

Wenqing Zheng

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Professional Summary

- Creative machine learning researcher, experienced with graph neural networks, meta learning and reinforcement learning. Fluent at idea-algorithm transformation.

Education

Ph.D. Electrical and Computer Engineering Since Aug. 2018
The University of Texas at Austin GPA: 3.83
Advisor: Zhangyang (Atlas) Wang
Academic Track: Decision, Information, and Communications Engineering (DICE)

B.S. in Telecommunications Engineering Jun. 2018
Beijing University of Posts and Telecommunications GPA: 3.89, *summa cum laude*

Research Experience

Deep Learning Research Assistant, *UT Austin,* Aug.2018 – Present
Selected Projects:

Vision-Based Decentralized Controllers for UAV Swarms

- Participate in Army Research Lab project; perform decentralized control for large UAV flock; Work elected as one of 10 best researches in 2020 by Army Research Lab;
- Cascade the visual detector with graph neural network and train the controller in an end-to-end style; work submitted to *IEEE Trans. on Signal Processing*;

Interpretable and Scalable Learning to Optimize via Symbolic Distillation

- Parse out symbolic optimization equation by first training an LSTM, then distill the learned numerical rule into the symbolic rule; Bridges the world of symbolic and numerical optimization models;
- Propose a quantitative complexity metric and a unified analyzing framework for the learned numerical meta-optimizers;
- Fine tune the light-weight symbolic rule with trainable re-parameterization; work submitted to *ICML 2021*;

Joint User Position and Channel Estimation

- Tackle with the GPS-unavailable scenario: localizing a 5G device only using the communication signals, and jointly estimate the channel;
- Proposed a compressive sensing minimization approach that better leverages the architecture constraint in the hybrid MIMO systems; outperformed the state-of-the-art accuracy;

Video Assisted Vehicle Ego-Motion Tracking

- Address the vehicle self-motion tracking problem with monocular camera video input. Concatenate feature transformer with pre-trained optical flow estimator.

Computer Vision Research Assistant, *BUPT,* Sept.2015 – Feb.2016

- Proposed a novel image quality assessment (IQA) algorithm based on Markov-Constrained Fuzzy C-Means clustering and information entropy; Work published at *ICIP 2019*.

Internship Experience

Reinforcement Learning Research Intern

GEIRI North America,

San Jose, CA,

May.2020 – Aug.2020

- Participate in NeurIPS 2020 challenge “Learning to Run Power Network”; Train a Soft Actor-Critic based agent to make discrete decisions within huge discrete action space;
- Feature aggregation with graph propagation; using Monte Carlo Tree Search and action space representation to guide exploration and exploitation.

Publications

- **Wenqing Zheng**, Tianlong Chen, Tingkuei Hu, Zhangyang Wang, Towards More Interpretable and Scalable Learning to Optimize via Symbolic Distillation, *submitted to ICML 2021*
- Xu Y, **Zheng W**, Qi J, et al. Blind Image Blur Assessment Based on Markov-Constrained FCM and Blur Entropy, 2019 IEEE International Conference on Image Processing (ICIP). IEEE, 2019: 4519-4523.
- Ting-Kuei Hu, Fernando Gama, Tianlong Chen, **Wenqing Zheng**, Zhangyang Wang, Alejandro Ribeiro and Brian M. Sadler, VGAI: End-to-End Learning of Vision-Based Decentralized Controllers for Robot Swarms, *Under Review by IEEE Transactions on Signal Processing*
- **Wenqing Zheng**, Nuria Gonzalez-Prelcic, Joint position, orientation and channel estimation in hybrid mmWave MIMO systems, *Asilomar2019*
- **Wenqing Zheng**, Anum Ali, Nuria Gonzalez-Prelcic, Robert W. Heath Jr. and Ehsan Moradi, 5G V2X communication at millimeter wave: rate maps and use cases, *VTC2020*
- Hao Yang, Jianan Zhao, **Wenqing Zheng**, Jianguo Yu*, Large Data Throughput Optimization Model with Full order C moment Model Parallel Flow Number Prediction Optical Domain, *TELKOMNIKA*, Vol.14, No.2A, June 2016, pp. 10~17.
- **Wenqing Zheng**, Wenjun Xu*, *et al.*, A New Cyclic Cumulants Based Doppler Estimation Method in UAV Channels, *Chinese Patent*, 2019.

Mathematical / Programming Skills

Programming Skills:

- Python (Pytorch, Tensorflow, MXNet, Scikit-learn), JAVA, C++, MATLAB, Latex;
- Fluent with TB-level data processing under Linux environment.

Math background/Machine Learning Tools:

- Statistical machine learning, Deep Learning, Reinforcement Learning, Signal Processing;
- Probability & Stochastic Process, (Non-)Convex Optimization, Statistical Methods in Data Mining.

Problem-Solving and Entrepreneurial Skills:

- Think creatively; strongly desired and skilled to test out and iterate new ideas rapidly;
- Adept at identifying goals, establishing a reasonable timeline and anticipate possible challenges;
- Apt at building consensus among group discussions and delivering presentations.

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Honors

- **First prize** in Chinese National Undergraduate Mathematical Contest (30 out of 8k)
- **Champion** in China Next-Generation Network Innovation Contest (out of 300 teams)
- Honorable Mention in MCM/ICM Contest (top 10%)
- Undergrad national first-class scholarship
- **First prize** in the National Physics Contest for College Students (5% out of 3k)