Gao Huang

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Research Interests

My research focuses on machine learning and computer vision, in particular deep learning, resource-efficient learning, weakly-supervised/unsupervised learning and reinforcement learning.

Current Appointment

Assistant Professor, **Tsinghua University** **2018 - Present**
Department of Automation

Education

PhD, **Tsinghua University** **2009 - 2015**
Advisors: Cheng Wu and Shiji Song

B.S., **Beihang University** **2005 - 2009**
GPA Rank: 1/200+

Research Experience

Postdoctoral Fellow, Cornell University **10/2015 - 08/2018**
Advisor: Kilian Q. Weinberger

Intern, Microsoft Research Asia **04/2014 - 10/2014**
Advisor: Jianwen Zhang

Visiting Scholar, Nanyang Technological University **02/2014 - 03/2014**
Advisor: Guangbing Huang

Visiting Scholar, Washington University in St. Louis **01/2013 - 07/2013**
Advisor: Kilian Q. Weinberger

Reviewing & Services

Senior Program Committee (SPC) for AAAI (2018, 2020)
Reviewer for
- Journal of Machine Learning Research (JMLR)
- Machine Learning (ML)
- Internatinal Journal of Computer Vision (IJCV)
- IEEE Transactions on Pattern Recognition and Machine Intelligence (TPAMI)
- IEEE Transactions on Image Processing (TIP)
- IEEE Transactions on Neural Networks and Learning Systems (TNNLS)
- IEEE Transactions on Cybernetics
- Pattern Recognition (PR)
- International Conference on Machine Learning (ICML)
- Neural Information Processing Systems (NIPS)
- International Conference on Artificial Intelligence and Statistics (AISTATS)
- International Conference on Learning Representations (ICLR)
- IEEE Conference on Computer Vision and Pattern Recognition (CVPR)
- European Conference on Computer Vision (ECCV)
- International Conference on Computer Vision (ICCV)
- AAAI Conference on Artificial Intelligence (AAAI)

Awards & Honors

- First Prize of Nature Science Award, Chinese Association for Artificial Intelligence, 2018
- Super AI Leader - Pioneer Award, World AI Conference (WAIC), 2018
- NeurIPS Workshop Best Paper Award, 2018
- CVPR Best Paper Award, 2017
- Doctoral Dissertation Award, Chinese Association of Automation, 2015
- First Prize of Doctoral Dissertation Award, Tsinghua University, 2015
- Outstanding Graduate, Tsinghua University, 2015

- Top 100 Most Influential Scientific Papers from China, Ministry of Science and Technology of China, 2015
- Stars of Tomorrow Internship Program, Microsoft Research, 2014
- National Scholarship for PhD Students, Ministry of Education of China, 2012
- Outstanding Graduate of Beijing, 2009
- National Scholarship, Ministry of Education of China, 2008

Invited Talks & Presentations

- International Conference on Image Processing (ICIP), Taipei, China, 09/2019
- International Conference on Multimedia and Expo (ICME), Shanghai, China, 07/2019
- Baidu Research, Beijng, China, 06/2019
- Vision And Learning SEminar (VALSE), Hefei, China, 04/2019
- University of British Columbia, Vancouver, Canada, 05/2018
- Microsoft Research, Seattle, USA, 04/2018
- Washington University in St. Louis, USA, 04/2018
- University of Chicago, Chicago, USA, 03/2018
- Temple University, Philadelphia, USA, 02/2018
- Megvii Technology Limited, Beijing, China, 12/2017
- Shanghai Jiao Tong University, Shanghai, China, 12/2017
- AI Seminar, Cornell University, Ithaca, USA, 09/2017
- CVPR, Honolulu, USA, 07/2017
- Apple Research, Seattle, USA, 07/2017
- Microsoft Research Asia, Beijing, China, 12/2016
- Tsinghua University, Beijing, China, 12/2016
- AAAI Conference on Artificial Intelligence, Austin, USA, 01/2015
- European Conference on Machine Learning, Nancy, France, 09/2014
- Nanyang Technological University, Singapore, 02/2014

Publications

Conference Publications

1. Haowei He, Gao Huang, Yang Yuan. Asymmetric Valleys: Beyond Sharp and Flat Local Minima *Neural Information Processing Systems* (NeurIPS **Spotlight**) 2019, Vancouver, Canada.

2. Yulin Wang, Xuran Pan, Shiji Song, Hong Zhang, Cheng Wu, Gao Huang. Implicit Semantic Data Augmentation for Deep Networks, *Neural Information Processing Systems* (NeurIPS) 2019, Vancouver, Canada.

3. Wenjie Shi, Shiji Song, Hui Wu, Ya-Chu Hsu, Cheng Wu, Gao Huang. Regularized Anderson Acceleration for Off-Policy Deep Reinforcement Learning, *Neural Information Processing Systems* (NeurIPS) 2019, Vancouver, Canada.

4. Hao Li, Hong Zhang, Xiaojuan Qi, Ruigang Yang, Gao Huang. Improved Techniques for Training Adaptive Deep Networks, *International Conference on Computer Vision* (ICCV) 2019, Seoul, Korea.

5. Shuang Li, Chi Harold Liu, Binhui Xie, Limin Su, Zhengming Ding, Gao Huang. Joint Adversarial Domain Adaptation, *ACM Multimedia* (ACM MM) 2019, Nice, France.

6. Yan Wang, Zihang Lai, Gao Huang, Brian Wang, Laurens van der Maaten, Mark Campbell, Kilian Q. Weinberger. Anytime Stereo Image Depth Estimation on Mobile Devices, *International Conference on Robotics and Automation* (ICRA), 2019, Montreal, Canada.

7. Zhuang Liu*, Mingjie Sun*, and Tinghui, Zhou, Gao Huang, Trevor Darrell. Rethinking the value of network pruning, *International Conference on Learning Representations* (ICLR), 2019, New Orleans, USA.

8. Yang Fu, Yunchao Wei, Yuqian Zhou, Honghui Shi, Gao Huang, Xinchao Wang, Zhiqiang Yao, Thomas Huang, Horizontal Pyramid Matching for Person Re-identification, *AAAI Conference on Artificial Intelligence* (AAAI), 2019, Hawaii USA.

9. Gao Huang*, Shichen Liu*, Laurens van der Maaten and Kilian Weinberger. CondenseNet: An Efficient DenseNet using Learned Group Convolutions. *IEEE Conference on Computer Vision and Pattern Recognition* (CVPR), 2018, Salt Lake City, USA.

10. Yan Wang*, Lequn Wang*, Yurong You*, Xu Zou, Vincent Chen, Serena Li, Gao Huang, Bharath Hariharan, Kilian Weinberger. Resource Aware Person Re-identification across Multiple Resolutions. *IEEE Conference on Computer Vision and Pattern Recognition* (CVPR), 2018, Salt Lake City, USA.

11. Gao Huang, Danlu Chen, Tianhong Li, Felix Wu, Laurens van der Maaten and Kilian Weinberger. Multi-Scale Dense Convolutional Networks for Resource Efficient Image Classification. *International Conference on Learning Representations* (ICLR), 2018, Vancouver, Canada. **Oral presentation.**

12. Zhuang Liu, Jianguo Li, Zhiqiang Shen, Gao Huang, Shoumeng Yan and Changshui Zhang. Learning Efficient ConvNets through Network Slimming. *International Conference on Computer Vision* (ICCV), 2017, Venice, Italy.

13. Gao Huang*, Zhuang Liu*, Laurens van de Maaten and Kilian Weinberger. Densely Connected Convolutional Networks. *IEEE Conference on Computer Vision and Pattern Recognition* (CVPR), 2017, Hawaii, USA. **Oral presentation.**
(Best Paper Award)

14. Gao Huang*, Yixuan Li*, Geoff Pleiss, Zhuang Liu, John E. Hopcroft and Kilian Weinberger. Snapshot Ensembles: Train 1, Get M for Free. *International Conference on Learning Representations* (ICLR), 2017, Toulon, France.

15. Gao Huang*, Chuan Guo*, Matt Kusner, Yu Sun, Fei Sha and Kilian Weinberger. Supervised Word Mover's Distance. *Neural Information Processing Systems* (NIPS), 2016, Barcelona, Spain. **Oral presentation.**

16. Gao Huang*, Yu Sun*, Zhuang Liu, Daniel Sedra and Kilian Weinberger. Deep networks with stochastic depth. *European Conference on Computer Vision* (ECCV), 2016, Amsterdam, Netherlands. **Spotlight.** (This paper was recommended as an **Oral Presentation** at NIPS 2016 Deep Learning Symposium.)

17. Gao Huang, Jianwen Zhang, Shiji Song and Zheng Chen. Maximin separation probability clustering. The *AAAI Conference on Artificial Intelligence* (AAAI), 2015, Austin, USA.

18. Yihe Wan, Shiji Song and Gao Huang. Incremental Extreme Learning Machine Based on Cascade Neural Networks. *IEEE International Conference on Systems, Man and Cybernetics* (IEEE SMC), 2015, Hong Kong.

19. Yanshang Gong, Shiji Song and Gao Huang. Dimension Reduction by Maximizing Pairwise Discriminations. *IEEE International Conference on Systems, Man and Cybernetics* (IEEE SMC). 2015, Hong Kong.

20. Chen Qin, Shiji Song and Gao Huang. Non-linear neighborhood component analysis based on constructive neural networks. *IEEE International Conference on Systems, Man and Cybernetics* (IEEE SMC), 2014, San Diego, CA, USA.

21. Gao Huang, Shiji Song, Zhixiang Xu, Kilian Weinberger and Cheng Wu. Transductive minimax probability machine. *European Conference on Machine Learning* (ECML), 2014, Nancy, France. **Oral presentation.**

22. Zhixiang Xu, Gao Huang, Kilian Weinberger, Alice Zheng. Gradient Boosted Feature Selection. *ACM SIGKDD International Conference on Knowledge Discovery and Data Mining* (KDD), 2014, New York, NY, USA.

23. Zhixiang Xu, Matt Kusner, Gao Huang and Kilian Weinberger. Anytime representation learning. *International Conference on Machine Learning* (ICML), 2013, Atlanta GA, USA.

Journal Publications

1. Gao Huang, Zhuang Liu, Geoff Pleiss, Laurens van der Maaten and Kilian Weinberger. Convolutional Networks with Dense Connectivity, *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 2019 (In press). **(Journal Version of DenseNet)**

2. Benben Jiang, Zhifeng Guo, Qunxiong Zhu and Gao Huang. Dynamic minimax probability machine-based approach for fault diagnosis using pairwise discriminate analysis, *IEEE Transactions on Control Systems Technology*, 27(2), pp. 806-813, 2019.

3. Shuang Li, Shiji Song, Gao Huang, Zhengming Ding and Cheng Wu. Domain invariant and class discriminative feature learning for visual domain adaptation. *IEEE Transactions on Image Processing*, 27(9), pp. 4260-4273, 2018.

4. Shiji Song, Yanshang Gong, Yuli Zhang, Gao Huang and Guangbin Huang. Dimension Reduction by Minimum Error Minimax Probability Machine. *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, 47(1), pp. 58-69, 2016.

5. Shuang Li, Shiji Song and Gao Huang. Prediction reweighting for domain adaptation. *IEEE Transactions on Neural Networks and Learning Systems*, 2016.

6. Quan Zhou, Shiji Song, Gao Huang and Cheng Wu. Efficient lasso training from a geometrical perspective. *Neurocomputing* 168 (11), pp. 234-239, 2015.

7. Chen Qin, Shiji Song and Gao Huang and Lei Zhu. Unsupervised neighborhood component analysis for clustering. *Neurocomputing*, 168(11), pp. 609-617, 2015.

8. Gao Huang, Tianchi Liu, Yan Yang, Zhiping Lin, Shiji Song and Cheng Wu. Discriminative clustering via extreme learning machine, *Neural Networks*, 70(10), pp. 1-8, 2015.

9. Gao Huang, Guang-Bin Huang, Shiji Song and Keyou You. Trends in extreme learning machine: a review, *Neural Networks*, 61(2), pp. 32-48, 2015.

10. Gao Huang, Shiji Song, Jatinder Gupta and Cheng Wu. Semi-supervised and unsupervised extreme learning machines. *IEEE Transactions on Cybernetics*, 44 (12), pp. 2405-2417, 2014.

11. Gao Huang, Shiji Song, Jatinder Gupta and Cheng Wu. A second order cone programming approach for semi-supervised learning. *Pattern Recognition*, 46(12), pp. 3548-3558, 2013.

12. Gao Huang, Shiji Song, Cheng Wu and Keyou You. Robust support vector regression for uncertain input and output data, *IEEE Transactions on Neural Networks and Learning System*, 23 (11), pp. 1690-1700, 2012.

13. Gao Huang, Shiji Song and Cheng Wu. Orthogonal least squares algorithm for training cascade neural networks. *IEEE Transactions on Circuits and Systems I: Regular Papers*, 59 (11), pp. 2629-2637, 2012.

14. Quan Zhou, Shiji Song, Cheng Wu and Gao Huang. Kernelized LARS-LASSO for constructing radial basis function neural networks. *Neural Computing and Applications*, 23(7-8), pp. 1969-1976, 2013.

Technical Reports

1. Q Xu, G Huang, Y Yuan, C Guo, Y Sun, F Wu, K Weinberger. An empirical study on evaluation metrics of generative adversarial networks. *Technical Report*, 2018.

2. Geoff Pleiss*, Danlu Chen*, Gao Huang, Tongcheng Li, Laurens van der Maaten and Kilian Q. Weinberger. Memory-Efficient Implementation of DenseNets. *Technical Report*, 2017.

*** Equal contribution**

Teaching Experience	Guest Lecturer for *Advanced Machine Learning* Instructor: Professor Kilian Weinberger Department of Computer Science, Cornell University	Fall 2017
	Teaching Assistant for *Applied Stochastic Process* Instructor: Professor Shiji Song Department of Automation, Tsinghua University	Fall 2010, 2011, 2012