Ruochen Wang (王若宸)

Home page: https://ruocwang.github.io/ • ruocwang@ucla.edu / ruocwang@umich.edu

Research Interests

I study the generic problem of AI for AI. The goal is to leverage the power of AI Agents to automatize the development of itself, with a recent focus on large-scale text-based generative models. I am the initiator and current principal of the AIGC Research Collaboration (ARC), a selective research team spanning several academic and industrial labs.

- Language Agents, including prompt optimization, multi-agent, reasoning, alignment, and trustworthiness in LLM.
- Controllable generation of diffusion models: LLM-augmented Diffusion generation, model diagnosis, and analysis.
- AutoML: Neural Architecture Search, Optimizer Search, Hyperparameter Optimization, Dataset Distillation

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, * denote equal contribution)

- [1] **Ruochen Wang**, Ting Liu, Cho-jui Hsieh, Boqing Gong. Diff-DPO: On the Discrete Prompt Optimization for Text-to-Image Diffusion Models. (*Under Review 2023*)
- [2] **Ruochen Wang***, Sohyun An*, Minhao Cheng, Tianyi Zhou, Sung Ju Hwang, Cho-jui Hsieh. Mixture-of-Prompt Optimization. (*Under Review 2023*)
- [3] Justin Cui, **Ruochen Wang**, Yuanhao Xiong, Cho-Jui Hsieh. Mitigating Bias in Dataset Distillation. (*Under Review 2023*)
- [4] Yuanhao Xiong*, **Ruochen Wang***, Minhao Cheng, Cho-Jui Hsieh. FedDM: Iterative Distribution Matching for Communication-Efficient Federated Learning. (*CVPR 2023*)
- [5] Justin Cui, **Ruochen Wang**, Si Si, Cho-Jui Hsieh. Scaling Up Dataset Distillation to ImageNet-1K with Constant Memory. (*ICML 2023*)
- [6] **Ruochen Wang**, Yuanhao Xiong, Minhao Cheng, Cho-Jui Hsieh. Efficient Non-Parametric Optimizer Search for Diverse Tasks. (*NeurIPS 2022*)
- [7] Justin Cui, **Ruochen Wang**, Si Si, Cho-Jui Hsieh. DC-BENCH: Dataset Condensation benchmark. (*NeurIPS 2022*)
- [8] Yuanhao Xiong, Li-Cheng Lan, Xiangning Chen, **Ruochen Wang**, Cho-Jui Hsieh. Learning to Schedule Learning Rate with Graph Neural Networks. (*ICLR 2022*)

- [9] Shoukang Hu*, **Ruochen Wang***, Lanqing Hong, Zhenguo Li, Cho-Jui Hsieh, Jiashi Feng. Generalizing Few-Shot NAS with Gradient Matching. (*ICLR 2022*)
- [10] **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*)
- [11] **Ruochen Wang**, Minhao Cheng, Xiangning Chen, Xiaocheng Tang, Cho-Jui Hsieh. Rethinking architecture selection in differentiable NAS. (*ICLR 2021*) **Outstanding Paper Award**.
- [12] Xiangning Chen*, **Ruochen Wang***, Minhao Cheng*, Xiaocheng Tang, Cho-Jui Hsieh. DrNAS: Dirichlet Neural Architecture Search. (*ICLR 2021*).

Research Experience

10/2023 to Present — **Google Research - Ads ML** — **U.S.**
Student Researcher on LLM, with Prof. Indejri Dellion, Dr. Felix Yu, and Dr. Si Si.
- Auto-prompting for large generative models (paper coming soon)
- Efficient CNN-Transformer hybrid architecture with linear attention for video processing.

07/2023 to Present — **ARC - AIGC Research Collaboration** — **Los Angeles**
Initiator & Current Principal of ARC Team.
Advisory Board: Cho-Jui Hsieh (Prof@UCLA), Tianyi Zhou (Prof@UMD), Minhao Cheng (Prof@PSU), Boqing Gong - Affiliated (RS@Google)
Members: Sohyun An (MS@KAIST->PhD@UCLA), Yuanhao Ban (PhD@UCLA), Sen Li (PhD@HKUST), Xirui Li (MS@UCLA), Hengguang Zhou (MS@UCLA)
- Topics surrounding Language Agents in LLM.
- Controllable generation in text-to-image diffusion models.

05/2022 to Present — **Google Research - Perception** — **U.S.**
Student Researcher on ML Vision Synergy, with Dr. Boqing Gong and Dr. Ting Liu
- Prompt Optimization for controllable generation in diffusion models.
- Efficient CNN-Transformer hybrid architecture with linear attention for video processing.

01/2020 to 06/2023 — **UCLA Samueli School of Engineering** — **Los Angeles**
Graduate Student Researcher with Prof. Cho-Jui Hsieh
- Understanding and improving efficient Neural Architecture Search algorithms.
- Efficient framework for automatic optimizer design.
- Efficient, scalable Dataset Distillation methods and their benchmark.

05/2019 to 09/2019 — **Microsoft Research** — **Beijing**
Research Intern
- Conducted research on resource-constrained neural architecture search for production purposes.
- 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
- 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
- Worked on natural language queried object detection with a word-sensitive discriminative bimodal network that aimed at solving dataset bias problems utilizing Bayesian reformulation.

Services

- Reviewer for ICML Since 2021, NeurIPS Since 2021, ICLR Since 2022, TMLR, CVPR Since 2023, ICCV Since 2023, ECV 2023, NeuroComputing, e.t.c.