

Chia-Hsiang Kao

PROFILE

I am a Computer Science Ph.D. student at Cornell and a licensed Medical Doctor from Taiwan. My research focuses on machine learning, particularly the learning dynamics and mechanism of modern machine learning and deep learning algorithms. My past research encompasses meta-learning, contrastive learning, federated learning, and medical image analysis.

EDUCATION

Cornell University

Ph.D. Student in Computer Science

Ithaca, NY, USA

Aug. 2023 - 2029 (expected)

National Yang-Ming Chiao-Tung University (NYCU)

Doctor of Medicine

Taipei, Taiwan

Aug. 2015 - Jun. 2022

LIST OF PUBLICATIONS

1. **Kao, C. H.**, & Wang, Y. C. F. (2023). FedBug: A Bottom-Up Gradual Unfreezing Framework for Federated Learning. arXiv preprint arXiv:2307.10317.
2. **Kao, C. H.**, Chiu, W. C., & Chen, P. Y. (2021). MAML is a Noisy Contrastive Learner in Classification. In International Conference on Learning Representations.
3. **Kao, C. H.**, Chen, Y. S., Chen, L. F., & Chiu, W. C. (2021). Demystifying T1-MRI to FDG18-PET Image Translation via Representational Similarity. In Medical Image Computing and Computer Assisted Intervention–MICCAI 2021: 24th International Conference, Strasbourg, France, September 27–October 1, 2021, Proceedings, Part III 24 (pp. 402-412). Springer International Publishing.
4. Huang, C. C., Low, I., **Kao, C. H.**, Yu, C. Y., Su, T. P., Hsieh, J. C., ... & Chen, L. F. (2022, July). MEG-based Classification and Grad-CAM Visualization for Major Depressive and Bipolar Disorders with Semi-CNN. In 2022 44th Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC) (pp. 1823-1826). IEEE.
5. **Kao, C. H.**, Yang, C. J., Cheng, L. K., Yu, H. Y., Chen, Y. S., Hsieh, J. C., & Chen, L. F. (2019, March). Unravelling the Spatio-Temporal Neurodynamics of Rhythm Encoding-reproduction Networks by a Novel fMRI Autoencoder. In 2019 9th International IEEE/EMBS Conference on Neural Engineering (NER) (pp. 615-618). IEEE.

RESEARCH EXPERIENCE

Prof. Volodymyr Kuleshov's Lab, Cornell University

Rotation PhD Student

Ithaca, NY, USA

Sep. 2023 - Dec. 2023

- Conducted research on DNA foundation model and long context extrapolation.
- Explored quantization techniques for large language model quantization.

Vision & Learning Lab, National Taiwan University

Research Assistant

Taipei, Taiwan

Dec. 2022 - Jul. 2023

- Developed the FedBug algorithm to address client drift in federated learning, with theoretical grounding.
- Submitted a paper to NeurIPS 2024.

Enriched Vision Application, NYCU & MIT-IBM Watson AI Lab

Research Student

Taipei, Taiwan

Jul. 2022 - Aug. 2022

- Demonstrated that MAML operates as a contrastive learning algorithm.
- Published findings in ICLR 2021.

Brain Mapping Laboratory, NYCU

Research Student

Taipei, Taiwan

Sep. 2017 - Sep. 2020

- Investigated the learning dynamics of medical image translation models.

- Published research in MICCAI 2021.

CLINICAL EXPERIENCE

Taipei Veteran General Hospital

Taipei, Taiwan

Intern Doctor

Oct. 2019 - Sep. 2020, Jan. - Jun. 2022

- Provided primary care for inpatients across various departments including Internal Medicine, Surgery, ICU, Emergency Medicine, and OB/GYN.

- Collaborated with multidisciplinary teams to ensure comprehensive patient care and treatment.

Chi Mei Medical Center

Tainan, Taiwan

Intern Doctor

Nov. 2021 - Nov. 2021

- Served in Internal Medicine and Emergency Medicine departments.

FELLOWSHIPS AND AWARDS

Student Travel Award.

MICCAI Conference, 2021

Undergraduate Research Fellowship

National Science and Technology Council, Taiwan, 2020

Undergraduate Research Fellowship

National Science and Technology Council, Taiwan, 2018

Summer Research Fellowship

National Health Research Institutes, Taiwan, 2018

SERVICES

CVIU (2022), AutoML (2022), NeurIPS (2021)

Reviewer

SKILLS

Languages: Mandarin (Native), English (Fluent, TOEFL: 106/120)

Programming Languages: Python (PyTorch, TensorFlow, Jax, OpenCV, Scikit-learn), MATLAB