WEI WEI

Dept. Electrical & Computer Engineering, Northwestern University, Evanston, IL
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EDUCATION

Northwestern University *2018/09 - 2023/12*
Ph.D. in Electrical Engineering. Advisor: Prof. Ying Wu *Evanston, IL*

Xi'an Jiaotong University *2015/09 - 2018/06*
M.S. in Statistics. Advisor: Prof. Zongben Xu and Prof. Deyu Meng *Xi'an, Shaanxi, China*

Xi'an Jiaotong University *2011/09 - 2015/06*
B.S. in Mathematics. (Everest Honored Program) *Xi'an, Shaanxi, China*

RESEARCH INTERESTS

◇ **Machine Learning**
– *Trustworthy, Security, Reliability: Adversarial Robustness, Out-of-Distribution Generalization*
– *Probabilistic methods: Bayesian methods, Variational Inference, Uncertainty Quantification*
– *General Machine Learning: Few-Shot Learning, Meta Learning, Continual Learning*

◇ **Computer Vision**
– *Image processing and low-level vision: visual quality enhancement under unsatisfactory imagery*
– *Visual sensing and understanding: 2D/3D human pose estimation, object detection*

PUBLICATIONS

https://scholar.google.com/citations?user=BlApk24AAAAJ&hl=en

Probabilistic methods, Uncertainty Modeling, Variational Inference

[1] **Wei Wei**, Jiahuan Zhou and Ying Wu. Class-Context-Aware Phantom Uncertainty Modeling. *under review of The Twelfth International Conference on Learning Representations* (**ICLR**), 2024.

[2] **Wei Wei**, Jiahuan Zhou and Ying Wu. Variational Aleatoric Uncertainty Modeling. *in submission to IEEE Transactions on Pattern Analysis and Machine Intelligence* (**T-PAMI**), 2023.

[3] **Wei Wei**, Jiahuan Zhou, Hongze Li and Ying Wu. ALUM: Adversarial Data Uncertainty Modeling from Latent Model Uncertainty Compensation. *arXiv preprint arXiv:2303.16866*, 2023.

Adversarial Robustness

[4] **Wei Wei**, Jiahuan Zhou and Ying Wu. Beyond Empirical Risk Minimization: Local Structure Preserving Regularization for Improving Adversarial Robustness. *arXiv preprint arXiv:2303.16861*, 2023.

Few-Shot Learning, Meta Learning, Continual Learning

[5] Mingfu Liang, Jiahuan Zhou, **Wei Wei**, Ying Wu. Balancing between Forgetting and Acquisition in Incremental Subpopulation Learning. *European Conference on Computer Vision* (**ECCV**), 2022.

[6] **Wei Wei**, Haonan Yu, Haichao Zhang, Wei Xu and Ying Wu. MetaView: Learning to View 3D Objects from Few Samples. *arXiv preprint arXiv:2103.04242*, 2021.

[7] Lei Fan, Peixi Xiong, **Wei Wei**, and Ying Wu. FLAR: A Unified Prototype Framework for Few-sample Lifelong Active Recognition. *IEEE International Conference on Computer Vision* (**ICCV**), 2021.

Computer Vision and Image Processing

[8] **Wei Wei**, Hao Kang, Li Guan, Yue Liu, Haoxiang Li, Ying Wu, Gang Hua. Beyond Visual Attractiveness: Physically Plausible Single Image HDR Reconstruction. *arXiv preprint arXiv:2103.12926*, 2021.

[9] Lixuan Yi, Qian Zhao, **Wei Wei**, Zongben Xu. Robust online rain removal for surveillance videos with dynamic rains. *Knowledge-Based Systems* (**KBS**), 2021.

[10] **Wei Wei**, Deyu Meng, Qian Zhao, Zongben Xu and Ying Wu. Semi-supervised Transfer Learning for Image Rain Removal. *IEEE Conference on Computer Vision and Pattern Recognition* (**CVPR**), 2019.

[11] Minghan Li, Qi Xie, Qian Zhao, **Wei Wei**, Shuhang Gu, Jing Tao and Deyu Meng. Video Rain Streak Removal By Multiscale Convolutional Sparse Coding. *IEEE Conference on Computer Vision and Pattern Recognition* (**CVPR**), 2018.

[12] **Wei Wei**, Liyuan Yi, Qi Xie, Qian Zhao, Deyu Meng and Zongben Xu. Should We Encode Rain Streaks in Video as Deterministic or Stochastic? *IEEE International Conference on Computer Vision* (**ICCV**), 2017.

EXPERIENCE

Research Assistant, Computational Vision Lab, Northwestern University *2018/09- now*
Advisor: Prof. Ying Wu *Evanston, IL*

University Research Program Lead, hosted by Ford Motor Company *2019/09- 2022/08*
Title: Visual Occupant Sensing and Action Understanding for Proactive Passenger Safety
– Developed a proactive in-cabin visual occupant sensing prototype system for real-time detection, classification, and tracking of passengers and for understanding basic human actions in the autonomous vehicle for safety applications.
– Collaborate with Ford Motor Company and Purdue University

Research Intern, Wormpex AI Research *2020/06- 2020/09*
Mentor: Dr. Gang Hua *Bellevue, WA*
Title: Physically Plausible Single Image HDR Reconstruction for Spherical Panoramas
– Proposed a novel HDR reconstruction method that can generate HDR with the advantage of physical plausibility; collected a new dataset that contains 8k HDR panoramas with measured ground truth illuminance to facilitate the research community.

Research Intern, General AI Lab, Horizon Robotics *2019/06- 2019/09*
Mentor: Prof. Wei Xu *Cupertino, CA*
Title: Few-shot Active Object Recognition
– Present a novel problem of active recognition in the context of few-shot learning; proposed a meta-learning approach to simultaneously learn the viewing policy and recognizer from very few samples, overcoming the limitations of the state-of-the-art active recognition methods.

SERVICE

Conference Reviewer

IEEE Conference on Computer Vision and Pattern Recognition (CVPR) *2019∼now*

IEEE International Conference on Computer Vision (ICCV) *2019∼now*

European Conference on Computer Vision (ECCV) *2020∼now*

International Conference on Learning Representations (ICLR) *2021∼now*

Neural Information Processing Systems (NeuIPS) *2021∼now*

International Conference on Machine Learning (ICML) *2022∼now*

Association for the Advancement of Artificial Intelligence (AAAI) *2020*

IEEE International Conference on Multimedia and Expo (ICME) *2020*

IEEE Winter Conference on Applications of Computer Vision (WACV) *2021∼2022*

Asian Conference on Computer Vision (ACCV) *2020*

Journal Reviewer

International Journal of Computer Vision (IJCV)

IEEE Transactions on Multimedia (TMM)

IEEE Transactions on Dependable and Secure Computing (TDSC)

IEEE Access

IEEE Signal Processing Letters (SPL)

TEACHING EXPERIENCE

Teaching Assistant, Northwestern University *Fall quarter, 2023*
ECE-375/475: Machine Learning: Foundations, Applications, and Algorithms
Instructor: Prof. Aggelos K Katsaggelos

Teaching Assistant, Northwestern University *Fall quarter, 2022*
ECE-332: Introduction to Computer Vision
Instructor: Prof. Ying Wu

Teaching Assistant, Xi'an Jiaotong University *Fall quarter, 2016*
Advanced Mathematical Statistics.

AWARDS AND FELLOWSHIPS

Terminal Year Fellowship, Northwestern University *2023*

The Murphy Fellowship, Northwestern University *2018*

Excellent Graduate Award, Xi'an Jiaotong University *2018*

Philip K H Wong Foundation Fellowship, Xi'an Jiaotong University *2017*

Siyuan Fellowship, Xi'an Jiaotong University *2012*

SKILLS

Programming Languages and Frameworks Python, PyTorch, TensorFlow, MATLAB, C++