Jyun-Ting Song

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EDUCATION

Carnegie Mellon University Advisor: Prof. **Kris Kitani**

M.S. in Robotics Sept 2023 - Aug 2025 (expected)

- Relevant Coursework: Introduction to Machine Learning, Math Fundamental for Robotics
- Research Interests: Human Pose Estimation, Mesh Recovery and Physics-based Humanoid Control

National Taiwan Normal University Advisor: Prof. **Jacky Baltes**

M.S. in Electrical Engineering (withdrew), GPA: 4.21/4.3 Sept 2021 - June 2022

- Research Topic: Balance Control for Humanoid Robots using Deep Reinforcement Learning

National Taiwan Normal University Advisor: Prof. **Jacky Baltes**

B.S. in Electrical Engineering, GPA: 3.9/4.3 Sept 2017 - June 2021

- Research Topic: Versatile Humanoid Robots

RESEARCH EXPERIENCE

- **Development of a 3D Multi-Human Interaction Dataset** Oct 2023 - present
  - Constructing a large-scale 3D multi-human dataset with large amount of contact using a semi-automatic annotation pipeline to generate 3D annotations like human pose, mesh and contact map with reduced human oversight.

- **Balancing Control for a Humanoid Agent in a Dynamic Environment** Jan 2022 - Oct 2022
  - Designed RL algorithm structure based on Proximal Policy Optimization (PPO) using GPU-based implementation to train a humanoid agent to play a balance board in a simulation environment (Isaac Gym) [link]

- **An Olympic Sports Humanoid Robot** Sept 2019 - June 2021
  - Developed versatile humanoid robot that could perform skills of Olympic sports events such as archery, basketball, weightlifting, sprint and marathon [link]

PUBLICATIONS

- [1] **J.-T. Song**, G. Christmann, J. Jeong, J. Baltes, “Reinforcement Learning and Action Space Shaping for a Humanoid Agent in a Highly Dynamic Environment,” Springer’s Studies in Computational Intelligence. (Accepted)

- [2] A. Xompero, S. Donaher, V. Iashin, F. Palermo, G. Solak, C. Coppola, R. Ishikawa, Y. Nagao, R. Hachiuma, Q. Liu, F. Feng, C. Lan, R. H. M. Chan, G. Christmann, **J.-T. Song**, G. Neeharika, C. K. T. Reddy, D. Jain, B. U. Rehman, and A. Cavallaro, “The Corsmal Benchmark for the Prediction of the Properties of Containers,” IEEE Access, vol. 10, pp. 41 388–41 402, 2022.

- [3] **J.-T. Song**, J. Baltes, “Interactive Card Magic with Humanoid Robot,” FIRA World Summit 2021. (A technical report)

ROBOT COMPETITIONS & AWARDS

- **1st Place,** All-Round Event, HuroCup, FIRA RoboWorld Cup 2022 July 2022
  - FIRA HuroCup is an international fully autonomous humanoid robot competition. The All-Round winner is determined by the overall points in ten robot Olympic sports events
  - **1st Place** in Basketball and Weightlifting, **2nd Place** in Sprint and Archery [link]
  - Designed Robinion2 (a humanoid robot) with two teammates, integrated image processing techniques for object detection, and developed closed-loop walking gait for stable walking

- **4th Place,** AI Robot Challenge 2021 - Recycling Oct 2021
  - Used YOLOv4 for object detection of different containers, applied inverse kinematics with pseudo-inverse Jacobian and forward kinematics to manipulate robot arm (ur10e) to move containers into corresponding boxes in a simulation environment (MoveIt) [link]

- **1st Place,** IJCAI 2021 - Robot Magic and Music Competition Aug 2021
  - Developed a humanoid robot that could perform interactive card magic [link]

- **2nd Place,** Basketball Event, Hurocup, FIRA SimulCup 2021 July 2021
  - Developed a humanoid robot that could grab and dunk a ball with 98% accuracy [link]

- **2nd Place,** ICPR 2020 - CORSMAL Challenge Sept 2020
  - Used CNN and image processing techniques to estimate physical properties (mass, type, and how full a container was) using a multimodal dataset, robots could predict properties of unseen containers’ content [link]

- **1st Place,** Archery Event, Hurocup, Taiwan Humanoid 2020 July 2020
  - Implemented image recognition of a target moving in a circular path for robot to pull a string and shoot an arrow by itself [link]

WORK EXPERIENCE

National Taiwan Normal University Taipei, Taiwan
Teaching Assistant, Course: Reinforcement Learning Sept 2022 - Jan 2023
Educational Robotics Center, National Taiwan Normal University Taipei, Taiwan
Research Assistant Sept 2021 - June 2022

- Project title, A Humanoid Robot that Can Ride an E-scooter, a project funded by the Ministry of Science and Technology (MOST)

SKILLS

- **Languages**: Mandarin Chinese (native), English (fluent)
- **Simulation Environment:** IssacGym, Gazebo
- **Libraries:** Matplotlib, Numpy, Scikit-Learn, Gym, OpenCV, ROS, PyTorch, Trimesh
- **Programming:** Python, C++, C