Tzu-Heng (Brian) Huang

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Education

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2021 – 2026 (Expected)	**Ph.D. in Computer Science. University of Wisconsin-Madison.** Advised by Prof. Frederic Sala.
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 focuses on ***data-centric AI for multimodal models***, enabling models to learn more with less supervision. Several works I have worked on, including (i) large-scale *data mixing* for multimodal models in dense captioning tasks, (ii) fine-grained *data selection* for efficient pretraining (e.g., training CLIP on 100+ million samples), (iii) *data curation* using ensemble and objective detection ***(1st place on the DataComp'23 leaderboard)***, (iv) a 500x cheaper *auto-labeling* system over LLM annotators ***(NeurIPS'24 Spotlight)***, and (v) a new accelerated training framework via *model merging*.

Research Experience

May. 2024 – Dec. 2024	**AIML Research Intern.** Apple Inc. 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 by 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   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.

5   **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.

6   **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.

7   **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.

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

2024	**Spotlight Paper: Alchemist**, selected by NeurIPS'24.
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.