Jiaji Huang

CONTACT
INFORMATION

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RESEARCH
INTERESTS

My PhD desertation is mostly on statistical signal processing and machine learning, with a special interest in understanding how geometry of high dimensional space would impact various tasks, including signal reconstruction, representation and classification, etc. My recent research interest is mainly in computational linguistics and natural language processing. I enjoy problems that are less driven by the amount of supervised data. For example, language modeling and word embedding/semantics are two very recent and representative directions I am working on.

EMPLOYMENT

July, 2016 — Now   **Senior Research Scientist, Baidu Research**

Representative Research Projects (inverse chronological order)

- Bilingual Lexicon Induction
  Key results: *State-of-art* on MUSE benchmark by facebook; open source at HNN
- Large Margin Neural Language Models
  Key results: *1.11 WER reduction* for speech recognition and *0.96 BLEU improvement* for machine translation
- Improved optimization of CTC loss
  Key results: smaller CTC loss by using estimated alignments
- Active learning for speech recognition
  Key results: *50% fewer labels*, but comparable accuracy

EDUCATION

April, 2016   **PhD, Electrical and Computer Engineering, Duke University**

Thesis Advisor: *Claude E. Shannon Award Winner* Robert Calderbank

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

with Honor: Distinguished graduate, National Scholarship

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, V. Cevher, M. Rodrigues, D. Brady, R. Calderbank, and L. Carin. 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**, Q. Qiu and K. Church. Hubless Nearest Neighbor Search for Bilingual Lexicon Induction. In Proceedings of the 57th Conference of the Association for Computational Linguistics (ACL) 2019.

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. International Conference on Artificial Intelligence and Statistics (AISTATS) 2018.

W. Zhu, Q. Qiu, **J. Huang**, R. Calderbank, G. Sapiro, and I. Daubechies, LDMNet: low dimensional manifold regularized neural networks. IEEE Conference on Computer Vision and Pattern Recognition (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, IEEE International Symposium on Information Theory (ISIT) 2015.

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.

PROFESSTIONAL EXPERIENCE

Reviewer for Journals and Conferences
- IEEE Transactions on Signal Processing
- IEEE Transactions on Knowledge and Data Engineering
- International Conference on Machine Learning (ICML)
- Association for the Advancement of Artificial Intelligence (AAAI)
- International Joint Conference on Artificial Intelligence (IJCAI)
- International Conference on Acoustics, Speech and Signal Processing (ICASSP)
- Global Conference on Signal and Information Processing (GlobalSip)
- International Conference on Image Processing (ICIP)

Research Intern at NEC Labs America
    May — Aug. 2013   Anomaly detection on heterogeneous time series (Advisor: Dr. Xia Ning)

Teaching Assistant in Department of ECE of Duke

- Spring, 2013   ECE 585: Signal Detection and Extraction
- Fall, 2013   ECE 590: Information Theory

AWARDS

Outstanding Researcher Award, Baidu Research, 2019
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
National Scholarship, 2011

PROGRAMING SKILLS

Python, C\C++, Matlab, deep learning frameworks (Tensorflow, pyTorch, etc.), LaTeX