Qiyang Yan

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EDUCATION

IMPERIAL COLLEGE LONDON ***2023.10-2024.6***

- **Major**: Electrical and Electronic Engineering (MEng 4YFT) – Master
- **Grade**: 76.96 % (First Class Honours)
- **Relevant Courses**: Computer Vision and Pattern Recognition (85.87, top 5%), Optimisation (78.75), Topics in Large Dimensional Data Processing (88.08, top 5%)

IMPERIAL COLLEGE LONDON ***2020.10-2023.6***

- **Major**: Electrical and Electronic Engineering (MEng 4YFT) – Bachelor
- **Grade**: 61.57 % (Upper Second Class Honours)
- **Relevant Courses**: Robotic Manipulation (78.2), Mathematics (77.48)

TECHNICAL SKILLS

Language: English (IELTS 7.5), Mandarin (Native)
Programming: Python, C/C++
Deep Learning Framework: PyTorch, TensorFlow
Robotics: ROS, MuJoCo, Issac Gym
Hardware Skills: LTspice, Eagle, Quartus, Verilog
Other Software Skills: Solidworks, OpenCV

PUBLICATIONS

Variable-Friction In-Hand Manipulation for Arbitrary Objects via Diffusion-Based Imitation Learning
Qiyang Yan, Zihan Ding, Xin Zhou and Adam J. Spiers
IEEE International Conference on Robotics and Automation (ICRA), 2025 ***(Under Review)***

RESEARCH EXPERIENCE

Variable-Friction In-Hand Manipulation for Arbitrary Objects via Diffusion-Based Imitation Learning
Research Assistant | Supervised by Dr Adam J. Spiers ***2024.5-2024.9***

- **Overview**: Proposed an end-to-end data-efficient learning framework, allowing gripper to learn to precisely manipulate arbitrary objects for any target pose on real hardware within 2 hours, with error around 3mm and 3°.
- **Demonstration Collection**: Trained a smoothness-optimized general RL policy with a tailored reward function, allowing automated demonstrations collection for arbitrary objects via hindsight goal relabelling.
- **Sim-Real Co-Training**: Proposed mixing real and simulation demonstrations for diffusion-based behaviour-cloning, effectively mitigated the problem of real-world data scarcity.

Sensor-Agnostic Pattern Recognition Framework for Multi-Modal Tactile Sensing
Research Assistant | Supervised by Dr Adam J. Spiers ***2023.9-2023.12***

- **Overview**: Responsible for dataset preparation for development of generalisable learning-based approaches to bridge the gap between various type of tactile sensors.
- **Data Collection**: Configured and integrated DIGIT, Gelsight, PapillArray and Xela tactile sensors on a UR5e robotic arm via ROS, designed a standardized data collection procedure for YCB object interactions.
- **Data Analysis**: Conducted feature distribution analysis from large-dimensional data for multiple tactile sensors by applying dimensionality reduction such as PCA and LDA and clustering techniques.

PROJECTS

Variable-Friction In-Hand Manipulation for Polygons via Reinforcement Learning with Sim2Real Transfer
Master Thesis | Supervised by Dr Adam J. Spiers ***2023.10-2024.4***

- **Overview**: Developed the first learning-based framework for the variable-friction gripper to learn to manipulate irregular polygons on real robot, achieving 95% success rate with average errors around 6 mm and 6°.
- **RL Training**: Built simulation environment in MuJoCo. Shaped the action space and reward function. Trained policies with self-implemented TD3 and PPO, realising robust and precise in-air in-hand manipulation.
- **Sim-to-Real**: Utilized system identification and domain randomization, successfully deployed the model trained from MuJoCo to the real robot with slight drop on success rate, around 2%.

A Pick-Manipulate-Insert System with Variable-Friction Gripper for Cube
3^{rd} Year Final Project | Supervised by Dr Adam J. Spiers ***2023.5-2023.6***

- **Overview**: Developed a vision-based closed-loop pick-manipulate-insert system with a variable-friction gripper and UR5e robotic arm using ROS, achieving a 92% success rate for this task for cube.
- **Trajectory Planning**: Developed a model-based IHM planner that enables the gripper to in-hand manipulate cube precisely and an UR5e arm trajectory planner; Achieved positional accuracy around 3mm.

INTERESTS

Sports Climbing (7b Onsight) and Bouldering (V10/7c+), Diving (AOW), Skateboarding, Skiing, Guitar, Drums