Tzu-Heng (Brian) Huang

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Education

2021 – 2026 (Expected)
Ph.D. in Computer Science. University of Wisconsin-Madison.
Advised by Prof. Frederic Sala. Minoring in Economics.

2016 – 2020
B.S. in Computer Science. National Chengchi University.
Advised by Prof. Man-Kwan Shan and Dr. Ling-Jyh Chen. Major GPA: *3.96*

Research Interests

My research centers on ***data-centric AI for multimodal models***, to enable models to learn more with less supervision. Several works I have developed, including (i) model-aware data selection for efficient pretraining (e.g., training MLLMs & CLIP on hundreds million samples), (ii) data curation for multimodal models through objective detection ***(1st place on the Datacomp leaderboard)***, (iii) a 500x cheaper auto-labeling system over LLM annotators ***(NeurIPS'24 Spotlight)***, and (iv) a new accelerated training framework via model merging.

Research Experience

May. 2024 – Dec. 2024
AIML Research Intern. Apple.
advised by Dr. Javier Movellan and Manjot Bilkhu.
— *Automated Model-aware Data Selection for Efficient Pretraining.*
— *Optimizing Domain Mixtures for MLLM Pretraining.*

Aug. 2021 – Present
Graduate Research Student. UW-Madison.
advised by Prof. Frederic Sala.
— *Data-centric AI for Foundation Models: Auto-labeling and Data Curation.*
— *Parameter Marketplace: Through Model Merging and Auction Agents.*

May. 2023 – Apr. 2024
Founder & CEO. Awan.AI LLC.
collaborated with and funded by TechTCM.
— *LLM for Traditional Chinese Medicine and Tongue Syndrome Diagnosis.*

Jun. 2019 – Sep. 2019
Research Intern. Argonne National Laboratory.
advised by Dr. Charlie Catlett and Dr. Rajesh Sankaran.
— *Ensemble-based Time Series Calibration for Low-cost Sensors.*

Sep. 2018 – Aug. 2021
Research Assistant. National Chengchi University.
advised by Prof. Man-Kwan Shan.
— *Spatio-temporal Modeling in Large-scale Sensor Networks.*

Feb. 2018 – Jul. 2020
Research Intern. Academia Sinica.
advised by Dr. Ling-Jyh Chen.
— *Large-scale Air Quality Sensor Network Development.*

Research Publications

1. T.-H. Huang, M. Bilkhu, F. Sala, and J. Movellan, "Evaluating Sample Utility for Data Selection via Mimicking Model Weights," in *submission*, 2024.

2. T.-H. Huang, C. Cao, V. Bhargava, and F. Sala, "The ALCHEmist: Automated Labeling 500x CHEaper than LLM Data Annotators," in *Neural Information Processing Systems (NeurIPS)* ***[Spotlight]***, 2024. 🔗 URL: https://arxiv.org/abs/2407.11004.

3. W. Tan, N. Roberts, T.-H. Huang, *et al.*, "MoRe Fine-Tuning with 10x Fewer Parameters," in *ICML Workshop: Efficient Systems for Foundation Models (ES-FoMo) and ICML Workshop: Foundation Models in the Wild.*, 2024. 🔗 URL: https://arxiv.org/abs/2408.17383.

4 T.-H. Huang, C. Cao, S. Schoenberg, H. Vishwakarma, N. Roberts, and F. Sala, "ScriptoriumWS: A Code Generation Assistant for Weak Supervision," in *ICLR Workshop: Deep Learning For Code (DL4C)*, 2023. URL: `https://dl4c.github.io/assets/pdf/papers/30.pdf`.

5 T.-H. Huang, C. Shin, S. J. Tay, D. Adila, and F. Sala, "Multimodal Data Curation via Object Detection and Filter Ensembles," in *ICCV Workshop: Towards the Next Generation of Computer Vision Datasets (TNGCV)* ***[1st place on the Datacomp leaderboard (small-scale filtering track)]***, 2023. URL: `https://arxiv.org/abs/2401.12225`.

6 T.-H. Huang, H. Vishwakarma, and F. Sala, "Train 'n Trade: Foundations of Parameter Markets," in *Neural Information Processing Systems (NeurIPS)*, 2023. URL: `https://arxiv.org/abs/2312.04740`.

7 N. Roberts, X. Li, D. Adila, *et al.*, "Geometry-Aware Adaptation for Pretrained Models," in *Neural Information Processing Systems (NeurIPS)*, 2023. URL: `https://arxiv.org/abs/2307.12226`.

8 N. Roberts, X. Li, T.-H. Huang, *et al.*, "AutoWS-Bench-101: Benchmarking Automated Weak Supervision with 100 Labels," in *Neural Information Processing Systems (NeurIPS)*, 2022. URL: `https://arxiv.org/abs/2208.14362`.

9 T.-H. Huang, C.-H. Tsai, and M.-K. Shan, "Key Sensor Discovery for Quality Audit of Air Sensor Networks," in *ACM International Conference on Mobile Systems, Applications, and Services (MobiSys)*, 2020. URL: `https://dl.acm.org/doi/abs/10.1145/3386901.3396606`.

Miscellaneous

Awards and Achievements

2023	**ICCV Datacomp Competition**, won the first place in the small-scale filtering track.
	Scholar Award, granted by NeurIPS'23.
2021	**First-year Departmental Scholarship**, granted by UW-Madison.
2020	**Research Intern Scholarship**, granted by National Chengchi University.
	Undergrad Research Scholarship, granted by Ministry of Science and Technology.

Invited Talks

Dec. 2019	**IoT Project Development**, invited by Nangang High School (Taiwan).
Sep. 2019	**Intern Research Talk**. invited by National Chengchi Univerisity.
Jul. 2019	**LASS Conference: International Session**. invited by Academia Sinica.
Mar. 2019	**Techbang Magazine: PiM25 Project**. invited by Techbang Magazine.
	Raspberry Pi Jam: PiM25 Project. invited by Raspberry Pi Foundation (Taiwan).
Jan. 2019	**Raspberry Pi Meetup: PiM25 Project**. invited by Raspberry Pi Foundation (Taiwan).

Academic Services

2023 – Present	**Paper Reviewer**. NeurIPS'23 & 24, ICLR'24 & 25, CoLLAs'24, ICML'24, DMLR.
2023	**Co-organizer**. AutoML Cup in AutoML Conference.
2022 – 2023	**President of Student Association of Taiwan**, UW-Madison.
2021 – 2022	**Vice President of Student Association of Taiwan**, UW-Madison.

Skills

Programming Languages	Python, R, C++/C, SQL, LaTeX, and Shell Programming.
Technologies	(Distributed) PyTorch, Tensorflow, Keras, ShinyApp, PostgreSQL, and Vim.