PENG, PEI （彭沛）

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Research Summary

I am a second-year Ph.D. student mentored by Prof. Sheng-Jun Huang in the Weakly Supervised Learning Laboratory at Nanjing University of Aeronautics and Astronautics (NUAA). My research uses ideas from **philosophy thought** (causality, counterfactual reasoning) in **image processing systems** to improve their interpretability and reliability, and to **address the problem of illusions** where models was misled into producing fake results. All of my work is based on publicly available resources, such as **wildlife photography** and airflow imaging of building air-circulation systems.

Education

Ph.D. —College of Computer Science and Technology (NUAA) 2024.4 – 2028.4 (expected)

- Major: Electronic Information (Image processing)
- Research fields: By introducing **philosophy concepts** such as **causal relationships**, we can make **image processing methods** more reliable (robust) and explainable (transparent). Currently, we can apply these methods to publicly available datasets for **wildlife research**.

Master —College of Energy and Power Engineering (NUAA) 2020.9 – 2023.6

- Major: Aeronautical Science and Technology (Systems Engineering)
- Research fields: **Non-destructive analysis of air systems in civilian buildings** (e.g., airport terminals and residential building). Used airflow imaging diagnostics to assess fault sources and lifecycle of ventilation/air-circulation systems, **helping ensure air quality and comfort**.

Bachelor —College of Energy and Power Engineering (NUAA) 2016.9 – 2020.6

- Major: Energy and Power Engineering
- Core Courses: Fluid (Air or water) Dynamics, Heat Transfer, Image Processing and Analysis

Publications

- **Peng Pei**, Xie MingKun, et al. Representation-Level Counterfactual Calibration for Debiased Zero-Shot Recognition [C]. Advances in Neural Information Processing Systems, 2025.
- Xie MingKun, Xiao JiaHao, **Peng Pei**, et al. Counterfactual reasoning for multi-label image classification via patching-based training[C]//Proceedings of the 41st International Conference on Machine Learning. 2024.
- **Peng Pei**, Zhao YongPing. Robust semi-supervised discriminant embedding method with soft label in kernel space[J]. Computing and Applications, 2022: 1-23.

Experience and Awards

- **Passed College English Test Band 6 (CET-6)、IELTS Score: 6.0**
- **Participant, IJCAI Youth Exchange Forum, Shanghai, 2023.**
- **Participant, Jiangsu Computer Society Meeting, Liyang, 2022.**
- **Second Prize (University Level), National College Student Mathematical Modeling Competition, 2020.**
- **Reviewer for NeurIPS-2025; NeurIPS-2024; ACM MM-2025; ICME-2025; ECCV-2024; CVPR2025**