Iou-Jen (Adam) Liu

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Employment

Google, Mountain View, CA — 2022 - Present

Education

PhD, Electrical and Computer Engineering — 2022
University of Illinois at Urbana-Champaign (UIUC), IL
Thesis: *Toward Efficient Multi-Agent Deep Reinforcement Learning*
Advisor: Prof. Alexander Schwing

Master of Science, Electronics Engineering — 2014
National Taiwan University (NTU), Taipei, Taiwan
Advisor: Prof. Yao-Wen Chang

Bachelor of Science, Electrical Engineering — 2012
National Taiwan University (NTU), Taipei, Taiwan

Research Interests

Embodied AI, Deep Reinforcement Learning, Multi-Agent Learning

Publications

[13] **Asking for Knowledge (AFK): Training RL Agents to Query External Knowledge Using Language.** [arxiv][project]
Iou-Jen Liu*, Xingdi Yuan*, Marc-Alexandre Côté*, Pierre-Yves Oudeyer, Alexander G. Schwing
(ICML'22) *International Conference on Machine Learning, 2022*

[12] **Bridging the Imitation Gap by Adaptive Insubordination.** [arxiv][project]
Luca Weihs*, Unnat Jain*, **Iou-Jen Liu**, Jordi Salvador, Svetlana Lazebnik, Aniruddha Kembhavi, Alexander Schwing
(NeurIPS'21) *Neural Information Processing Systems, 2021*

[11] **GridToPix: Training Embodied Agents with Minimal Supervision.** [arxiv][project]
Unnat Jain, **Iou-Jen Liu**, Svetlana Lazebnik, Aniruddha Kembhavi, Luca Weihs, Alexander Schwing
(ICCV'21) *IEEE/CVF International Conference on Computer Vision, 2021*

[10] **Semantic Tracklets: An Object-Centric Representation for Efficient Visual Multi-Agent Reinforcement Learning.** [arxiv][project]
Iou-Jen Liu*, Zhongzheng Ren*, Raymond A. Yeh*, Alexander G. Schwing
(IROS'21) *IEEE/RSJ International Conference on Intelligent Robots and Systems, 2021*

[9] **Coordinated Exploration for Multi-Agent Deep Reinforcement Learning.** [arxiv][project]
Iou-Jen Liu, Unnat Jain, Raymond A. Yeh, Alexander G. Schwing
(ICML'21) *International Conference on Machine Learning, 2021*
with long talk presentation (top 3.0%)

[8] **High-Throughput Synchronous Deep Reinforcement Learning.** [arxiv][project]
Iou-Jen Liu, Raymond A. Yeh, Alexander G. Schwing
(NeurIPS'20) *Neural Information Processing Systems, 2020*

[7] **PIC: Permutation Invariant Critic for Multi-Agent Deep RL.** [arxiv][project]
Iou-Jen Liu*, Raymond A. Yeh*, Alexander G. Schwing
(CoRL'19) *Conference on Robot Learning, 2019*

[6] **Accelerating Distributed Reinforcement Learning with In-Switch Computing.** [pdf]
Youjie Li, **Iou-Jen Liu**, Yifan Yuan, Deming Chen, Alexander G. Schwing, Jian Huang
(ISCA'19) *ACM/IEEE International Symposium on Computer Architecture, 2019*

[5] **Knowledge Flow: Improve upon Your Teachers.** [arxiv]
Iou-Jen Liu, Jian Peng, Alexander G. Schwing
(ICLR'19) *International Conference on Learning Representations, 2019*

[4] **Overlay-Aware Detailed Routing for Self-Aligned Double Patterning Lithography Using the Cut Process.** [pdf]
Iou-Jen Liu, Shao-Yun Fang, Yao-Wen Chang
(TCAD'16) *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems, Vol. 35, 2016*

[3] **Stitch-Aware Routing for Multiple E-Beam Lithography.** [pdf]
Iou-Jen Liu, Shao-Yun Fang, Yao-Wen Chang
(TCAD'15) *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems, Vol. 34, 2015*

[2] **Overlay-Aware Detailed Routing for Self-Aligned Double Patterning Lithography Using the Cut Process.** [pdf]
Iou-Jen Liu, Shao-Yun Fang, Yao-Wen Chang
(DAC'14) *ACM/IEEE Design Automation Conference, 2014*

[1] **Stitch-Aware Routing for Multiple E-Beam Lithography.** [pdf]
Shao-Yun Fang, **Iou-Jen Liu**, Yao-Wen Chang
(DAC'13) *ACM/IEEE Design Automation Conference, 2013*

Internships & Research Experience

Google, 2022 - present
- Video analytic and classification.
- Multimodal foundation model for video content understanding.

Microsoft Research, Summer 2021
- Work on embodied agents that are capable of asking useful questions in language and leveraging external knowledge to solve tasks more efficiently (Publication [13]).

University of Illinois at Urbana-Champaign, 2015 - 2022
- I aim to train embodied agents in multi-agent systems more efficiently via reinforcement learning (RL) and imitation learning. That is, using less time and less data to learn the desired policies. We address the problem in four directions:
  (1) Better representation learning and interaction modeling (Publications [5, 7, 10]).
  (2) Large-scale parallel and distributed training, which largely reduces training time (Publications [6, 8]).
  (3) Improved multi-agent exploration (Publication [9]).
  (4) RL with efficient imitation learning (Publications [11, 12]).

D-wave Systems, Summer 2017
- Work on machine learning with quantum computing.

TSMC-NTU Research Center, 2012 - 2015
- Work on Electronic Design Automation with an emphasis on physical design and design for manufacturing (Publications [1-4]).

Skills

- Programming Languages: Python, C/C++, CUDA, SQL, Matlab

- Deep Learning Platform: Pytorch, Tensorflow

Selected Awards

- Top 10% reviewer, NeurIPS 2022
- **Third Place, CAD Programming Contest** at ACM/IEEE International Conference on Computer-aided Design (ICCAD), 2012
- *Best Master Thesis Award*, Taiwan IC Design Society, 2014
- *Graduate Scholarship*, National Taiwan University, 2014 (Top 10% student in one academic year)
- *Teachers Ranked as Excellent*, University of Illinois, Sp17, Sp18, Fa18, Sp19, Fa19, Sp22 (Student rating higher than 4.3 out of 5)
- *Graduate Student SSBG Fellowship*, University of Illinois, Summer 2020
- *ICLR Travel Award*, 2019
- *ICML Travel Award*, 2022

Academic Services

Program Committee (Reviewer)

- International Conference on Machine Learning (ICML), 2021, 2022, 2023
- Neural Information Processing Systems (NeurIPS), 2021, 2022, 2023
- International Conference on Learning Representations (ICLR), 2022, 2023, 2024
- Conference on Computer Vision and Pattern Recognition (CVPR), 2023
- International Conference on Computer Vision (ICCV), 2023
- Association for the Advancement of Artificial Intelligence Conference (AAAI), 2023
- Artificial Intelligence Review, 2022
- IEEE Transactions on Neural Networks and Learning Systems, 2022
- IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems, 2016
- Transactions on Machine Learning Research, 2023
- Interactive Learning with Implicit Human Feedback Workshop at ICML, 2023
- Reinforcement Learning for Real Life Workshop at NeurIPS, 2022

Talks

- Facebook AI Research, Melon Park, CA, 2021,. Host: Dr. Dhruv Batra
- NVIDIA Research, Austin, TX, 2021, Host: Dr. Mark Ren
- Cruise, San Francisco, CA, 2021, Host: Dr. Yuning Chai
- Waymo, Oxford, UK, 2021, Host: Dr. Shimon Whiteson
- Amazon, Boston, MA, 2021, Host: Dr. Chieh-Chi Kao
- International Conference on Machine Learning (ICML), 2021, 2022
- International Conference on Intelligent Robots and Systems (IROS), 2021
- Neural Information Processing Systems (NeurIPS), 2020
- Conference on Robot Learning (CoRL), 2019
- Desian Automation Conference (DAC), 2014

Teaching

University of Illinois at Urbana-Champaign, Head Teaching Assistant / Instructor
ECE220 Computer System and Programming, Sp17, Fa17, Sp18, Su18, Fa18, Sp19, Su19, F19, Sp20, Fa20, Sp21, Fa21, Sp22

- Teach weekly C/C++ programming studios and maintain online grading system (PrairieLearn) for machine-based tests.

National Taiwan University, Teaching Assistant
EE5026 Physical Design for VLSI, Sp14

Inclusion and Diversity

Organizer, Graduate Social, NTU, 2013

- Led a team to organize social events and the new year dinner for all students, staff, and faculty of the department (300+ people).