Hung-Jui (Joe) Huang

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Education

Carnegie Mellon University (CMU) Pittsburgh, PA
Ph.D. in Robotics *Sept. 2021 - Now*

Massachusetts Institute of Technology (MIT) Cambridge, MA
Bachelor of Science in Electrical Engineering and Computer Science, GPA:4.8/5.0 *Sept. 2014 - June 2019*

Research

CMU RPL Lab Pittsburgh, PA
Ph.D. Student *Sept. 2021 - Now*

- My research is about superhuman tactile sensing, including actively estimating physical properties and creating high-resolution 3D reconstructions. I am co-advised by Professor Michael Kaess and Professor Wenzhen Yuan.

ISEE, Inc. Cambridge, MA
Research Engineer *Aug. 2019 - May 2021*

- Invented an efficient planning algorithm with guaranteed bounds on the probability of safety violation in probabilistic dynamic environments [2]. Deployed real-time on a 12-tons autonomous truck. The work is supervised by Dr. Chris Baker and Professor Ying Nian Wu.

MIT Robust Robotics Group Cambridge, MA
Undergraduate Researcher *Sept. 2018 - June 2019*

- Designed novel Graph Neural Network (GNN) method and a novel graph representation of the observation history to help the autonomous robot navigate more efficiently without a map. The work is supervised by Professor Gregory J Stein and Professor Nicholas Roy.

NTHU Vision Science Lab HsinChu, Taiwan
Research Assistant *Jan. 2017 - July 2017*

- Invented a new robotics visual place recognition deep learning algorithm that can be used in topological map and navigation [1]. This work is supervised by Professor Min Sun.

Publications

[6] **Hung-Jui Huang**, Wenzhen Yuan. *Meta Active Perception and a Case Study on Liquid Viscosity Estimation.*

Submitted to IEEE Transactions on Robotics (T-RO). Dec. 2023
[5] **Hung-Jui Huang**, Jingyi Xiang, Wenzhen Yuan. *Kitchen Artist: Precise Control of Liquid Dispensing for Gourmet Plating.* International Conference on Robotics and Automation (ICRA). Nov. 2023
[4] Xiaofeng Guo, **Hung-Jui Huang**, Wenzhen Yuan. *Estimating Properties of Solid Particles Inside Container Using Touch Sensing.* International Conference on Intelligent Robots and Systems (IROS). Oct. 2023.
[3] **Hung-Jui Huang**, Xiaofeng Guo, Wenzhen Yuan. *Understanding Dynamic Tactile Sensing for Liquid Property Estimation.* Robotics: Science and Systems (RSS). June 2022.

[2] **Hung-Jui Huang**, Kai-Chi Huang, Michal p, Yibiao Zhao, Ying Nian Wu, Chris L. Baker. *Planning on a (Risk) Budget: Safe Non-Conservative Planning in Probabilistic Dynamic Environments.* International Conference on Robotics and Automation (ICRA). May 2021.

[1] Tsun-Hsuan Wang*, **Hung-Jui Huang***, Juan-Ting Lin, Chan-Wei Hu, Kuo-Hao Zeng, Min Sun. *Omnidirectional CNN for Visual Place Recognition and Navigation.* International Conference on Robotics and Automation (ICRA). May 2018.

**Equal Contribution*

Working Experience

ISEE, Inc. Cambridge, MA
Research Engineer *Aug. 2019 - May 2021*

- Invented a patentable state estimation algorithm that fulfilled the high standard robustness requirement; it is now a part of our autonomous navigation system
- Implemented a fast robot mapping algorithm for robust obstacle avoidance task for the autonomous navigation system

NVIDIA, Corp. Santa Clara, CA
Deep Learning Intern *June 2018 - Aug. 2018*

- Coordinated a three person team to implement a C++ pedestrian tracking algorithm running on a Jetson TX2 with real life demo
- Redesigned an object detection algorithm under Project Isaac; portion of it was used for GTC Japan 2018

NTHU Vision Science Lab HsinChu, Taiwan
Research Assistant *Jan. 2017 - July 2017*

- Directed the robot place recognition and navigation research team under supervision of professor Min Sun, and demonstrated the new algorithm on real world robot to Taiwanese government officials

Teaching

CMU Computer Vision (16-720) Pittsburgh, PA
Teaching Assistant *Jan. 2024 - Now*

- Revised and led the Lucas-Kanade assignment.

MIT Robotics Science and Systems (6.141) Cambridge, MA
Teaching Assistant *Feb. 2018 - May 2018*

- Devised a final class project, which used deep learning to navigate a mobile robot indoors using RGB sensors as the only sensor input; verified its feasibility prior to assigning to students
- Restructure the lab materials and advised students on classical robotics algorithms; received a 6.5/7.0 rating from students after the class ended

Honors and Awards

42th International Physics Olympiad Gold Medal Winner July 2011

Skills

- **Programming languages**: Python, C++, Java, Assembly31
- **Software Libraries**: Pytorch, TensorFlow, ROS, Isaac SDK, NumPy, OpenCV, MATLAB GPOP
- **Software**: Linux, Ansys Fluent, SolidWorks, Arduino, Onshape, OpenSCAD, Psoc5