

Hsin-Yu Liu (Desmond)

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Profile

Accomplished AI/ML researcher with expertise in deep reinforcement learning, machine learning, and deep learning. Proven ability to design and implement cutting-edge AI solutions to address complex technological and business challenges, delivering measurable and impactful outcomes. Adept at applying advanced algorithms, scalable systems, and data-driven methodologies to drive innovation and optimize performance in diverse domains.

Skills

Programming Languages: Python, Perl, Tcl

ML/DL/RL Frameworks & Tools: PyTorch, TensorFlow, Keras, NumPy, Pandas, k8s, Scikit-Learn, XGBoost, LightGBM, AWS (S3/EC2/SageMaker), OpenAI Gym, MuJoCo, Stable-Baselines, HuggingFace, Slurm, Docker, etc.

Experience

- Articul8 AI - Applied AI Researcher**, Dublin, CA (Remote) Apr. 2025~Now
- Improve the existing hardware coding Domain Specific Model's benchmark performances by 16~32%, surpassing several leading closed-source models
 - Post-training (RL: GRPO and DPO and Rejection Sampling), Synthetic Data Generation, SFT, etc.
 - Hyper-personalization and User Feedback fine-tuning using Reinforcement Learning
- Glidewell Dental - Machine Learning Engineer II**, Irvine, CA May. 2024~Apr.2025
- Designed and implemented an Offline Reinforcement Learning (RL)-based Next-Best-Action Recommendation system, increasing CLTV by ~14% compared to existing methods.
 - LLM RAG system development for unstructured data (pdf, docx, xlsx, etc.)
 - 2D-to-3D reconstruction from images to 3D models to reduce costs and TAT of manufacturing
- UC San Diego - Graduate Student Researcher**, La Jolla, CA Sep. 2018~Jun. 2024
- Developed **state-of-the-art reinforcement learning algorithms**, including **Online RL**, **Offline RL**, **Offline-to-Online RL**, and advanced **policy regularization techniques**, achieving robust performance improvements across diverse applications.
- Cadence Design Systems- Machine Learning Software Intern**, Milpitas, CA (Remote) Jun. 2020~Aug. 2020
- Developed and deployed **advanced clustering algorithms** to optimize **performance, power, and area** during the partitioning phase, achieving up to a **75% reduction in size** compared to traditional approaches.
- Cadence Design Systems - Principal Application Engineer**, Hsinchu, Taiwan Oct. 2013~Jul. 2018
- Designed and implemented **custom software solutions** and **intuitive graphical user interfaces (GUIs)** using **Python, Tcl, Perl, SKILL**, and **Bash**, tailored to meet the diverse needs of global clients, enhancing user experience and productivity.
- TSMC - Research & Development Engineer**, Hsinchu, Taiwan Nov. 2008~Sep. 2013
- Led pioneering research in manufacturing technology, delivering the first-generation Double Patterning Technology (DPT) in a dynamic, fast-paced environment.

Education

University of California, San Diego — Ph.D. in Computer Engineering (Sep 2018 – Jun 2024), La Jolla, CA

National Taiwan University — M.S. in Optoelectronics (Sep 2006 – Jul 2008), Taipei, Taiwan

National Central University — B.S. in Physics (Sep 2001 – Jul 2005), Taoyuan, Taiwan

Publications

Policy Regularization in Model-Free Building Control via Comprehensive Approaches from Offline to Online Reinforcement Learning

Ph.D. Dissertation, Jun. 2024

- Developed a novel policy regularization framework for reinforcement learning in HVAC control systems, ensuring safe and efficient operation in real-world settings.
- Released the first open-source building batch reinforcement learning dataset, enabling benchmarking and advancing research in energy-efficient building management.

Adaptive Policy Regularization for Offline-to-Online Reinforcement Learning in HVAC Control

NeurIPS CCAI & ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation (BuildSys)' Nov. 2024

- Automatic policy regularization fine-tuning from offline to online via average Q-value estimators
- 40.3% performance improvement from the state-of-the-art methods

Rule-based Policy Regularization for Reinforcement Learning-based Building Control

ACM International Conference on Future Energy Systems (e-Energy). Jun. 2023

- Adaptively incorporates existing policy and RL policies with higher estimated values in policy learning, applicable for both online and offline settings
- >40% of average episode reward increases for both Online and Offline approaches

B2RL-An open-source dataset for building batch reinforcement learning

ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation (BuildSys)' - RL Energy Management. Nov. 2022

- First Released the first open-source Building Batch RL dataset for benchmarking purposes

Safe HVAC Control via Batch Reinforcement Learning

International Conference on Cyber-Physical Systems. (ICCPs). May. 2022

- Pioneered the development and deployment of Batch RL in real-world building environments
- Incorporate KL-divergence for penalizing large policy update with 16.7% energy reduction

Offline Reinforcement Learning with Munchausen Regularization

NeurIPS Offline RL Workshop. Dec. 2021

- Developed RL policy regularization techniques to penalize large policy updates via KL Divergence

METRICS 2.0: A machine-learning based optimization system for IC design

Workshop on Open-Source EDA Technology (WOFSET) 2018

- Proposed new EDA metrics for EDA-ML studies, marking the first integration of such metrics

SVM Learning for GFIS Trimer Health Monitoring in Helium-Neon Ion Beam Microscopy

Advanced Process Conference (APC), 2019

- Developed SVM for image classification for automated trimer monitoring with >95% precisions

Projects

Hidden Markov Model-based “Doomed Run” Prediction From Detailed Routing Sequential Data

- Developed and implemented HMM models to enable fast predictions, significantly reducing turnaround time (TAT) during the early stages of detailed routing

A Blended Instance-Clip Graph Neural Network Model for Accurate Post-Global Route DRC Prediction

- Integrated connectivity information as graphs into GCN models, successfully predicting DRC violation hotspots during post-global routing stages in RTL-to-GDS implementation