Weijia Fan

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Education

Exchange Student — *Karlsruhe Institute of Technology*
Research Stay — *Jun. 2025 - Nov. 2025*
Topic: Panoramic Scene Understanding
Supported by Shenzhen University Overseas Exchange Study Scholarship

Master's degree in Computer Technology — *Shenzhen University*
Master of Engineering — *Sep. 2023 - Jun. 2026*
Final GPA: 3.65/4.0
Thesis: Tripartite Synergistic Learning on Class-imbalanced Scenario

Bachelor's degree in IOT, minor in Economics — *Harbin University of Commerce*
Bachelor of Engineering (major) and Economics (minor) — *Sep. 2019 - Jun. 2023*
Final GPA: 3.67/4.0, Rank: 1/118
Thesis: Research on River Floating Debris Detection Based on Deep Learning (link)

Experience

Panorama-Language Model — *Jun. 2025 - Nov. 2025*
Visiting Student — *CV:HCI@KIT, Karlsruhe, Germany*

- Curated a robust benchmark for panoramic vision across diverse scenarios, including normal, occlusions, and accident scenarios, to ensure thorough model training and evaluation.
- Developed the Panorama-Language Model (PLM), a well-designed model, filling the gap of existing VLMs in panoramic scene understanding and surpassing existing VLMs (+10%). (CoreA Submit.)

BCE3S for Long-tailed Recognition — *Jul. 2024 - Nov. 2024*
First Author — *Computer Vision Institute, Shenzhen, China*

- Proposed the **BCE3S** (Binary Cross-Entropy Based Tripartite Synergistic Learning) to resolve the issue where coupled classifier vectors in Cross-Entropy loss hinder tail-class representation learning, effectively decoupling feature optimization from classifier imbalance (+4% in All, +∼3% in Few).
- Designed a novel **uniform learning** that maximizes and balances classifier separability, achieving **State-of-the-Art (SOTA)** performance on four major benchmarks (e.g., CIFAR-LT, ImageNet-LT) and validating the theoretical superiority of BCE over CE. (Accepted by **AAAI 2026**).

Micro-Expression Recognition Competition — *May. 2024 - Aug. 2024*
Algorithm Developer — *Computer Vision Institute, Shenzhen, China*

- We proposed a simple yet effective algorithm, bidirectional optical flow, which effectively suppresses minute noise caused by head movements.
- To compensate for detail loss during downsampling caused by maxpooling. We proposed a wavelet-based downsampling module, surpassing the SOTA. The method achieved a final Rank of 3.

Publications & Manuscripts

- **Weijia Fan**, Qiufu Li*, Jiajun Wen, Xiaoyang Peng. BCE3S: Binary Cross-Entropy-Based Tripartite Synergistic Learning for Long-Tailed Recognition. Proceedings of the 40th AAAI Conference on Artificial Intelligence (**AAAI-26**), 2026.

- **Weijia Fan**, Yan Huang, Zhixiang Cai, Chunsong Chen, Yanxi Liu, Jiajun Wen, Xi Jia, Linlin Shen, Jiancan Zhou, Qiufu Li*. AEPL: Adaptive Empirical Prototype Learning with Dynamic Margins for Deep Face Recognition. *Pattern Analysis and Applications*, 2026.
- Weicheng Jie, Hang Xiao, **Weijia Fan**, Zihan Wang, Zitong Yu, and Linlin Shen*. "Micro-expression Recognition Based on Bidirectional Optical Flow and Wavelet Attention Mechanism." *Chinese Journal of Computers*, 2025.
- **Weijia Fan**, Ru Zhang*, Hao He, Siyu Hou, Yongbo Tan. A Short-Term Price Prediction-Based Trading Strategy. *PLOS ONE*, 2023.
- Shizhen Bai, Hao He, Chunjia Han*, Mu Yang, Dingyao Yu, Xinrui Bi, Brij B. Gupta, **Weijia Fan**, and Prabin Kumar Panigrahi. Exploring Thematic Influences on Theme Park Visitors' Satisfaction: An Empirical Study on Disneyland China. *Journal of Consumer Behaviour*, 2023.

Research Statement & Interests

My research centers on **visual recognition tasks** and **label-efficient learning**. I have developed several techniques ranging from contrastive learning for sample discrimination to uniform learning for balanced classifiers' separability. Currently, I investigate the capabilities of Vision-Language Models (VLMs) within complex, 360-degree panoramic environments.

Moving forward, I aim to advance multi-modal learning for autonomous driving, scene understanding, and document analysis by:

1. **Optimizing Learning Paradigms:** Designing novel loss functions and training strategies that enhance efficiency and stability in both visual recognition and multi-modal learning.
2. **Scaling AI Applications:** Extending the capabilities of VLMs, VLA, and Agents in high-complexity domains—specifically panoramic perception and document intelligence—to address critical performance bottlenecks.

Technical Skills

Programming Languages	Shell, Python, C/C++, MatLab, Java, LaTeX
Frameworks & Libraries	PyTorch, TensorFlow, Transformers, vLLM.
Tools & Technologies	Git, Slurm, Linux Server Maintenance (Ubuntu, CentOS).

Language Proficiencies

Mandarin	Native
English	IELTS: 6.5 (R:6.5, L:5.5, W:6.5, S:6.5)

Selected Award

2025	Shenzhen University Overseas Exchange Study Scholarship ($\leq 0.05\%$)
2024	Academic Scholarship
2024	2nd place in the Micro-Expression Recognition Competition at the CCAC
2023	Chinese National Scholarship ($\leq 0.02\%$)
2023	Harbin University of Commerce, School Scholarship
2023	Merit Student
2023	Outstanding Undergraduate Student