

He Lyu

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Education

Michigan State University

PhD Student in Computation Mathematics, Science and Engineering. GPA: 4.00/4.00

- Advisor: Dr. Rongrong Wang

East Lansing, MI

Aug. 2018 - present

Fudan University

MS Student in Computational Mathematics

Shanghai, China

Sept. 2016 - Jun. 2018

Fudan University

BS in Mathematics and Applied Mathematics

Shanghai, China

Sept. 2012 - Jun. 2016

- Minor in Economics

Research Interests

- Machine Learning
- Compressed Sensing
- Optimization

Research Experience

Michigan State University-Dept of CMSE

Graduate Research Assistant

East Lansing, MI

Aug. 2018-present

- Proposed and analyzed an adaptive quantization method for direct digital image acquisition that yields a better information conversion rate than the state-of-the-art method in cameras. Joint work with Rongrong Wang et al., manuscript under review.
- Proposed and analyzed an algorithm that extends robust principal component analysis (RPCA) to nonlinear manifolds, which can be applied to manifold denoising tasks. Joint work with Rongrong Wang et al., published at NeurIPS 2019.
- Proposed a unified framework to establish perturbation bounds for the left and right singular spaces, which greatly simplifies the proofs of some existing results as well as provides improved error bounds. Joint work with Rongrong Wang, manuscript in prep.

Fudan University-Dept of Mathematics and Applied Mathematics

Shanghai, China

- Thesis: "A review on variance reduction based stochastic gradient descent methods". Reasearched and compared large-scale optimization algorithms based on variance reduction for stochastic gradient descent (SGD), including SVRG, SAGA, SAG, etc.

Feb. 2016-Jun. 2016

Presentations

Jun. 2019. *Image Reconstruction from Sigma Delta Quantization using Super-Resolution Techniques*. Poster presentation: UTD 2019 workshop(MSDAS), Dallas, TX.

Dec. 2019. *Manifold Denoising by Nonlinear Robust Principal Component Analysis*. Poster presentation: Thirty-third Conference on Neural Information Processing Systems, Vancouver, Canada.

Teaching Experience

Spring 2020 **Numerical Linear Algebra CMSE 823**, Teaching Assistant

MSU

Fall 2019 **Applied Machine Learning in the Physical and Life Sciences CMSE 890-005**, Teaching Assistant

MSU

Awards and Achievements

- 2019 **CMSE Outstanding Early Student Award**, Michigan State University
- 2017 **National Scholarship**, Fudan University
- 2017 **Second Place of Amateur Woman Group in the Ying's Cup National University Go(Weiqi) Competition**, Xi'an, China
- 2015 **First Prize Scholarship**, Fudan University
- 2014 **Third Prize in the National University Students Mathematics Modeling Contest**, Shanghai division, China
- 2010 **Second Place in the Shanxi Province Go Tournament**, Taiyuan, China

Software Skills

- MATLAB
- Python(PyTorch, TensorFlow)
- Latex
- C

Other Skills

- Proficient in Go(Weiqi), Amateur 5-dan Go Player

Publications

CONFERENCE PAPER

Lyu H, Sha, N., Qin, S., Yan, M., Xie, Y. and Wang, R., 2019. Manifold Denoising by Nonlinear Robust Principal Component Analysis. In Advances in Neural Information Processing Systems (pp. 13390-13400).

IN REVIEW

Lyu, H. and Wang, R., 2020. Sigma Delta quantization for images. arXiv preprint arXiv:2005.08487.