Shiyu Huang (黄世宇)

No.1 Zhongguancun East Road, Haidian District, Beijing, China, 100084
huangsy1314@163.com
[OpenRL] [知乎] [GitHub] [Personal Website] [Google Scholar] [Linkedin]
updated in 8/2024

Biography

I am a researcher in Zhipu AI. Before that, I was a research scientist in 4Paradigm Inc. and the leader of OpenRL Lab. I received my B.E. and Ph.D. degrees (co-advised by Prof. Jun Zhu and Prof. Ting Chen) from the Department of Computer Science and Technology, Tsinghua University in July, 2017 and June, 2022. My researches focus on deep reinforcement learning, multi-agent reinforcement learning, distributed reinforcement learning, RL for robotics, LLM as agent, artificial general intelligence (AGI) and generative artificial intelligence (GAI). I have also spent time working at 4Paradigm Inc., RealAI Inc. , Huawei Noah's Ark Lab, Tencent AI Lab, Carnegie Mellon University and Sensetime Inc. . And I am also the founder of the OpenRL Lab (1.3k+ GitHub stars).

Education

- **Tsinghua University**(清华大学), Beijing, China
  Doctor of Philosophy (PhD)(博士), Computer Science and Technology, co-advised by Prof. **Jun Zhu** and Prof. **Ting Chen** Sept. 2017 - Jun. 2022
- **Tsinghua University**(清华大学), Beijing, China
  Bachelor of Engineering(本科), Computer Science and Technology Aug. 2013 - Jul. 2017
  - cumulative GPA: **90/100**
  - Tsinghua Excellent Graduates (**top10%**)
  - won Academic Excellence Award every year
  - 四川省 2013 年高考理科前 30 名

Work Experience

- **Researcher**, Zhipu AI(智谱 AI), Beijing, China Mar. 2024 - Now
  - Team Leader, Project Manager
  - GLM-4V-Plus: A commercial-grade general video understanding model.
  - CogVLM2-Video: A Temporally-Aware Video Understanding Model
  - CogVideoX: Text-to-Video Diffusion Models with An Expert Transformer
  - LVBench: An Extreme Long Video Understanding Benchmark
- **Research Scientist**, 4Paradigm(第四范式), Beijing, China Jul. 2022 - Mar. 2024
  - Founder and leader of OpenRL Lab: https://github.com/OpenRL-Lab/.
  - Leader of developing distributed multi-agent reinforcement learning framework.

  - Leader of developing self-play reinforcement learning framework.
  - TiZero: Mastering Multi-Agent Football with Curriculum Learning and Self-Play.
- **Researcher**, RealAI(瑞莱智慧), Beijing, China Jun. 2021 - Apr. 2022
  - Leader of developing distributed multi-agent reinforcement learning framework.
  - Leader of developing offline reinforcement learning benchmarks.
  - TiKick: Towards Playing Multi-agent Football Full Games from Single-agent Demonstrations.
- **Research Intern**, Huawei Noah's Ark Lab(华为诺亚), Beijing, China May. 2020 - Jun. 2021
  - Develop algorithms for circuit routing. The work is submitted to AAMAS 2022.
  - Do research for Deep Reinforcement Learning algorithms. The work is published on PRICAI 2021 and CoG 2022.
- **Research Intern**, Tencent(腾讯) AI Lab, Shen Zhen, China Apr. 2018 - Feb. 2019
  - Developed an AI agent for ViZDoom. The work is published on AAAI 2019.
- **Research Intern**, Carnegie Mellon University(卡内基梅隆大学), Pittsburgh, USA Jun. 2016 - Sep. 2016
  - Developed a detection framework. The work is published on CVPR 2017.
- **Research Intern**, SenseTime(商汤), Beijing, China Jun. 2015 - Dec. 2015
  - Vehicle Recognition and Face Verification.

Publications & Preprints

(* equal contribution)

- CogVLM2: Visual Language Models for Image and Video Understanding
  Wenyi Hong, Weihan Wang, Ming Ding, Wenmeng Yu, Qingsong Lv, Yan Wang, Yean Cheng, **Shiyu Huang**, Junhui Ji, Zhao Xue, Lei Zhao, Zhuoyi Yang, Xiaotao Gu, Xiaohan Zhang, Guanyu Feng, Da Yin, Zihan Wang, Ji Qi, Xixuan Song, Peng Zhang, Debing Liu, Bin Xu, Juanzi Li, Yuxiao Dong, Jie Tang
  arXiv:2408.16500, 2024
- CogVideoX: Text-to-Video Diffusion Models with An Expert Transformer
  Zhuoyi Yang*, Jiayan Teng*, Wendi Zheng, Ming Ding, **Shiyu Huang**, Jiazheng Xu, Yuanming Yang, Xiaohan Zhang, Xiaotao Gu, Guanyu Feng, Da Yin, Wenyi Hong, Weihan Wang, Yean Cheng, Yuxuan Zhang, Ting Liu, Bin Xu, Yuxiao Dong, Jie Tang
  arXiv:2408.06072, 2024
- A Survey on Self-play Methods in Reinforcement Learning
  Ruize Zhang, Zelai Xu, Chengdong Ma, Chao Yu, Wei-Wei Tu, **Shiyu Huang**, Deheng Ye, Wenbo Ding, Yaodong Yang, Yu Wang
  arXiv:2408.01072, 2024
- Soft-QMIX: Integrating Maximum Entropy For Monotonic Value Function Factorization
  Wentse Chen, **Shiyu Huang**, Jeff Schneider
  arXiv:2406.13930, 2024

- LVBench: An Extreme Long Video Understanding Benchmark
  Weihan Wang, Zehai He, Wenyi Hong, Yean Cheng, Xiaohan Zhang, Ji Qi, **Shiyu Huang**, Bin Xu, Yuxiao Dong, Ming Ding, Jie Tang
  arXiv:2406.08035, 2024
- MQE: Unleashing the Power of Interaction with Multi-agent Quadruped Environment
  Ziyan Xiong, Bo Chen, **Shiyu Huang**, Wei-Wei Tu, Zhaofeng He, Yang Gao
  The 2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**), 2024
- LLMArena: Assessing Capabilities of Large Language Models in Dynamic Multi-Agent Environments
  Junzhe Chen, Xuming Hu, Shuodi Liu, **Shiyu Huang**, Wei-Wei Tu, Zhaofeng He, Lijie Wen
  The 62nd Annual Meeting of the Association for Computational Linguistics(**ACL**), 2024
- AutoSAT: Automatically Optimize SAT Solvers via Large Language Models
  Yiwen Sun, Xianyin Zhang, **Shiyu Huang**, Shaowei Cai, Bing-Zhen Zhang, Ke Wei
  arXiv:2402.10705, 2024
- OpenRL: A Unified Reinforcement Learning Framework
  Shiyu Huang, Wentse Chen, Yiwen Sun, Fuqing Bie, Wei-Wei Tu
  arXiv:2312.16189, 2023
- DGPO: Discovering Multiple Strategies with Diversity-Guided Policy Optimization
  Wenze Chen, **Shiyu Huang**, Yuan Chiang, Tim Pearce, Wei-Wei Tu, Ting Chen, Jun Zhu
  Thirty-Eighth AAAI Conference on Artificial Intelligence(**AAAI**), Vancouver, Canada, 2024
- SwiftSage: A Generative Agent with Fast and Slow Thinking for Complex Interactive Tasks
  Bill Yuchen Lin, Yicheng Fu, Karina Yang, Prithviraj Ammanabrolu, Faeze Brahman, **Shiyu Huang**, Chandra Bhagavatula, Yejin Choi, Xiang Ren
  Thirty-seventh Conference on Neural Information Processing Systems(**NeurIPS**)(**Spotlight**), 2023
- Robustness and Generalizability of Deepfake Detection: A Study with Diffusion Models
  Haixu Song, **Shiyu Huang**, Yinpeng Dong, Wei-Wei Tu
  arXiv:2309.02218, 2023
- Diverse Policies Converge in Reward-free Markov Decision Processes
  Fanqi Lin, **Shiyu Huang**, Wei-Wei Tu
  The 20th Pacific Rim International Conference on Artificial Intelligence(**PRICAI**), Jakarta, Indonesia, 2023
- Uncertainty quantification via a memristor Bayesian deep neural network for risk-sensitive reinforcement learning
  Yudeng Lin, Qingtian Zhang, Bin Gao, Jianshi Tang, Peng Yao, Chongxuan Li, **Shiyu Huang**, Zhengwu Liu, Ying Zhou, Yuyi Liu, Wenqiang Zhang, Jun Zhu and He Qian
  Nature Machine Intelligence, 2023
- TiZero: Mastering Multi-Agent Football with Curriculum Learning and Self-Play
  Fanqi Lin*, **Shiyu Huang***, Tim Pearce, Wenze Chen and Wei-Wei Tu
  The 22nd International Conference on Autonomous Agents and Multiagent Systems(**AAMAS**), London, UK, 2023
- Learning Graph-Enhanced Commander-Executor for Multi-Agent Navigation
  Xinyi Yang, **Shiyu Huang**, Yiwen Sun, Yuxiang Yang, Chao Yu, Wei-Wei Tu, Huazhong Yang and Yu Wang
  The 22nd International Conference on Autonomous Agents and Multiagent Systems(**AAMAS**), London, UK, 2023
- DGPO: Discovering Multiple Strategies with Diversity-Guided Policy Optimization

Wenze Chen, **Shiyu Huang**, Yuan Chiang, Ting Chen, Jun Zhu
The 22nd International Conference on Autonomous Agents and Multiagent Systems(**AAMAS**) Extended Abstract, London, UK, 2023

- VMAPD: Generate Diverse Solutions for Multi-Agent Games with Recurrent Trajectory Discriminators
  Shiyu Huang*, Chao Yu*, Bin Wang, Dong Li, Yu Wang, Ting Chen and Jun Zhu
  IEEE Conference on Games (**CoG**), Beijing, China, 2022. (**Best Paper Nomination**)
- TiKick: Towards Playing Multi-agent Football Full Games from Single-agent Demonstrations
  Shiyu Huang*, Wenze Chen*, Longfei Zhang, Shizhen Xu, Ziyang Li, Fengming Zhu, Deheng Ye, Ting Chen and Jun Zhu
  NeurIPS-21 Workshop: 2nd Offline Reinforcement Learning Workshop.
- Ranking Cost: Building An Efficient and Scalable Circuit Routing Planner with Evolution-Based Optimization
  Shiyu Huang, Bin Wang, Dong Li, Jianye Hao, Jun Zhu and Ting Chen
  IJCAI-ECAI 2022 Workshop: The 2nd International Workshop on Heuristic Search in Industry, Vienna, Austria, 2022.
- Deep Reinforcement Learning with Credit Assignment for Combinatorial Optimization
  Dong Yan, Jiayi Weng, **Shiyu Huang**, Chongxuan Li, Yichi Zhou, Hang Su, Jun Zhu
  Pattern Recognition, 2022.
- Off-policy Training for Truncated TD(λ) Boosted Soft Actor-Critic
  Shiyu Huang, Bin Wang, Hang Su, Dong Li, Jianye Hao, Jun Zhu and Ting Chen
  The Pacific Rim International Conference on Artificial Intelligence (**PRICAI**), Hanoi, Vietnam, 2021.
- SVQN: Sequential Variational Soft Q-Learning Networks
  Shiyu Huang, Hang Su, Jun Zhu, and Ting Chen
  Eighth International Conference on Learning Representations **(ICLR)**, Millennium Hall, Addis Ababa ETHIOPIA, 2020
- Combo-Action Training Agent For FPS Game with Auxiliary Tasks
  Shiyu Huang, Hang Su, Jun Zhu, and Ting Chen
  The Thirty-Third AAAI Conference on Artificial Intelligence **(AAAI)**(**Spotlight**), Honolulu, Hawaii, USA, 2019
- Expecting the Unexpected: Training Detectors for Unusual Pedestrians with Adversarial Imposters
  Shiyu Huang, and Deva Ramanan
  IEEE Conference on Computer Vision and Pattern Recognition **(CVPR)**, Honolulu, Hawaii, USA, 2017
- Learning to Assign Credit in Reinforcement Learning by Incorporating Abstract Relations
  Dong Yan, **Shiyu Huang**, Hang Su, and Jun Zhu
  AAAI-19 Workshop on Reinforcement Learning in Games
- Model-based Credit Assignment for Model-free Deep Reinforcement Learning
  Dong Yan, Jiayi Weng, **Shiyu Huang**, Chongxuan Li, Yichi Zhou, Hang Su, Jun Zhu

Talks

- **RLHF @ Zhiyuan Community**, 2023.8.
  - slide: https://drive.google.com/file/d/1qh92DrsN5yjEbk43nG4hlw2cZd1hnlub/view
- **OpenRL @ 5th BAAI Conference**, 2023.6.

  - video: https://www.youtube.com/watch?v=3_EtNuLJRdM

Projects

- **CogVideoX**.
  - 6.5k stars, 579 forks
  - https://github.com/THUDM/CogVideo
- **CogVLM2**.
  - 1.8k stars, 112 forks
  - https://github.com/THUDM/CogVLM2
- **OpenRL: Unified reinforcement learning framework**.
  - 619 stars, 60 forks
  - https://github.com/OpenRL-Lab/openrl
- **TiZero: RL agents for Google Research Football**.
  - https://github.com/OpenRL-Lab/TiZero
- **ChatAgent: A Python-based agent framework for large language models**.
  - https://github.com/OpenRL-Lab/ChatAgent
- **TLaunch: Launch programs on multiple hosts**.
  - https://github.com/TARTRL/TLaunch
- **OpenPlugin: Toolkit to manage the plugins of the large language model**.
  - https://github.com/OpenRL-Lab/OpenPlugin

Patents

- **Generation method, device, medium and computing device of diversity strategy**.
  Shiyu Huang, Tian Tian. 2021116684627
- **Method or equipment for controlling agent**.
  Jun Zhu, Shiyu Huang, Hang Su. ZL201910078546.1

Honors & Awards

- **Tung OOCL Scholarship, Tsinghua University**, 2019
- **Tsinghua Excellent Graduates, Tsinghua University**, 2017
- **Academic Excellence Award, Tsinghua University**, 2014-2016

Competitions

- 2022.8
  IEEE CoG 2022 Football AI Competition:
  Track2, 3rd place

- 2018.8
  ViZDoom 2018 AI Competition:
  Track1, 1st place
  Track2, 2nd place
- 2017
  ViZDoom 2017 AI Competition:
  Track2, 2nd place

Skills

- **Programming**: C++/C, Python, Matlab, Java, Ruby, C#
- **OS**: Linux, MacOS, Windows
- **Software**: Tensorflow, Pytorch, OpenCV, Flask, Unity3D, Qt5.

Services

Organizer for:
NeurIPS 2023 Workshop on New in ML: https://newinml.github.io

Reviewer for:
AAAI 2025, **NeurIPS** 2024, **ICML** 2024, **ICLR** 2024, **AAAI** 2024, **NeurIPS** 2023, **AISTATS** 2023, **AAAI** 2023, **ICLR** 2023, **NeurIPS** 2022, **ICML** 2022, **AISTATS** 2022, **AAAI** 2022, **ICLR** 2022, **NeurIPS** 2021, **ICML** 2021, **AAAI** 2021, **NeurIPS** 2020

Teaching

2020 Spring, TA in **Big Data and Machine Intelligence**, instructed by Zhen Chen
2019 Fall, TA in **Big Data and Machine Intelligence**, instructed by Zhen Chen
2019 Spring, TA in **Machine Learning**, instructed by Prof. Jun Zhu

PS

- OpenRL Lab: https://github.com/OpenRL-Lab
- Personal Website: https://huangshiyu13.github.io
- 知乎: https://www.zhihu.com/people/huangshiyu.me
- GitHub: https://github.com/huangshiyu13
- Google Scholar: https://scholar.google.com/citations?user=PK57vrQAAAAJ&hl=en
- Linkedin: https://www.linkedin.com/in/shiyu-huang-841b92106/