YIXIONG CHEN

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EDUCATION

Johns Hopkins University (JHU) — Baltimore, United States
Ph.D. in Computer Science (Overall GPA: 4.00 / 4.00) — *Sept. 2023 - Present*
- Working on foundation models and generative models under the supervision of Alan Yuille.
- Interested in large multi-modal models, diffusion models, and self-supervised learning

Chinese University of Hong Kong (CUHK) — Shenzhen, China
Ph.D. in Data Science (Overall GPA: 3.90/4.00) — *Sept. 2021 - July 2023*
- Excellent Paper on Science and Technology of Shenzhen (2023)
- Excellent Paper on Artificial Intelligence of Shenzhen (2022)

Fudan University — Shanghai, China
B.Sc. in Data Science (Major GPA: 3.42/4.00, Overall GPA: 3.31/4.00) — *Sept. 2016 - June 2021*
- Second Class Scholarship for Outstanding Graduates (2021)
- Huawei Cloud Scholarship (2018)

PROFESSIONAL EXPERIENCE

Johns Hopkins University — Baltimore, United States
Research Intern, CCVL (Alan Yuille Group) — *July 2022 - Mar. 2023*
- Analyzed the training process of MLPs, CNNs, and ViTs, on 8 datasets, and discovered a fundamental learning preference called *layer convergence bias*. The results were published on **ICLR 2023**.
- Explored the radiomic features of liver tumors in CT slides and proposed an algorithm for 3D tumor synthesis, which can pass the Visual Turing Test conducted by experienced clinical doctors. The results were published on **NeurIPS workshop 2022** and **CVPR 2023**.

Shenzhen Research Institute of Big Data (SRIBD) — Shenzhen, China
Research Assistant, Leader of Medical Group — *July 2020 - July 2023*
- Forged a label selection/correction algorithm inspired by the KNN representation space for effective learning with noisy labels. The results were published on **ICASSP 2024**.
- Devised powerful layer-wise fine-tuning algorithms for pre-trained medical models based on Meta-learning. The results were published on **MICCAI 2023**.
- Developed and perfected pre-training algorithms for ultrasound videos with contrastive learning. The results were published on **MICCAI 2021** and **TMI 2022**.
- Designed novel models for liver fibrosis staging based on lesion localization and multi-modal training.
- Interviewed new members to investigate their academic background and programming ability.

Points Technology — Shanghai, China
Machine Learning Intern — *Mar. 2020 - June 2020*
- Designed and implemented the SecureBoost algorithm with Numpy, which is an improvement of XG-Boost under the horizontal federated learning standard.
- Optimized the SecureBoost to reduce its time complexity from $O(n^2)$ to $O(nlogn)$.
- Participated in the formulation of the standard *"Promotion Committee of China Communication Standardization Association: Federated learning technology tool for data circulation"*.

RESEARCH PROJECTS

Text-to-Image Generation Benchmarking CUHK, Spring 2023

· Proposed a novel hierarchical Chain of Thought to prompt MiniGPT-4 for explainable evaluation of images generated by text-to-image diffusion models.
· Built a large-scale dataset that captures human preferences on images from a wide range of sources comprising 800k human preference choices on 430k pairs of images.
· Used COCO Caption and DrawBench as prompt sets to benchmark 15 models' capabilities to generate images based on texts *w.r.t.* their performance of fidelity, alignment, and aesthetics.

Liver Tumor Synthesis JHU, Autumn 2022

· Proposed a novel liver tumor synthesizing pipeline based on location selection, texture/shape generation, and image warping, to generate 49,000 examples with annotated synthetic tumors.
· Combined clinical knowledge to the algorithm, enabling the synthetic tumors to cheat doctors.
· Conducted tumor segmentation with synthetic tumors to achieve SOTA on the LiTS dataset.

Basic Layer Properties of DNNs CUHK and JHU, Summer 2022

· Defined a measurement for transferability based on optimization path, and found the layer-wise transferability trend from ImageNet to 12 downstream image classification tasks.
· Defined a measurement for layer-wise convergence rate, analyzed the learning speeds for different layers in a DNN, and found shallower layers tend to learn faster than deeper layers.

Transfer Learning for Medical Image Analysis CUHK, 2020 - 2022

· Proposed a meta-learning-based fine-tuning method to automatically determine transfer strengths for different layers of a DNN, reaching 2%+ performance improvement.
· Implemented a meta-contrastive learning framework for ultrasound videos, leveraging the semantic clustering of 3000 videos to reach more than 10% performance gain than ImageNet pre-training.

Person Re-identification with Changing Cloths Fudan University, Spring 2019

· Proposed a person re-id benchmark including 23,000+ pedestrians, each with 4 different clothes.
· Collected, organized, and annotated a video dataset for pedestrians using GTA-V virtual engine.
· Tested 10 existing SOTA person re-id algorithm frameworks on our benchmark.

PUBLICATIONS

Click to view Google Scholar

1. Jiang H, **Chen Y**, Ding C, Liu L, Han X, Zhang X. Leveraging Noisy Labels of Nearest Neighbors for Label Correction and Sample Selection. **ICASSP 2024.**

2. **Chen Y**, Li J, Jiang H, et al. MetaLR: Meta-tuning of Learning Rates for Transfer Learning in Medical Imaging. **MICCAI 2023.**

3. Wu X, Hao Y, Sun K, **Chen Y**, Zhu F, Zhao R, Li H. Human Preference Score v2: A Solid Benchmark for Evaluating Human Preferences of Text-to-Image Synthesis. **Arxiv 2023 preprint.**

4. **Chen Y**, Liu L, Ding C. X-IQE: eXplainable Image Quality Evaluation for Text-to-Image Generation with Visual Large Language Models. **Arxiv 2023 preprint.**

5. Hu Q, **Chen Y**, Yuille A, Zhou Z. Label-Free Liver Tumor Segmentation. **CVPR 2023.**

6. **Chen Y**, Yuille A, Zhou Z. Which Layer is Learning Faster? A Systematic Exploration of Layer-wise Convergence Rate for Deep Neural Networks. **ICLR 2023.**

7. **Chen Y**, Li J, Liu L, Ding C. Rethinking Two Consensus of the Transferability in Deep Learning. **Arxiv 2023 preprint.**

8. **Chen Y**, Zhang C, Liu L, Ding C. Generating and Weighting Semantically Consistent Sample Pairs for Ultrasound Contrastive Learning. **IEEE Transactions on Medical Imaging.**

9. Hu Q, Xiao J, **Chen Y**, Sun S, Chen JN, Yuille A, Zhou Z. Synthetic Tumors Make AI Segment Tumors Better. **NeurIPS 2022 Workshop.**

10. Zhang C, **Chen Y**, Liu L, et al. HiCo: Hierarchical Contrastive Learning for Ultrasound Video Model Pretraining. **ACCV 2022.**

11. **Chen Y**, Zhang C, Liu L, et al. Uscl: Pretraining deep ultrasound image diagnosis model through video contrastive representation learning. **MICCAI 2021 (oral).**

12. Wan F, Wu Y, Qian X, **Chen Y**, Fu Y. When person re-identification meets changing clothes. **CVPR 2020 Workshop.**

PRESENTATIONS

Meta-Learning-Rate for Medical Transfer Learning (Poster)   Vancouver, Canada
The 26th Int. Conf. on Medical Image Computing and Computer Assisted Intervention   *Oct. 2023*

Layer-wise Convergence Rate of DNNs (Poster)   Kigali, Rwanda
The 11th International Conference on Learning Representations   *May. 2023*

Meta-Reweighting for Contrastive Learning (Poster)   Shenzhen, China
The 2nd Doctoral & Postdoctoral Academic Forum at SRIBD   *Aug. 2022*

Ultrasound Contrastive Learning (Oral)   Online
The 24th Int. Conf. on Medical Image Computing and Computer Assisted Intervention   *Sept. 2021*

ACDEMIC ACTIVITIES

Reviewer: MICCAI, ICML, TASE   2023

Teaching Assistant: AI in Medical Imaging   2022 Spring

Teaching Assistant: Statistical Inference   2021 Fall

RELEVANT COURSES

Core Courses	Other Courses
Machine Learning	Cloud Computing
Deep Learning and Neural Networks	Data Visualization
Advanced Convex Optimization	Probability and Statistics
Algorithms for Numerical Computation	Linear Algebra
Advanced Big Data Technologies	Advanced Mathematics

SKILLS

Programming	Python, Bash, Matlab, R, JavaScript
Tech Stack	Linux, Git, Slurm, PyTorch, Numpy, Pandas, OpenCV, LaTeX
Language	English (TOEFL 107), Chinese (mother tongue)