

# Shuai Liu

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## EDUCATION

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### Laurentian University

Master of Computational Science

CA

2024-2025(Expected)

### Oakland University

Bachelor of Computer Science, Exchange Student

US

2017-2018

### Zhengzhou University of Light Industry

Bachelor of Computer Science

CN

2015-2019

## EXPERIENCE

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### Freelancer

Machine Learning Engineer

2023 – Present

- Designing and developing Beast Engine, a high-performance, lightweight **C++ game engine** optimized for **AI training**, with integrated **PyTorch** models for seamless AI interaction within game.
- Developed a **visual editor** to empower researchers and hobbyists to easily create custom Gym 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 **Distributed training framework** with modular code structures and comprehensive documentation, supporting diverse research needs.
- Leveraged optimized **PPO**, integrated **attention mechanism** into the network architecture, and engineered **heuristic rewards** to secure **1st place** in [IJCAI2022 Neural MMO Challenge](#) and top placements in multiple RL competitions—demonstrating the framework's effectiveness in single-agent, **multi-agent**, and self-play scenarios.
- Developed and integrated AI bots with **human-like behavior** in Unity games, 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** 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 teams) in [Kaggle Google Research Football](#).

### 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

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## **Beast Engine**, *AI-native Game Engine*

2023

- Designed for seamless **AI integration**, enabling the natural loading and referencing of AI models within games.
- 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**).
- Designed a modular architecture with a stable core and adaptable project-specific modules, enabling simultaneous multi-project research without core disruptions.

## **LastOrder-Dota2**, <https://github.com/bilibili/LastOrder-Dota2> **402 GitHub stars**

2021

The inference component of our Dota2 agent **outperforms 98%** of Dota players.

## **Distributed-RL**, <https://github.com/LiuShuai26/Distributed-RL>

2019

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

# AWARDS

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

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

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

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

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

# SKILLS

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