

WEI WEI

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

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EDUCATION

Northwestern University

Ph.D. in Electrical Engineering. Advisor: Prof. Ying Wu

2018/09 - 2023/12

Evanston, IL

Xi'an Jiaotong University

M.S. in Statistics. Advisor: Prof. Zongben Xu and Prof. Deyu Meng

2015/09 - 2018/06

Xi'an, Shaanxi, China

Xi'an Jiaotong University

B.S. in Mathematics. (Everest Honored Program)

2011/09 - 2015/06

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 <i>ECE-375/475: Machine Learning: Foundations, Applications, and Algorithms</i> <i>Instructor: Prof. Aggelos K Katsaggelos</i>	<i>Fall quarter, 2023</i>
Teaching Assistant , Northwestern University <i>ECE-332: Introduction to Computer Vision</i> <i>Instructor: Prof. Ying Wu</i>	<i>Fall quarter, 2022</i>
Teaching Assistant , Xi'an Jiaotong University <i>Advanced Mathematical Statistics.</i>	<i>Fall quarter, 2016</i>

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++