YA-CHUAN (SOPHIE) HSU

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RESEARCH INTERESTS

Human-robot collaboration, hierarchical planning, uncertainty planning, reinforcement learning

EDUCATION

University of Southern California (USC), Los Angeles, CA **Aug 2020 - Present**
Ph.D. in Computer Science • *Advisor: Stefanos Nikolaidis*

Texas A&M University (TAMU), College Station, TX **Dec 2019**
M.S. in Computer Science and Engineering • *Advisor: Dylan A. Shell*

National Taiwan University of Science and Technology, Taipei, Taiwan **Jun 2017**
B.S. in Electrical Engineering (Minor in Computer Science)

EXPERIENCE

Toyota Research Institute • Human Interactive Driving Team **May 2024 - Aug 2024**
Research Intern, Manager: Guy Rosman, Mentor: Jonathan Decastro
- Designed a framework for time-critical assistive notification systems that account for human reaction times
- Leveraged Large Language Models (LLMs) as human reaction model surrogates to train assistive systems using reinforcement learning (RL)

USC • Interactive and Collaborative Autonomous Robotics Lab **Aug 2020 - Present**
Research Assistant, PI/Collaborators: Stefanos Nikolaidis, Erdem Biyik
- Developed hierarchical Partially Observable Markov Decision Process (POMDP) framework for human-aware robotic planning in long-horizon tasks
- Modeled human 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

TAMU • Distributed AI Robotics Lab **Mar 2019 - Jul 2020**
Graduate Research Assistant, PI: Dylan A. Shell, Swaminathan Gopalswamy
- Developed real-time pedestrian-aware autonomous vehicle driving plan through encoding pedestrian road-crossing intentions into a POMDP model

Texas A&M Transportation Institute **Sep 2017 - Feb 2019**
Graduate Research Assistant, PI: Swaminathan Gopalswamy, Srikanth Saripalli, Dylan A. Shell
- Formalized human-machine communication in autonomous vehicle contexts
- Deployed pedestrian-aware behavior planner using ROS on Ford Lincoln MKZ

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* [Under Submission]

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*

SKILLS

Programming Languages: Python, C/C++, LaTeX; **Languages:** English (full professional), Mandarin (native); **Tools:** PyTorch, ROS, Git, Linux, Raspberry Pi

TEACHING & MENTORING

Women in Engineering (WiE) Mentor, USC **2022 - 2023**

Teaching Assistant, USC **Jan 2021 - present**
Classes: Introduction to Artificial Intelligence, Computational Human-Robot Interaction, Introduction to Robotics, Discrete Methods in Computer Science