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 A.I. to automatize the development of itself. For the past two years, I have mainly focused on a prominent direction under this concept - Automated Machine Learning (AutoML), which includes:

- Neural Architecture Search (NAS)
- Optimize Search
- Dataset Compression (DC)

Education

01/2020 to present — **University of California at Los Angeles (UCLA)** — **U.S.**
Computer Science Department
- 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)** — **U.S.**
Department of Electrical Engineering and Computer Science (EECS)
- 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)** — **China**
School of Finance
- 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)

- **Ruochen Wang**, Yuanhao Xiong, Minhao Cheng, Cho-Jui Hsieh. Efficient Non-Parametric Optimizer Search for Diverse Tasks. (*under review 2022*)
- Justin Cui, **Ruochen Wang**, Si Si, Cho-Jui Hsieh. DC-BENCH: Dataset Condensation benchmark. (*under review 2022*)
- Yuanhao Xiong*, **Ruochen Wang***, Minhao Cheng, Cho-Jui Hsieh. FedDM: Iterative Distribution Matching for Communication-Efficient Federated Learning. (*Arxiv 2022*)
- Yuanhao Xiong, Li-Cheng Lan, Xiangning Chen, **Ruochen Wang**, Cho-Jui Hsieh. Learning to Schedule Learning rate with Graph Neural Networks. (*ICLR 2022*).
- Shoukang Hu*, **Ruochen Wang***, Lanqing Hong, Zhenguo Li, Cho-Jui Hsieh, Jiashi Feng. Generalizing Few-Shot NAS with Gradient Matching. (* equal contribution) (*ICLR 2022*).
- **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*).

- **Ruochen Wang**, Minhao Cheng, Xiangning Chen, Xiaocheng Tang, Cho-Jui Hsieh. Rethinking architecture selection in differentiable NAS. (*ICLR 2021*). **Outstanding Paper Award**.
- Xiangning Chen*, **Ruochen Wang***, Minhao Cheng*, Xiaocheng Tang, Cho-Jui Hsieh. DrNAS: Dirichlet Neural Architecture Search. (* equal contribution) (*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
- Developing efficient architectures for video dense prediction.

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.
- 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).
- Proposed a scheduling algorithm and a learning-to-rank framework that reduce the search cost of predictor-based NAS by 5x while achieving the same search performance (ICCV 2021).
- 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).

Dataset Learning:
- Investigating the effectiveness of Dataset Distillation for non-i.i.d. Federated Learning (under review).
- Co-developing a benchmark for Dataset Condensation methods. (under review).

Graph Neural Networks:
- Exploring stochastic learning algorithms for Graph Neural Networks (ongoing).

Transformers:
- Studying the efficiency and multimodality of Transformer models (ongoing).

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 Meets 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 2021~2022, NeurIPS 2021~2022, ICLR 2022~2023, TMLR