Yuan-Yao (Mike) Lou

Ph.D. student, Computer Engineering @ Purdue University

yylou [at] purdue [dot] edu
yylou
https://yylou.github.io/
yylou
Google Scholar

Professional Summary

I am a fourth-year PhD student at Purdue University seeking a research internship for 2025. I am deeply passionate about distributed systems (resource allocation for server load-balancing), computer networking (virtualization of 5G/6G networks), and deep reinforcement learning (DRL) for optimization. I have 3 years of experience as a software engineer in the IC design and EDA industry.

Education

2021 – Present	**Ph.D.**, *Computer Engineering, Purdue University* Advisors: Mung Chiang, Kwang Taik Kim
2015 – 2017	**M.S.**, *Computer Science, National Taiwan University (NTU)* Advisor: Ai-Chun Pang
2011 – 2015	**B.S.**, *Computer Science, National Chiao Tung University (NCTU)* Mentors: Yi-Ping You, Shiao-Li Tsao, T. Russell Hsing

Research Interests

Distributed Computing	Cloud/Edge Computing, Load Balancing, Integrated Computation and Communication (ICC)
Networking and Internet Architecture	Software-defined Networking (SDN), Network Function Virtualization (NFV), Cellular Networks (4G/5G/6G), AI-RAN, Resource Allocation and Scheduling, Congestion Control
Machine Learning	Deep Learning (DL), Multi-Agent Reinforcement Learning (MARL), Federated Learning (FL), Large Language Models (LLM), Large AI Models (LAM)

Skills

Languages	Python, C++, Java, Javascript, Shell Script, CUDA, SQL, CSS
Tools	PyTorch, TensorFlow, Scikit-learn, Numpy, Seaborn, SimPy, OpenAI Gym, Git, Vim
Cloud	Grafana, Prometheus, Docker, Telegraf, InfluxDB, Flask, Django, MongoDB, RESTful, HTML
Platforms	Linux, AWS, Google App Engine, Android, ROS, Cisco, Amarisoft, Intel/Radisys 5G NR RAN

Publications

2024

[9] X. Li, M. Abdallah, **Y.-Y. Lou**, M. Chiang, K. T. Kim, and S. Bagchi. "Dynamic DAG-Application Scheduling for Multi-Tier Edge Computing in Heterogeneous Networks". In: *arXiv:2409.10839 [cs.NI]* (2024).

[8] **Y.-Y. Lou**, J. Spencer, K. T. Kim, and M. Chiang. "E-MPC: Edge-assisted Model Predictive Control". In: *arXiv:2410.00695 [cs.DC]* (2024).

[7] **Y.-Y. Lou**, J. Spencer, K. T. Kim, and M. Chiang. "Utilizing Priors in Sampling-based Cost Minimization". In: *arXiv:2409.19834 [eess.SY]* (2024).

2021 [6] S. B. Weinstein, **Y.-Y. Lou**, and T. R. Hsing. "Intelligent Network Edge with Distributed SDN for the Future 6G Network". In: *IEEE International Conference on Microwaves, Communications, Antennas, Biomedical Engineering and Electronic Systems (COMCAS)* (2021).

2020 [5] Y.-Y. Shih, A.-C. Pang, and **Y.-Y. Lou**. "Development of Wearable Services with Edge Devices". In: *Fog and Fogonomics: Challenges and Practices of Fog Computing, Networking, Strategy and Economics, Wiley* (2020).

2018 [4] Y.-Y. Shih, A.-C. Pang, **Y.-Y. Lou**, C.-C. Chuang, L. Zhao, and Z. Ren. "Modularized Service Provisioning at Fog Networks". In: *IEEE Vehicular Technology Society Asia Pacific Wireless Communications Symposium (VTS APWCS)* (2018).

2017 [3] **Y.-Y. Lou**. "Fog-based Virtualization for Low-Latency Wearable Services". In: *Master's Thesis, National Taiwan University Library* (2017).

2016 [2] H.-P. Lin, Y.-Y. Shih, A.-C. Pang, and **Y.-Y. Lou**. "A Virtual Local-hub Solution with Function Module Sharing for Wearable Devices". In: *ACM Modeling, Analysis and Simulation of Wireless and Mobile Systems (MSWiM)* (2016).

[1] X.-L. Wang, M.-J. Sheng, **Y.-Y. Lou**, Y.-Y. Shih, and M. Chiang. "Internet of Things Session Management Over LTE – Balancing Signal Load, Power, and Delay". In: *IEEE Internet of Things Journal (IoT-J)* (2016).

Professional Experience

Aug. 2024 – Present | **Research Intern**, *MediaTek USA Inc.*

- System Design for LLM Applications in 6G Edge Cloud
  - Proposed computation offloading framework for emerging applications (e.g., LLM, XR) by integrating device cloud and RAN cloud in 6G networks

Sep. 2021 – Present | **Research Assistant**, *Purdue University – EDGE Lab*

- AI-ML for Joint Optimization of Network and Application in 5G/6G
  - Trained multi-agent reinforcement learning (MARL) model for network deployment policy by considering multi-dimensional trade-offs in joint optimization
- Edge Computing for Path Planning in Autonomous Driving [7, 8]
  - Optimized local path planning by collaborative and sampling-based model predictive control (MPC) method with driving data analysis in edge networks
- Multi-object Tracking (MOT) and Detection System for Embedded Devices
  - Designed MOT system by using static and dynamic matching approaches along with content-aware dynamic sampling technique, achieving 63.12% MOT accuracy
- Multi-tier Computation Offloading Framework in 6G Edge Cloud [9]
  - Proposed multi-tier edge computing system including device cloud concept to schedule offloading tasks in 4G testbed, optimizing latency and reducing cost
- Network Testbed Deployment for Smart Factory Applications
  - Deployed 5G and Wi-Fi 6E testbeds and trained DL model for defect detection using Amazon dataset (ARMBench) for performance comparison and analysis

Apr. 2021 – Aug. 2021 | **Full-stack Cloud Developer (contractor)**, *IoT Eye Inc.*

- DevOps and Cloud Application Development
  - Deployed multi-agency management platform on AWS using Frappe framework to support five industry partners, and open-sourced tutorial codes on GitHub

Dec. 2020 – Aug. 2021 | **Independent Researcher** (*Collaborators: Prof. Stephen B. Weinstein, Prof. T. Russell Hsing*)

- Distributed SDN and Edge Computing for 6G Networks [6]
  - Served as speaker in Edge and Fog Computing track on IEEE 7th WF-IoT in 2021 to propose distributed SDN system coupled with localized edge platforms

Dec. 2017 – Apr. 2021 | **Software Engineer (Senior/Supervisor)**, *Silicon Motion Inc. (NASDAQ: SIMO)*

- Design Flow Automation and In-house EDA Tool Development
  - Deployed microservice system in on-premise servers and developed in-house EDA tools, automating 7/16 nm IC design flows and improving verification robustness
- Leadership and Communication
  - Acted as project leader to cooperate with industry partners (TSMC, Synopsys) for establishing design flows in new IC technology nodes

Sep. 2015 – Sep. 2017 | **Research Assistant**, *National Taiwan University – FGCN Lab*

- Microservice-based Computation Offloading for Wearable Devices [2]
  - Proposed microservice-based function module sharing framework (Virtual Local-Hub) for Android wearable devices by edge computing and WiFi P2P concept
- Proof of Concept for Edge and Wearable Computing in WLAN Testbed [3, 4, 5]
  - Modified Android Wear OS to intercept system calls and redirect application API calls to WLAN Wi-Fi AP (using Raspberry Pi) for offloading orchestration

Jul. 2014 – Mar. 2015 | **Research Intern**, *Princeton University – EDGE Lab*

- 4G LTE IoT Session Management for Balancing Latency, Power, and Signaling [1]
  - Designed uplink scheduler and adaptive RRC/DRX algorithm with a Markov chain analysis for 4G LTE IoT session management, balancing costs and performance

Sep. 2013 – Feb. 2015 | **Undergraduate Researcher**, *National Science and Technology Council Taiwan (NSTC)*

- GPGPU/CUDA for Video Coding Acceleration [Granted Research Project]
  - Studied High-Efficiency Video Coding (HEVC; H.265) codec structure to construct parallelism model using NVIDIA CUDA programming language and GPU

Teaching Experience

Sep. 2016 – Jan. 2017 | **CSIE 5057 – Advanced Computer Network**, *National Taiwan University*

- Designed IRC chatbot application as final project for lecturing socket programming
- Enhanced program robustness by peer-testing system and promoted creativity by flexible score criterion

Feb. 2016 – Jun. 2016 | **CSIE 3510 – Computer Network**, *National Taiwan University*

- Lectured TCP/IP protocol (802.11, 802.3) and demonstrated network packet monitoring and analysis using WireShark
- Assigned paper readings and held course seminar for final evaluation

Mentoring Experience

2023 – Present | **Undergraduate Research**

- "Real-Time Robotic Applications for Autonomous Driving, Drones, and Smart Factory" – Basil Hasan Khwaja, *Summer Undergraduate Research Fellowship (SURF) Project, Purdue University*
  ROS | MuSHR | Algorithm | Path Planning | Autonomous Driving
- "Measurement-based Experiments and Evaluation for Digital Transformation in Smart Factory" – Ana Milena Espinosa Jiménez, *Undergraduate Research Experience Purdue-Colombia (UREP-C) Program, Purdue University*
  Wi-Fi 6E | 5G CBRS | Application | Video Streaming | Computer Vision

Professional Activities

2024 | **Reviewer: NL2024 (x3)**, *IEEE Networking Letters*

2021 | **Speaker: Edge and Fog Computing Track**, *IEEE 7th World Forum on Internet of Thing (WF-IoT)*

Honors & Awards

2022 | **Course certificate: Machine Learning**, *Coursera & Stanford Online*

2021 | **Course certificate: Modern Application Development with Python on AWS**, *Coursera & AWS*

2020 | **Course certificate: IEEE Winter School on Fog/Edge Computing**, *IEEE SA & IEEE ComSoc*

2017 | **Valedictorian of Graduation Ceremony**, *Graduate Institute of Networking and Multimedia, NTU*
Outstanding Teaching Assistant Awards (CSIE 3510 Computer Network), *NTU*
Outstanding Teaching Assistant Awards (CSIE 5057 Advanced Computer Network), *NTU*

2015 | **Presidential Awards (2015 Spring)**, *NCTU*

2014 | **Research Project Funding (103-2815-C-009-043-E)**, *National Science and Technology Council (Taiwan)*
Presidential Awards (2014 Spring), *NCTU*