

Zeyu Zhang

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RESEARCH INTERESTS

- Machine Learning (ML), Reinforcement Learning (RL)
- Recommendation System (RS), Information Retrieval (IR)
- Multi-Agent Collaboration and Gaming

EDUCATION

- **University of Science and Technology of China (USTC)** **Hefei, P.R.China**
Electronic Information Engineering, Bachelor of Engineer *Sept 2019 - Jun 2023*
 - Wang Xiaomo Talent Program in Cyber Science and Technology
 - Talent Program in Information Science and Technology
- **University of Science and Technology of China (USTC)** **Hefei, P.R.China**
Artificial intelligence, certificate, minor *Sept 2021 - Jun 2023*
 - Talent Program in Artificial Intelligence
- **Overall GPA: 3.93/4.30 (91/100);**
 - **Mathematics:** Linear Algebra: 97/100, Stochastic Process: 97/100, Probability Theory: 90/100, Mathematical Analysis B1: 90/100, Mathematical Analysis B2: 90/100, Information Theory: 93/100
 - **Computer Science:** Data Structure and Algorithm: 95/100, Parallel Computing: 95/100, Principle of Microcomputer and Embedded System: 91/100
 - **Professions:** Machine Learning: 93/100, Pattern Recognition: 90/100, Signals and Systems: 99/100, Basic Circuit Theory: 100/100, Operations Research B: 92/100
- **China National Scholarship honored by Ministry of Education of the PRC, 2020-2021, top 1%**
- **Outstanding Undergraduate Honorary Rank, top 5%**
- **Rank: 5/213** in School of Information Science and Technology

EXPERIENCE

- **Reinforcement Learning to Rank (remote)** **Princeton**
Mentor: Prof. Mengdi Wang, Prof. Huazheng Wang *Mar 2022 - present*
 - Reproduced the code in paper *Reinforcement Online Learning to Rank with Unbiased Reward Shaping*. (OLTR)
 - Propose a novel **Cascade Offline Learning Algorithm** for learning to rank (LTR), using Doubly Robust (DR) estimator to trade off between bias and variance. (Cascade OfflineLTR)
 - Unify off-policy LTR methods empirically and model user browsing behavior as **Markov decision process**, and learn through offline RL methods like (Double)DQN, BCQ, SAC, CQL etc. (LTR codebase)
- **Playing pong via Proximal Policy Optimization** **USTC**
Mentor: Prof. Jie Wang *Nov 2021 - Jan 2022*
 - Trained an agent to learn the Atari game: pong with **proximal policy optimization algorithm (PPO)**.
 - The result reached **an average reward of twenty points** after training on RTX 3060 GPU for 14310 epochs, where the maximum reward is twenty-one points.
 - Took advantage of **Actor-Critic** policy, **clipping** technique to reduce variance.
- **Deep Q-Networks Reproduction** **USTC**
Mentor: Prof. Jie Wang *Sept 2021 - Nov 2021*
 - Reproduced Deep Q-Network (DQN) and its variants (**Double DQN, Duel DQN**) using PyTorch to play Atari games.
 - Reduced correlation between input data by applying **experience replay** technique to the model.
 - Improved stability through employing **fixed target** technique to the model.
- **Implementing FFT Parallel Algorithms via Opemmp** **USTC**
Mentor: Prof. Lixiang Tan *Sep 2021 - Nov 2021*
 - On 8-core CPU with 8 threads, the acceleration ratio was **stable at around 3** when the number of FFT points was large(2^{20} or more).
 - Theoretically analyzed FFT algorithm and found **relative independence** of each butterfly operation in each step, which can be paralleled.
 - Added appropriate **parallel compilation guidance** using OpenMP to maximize the effectiveness of parallel.
- **Signal Distortion Measurement Device Design** **USTC**
Mentor: Dr. Wei Lu *Apr 2021 - Nov 2021*
 - Reduced distortion error to around **0.5%** with requirement of **3%** and extended measurement band width to **1k~100k**.
 - Applied **window functions** to reduce Spectrum Leakage. Considering both effectiveness and feasibility, I chose Hanning window finally.
 - Designed an algorithm to **accurately detect the center spectrum** by adding energy from nearby spectrum lines.
 - Developed an LCD to visualize relevant data and input analog signals.

HONORS AND AWARDS

- The National Undergraduate Electronic Design Contest, 2nd Prize Nationally, 1st in Anhui Province *Nov 2021*
- The 12th College Mathematics Competition, 2nd Prize in Anhui Province *Nov 2020*
- Scholarship for Talent Program in Basic Disciplines (Class A, Top 3%) *Oct 2020*
- Outstanding Student Scholarship (Class A, Top 1%) *Sept 2020*

SKILLS AND LANGUAGE SUMMARY

- **Programming:** *skilled:* Python(Scikit, Pytorch, Gym, Numpy), C, Verilog, Git, Bash | *qualified:* C++, Matlab, java
- **Languages:** *native:* Chinese | *proficient:* English **TOEFL Best Score:** 103(30/25/23/25)
- **Software:** *experienced:* Visual Studio, Visual Studio Code, L^AT_EX, Markdown | *familiar:* Origin, ISE, Vivado

TEACHING ASSISTANT

- **Digital Logic Circuits** **USTC**
Assist with Lecturer Xinwei Hu *Sept 2022 - Jan 2023*
- **Signal and System** **USTC**
Assist with lecturer Wei Lu *Feb 2022 - Jul 2022*