Ruochen Wang (王若宸)

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Research Interests

I study the problem of AI for AI. The goal is to leverage the power of AI to automatize the development of itself. My recent focus is developing automated methods for large-scale generative models. Below are selected areas I work(ed) on:

- Automatic Prompt Optimization for Large-Scale Generative Models (e.g. Diffusion, LLM)
- AutoML: Neural Architecture Search [6, 7, 8, 9], Optimizer Search [3], Hyperparameter Optimization [5], and Dataset Distillation [1, 2, 4]

Education

01/2020 to present	**University of California at Los Angeles (UCLA)** *Computer Science Department*	**U.S.**

- Ph.D. in Computer Science; Advisor: Prof. Cho-Jui Hsieh
- M.S. in Computer Science; GPA=4.0/4.0; Advisor: Prof Cho-Jui Hsieh

09/2015 to 08/2019	**The University of Michigan-Ann Arbor (UMich)** *Department of Electrical Engineering and Computer Science (EECS)*	**U.S.**

- B.S. in Computer Science & B.S. in Statistics; GPA: 4.0/4.0

09/2013 to 06/2015	**(Transferred) Shanghai University of Finance and Economics (SUFE)** *School of Finance*	**China**

- Financial Experimental Class; GPA: 3.93/4.0; Program Rank: 1/30

Selected Honors

- Outstanding Graduate Student (for Master's degree, 1 per department), ***UCLA CS Department***, 05/2022.
- Outstanding Paper Award, ***ICLR 2021***, 04/2021.
- Award of Excellence (10%), ***Microsoft Research Asia (MSRA)***, 09/2019.
- Highest Distinction Graduate Award, ***The University of Michigan***, 08/2019.
- Berkeley Fung's Excellence Scholarship, ***UC Berkeley Graduate Admission Committee***, 03/2019.
- Outstanding Intern Award, ***SenseTime***, 01/2019.
- James B. Angell Scholar, ***The University of Michigan***, 2017-2019.
- Shanghai City Scholarship (0.6%), ***Shanghai City Government***, 09/2014.

Publications (1st-author marked blue, * denote equal contribution)

- [1] Yuanhao Xiong*, **Ruochen Wang***, Minhao Cheng, Cho-Jui Hsieh. FedDM: Iterative Distribution Matching for Communication-Efficient Federated Learning. (*CVPR 2023*)
- [2] Justin Cui, **Ruochen Wang**, Si Si, Cho-Jui Hsieh. Scaling Up Dataset Distillation to ImageNet-1K with Constant Memory. (*ICML 2023*)
- [3] **Ruochen Wang**, Yuanhao Xiong, Minhao Cheng, Cho-Jui Hsieh. Efficient Non-Parametric Optimizer Search for Diverse Tasks. (*NeurIPS 2022*)
- [4] Justin Cui, **Ruochen Wang**, Si Si, Cho-Jui Hsieh. DC-BENCH: Dataset Condensation benchmark. (*NeurIPS 2022*)
- [5] Yuanhao Xiong, Li-Cheng Lan, Xiangning Chen, **Ruochen Wang**, Cho-Jui Hsieh. Learning to Schedule Learning Rate with Graph Neural Networks. (*ICLR 2022*)
- [6] Shoukang Hu*, **Ruochen Wang***, Lanqing Hong, Zhenguo Li, Cho-Jui Hsieh, Jiashi Feng. Generalizing Few-Shot NAS with Gradient Matching. (*ICLR 2022*)
- [7] **Ruochen Wang**, Xiangning Chen, Minhao Cheng, Xiaocheng Tang, Cho-Jui Hsieh. RANK-NOSH: Efficient Predictor-Based Architecture Search via Non-Uniform Successive Halving. (*ICCV 2021*)
- [8] **Ruochen Wang**, Minhao Cheng, Xiangning Chen, Xiaocheng Tang, Cho-Jui Hsieh. Rethinking architecture selection in differentiable NAS. (*ICLR 2021*) **Outstanding Paper Award**.

- [9] Xiangning Chen*, **Ruochen Wang***, Minhao Cheng*, Xiaocheng Tang, Cho-Jui Hsieh. DrNAS: Dirichlet Neural Architecture Search. (*ICLR 2021*).

Research Experience

05/2022 to Present	**Google Research**	**U.S.**

Student Researcher on ML Vision Synergy, with Dr. Boqing Gong and Dr. Ting Liu
- Auto-prompting for large generative models (paper coming soon)
- Efficient CNN-Transformer hybrid architecture with linear attention for video processing.

01/2020 to Present	**UCLA Samueli School of Engineering**	**Los Angeles**

Graduate Student Researcher with Prof. Cho-Jui Hsieh
AutoML:
- Proposed the first efficient, scalable, and generalizable optimizer search framework for diverse tasks (NeurIPS 2022).
- Proposed a method to measure and alleviate the adverse effects of weight-sharing in One-Shot NAS; obtained SOTA on all major NAS search spaces and datasets (ICLR 2022).
- Analyzed and explained the failure modes of Differentiable NAS from the long-overlooked architecture selection perspective (ICLR 2021 Oral, Outstanding Paper Award).
- Proposed (together with collaborators) a method to improve the robustness of differentiable NAS via Bayesian learning with Dirichlet distribution; derived a theoretical bound to prove the effectiveness of the proposed method utilizing Laplacian Approximation (ICLR 2021).

Data-Centric A.I.:
- Investigating the effectiveness of Dataset Distillation for Federated Learning (NeurIPS 2022 workshop & under review).
- Co-developing a benchmark for Dataset Distillation methods. (NeurIPS 2022).
- Co-developed the first SOTA Dataset Distillation method that scales to ImageNet-1K. (under review)

05/2019 to 09/2019	**Microsoft Research**	**Beijing**

Research Intern
Neural Architecture Search:
- Conducted research on resource-constrained neural architecture search for production purposes.

Reinforcement Learning:
- Drafted a paper on improving the optimization of the Proximal Policy Gradient via Interior Point methods.

09/2018 to 03/2019	**SenseTime**	**Shanghai**

Research Intern
Adversarial Robustness:
- Conducted research on the adversarial robustness in the frequency domain; developed evolution and gradient-based method to generate adversarial frequencies.

09/2017 to 04/2018	**UMich College of Engineering**	**Ann Arbor**

Research Assistant with Prof. Honglak Lee
Vision & Language:
- Worked on natural language queried object detection with a word-sensitive discriminative bimodal network that aimed at solving dataset bias problems utilizing Bayesian reformulation.

Professional Services

- Reviewer for ICML 2021~2023, NeurIPS 2021~2023, ICLR 2022~2024, TMLR, CVPR 2023, ICCV 2023, ECV2023, NeuroComputing