Jiaji Huang

CONTACT INFORMATION

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RESEARCH INTERESTS

My research interest lies in the intersection of signal processing, machine learning and information theory. I design novel algorithms for a wide range of signal reconstruction and classification problems. I also work on theories that predict the behavior of algorithms. Representative works cover topics in imaging, speech recognition and language modeling.

EMPLOYMENT

July, 2016 — **Research Scientist, Baidu Silicon Valley AI Lab**

Projects (inverse chronological order):
- Simultaneous Machine Translation (ongoing)
- Stability of Word Embedding (ongoing)
- Large Margin Neural Language Models: language model for speech recognition (1.11 WER reduction) and machine translation (0.96 BLEU increase).
- Improved optimization of CTC loss: smaller CTC loss by using estimated alignments
- Active learning for speech recognition: 50% fewer labels, but comparable accuracy

EDUCATION

May, 2016, **Ph.D, Electrical and Computer Engineering, Duke University**

Advisor: Robert Calderbank

July, 2011, **B.S., Electrical Engineering, University of Science and Technology of China**

JOURNAL PUBLICATIONS

J. Huang, Q. Qiu and R. Calderbank. The Role of Principal Angles in Subspace Classification. IEEE Transaction on Signal Processing, vol. 64, no. 8, 2016, 1933-1945.

J. Huang, Q. Qiu, R. Calderbank and G. Sapiro. *GraphConnect*: A Regularization Framework for Neural Networks. arXiv preprint arXiv:1512.06757, 2015.

L. Wang*, **J. Huang***, X. Yuan*, K. Krishnamurthy, J. Greenberg, *et. al.* Signal Recovery and System Calibration from Multiple Compressive Poisson Measurements, SIAM Journal on Imaging Sciences (SIIMS), vol. 8, no. 3, 1923-1954, 2015. (∗: equal contribution)

Y. Xie, **J. Huang**, and R. Willett. Changepoint detection for high-dimensional time series with missing data, IEEE Journal of Selected Topics on Signal Processing (J-STSP), vol. 7, no. 1, pp. 12-27. 2013.

Y. Zhou, Z. Ye, and **J. Huang**. Improved decision-based detail-preserving variational method for removal of random-valued impulse noise, IET Image Processing, Vol. 6, no. 7, pp. 976-985, 2012.

CONFERENCE

J. Huang, Y. Li, P. Wei and L. Huang. Large Margin Neural Language Model. In Empirical Methods in Natural Language Processing (EMNLP) 2018.

W. Wang , Z. Gan, W. Wang, D. Shen, **J. Huang**, W. Ping, S. Satheesh, and L. Carin. Topic Compositional Neural Language Model. AISTATS 2018.

W. Zhu, Q. Qiu, **J. Huang**, R. Calderbank, G. Sapiro, and I. Daubechies, LDMNet: low dimensional manifold regularized neural networks. CVPR 2018.

J. Huang, Q. Qiu, R. Calderbank and G. Sapiro. Discriminative Robust Transformation Learning. Neural Information Processing Systems (NIPS), 2015.

J. Huang, Q. Qiu, R. Calderbank and G. Sapiro. Geometry-aware Deep Transform. International Conference on Computer Vision (ICCV), 2015.

L. Wang, **J. Huang**, X. Yuan, V. Cevher, M. Rodrigues, R. Calderbank, L. Carin. A concentration-of-measure inequality for multiple-measurement models, 2015 IEEE International Symposium on Information Theory (ISIT).

J. Huang, Q. Qiu, R. Calderbank, M. Rodrigues and G. Sapiro. Alignment with Intra-class Structure can imporve classification. 40th IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2015.

J. Huang, X. Yuan, and R. Calderbank. Multiscale bayesian reconstruction of compressive X-Ray image. 40th IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2015.

J. Huang, X. Yuan, and R. Calderbank. Collaborative compressive X-Ray Image reconstruction. 40th IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2015.

X. Yuan and **J. Huang**. Polynomial-phase signal direction-finding and source-tracking with a single accoustic vector sensor. 40th IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2015.

J. Huang and X. Ning. Latent Space Tracking from Heterogeneous Data with an Application for Anomaly Detection. Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD) 2015.

Workshops

J. Huang, R. Child, V. Rao, H. Liu, S. Satheesh and A. Coates, Active Learning for Speech Recognition: the Power of Gradients. Workshop of Neural Information Processing Systems on Continual Learning and Deep Networks (NIPS-CLDL), 2016.

J. Huang and R. Calderbank, Modulator design for binary classification of poisson measurements. UCL-Duke Workshop on Sensing and Analysis of High-Dimensional Data (SAHD) 2014.

Y. Xie, **J. Huang**, and R. Willett. Multiscale online tracking of manifolds, 2012 IEEE Statistical Signal Processing Workshop (SSP).

Patent Applications

X. Ning, **J. Huang**, and G. Jiang, Online sparse regularized joint analysis for heterogeneous data, US20150095490 A1, 2015.

Other Experience

Reviewer for Journals and Conferences

- IEEE Transactions on Signal Processing
- IEEE Transactions on Knowledge and Data Engineering
- International Conference on Machine Learning (ICML)
- International Conference on Acoustics, Speech and Signal Processing (ICASSP)
- IEEE International Workshop on machine learning for signal processing (MLSP)
- Global Conference on Signal and Information Processing (GlobalSip)
- International Conference on Image Processing (ICIP)

Research Intern at NEC Labs America, Summer, 2013

- Anomaly detection on heterogeneous time series (Supervisor: Dr. Xia Ning)

Awards	Student Travel Award, International Conference on Computer Vision (ICCV) 2015 Student Travel Grant, Duke University, 2014 Duke graduate school Fellowship, 2011-2012 Distinguished Graduate, University of Science and Technology of China, 2011
Programing Skills	Deep learning frameworks (Tensorflow, pyTorch, Caffe) Python, C/ C++, Matlab, LaTeX.