ZHE HUANG

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EDUCATION BACKGROUND

09/2019—06/2024 (Expected)	**University of Illinois at Urbana-Champaign** *Ph.D.* in Electrical and Computer Engineering
09/2017—06/2019	**Stanford University** *M.S.* in Mechanical Engineering
09/2013—07/2017	**Xi'an Jiaotong University** *B.Eng.* in Energy and Power Engineering, Honors Engineering Program

Skills: Python, Robot Operating System (ROS), PyTorch, MATLAB, LaTeX.

PROFESSIONAL EXPERIENCES

Amazon Robotics, North Reading, MA   08/22-12/22

Advanced Robotics Research Co-op

- Developed a learning-based instance-wise multi-modal grasp policy algorithm using RGB images and point cloud as input for picking Amazon Fresh groceries with a hybrid gripper.

Nuro, Mountain View, CA   05/22-08/22

PhD Intern

- Designed causal reasoning metrics regarding trajectory prediction for scene sets of interactive agents.

Human-Centered Autonomy Lab, Urbana, IL   07/19-Now

Research Assistant

- Proposed an optimal sampling-based path planning algorithm by incorporating PointNet++ into Informed Rapidly-exploring Random Tree Star (IRRT*), where IRRT* helps PointNet++ focus guidance state inference on the important region for solution improvement, and PointNet++ helps IRRT* sample critical states in the informed subset for convergence acceleration.

- Created a robust human intention estimation architecture for human-robot collaboration in free-form industrial assembly tasks, where human trajectory prediction is integrated into robot motion planning by estimating human intention in real-time, to boost collaboration efficiency under safety monitoring.

- Introduced an end-to-end Transformer-based approach which recognizes multi-agent interaction patterns by inferring sparse interaction graphs, and performs trajectory prediction for crowds in public scenes. The effectiveness is demonstrated in addressing freezing robot problems and minimizing disturbances from unimportant neighbors.

- Presented a novel framework that incorporates particle filtering and Long-Short Term Memory (LSTM) Networks, to simultaneously estimate pedestrian intentions and generate multi-modal long-term trajectory prediction with a flexible sampling strategy. Deployed the trajectory prediction algorithm on an autonomous vehicle.

PUBLICATIONS

1. **Huang, Z.**, Chen, H., and Driggs-Campbell, K. (2023). Neural Informed RRT* with Point-based Network Guidance for Optimal Sampling-based Path Planning. Submitted to IEEE International Conference on Robotics and Automation.

2. **Huang, Z.*,** Mun, Y. J.*, Li, X.†, Xie, Y.†, Zhong, N.†, Liang, W., Geng, J., Chen, T., and Driggs-Campbell, K. (2023). Hierarchical Intention Tracking for Robust Human-Robot Collaboration in Industrial Assembly Tasks. IEEE International Conference on Robotics and Automation.

3. Liu, S.*, Chang, P.*, **Huang, Z.,** Chakraborty, N., Hong, K., Liang, W., McPherson, D., Geng, J., and Driggs-Campbell, K. (2023). Intention Aware Robot Crowd Navigation with Attention-Based Interaction Graph. IEEE International Conference on Robotics and Automation.

4. **Huang, Z.,** Li, R., Shin, K., & Driggs-Campbell, K. (2022). Learning Sparse Interaction Graphs of Partially Detected Pedestrians for Trajectory Prediction. IEEE Robotics and Automation Letters, 7(2), 1198-1205.

5. **Huang, Z.**, Hasan, A., Shin, K., Li, R., & Driggs-Campbell, K. (2021). Long-Term Pedestrian Trajectory Prediction Using Mutable Intention Filter and Warp LSTM. IEEE Robotics and Automation Letters, 6(2), 542-549.

6. Du, P., **Huang, Z.**, Liu, T., Ji, T., Xu, K., Gao, Q., Sibai, H., Driggs-Campbell, K., & Mitra, S. (2020). Online Monitoring for Safe Pedestrian-Vehicle Interactions. IEEE International Conference on Intelligent Transportation Systems.