Iou-Jen (Adam) Liu

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Research Interests

Multi-Agent Systems, Embodied Agents, Reinforcement Learning

Education

PhD, Electrical and Computer Engineering — 2022 (Expected)
University of Illinois at Urbana-Champaign (UIUC), IL, U.S.A.
Advisor: Prof. Alexander Schwing

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

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

Publications

[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

University of Illinois at Urbana-Champaign, Research Assistant, 2018 - present

- *Advisor: Prof. Alexander Schwing*
- I aim to train embodied agents in multi-agent systems more efficiently. That is, using less time and less data to learn the desired policy. We address the problem in four directions:
  (1) Better representation learning and interaction modeling (Publications [5, 7, 10]).
  (2) Parallel and distributed training, which largely reduces training time (Publications [6, 8]).
  (3) Improved multi-agent exploration (Publications [9]).
  (4) RL with efficient imitation learning (Publications [11, 12]).

Microsoft Research, Research Intern, Summer'21

- *Mentor: Marc-Alexandre Côté and Xingdi (Eric) Yuan*
- Works on agents that are capable of asking useful questions and leveraging external knowledge to solve tasks more efficiently.

D-wave Systems, Research Intern, Summer'17

- Works on machine learning with quantum computing.

TSMC-NTU Research Center, Research Assistant, 2012 - 2015

- *Advisor: Prof. Yao-Wen Chang*
- Works on Electronic Design Automation with an emphasis on physical design and design for manufacturing (Publications [1-4]).

Skills

- Programming Languages: Python, C/C++, CUDA, Matlab
- Deep Learning Platform: Pytorch, Tensorflow

Selected Awards

- ***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 (Student rating higher than 4.3 out of 5)
- *Graduate Student SSBG Fellowship*, University of Illinois, Summer'20

Services

Program Committee (Reviewer)

- International Conference on Machine Learning (ICML), 2021 - present

- Neural Information Processing Systems (NeurIPS), 2021 - present
- International Conference on Learning Representations (ICLR), 2021 - present
- IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), 2016

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

- 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, Spring'14

Reference

Alexander Schwing, Assistant Professor, UIUC, aschwing@illinois.edu [Ph.D. Thesis Advisor]
Yao-Wen Chang, Dean, College of EECS, NTU, ywchang@ntu.edu.tw [Master Thesis Advisor]
Raymond Yeh, Research Assistant Professor, TTIC, yehr@ttic.edu [Collaborator]
Yuting Chen, Teaching Associate Professor, UIUC, ywchen@illinois.edu [Teaching Assistant Supervisor]