IOU-JEN (ADAM) LIU

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EDUCATION

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

National Taiwan University, Taipei, Taiwan
Master of Science, Electrical Engineering
2014
Bachelor of Science, Electrical Engineering
2012
Advisor: Prof. Yao-Wen Chang

PUBLICATIONS

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

10. **Iou-Jen Liu**, Unnat Jain, Raymond A. Yeh, Alexander G. Schwing, "Coordinated Exploration for Multi-Agent Deep Reinforcement Learning", in International Conference on Machine Learning (**ICML**), 2021(**Long Talk**)

9. Unnat Jain, **Iou-Jen Liu**, Svetlana Lazebnik, Aniruddha Kembhavi, Luca Weihs, Alexander Schwing, "GridToPix: Training Embodied Agents with Minimal Supervision", arXiv. 2021

8. **Iou-Jen Liu**, Raymond A. Yeh, Alexander G. Schwing, "High-Throughput Synchronous Deep Reinforcement Learning", in Neural Information Processing Systems (**NeurIPS**), 2020

7. **Iou-Jen Liu***, Raymond A. Yeh*, Alexander G. Schwing, "PIC: Permutation Invariant Critic for Multi-Agent Deep Reinforcement Learning", in Conference on Robot Learning (**CoRL**), 2019

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

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

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

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

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

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

SELECTED AWARDS

- **Third Place**, ACM/IEEE ICCAD CAD Programming Contest, 2012
  3rd place out of 60 teams around the world
- **Best Master Thesis Award**, Taiwan IC Design Society, 2014
- **Graduate Scholarship**, National Taiwan University, 2014
  Top 10% student in one academic year
- **Travel Grant**, ICLR'19, NeurIPS'20
- **Graduate Student Fellowship**, University of Illinois, Summer'20
- **Teachers Ranked as Excellent**, University of Illinois, Spring'17, Spring'18, Fall'18, Spring'19, Fall'19
  Average student rating higher than 4.3 (out of 5.0)

MACHINE LEARNING RESEARCH

Microsoft Research, Montreal (Summer 2021)
Research Intern
Mentor: Marc-Alexandre Côté and Xingdi (Eric) Yuan

- **Efficient Info-seeking by Asking Questions**

University of Illinois at Urbana-Champaign (2018 - present)
Research Assistant
Advisor: Professor Alexander Schwing
- **High-Throughput Synchronous RL (HTS-RL)** maintains the advantages of synchronous RL, i.e., data efficiency, training stability, full determinism, and reproducibility, while achieving speedups, especially in environments where the step time varies. (NeurIPS'20)
- **Permutation Invariant Critic (PIC) for MARL** studies the ordering issue in centralized MARL. PIC significantly improves the sample efficiency over baseline MARL method, and scales to 200 agents. (CORL'19)
- **Accelerating Distributed Reinforcement Learning with In-Switch Computing (iSwitch)** is an in-switch acceleration solution that moves the gradient aggregation from server nodes into the network switches. iSwitch not only reduces the end-to-end network latency for synchronous training, but also improves the convergence with faster weight updates for asynchronous training. (ISCA'19)
- **Knowledge Flow** transfers knowledge from multiple (pre-trained) teacher models to a student model. Student trained with knowledge flow achieves top results in both supervised learning and RL tasks. (ICLR'19)

D-wave Systems (Summer 2017)
Research Intern
- Combine DCGAN with restricted Boltzmann machine, where sampling steps could be performed on D-wave quantum computers.

EDA RESEARCH

TSMC-NTU Research Center (2012 - 2015)
Research Assistant
Advisor: Professor Yao-Wen Chang
- **Overlay-Aware Routing for Self-Aligned Double Patterning Lithography** proposed a dynamic-programming-based detailed router that significantly reduces overlay errors. (DAC'14, TCAD'16)
- **Stitch-Aware Routing for Multiple E-beam Lithography (MEBL)** is the first work of stitch-aware routing framework for MEBL. We developed stitch-aware routing algorithms for each VLSI routing stage, i.e. global routing, layer / track assignment, and detailed routing. (DAC'13, TCAD'15)

TEACHING

University of Illinois at Urbana-Champaign (2017 - present)
Teaching Assistant (Head TA)
ECE220 - Computer System and Programming
- Teach weekly C/C++ programming studios.
- Maintain online grading system (PrairieLearn) for machine-based tests.

National Taiwan University (Spring 2014)
Teaching Assistant
EE5026 - Physical Design for VLSI

SKILLS

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

SERVICES

- Reviewer for ICML, NeurIPS, ICLR, IEEE Transactions on CAD

COURSE WORKS

- Statistical Reinforcement Learning, Computer Vision, Pattern Recognition
- Random Processes, Abstract Linear Algebra, Nonlinear Programming
- VLSI CAD Flow, Physical Design for Nanometer ICs