Yanchao Sun

Gender: female
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Education

- **University of Maryland, College Park** Maryland, U.S.A.
  Ph.D. in Computer Science; GPA: 3.95/4 *Sep 2018 – Present*
- **Sichuan University** Chengdu, China
  B.S. in Computer Science and Technology; GPA: 3.9/4 (95/100); Rank: 1/380 *Sep. 2014 – Jun 2018*
- **The Hong Kong Polytechnic University** Hong Kong, China
  Exchange student in Computer Science; GPA: 4/4.5 *Sep. 2016 – Dec. 2016*

Research Interests

- **improving sample efficiency and computational efficiency of reinforcement learning algorithms;**
- **knowledge transfer in reinforcement learning;**
- **robustness and stability of reinforcement learning methods: adversarial attacks and defenses;**
- **generalizability of deep learning models.**

Research Experience

- **Research Assistant** University of Maryland, College Park, U.S.A.
  Advisor: Prof. Furong Huang *Jan 2019 – Present*
  - **Poisoning Attacks in Reinforcement Learning.**
    proposed the first poisoning algorithm against deep policy-based RL methods, without any prior knowledge of the environment, covering heterogeneous poisoning models.
  - **Multi-task Reinforcement Learning.**
    presented Template Learning (TempLe), the first PAC-MDP method for multi-task reinforcement learning that could be applied to tasks with varying state/action space;
    TempLe achieves lower per-task sample complexity compared with state-of-the-art algorithms.
  - **Spectral Methods for Model-based Reinforcement Learning.**
    introduced a new reinforcement learning algorithm with a novel exploration strategy and the ability to infer unknown dynamics via spectral methods;
    both of theoretical analysis and empirical results show that our proposed algorithm achieves higher sample and computational efficiency than state-of-the-art approaches.
  - **Multi-task Reinforcement Learning Based on Option Grouping.**
    expedited the learning of multiple tasks by discovering optimal options (temporally extended actions) for similar historical tasks.
  - **Understanding of Generalization in Deep Learning via Tensor Methods.**
    proposed a highly compressible neural network architecture and derive practical generalization bounds for fully connected networks, convolutional neural networks, and networks with skip connections.
- **Machine Learning Research Intern** Unity Technologies, San Francisco (remote), U.S.A.
  Advisor: Dr. Andrew Cohen *May 2020 – Aug 2020*
  - **Policy Transfer with Model-based Regularizers.**
    designed an algorithm that utilizes model-based regularizers to transfer a learned policy to a new task with different observation space, action space or dynamics;
    implemented the algorithm for the ML-Agents toolkit
- **Research Assistant Intern** Sichuan University, China
  Advisor: Prof. Ning Yang *Apr 2016 – Jun 2018*
  - **Collaborative Inference of Coexisting Information Diffusions.**
    built a model that accurately recovers and predicts information diffusion trails in coexisting information diffusion networks (e.g. on social networks), by using context-aware tensor decomposition with heterogeneous constraints.
- **Independent Research** Sichuan University, China
  Advisor: Prof. Yu Chen *Mar 2016 – Nov 2016*
  - **Modified Linear Time Selection Algorithm.**
    improved the selection step of the classic linear time selection algorithm to make it faster.

Publications

1. **Yanchao Sun**, Da Huo, and Furong Huang. *"Vulnerability-Aware Poisoning Mechanism for Online RL with Unknown Dynamics"*. Submitted to ICLR 2021.

2. **Yanchao Sun**, Xiangyu Yin, and Furong Huang. *"TempLe: Learning Template of Transitions for Sample Efficient Multi-task RL"*. Submitted to AAAI 2021.

3. **Yanchao Sun** and Furong Huang. *"Can Agents Learn by Analogy? An Inferable Model for PAC Reinforcement Learning"*. Accepted by the International Conference on Autonomous Agents and Multiagent Systems (AAMAS 2020). May 2020.

4. Jingling Li, **Yanchao Sun**, Ziyin Liu, Taiji Suzuki and Furong Huang. *"Understanding Generalization in Deep Learning via Tensor Methods"*. Accepted by the 23rd International Conference on Artificial Intelligence and Statistics (AISTATS 2020). June 2020.

5. **Yanchao Sun**, Cong Qian, Ning Yang and Philip S. Yu. *"Collaborative Inference of Coexisting Information Diffusions"*. Proceedings of the IEEE 17th International Conference on Data Mining (ICDM 2017). November 2017.

Selected Projects

- **Online System: Career Explore Club** — Sichuan, China
  Technical Team Leader — *May 2016 – Jun 2018*
  - We developed an online system to help students evaluate themselves and plan their careers. We designed an original algorithm to match a person's personality and majors/occupations. This product is still being used by many students in Sichuan, China.

- **Software: QR Code Beautifier** — Fudan University, China
  Developer — *May 2016 – Dec 2016*
  - This work was inspired by the phenomenon that some QR codes were beautified or distorted to attract people, but scanning programs may have difficulty recognizing them. We did a survey on current QR code recognition algorithms, then developed a tool to recognize beautified QR codes and beautify QR codes without loss of recognizability.

- **Game: Little Droplet** — Sichuan University, China
  Team Leader — *Apr 2016 – Apr 2017*
  - We designed and developed a cross-platform adventure game on the subject of environmental protection.

Selected Awards

- **Dean's Fellowship, University of Maryland, College Park** — *Sep 2018*
- **Outstanding Graduates of Sichuan University** — *Nov 2017*
- **Special Award of Wang Wen Guo Scholarship, Wuyuzhang Honors College** — *Nov 2016*
- **National Endeavor Scholarship, China** — *Nov 2016*
- **The 1st Prize of Blue Bridge Cup National C/C++ Programming Contest, Sichuan Province** — *Mar 2016*
- **National Scholarship, China** — *Nov 2015*
- **The 1st Prize of The Seventh Chinese Mathematics Competitions, Sichuan Province** — *Nov 2015*

Skills

- **Languages**: Python, C/C++, Java, Javascript, PHP, HTML/CSS, Matlab, Scala, SQL
- **Technologies**: Hadoop, Spark, LaTeX