Runlong Zhou (周润龙)

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Research Interests

- Emphasis on reinforcement learning theory
- Applied machine learning and reinforcement learning

Education

- **University of Washington**
  PhD, Paul G. Allen School of Computer Science & Engineering, advised by Simon S. Du — Seattle, USA
  2022.9 - Now (Est. 2027.8)
- **Tsinghua University**
  BEng, Special Pilot CS Class (Yaoclass), Institute for Interdisciplinary Information Sciences (IIIS) — Beijing, China
  GPA: 3.84 (overall) / 3.89 (major) over scale 4.0, Rank: 16 / 54 — 2018.8 - 2022.6

Academic Experience

- **Microsoft Research**
  Research intern with Beibin Li — Redmond, USA
  2023.6 - 2023.9
- **University of Washington**
  Research intern with Simon S. Du — Virtual
  2020.9 - 2022.9
- **Facebook AI Research**
  Research intern with Alessandro Lazaric and Matteo Pirotta — Virtual
  2021.3 - 2021.5

Publications

* denotes equal contribution or alphabetical ordering.

1. **Sharp Variance-Dependent Bounds in Reinforcement Learning: Best of Both Worlds in Stochastic and Deterministic Environments** [Link]
   Runlong Zhou, Zihan Zhang, Simon S. Du
   ICML 2023 — Poster
   We provide a systematic study of variance-dependent regret bounds of model-based and model-free reinforcement learning for tabular MDPs. The proposed model-based algorithm is both optimal for stochastic and deterministic MDPs.
2. **Variance-Dependent and Horizon-Free Reinforcement Learning for Latent Markov Decision Processes** [Link]
   Runlong Zhou, Ruosong Wang, Simon S. Du
   ICML 2023 — Poster
   We provide an algorithm framework for Latent MDPs (with context in hindsight), achieving the first horizon-free minimax regret. We complement the study by giving a novel regret lower bound for LMDPs using the symmetrization technique.
3. **Stochastic Shortest Path: Minimax, Parameter-Free and Towards Horizon-Free Regret** [Link]
   Jean Tarbouriech*, **Runlong Zhou***, Simon S. Du, Matteo Pirotta, Michal Valko, Alessandro Lazaric
   NeurIPS 2021 — Spotlight, 3% acceptance rate
   We propose an algorithm (EB-SSP) for SSP problems, which is the first to achieve minimax optimal regret while being parameter-free.

Preprints

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1. **Understanding Curriculum Learning in Policy Optimization for Solving Combinatorial Optimization Problems** [Link]
   Runlong Zhou, Yuandong Tian, Yi Wu, Simon S. Du
   We formulate of canonical online Combinatorial Optimization problems as Latent MDPs and give convergence guarantee of Natural Policy Gradient on LMDPs. We show effectiveness of Curriculum Learning through the perspective of relative conditional number.

Awards, Grants & Honors

- **Undergraduate:**

IIIS Outstanding Graduate	2022
The 2021 China Collegiate Programming Contest, Guilin Site (Gold Medal)	2021
IIIS Research Innovation Scholarship	2021
IIIS Academic Performance Scholarship	2021
Tsinghua University Air Rifle Competition (First Place)	2021
The 2019 ACM-ICPC Asia Regional Contest, Xuzhou Site (Gold Medal)	2019
The 2018 ACM-ICPC Asia Regional Contest, Beijing Site (Gold Medal)	2018

- **Secondary school:**

The 34th National Olympiad in Informatics (Silver Medal)	2017
China Team Selection Competition 2017 (Gold Medal)	2017
The 2016 ACM-ICPC Asia CHINA-Final Contest (Gold Medal)	2016
The 2016 China Collegiate Programming Contest Finals (Silver Medal)	2016
The 33rd National Olympiad in Informatics (Silver Medal)	2016

Past Projects

If hyperlink not applicable, please refer to my GitHub page.

1. **RhythmicSpeechSongAligner** [Link]
   Runlong Zhou*, Zhui Zhu*
   Multimedia Computing course project python
   Create visually-rhythmic videos by matching each lyric with a video clip which has similar semantic meaning
2. **GodScanner** [Link]
   Rui Shen*, Heyang Zhao*, **Runlong Zhou***
   Deep Learning course project python
   Transfer a photo of file into its scanned style (flatten, shadow and watermark removal)
3. **Ray Tracing Renderer** [Link]
   Runlong Zhou
   Advanced Computer Graphics course project C++
   Optimized path tracing framework supporting Mitsuba configurations, many textures and sampling methods
4. **Texas Hold'em Agent** [Link]
   Runlong Zhou
   Game Theory course project C++
   A smart Texas hold'em agent
5. **IconAdapter** [Link]
   Kailu Wu*, **Runlong Zhou***
   Machine Learning course project python
   Transfer icon styles to match mobile UI themes

Miscellanea

- **Professional skills:** Algorithm design, Data structures, Deep (Reinforcement) learning
- **Programming skills:** C++ / C, python , LaTeX, **CUDA** , **Java**™ , MATLAB®
- **Hobbies:** Air rifle / pistol shooting, Archery
- **Service:** Teaching Olympiad in Informatics to secondary school students between 2018 and 2021. Reviewer of ICML 2022, NeurIPS 2022.