST Symposium on Computer Vision and Machine Learning, Vienna, Austria)
- 10/2014 *“Fine-grained Recognition and Patch Discovery”*
(invited talk at the Workshop on Learning, Modelling, and Inference in Visual Data, Dresden, Germany)
- 10/2014 *“Active Learning (for Visual Object Recognition)”*
(invited talk at the Workshop on Learning, Modelling, and Inference in Visual Data, Dresden, Germany)
- 09/2014 *“Exemplar-specific Patch Features for Fine-grained Recognition”*
(German Conference on Pattern Recognition (GCPR), Münster, Germany)
- 04/2014 *“Intelligente Bildverarbeitung – Wie man Robotern das Sehen beibringt”*
(invited talk at the Tage der Wissenschaften und Kultur of Albert-Schweitzer-Gymnasium Erfurt, Spezialschuleteil, Erfurt, Germany)
- 03/2014 *“Computer Vision Research in Jena”*
(invited talk at the STEINBEIS SpectroNet Collaboration Forum, Ilmenau, Germany)
- 01/2014 *“Adaptive and Active Lifelong Learning for Visual Recognition Systems”*
(invited talk at the 1st DAAD FITweltweit Alumni Veranstaltung, Saarbrücken, Germany)
- 01/2014 *“Where to look first – Autonomous Experimentation”*
(Cosre Anwender-Workshop, Jena, Germany)
- 09/2013 *“Labeling examples that matter: Relevance-Based Active Learning with Gaussian Processes”*
(German Conference on Pattern Recognition (GCPR), Saarbrücken, Germany)
- 07/2013 *“Computer, die lebenslang lernen”*
(invited talk at the Albert-Schweitzer-Gymnasiums Erfurt, Spezialschuleteil, Erfurt, Germany)
- 11/2012 *“Rapid Uncertainty Computation with Gaussian Processes and Histogram Intersection Kernels”*
(Asian Conference on Computer Vision (ACCV), Daejon, South Korea)

Scientific Poster Presentations

- 09/2016 *“Lifelong Learning for Visual Recognition Systems”*
(Annual Assembly of the Michael Stifel Center for Data-driven and Simulation Science, Jena, Germany)
- 07/2016 *“Lifelong Learning for Visual Recognition Systems”*
(Doctorial Consortium at the IEEE Conference on Computer Vision and Pattern Recognition (CVPR), Las Vegas, Nevada, USA)
- 03/2016 *“Image and Signal Analysis for Data-driven Science – Knowledge from Data”*
(Annual Assembly of the Leibniz Institute on Aging, Jena, Germany)
- 10/2015 *“Active Learning and Discovery of Object Categories in the Presence of Unnameable Instances”*
(Nectar Track Session at German Conference on Pattern Recognition (GCPR), Aachen, Germany)

- 10/2015 “*Selecting Influential Examples: Active Learning with Expected Model Output Changes*”
(Nectar Track Session at German Conference on Pattern Recognition (GCPR), Aachen, Germany)
- 06/2015 “*Active Learning and Discovery of Object Categories in the Presence of Unnameable Instances*”
(IEEE Conference on Computer Vision and Pattern Recognition (CVPR), Boston, Massachusetts, USA)
- 06/2015 “*Image and Signal Analysis for Data-driven Science - Knowledge from Data*”
(Tag der Forschung, Friedrich Schiller University, Jena, Germany)
- 03/2015 “*Lifelong Learning using Big Data for Visual Recognition Systems*”
(Herrenhausen Conference: “Big Data in a Transdisciplinary Perspective”, Hannover, Germany)
- 05/2014 “*Digitale Bildverarbeitung*”
(Annual Assembly of the Leibniz Institute on Aging, Jena, Germany)
- 09/2014 “*Selecting Influential Examples: Active Learning with Expected Model Output Changes*”
(European Conference on Computer Vision (ECCV), Zürich, Switzerland)
- 09/2014 “*Birds of a Feather Flock Together - Local Learning of Mid-level Representations for Fine-grained Recognition*”
(ECCV Workshop on Parts and Attributes (ECCV-WS), Zürich, Switzerland)
- 06/2014 “*Nonparametric Part Transfer for Fine-grained Recognition*”
(IEEE Conference on Computer Vision and Pattern Recognition (CVPR), Columbus, Ohio, USA)
- 09/2013 “*Open-Set Lifelong Learning for Visual Recognition Problems*”
(Nectar Track Session at German Conference on Pattern Recognition (GCPR), Saarbrücken, Germany)
- 06/2013 “*Kernel Null Space Methods for Novelty Detection*”
(IEEE Conference on Computer Vision and Pattern Recognition (CVPR), Portland, Oregon, USA)
- 11/2012 “*Large-Scale Gaussian Process Classification with Flexible Adaptive Histogram Kernels*”
(Asian Conference on Computer Vision (ACCV), Daejeon, South Korea)
- 10/2012 “*Large-Scale Gaussian Process Classification with Flexible Adaptive Histogram Kernels*”
(European Conference on Computer Vision (ECCV), Florenz, Italien)

Administration and Further Details

Details on my administration duties during my time as research coordinator of the Michael Stifel Center Jena for Data-driven and Simulation Sciences and at the Computer Vision Group Jena are excluded from this CV and are available upon request.



Jena, February 26th, 2017

Alexander Freytag