Yijia Wu

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Education

Worcester Polytechnic Institute — Worcester, MA
Ph.D. student in Robotics Engineering — *Aug. 2022 – Present*

Dartmouth College — Hanover, NH
M.S. in Computer Science — *Sep. 2019 – June 2021*

- **Thesis title**: "Zooming towards High Precision Pose Estimation"
- **Thesis advisor**: Professor Devin Balkcom

Beihang University — Beijing, China
B.S. in Automation, Outstanding Graduate — *Sep. 2015 – June 2019*

Language and Technical Skills

Programming Languages: Python, C, C++, MATLAB
Libraries / Frameworks: ROS, MoveIt, Gazebo, OpenCV, PCL, CUDA, pytorch
Engineering Software: Solidworks, onshape, EasyEDA
Hardware Platform: Arduino, Raspberry Pi, industrial robot arm (UR5, ABB IRB 120, Adept Cobra i600)
Languages: English, Chinese (Mandarin), Chinese (Cantonese)

Publications

[1] Luyang Zhao, **Yijia Wu**, Julien Blanchet, Maxine Perroni-Scharf, Xiaonan Huang, Joran Booth, Rebecca Kramer-Bottiglio, Devin Balkcom, "Soft Lattice Modules that Behave Independently and Collectively" IEEE Robotics and Automation Letters, vol. 7, no. 3, pp. 5942-5949, July 2022

[2] Samuel Lensgraf, Karim Itani, Yinan Zhang, Zezhou Sun, **Yijia Wu**, Alberto Quattrini Li, Bo Zhu, Emily Whiting, Weifu Wang, Devin Balkcom , "PuzzleFlex: kinematic motion of chains with loose joints," IEEE International Conference on Robotics and Automation (ICRA), 2020

Research Experience

Underwater Modular Robot — Aug. 2022 – Present
Supervisor: Prof. Markus P. Nemitz — *Worcester Polytechnic Institute*

- Working on improving 3d printing technique to build watertight functional components for underwater robots
- Working on designing soft valve

Robust Assembly of Compliant Modular Robots [1] — June 2021 – Jan. 2022
Supervisor: Prof. Devin Balkcom — *Dartmouth College*

- Improved robot module design and fabricated multiple modules, including 3D printing TPU-based structure, designing PCBs, wiring, and programming with Arduino
- Designed, implemented, and tested robot basic functions and properties
- Designed the structure of the second version robot which extends the capability of multi-module structures

Zooming towards High Precision Pose Estimation — Sep. 2020 – Sep. 2021
Supervisor: Prof. Devin Balkcom, Prof. Alberto Quattrini Li — *Dartmouth College*

- Improved localization accuracy by analyzing multiples factors that could influence fiducial marker-based pose estimation accuracy with the theoretical model, simulation, and field experiment
- Analyzed the benefit and limitation of using a zoom camera to improve pose estimation accuracy and precision

Computational Joinery [2] — July 2018 – Sep. 2018
Supervisor: Prof. Devin Balkcom — *Dartmouth College*

- Built an error model to analyze the possible deformation of block-based structure with mass-spring model
- Improved the design of a parallel gripper and programmed a SCARA robot to build an interlocking structure

Double Excitation Windings Linear Switched Reluctance Motor — Oct. 2018 – Jan. 2019
Supervisor: Prof. Liang Yan — *Beihang University*

- Assisted in CAD drawing, fabricating motor, and experiment setup
- Verified the output force performance by 2D simulation with Ansys Maxwell and experiments

Work Experience

Dorabot Inc. Feb. 2022 - July 2022
Robotics Software Engineer *Peachtree Corners, GA*

- Responsible for the testing, maintenance, and deployment of the autonomous pallet jack system
- Maintained and improved the vision part of the palletizing project, including camera driver integration, calibration, data processing, and model training

Dartmouth College Sep. 2021 - Jan. 2022
Research Assistant *Hanover, NH*

- Worked on "Robust Assembly of Compliant Modular Robots" project

Megvii (Face++) Feb. 2019 - July 2019
Robotics Intern *Beijing, China*

- Built vision-based robot manipulation demos with kinect and UR5 robot arm
- Participated in the development of multiple projects, such as chess robot, pet monitor system, and wheel hub surface defect detection system, on mechanical, electrical design, and writing testing code

Cheitech July 2017 - Dec. 2017
Mechatronics Engineer *Beijing, China*

- Designed an EEG-controlled cable-driven hand exoskeleton for stroke patients and tested it in hospitals
- Responsible for patent application and contacting manufacturers
- Won the First Price in International Contest of Innovation in 2017

Engineering Projects

Industrial robot simulation for JdeRobot Academy June 2020 - Aug. 2020
Google Summer of Code *Hanover, NH*

- Developed three industrial robot simulation exercises for students based on ROS, MoveIt, and Gazebo
- **Pick and Place**: given object positions, pick and place objects on the table with parallel gripper and robot arm
- **Machine Vision**: given object shape and color, find the object position and avoid collision with the occupancy map built with RGBD camera, pick and place with a vacuum gripper and robot arm
- **Mobile Manipulation**: given object and goal position in the world, pick objects from one table, then navigate the mobile manipulator to place objects in goal positions

Highway Trash Inspection Robot Sep. 2018 – Dec. 2018
Beihang University *Beijing, China*

- Built a four-wheel-drive mobile robot platform with up to 20kg load to carry a large battery and computer
- Won the First Prize in National Competition of Transport Science and Technology for Students in 2018

Foldable Worm Dec. 2015 – May. 2016
Beihang University *Beijing, China*

- Designed a foldable worm-shape robot with less than 5mm height and its wriggling locomotion mechanism