

YA-CHUAN (SOPHIE) HSU

yachuan815@gmail.com · SophieHsu.github.io · Los Angeles, California

Human-robot collaboration, reinforcement learning (RL), uncertainty planning, hierarchical planning

EDUCATION

University of Southern California (USC)

Ph.D. Computer Science, Advisor: Stefanos Nikolaidis

- Leadership: Women in Engineering (WiE) Mentor

Aug. 2020 - present

Los Angeles, CA, US

Texas A&M University (TAMU)

M.S. Computer Science and Engineering, Advisor: Dylan A. Shell

Dec. 2019

College Station, TX, US

National Taiwan University of Science and Technology (NTUST)

B.S. ECE Undergraduate Honors Program

Jun. 2017

Taipei, Taiwan

EXPERIENCE

Toyota Research Institute

Research Intern, Human Interactive Driving Team

May. 2024 - Aug. 2024

- Designed a framework for **time-critical** assistive notification systems that account for human reaction time
- Leveraged Large Language Models (LLMs) as **human reaction model surrogates** to train assistive systems using RL

Interactive and Collaborative Autonomous Robotics Lab, USC

Research Assistant

Aug. 2020 - present

- **Generated diverse evaluation environments** by exploring the latent space of generative adversarial networks (GANs) with quality-diversity algorithms
- Developed hierarchical Partially Observable Markov Decision Process (POMDP) framework for human-aware robotic planning in long-horizon tasks
- Modeled **human vision limitations induced false knowledge** of surroundings and deployed human-knowledge-aware robots for collaboration in virtual reality (VR) kitchen setting
- Identified human observation function with Bayesian inference for real-time robot planning

Distributed AI Robotics Lab, TAMU

Graduate Research Assistant

Mar. 2019 - Jul. 2020

- Developed **real-time pedestrian-aware autonomous vehicle driving** plan through encoding pedestrian road-crossing intentions into a POMDP model

Texas A&M Transportation Institution

Graduate Research Assistant

Sep. 2017 - Feb. 2019

- Formalized human-machine communication in autonomous vehicle contexts
- Deployed pedestrian-aware behavior planner using ROS on Ford Lincoln MKZ (Project Report)

SKILLS

- **AI/Robotics:** MDP/POMDP, Generative Models, Bayesian inference, Transformer models, ROS
- **Software engineering:** Python/PyTorch, C/C++, Git, Linux

SELECTED PUBLICATIONS

- **Y.-C. Hsu**, M. Defranco, R. Patel, S. Nikolaidis. “Integrating Field of View in Human-Aware Collaborative Planning”. *IEEE International Conference on Robotics & Automation (ICRA) 2025*
- V. Bhatt, H. Nemlekar, M. C. Fontaine, B. Tjanaka, H. Zhang, **Y.-C. Hsu**, S. Nikolaidis. “Surrogate Assisted Generation of Human-Robot Interaction Scenarios”. *Conference on Robot Learning (CoRL) 2023*
- M. C. Fontaine*, **Y.-C. Hsu***, Y. Zhang*, B. Tjanaka, S. Nikolaidis. “On the Importance of Environments in Human-Robot”. *Robotics: Science and Systems (RSS) 2021*.
- **Y.-C. Hsu**, S. Gopalswamy, S. Saripalli, D. Shell. “Implicit Coordination via Uncertainty-Aware Plans: A POMDP Treatment of Vehicle-Pedestrian Interaction”. *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2020*