Hao Zhang

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Research Interest

Large-scale machine learning, deep learning, computer vision, distributed systems

Education

Robotics Institute, School of Computer Science, Carnegie Mellon University
Ph.D. in Robotics, 2014 - 2019 (expected)
M.S. in Robotics, 2014 - 2016
Advisor: Prof. Eric Xing

Department of Computer Science and Engineering, Shanghai Jiao Tong University
M.S. in Computer Science, 2011 - 2014
Advisor: Prof. Liqing Zhang

School of Computer Science and Engineering, South China University of Technology
B.E. in Computer Science, the Elite Class of Computer Science, 2008 - 2011

Experience

Symphony Team, Petuum Inc.
Director of Scalable ML, Research Scientist, December 2017 – present.

Sailing Lab, Machine Learning Department, Carnegie Mellon University.
Research Assistant, September 2014 – December 2017.

Petuum Inc.
Research Intern, May 2017 – August, 2017.

Visual Computing Group, Microsoft Research (Asia).
Research Intern, July 2013 - January 2014.

Windows Server and System Center Group, Microsoft.
SDE Intern, September 2012 – April 2013.

Center for Brain-like Computing& Machine Intelligence, Shanghai Jiao Tong University.
Research Assistant, September 2011 – March 2014.

Intelligent Software and Robot Laboratory, South China University of Technology.
Research Assistant, March 2010 – June 2011.

Publications and Manuscripts

Journals

Zhicheng Yan, **Hao Zhang**, Baoyuan Wang, Sylvain Paris, and Yizhou Yu. Automatic Photo Adjustment Using Deep Neural Networks. In *ACM Transactions on Graphics*. (**TOG Vol 35, 2016**).

Ye Liu, **Hao Zhang**, Min Chen, and Liqing Zhang. A Boosting-Based Spatial-Spectral Model for Stroke Patients' EEG Analysis in Rehabilitation Training. In *IEEE Transactions on Neural System and Rehabilitation Engineering*, 2015.

Ye Liu, Mingfen Li, **Hao Zhang**, Hang Wang, Junhua Li, Jie Jia, Yi Wu, Jianting Cao, and Liqing Zhang. A Tensor-based Scheme for Stroke Patients' Motor Imagery EEG Analysis in BCI-FES Rehabilitation Training. In *Journal of Neuroscience Methods*, 2013.

Proceedings

Hao Zhang*, Shizhen Xu*, Graham Neubig, Qirong Ho, Guangwen Yang, and Eric P. Xing. Cavs: An Efficient Runtime System for Dynamic Neural Networks. In *USENIX Annual Technical Conference*. (**ATC 2018**, **Oral**, **AISys@SOSP 2017**, **MLSys@NIPS 2017**) (* indicates equal contributions).

Hao Zhang*, Zhijie Deng*, Xiaodan Liang, Luona Yang, Shizhen Xu, Jun Zhu, and Eric P. Xing. Structured Generative Adversarial Networks. In *The Annual Conference on Neural Information Processing Systems*. (**NIPS 2017**) (* indicates equal contributions).

Xiaodan Liang, Zhiting Hu, **Hao Zhang**, Chuang Gan, and Eric P. Xing. Recurrent Topic-Transition GAN for Visual Paragraph Generation. In *International Conference on Computer Vision*. (**ICCV 2017**).

Hao Zhang, Zeyu Zheng, Shizhen Xu, Wei Dai, Qirong Ho, Xiaodan Liang, Zhiting Hu, Jinliang Wei, Pengtao Xie, and Eric P. Xing. Poseidon: An Efficient Communication Architecture for Distributed Deep Learning on GPU Clusters. In *USENIX Annual Technical Conference*. (**USENIX ATC 2017**, **Oral**).

Hao Zhang, Zhiting Hu, Jinliang Wei, Pengtao Xie, Gunhee Kim, Qirong Ho, and Eric Xing. Poseidon: A System Architecture for Efficient GPU-based Deep Learning on Multiple Machines. In *USENIX Annual Technical Conference*. (**USENIX ATC 2016**, **Poster**, **MLSys@ICML 2016**, **Spotlight**).

Hao Zhang, Zhiting Hu, Yuntian Deng, Mrinmaya sachan, Zhicheng Yan, and Eric Xing. Learning Concept Taxonomies from Multi-modal Data. In *The Annual Meeting of the Association for Computational Linguistics*. (**ACL 2016**, **Oral**).

Zhicheng Yan, **Hao Zhang**, Baoyuan Wang, Sylvain Paris, and Yizhou Yu. Automatic Photo Adjustment Using Deep Neural Networks. In *International Conference on Computational Photography*. (**ICCP 2016**, **Invited Poster**).

Henggang Cui, **Hao Zhang**, Gregory R. Ganger, Phillip B. Gibbons, and Eric Xing. GeePS: Scalable Deep Learning on Distributed GPUs with a GPU-specialized Parameter Server. In *European Conference on Computer Systems*. (**EuroSys 2016**).

Jincheng Mei, **Hao Zhang**, and Baoliang Lu. On the Reducibility of Submodular Functions. In *International Conference on Artificial Intelligence and Statistics*. (**AISTATS 2016**).

Zhicheng Yan, **Hao Zhang**, Robinson Piramuthu, Vignesh Jagadeesh, Dennis DeCoste, Wei Di, and Yizhou Yu. HD-CNN: Hierarchical Deep Convolutional Neural Network for Large Scale Visual Recognition. In *International Conference on Computer Vision*. (**ICCV 2015**).

Hao Zhang, Gunhee Kim, and Eric Xing. Dynamic Topic Modeling for Monitoring Market Competition from Online Text and Image Data. In *ACM SIGKDD Conference on Knowledge Discovery and Data Mining*. (**KDD 2015**, **Oral**).

Ye Liu*, **Hao Zhang***, and Liqing Zhang. Common Spatial-Spectral Boosting Pattern for Brain-Computer Interface. In *European Conference on Artificial Intelligence* . (**ECAI 2014**) (* indicates equal contributions).

Hao Zhang, Ye Liu, Jianyi Liang, Jianting Cao, and Liqing Zhang. Gaussian Mixture Modeling in Stroke Patients' Rehabilitation EEG Data Analysis. In *Annual International Conference of the IEEE Engineering in Medicine and Biology Society*. (**EMBC 2013**).

Ye Liu, Mingfen Li, **Hao Zhang**, Junhua Li, Jie Jia, Yi Wu, Jianting Cao, and Liqing Zhang. Single-Trial Discrimination of EEG Signals for Stroke Patients: A General Multi-Way Analysis. In *Annual International Conference of the IEEE Engineering in Medicine and Biology Society*. (**EMBC 2013**).

Manuscripts

Wei Dai, Joseph Doyle, Xiaodan Liang, **Hao Zhang**, Nanqing Dong, Yuan Li, and Eric P. Xing. SCAN: Structure Correcting Adversarial Network for Chest X-rays Organ Segmentation. In **arXiv 1703.08770, 2017**.

Hao Wang, Xiaodan Liang, **Hao Zhang**, Dit-Yan Yeung, and Eric P. Xing. ZM-Net: Real-time Zero-shot Image Manipulation Network. In **arXiv 1703.07255, 2017**.

Zhicheng Yan, **Hao Zhang**, Yangqing Jia, Thomas Breuel, and Yizhou Yu. Combining the Best of Convolutional Layers and Recurrent Layers: A Hybrid Network for Semantic Segmentation. In **arXiv 1603.04871, 2016**.

Software and Code

DyNet: The Dynamic Neural Network Toolkit.
Source code available at https://github.com/clab/dynet/.

GeePS: Scalable Deep Learning on Distributed GPUs with a GPU-specialized Parameter Server.
Source code available at https://github.com/cuihenggang/geeps.

Poseidon: Distributed Deep Learning Framework on Petuum.
Software available at http://poseidon-release.readthedocs.io/en/latest/.

HD-CNN: Hierarchical Deep Convolutional Neural Network for Large Scale Visual Recognition.
Source code available at https://github.com/stephenyan1984/caffe-public.

Context-aware Photo Editing Toolkit.
Source code and dataset available at https://github.com/stephenyan1984/dl-image-enhance.

Awards and Honors

Nvidia Pioneer Research Award, 2017.

Student Grant, NIPS 2017, ICML 2016, KDD 2015.

Excellent Graduates (top 5%), Shanghai Jiao Tong University, 2014.

Scholarship for Graduates, Shanghai Jiao Tong University, 2011 - 2014.

Google Excellence Scholarship (National wide), Google Inc., 2013.

Early Graduate Honor (top 1%), South China University of Technology, 2011.

Excellent Undergraduates, South China University of Technology, 2008 - 2011.

1st Class Scholarship (top 10%), South China University of Techonology, 2008 - 2011.

Teaching Experience

Teaching Assistant in Carnegie Mellon University, Pittsburgh, PA.
10-701, Introduction to Machine Learning. Instructors: Eric Xing and Ziv Bar-Joseph, Fall 2015.

Teaching Assistant in Shanghai Jiao Tong University, Shanghai, China.
Artificial Intelligence for ACM Class. Instructors: Prof. Liqing Zhang, Spring 2012.

Professional Activities

Program Committee. UAI 2018.

Reviewer. NIPS 2018, UAI 2018, NACCL HLT 2018, SOSP 2017, CVPR 2016, ICCV 2015, TPAMI, SCIS, IET Computer Vision, MVAP, TCC, VLDB.

Volunteer. ICML 2016, KDD 2015.

Talks

Machine Learning System Workshop, December 2017. Cavs: A Vertex-centric Programming Interface for Dynamic Neural Networks.

USENIX Annual Technical Conference, July 2017. Poseidon: An Efficient Communication Architecture for Distributed Deep Learning on GPU Clusters.

Annual meeting of the Association for Computational Linguistics, August 2016. Learning Concept Taxonomies from Multi-modal Data.

Database Seminar, Carnegie Mellon University, Feb 2016. Dynamic Topic Modeling for Monitoring Market Competition from Online Text and Image Data.

Machine Learning Lunch Seminar, Carnegie Mellon University, Feb 2015. Poseidon: A System Architecture for Large-scale Distributed Deep Learning on GPU Clusters with Commodity Hardware.

ACM SIGKDD Conference on Knowledge Discovery and Data Mining, Sydney, Aug 2015. Dynamic Topic Modeling for Monitoring Market Competition from Online Text and Image Data.

Patents

A System with Hybrid Communication Strategy for Large-scale Distributed Deep Learning (Pending).