Shuai Liu

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EXPERIENCE

Freelancer

Machine Learning Engineer — 2023 – Present
- Designing and developing Beast Engine, a **C++ game engine** optimized for AI training, with integrated **PyTorch models** for seamless AI interaction within game environments.

bilibili

Machine Learning Engineer — Jan 2021 – Dec 2022
- Boosted data utilization efficiency by **1.5x** and **halved** training cycle time by developing a scalable, efficient RL training framework with modular code structures and comprehensive documentation, supporting diverse research needs.
- Secured **1st place in IJCAI2022 Neural MMO Challenge** and achieved other top placements in RL competitions, showcasing the framework's effectiveness in **single-agent, multi-agent, and self-play scenarios**.
- Developed and integrated AI bots with **human-like behavior** in Unity game environments, enabling advanced gameplay with demonstrated human-level competencies.
- Collaborated with the live streaming team to design, develop, and successfully **launch live interactive games** for live streaming platforms.

ji zhi intelligence technology

Machine Learning Engineer — Jul 2019 – Jan 2021
- Optimized futures trading strategies for sub-5ms execution using PPO RL algorithms with XGBoost, achieving **expert-level performance** in real-world trading conditions.
- Enhanced football strategy modeling with **Soft Q Network** using entropy for exploration and distributed training via Ray, achieving **3x training efficiency** improvements.
- Leveraged curriculum learning, self-play, and n-step solutions to achieve a **top 1% ranking (11th of 1,138 participants)** in Kaggle Google Research Football competition.

CATL

Intern — Oct 2018 – Dec 2018
- Participated in ETL processes and collaborated with multiple departments to identify practical applications of **AI in the manufacturing**

PROJECTS

Beast Engine, *AI-native Game Engine* — 2023
- Designed and built Beast, a **C++ game engine** optimized for agent training, integrating **PyTorch models** for seamless AI interaction within game environments.
- Built on **Entity Component System (ECS)**, allowing easy creation, saving, and loading of scenes with dynamic runtime script loading.
- Designed for **high performance**, with **Python bindings** for C++ code wrapped as a standard Gym environment.

Large-scale Distributed Training Framework — 2022
- Enabled high scalability across single machines to clusters (up to **10,000 CPU cores and 80 GPUs**), enabling high-performance Dota2 agent training with **98th-percentile skill levels**.

LastOrder-Dota2, *https://github.com/bilibili/LastOrder-Dota2* **399 GitHub stars** — 2021

The inference component of our Dota2 agents has skills that are better than about 98th percentile of Dota players.

Distributed-RL, *https://github.com/LiuShuai26/Distributed-RL* — 2019

Implemented a distributed deep reinforcement learning framework using Ray and TensorFlow.

AWARDS

2022: **1st Place** - IJCAI2022 Neural MMO Challenge (110 participants)

2022: **2nd Place** - CoG Football AI Competition (57 participants)

2022: **3rd Place** - IJCAI-ECAI AI Olympics (119 participants)

2020: **11th Place** - Kaggle Google Research Football (1,138 participants)

2017: CSC Scholarship - **State-financed** studying abroad

EDUCATION

Laurentian University   **CA**
Master of Computational Science   *2024-2025*

Zhengzhou University of Light Industry   **CN**
Bachelor of Computer Science   *2015-2019*

Oakland University   **US**
Bachelor of Computer Science, Exchange Student   *2017-2018*

PUBLICATIONS

2023: Yangkun Chen, Joseph Suarez, Junjie Zhang, Chenghui Yu, Bo Wu, Hanmo Chen, Hengman Zhu, Rui Du, Shanliang Qian, **Shuai Liu**, Weijun Hong, Jinke He, Yibing Zhang, Liang Zhao, Clare Zhu, Julian Togelius, Sharada Mohanty, Jiaxin Chen, Xiu Li, Xiaolong Zhu and Phillip Isola. Benchmarking Robustness and Generalization in Multi-Agent Systems: A Case Study on Neural MMO. AAMAS 2023

2020: Jingbin Liu, **Shuai Liu** and Xinyang Gu. SOFT Q NETWORK. arXiv preprint arXiv: 1912.10891

SKILLS

Python, C#, C++, Go, Pytorch, Tensorflow, Git, Docker, ZeroMQ, Ray, Linux, Unity.