Yuyou Zhang

✉ yuyouz@andrew.cmu.edu   •   🌐 zhangyuyou-10.github.io

EDUCATION

Carnegie Mellon University   **Pittsburgh, US**
Ph.D. student at SafeAI Lab   *Sept. 2022*
Shanghai Jiao Tong University (SJTU)   **Shanghai, China**
(Honors) B.S. in Automation   *Sept. 2018 - June 2022*

SELECTED RESEARCH EXPERIENCE

Mechanical Systems Control Lab   **University of California, Berkeley**
Undergraduate Researcher   *June 2021 - Nov. 2021*

Offline and Online Deformation Model Learning for Robust Cable Manipulation with Graph Neural Networks [1]
- Combined offline graph neural network with online residual model to approximate cable dynamics
- Proposed a model predictive control framework for robust cable deformation control
- Demonstrated faster convergence and less terminal error compared to baselines algorithms
- Improved model training efficiency and generalizability, narrowed sim-to-real gap.

Intelligent Robotics and Machine Vision Lab   **Shanghai Jiao Tong University**
Undergraduate Researcher   *Sept. 2020 - June 2022*

Safe Vision-based Contact Selection for the Non-fixed Contact Manipulation of Deformable Objects[2]
- Proposed a contact optimization strategy to select the initial contact points and minimized the rotational or sliding motion of deformable objects during shape servoing
- Considered joint limits and singularities by introducing constraints to the contact optimization
- Designed an uncalibrated visual servo controller to validate the contact optimization strategy

Hybrid Vision-Force Control for Robotics Manipulation in Confined Space[3]
- Derived the kinematic formulation of a generalized constraint for confined robot workspace
- Developed an adaptive method to respectively estimate the Jacobian matrix online in force space and image space
- Designed a hybrid vision-force controller for manipulation with a desired contact force

Adaptive Visual Servoing Shape Control of A Soft Robot Manipulator Using *Bézier* Curve Features[4]
- Proposed an adaptive *Bézier* curves update algorithm to represent the shape of the soft continuum robot, and a feature extraction algorithm without man-made markers
- Designed an uncalibrated visual servo controller for shape regulation of the soft continuum robot

SKILLS

- **Programming Languages**: Python, C/C++, Java
- **Software & Tools**: Matlab, ROS, Abaqus, Gmsh, SolidWorks, AutoCAD
- **Languages**: Mandarin (native), English (proficient, TOEFL: 109, S: 24)

AWARDS

- Honors degree of SJTU with Zhiyuan Honor Program, 2022
- Shanghai Outstanding Graduates 2022
- Meritorious Winner pf the Mathematical Contest in Modeling 2020
- Zhiyuan Scholarship in 2018, 2019, 2020, 2021   (**top 5%**)

PUBLICATIONS

[1] C. Wang, Y. Zhang, X. Zhang, Z. Wu, X. Zhu, S. Jin, T. Tang, and M. Tomizuka, "Offline-online learning of deformation model for cable manipulation with graph neural networks," *IEEE Robotics and Automation Letters*, vol. 7, no. 2, pp. 5544–5551, 2022.

[2] L. Han, Y. Zhang, and H. Wang, "Vision-based contact point selection for the fully non-fixed contact manipulation of deformable objects," *IEEE Robotics and Automation Letters*, vol. 7, no. 2, pp. 4368–4375, 2022.

[3] L. Han, Y. Zhang, and H. Wang, "Hybrid adaptive vision-force control under the bottleneck constraint," *IEEE Transactions on Control Systems Technology*, 2022.

[4] F. Xu, Y. Zhang, S. Jing, H. Wang, and W. Chen, "Adaptive visual servoing shape control of a soft robot manipulator using *bézier* curve features." IEEE Transactions on Mechatronics (submitted for publication), 2021.