Yongkai Ye

Hangzhou, China +86 19012772732 22213004@zju.edu.cn

ResearchGate-Yongkai Ye ORCID-Yongkai Ye GoogleSchloar-Yongkai Ye

You can find more information about me on this website: Github-Yongkai Ye's Profile

Education

2022 – 2025 **M.Phil. in Agricultural Mechanization Engineering (Expected)** IELTS in preparation
Zhejiang University, Hangzhou, China Supervisor: Associate Fellow Dongdong Du

2018 – 2022 **B.Eng. in Electronics and Information Engineering** GPA: **3.89**/4.0 Rank: **1**/60
Northwest A & F University, Yangling, China Supervisor: Associate Professor Jiao Guo

Researches

Research Interests

- Soft Robotics, Soft Grippers, Soft Actuators, Finite Element Method, Fluid-Structure Interaction Analysis, Sensing, and Machine Learning

Research Projects

2024 – 2026 **Research on adaptive grasping method of agricultural robots based on flexible tactile perception (Major Participant, In Preparation)**
Funing: National Natural Science Foundation of China

2021 – 2023 **Research on fruit-picking mechanism of particle-jamming soft gripper (Major Participant)**
Funing: Natural Science Foundation of Zhejiang Province
Material Characteristic Study: Several typical pulpy fruits were selected as the experimental samples, and their physical, compressing, and fractional characteristics were studied for the gripper design.
Actuator Design: Pneumatic Networks was employed as the basis for our soft gripper, and sand was selected as the particle-jamming material. The volume ratio of sand to air chamber was varied to study the influence of the usage of sand for enhancing the grasping performance.
Surface Response Measurement: The grasping force was measured by a flexible thin-film force transducer, and the damage ratio of different pulpy fruits was calculated by the thermal imaging technique. Then, I built a map among different volume ratios, grasping forces, and fruit damage ratios.

2019 – 2022 **Measurement of wheat head traits via 3D reconstruction using sequence images (Principal)**
Funing: National Student Research Training Program
Platform Construction: I built a customized frame using aluminum profiles with a three-axis slider and a camera mounted to obtain the multi-view sequence images.
3D Reconstruction: With the help of my partners, multi-view sequence images were employed for 3D reconstruction using Marching Cubes algorithm.
Point Cloud Processing and Measuring: The generated 3D point cloud results were processed to remove artifacts and measured by Point Cloud Library for comparison with actual experiments.

Research Experiences

2022 – 2024 **Development of a variable-curvature soft gripper for orientating broccoli in the trimming line (Independent Research)**
We presented a novel pneumatic variable-curvature soft gripper (VCSG) for orientating broccoli self-adaptively in the trimming line. The proposed VCSG first applied specific pressurizing pressure to form a hook shape and generated additional lifting forces to the bottom of the broccoli head to guide the broccoli upright and then clamped it using the clamping forces by further increasing the pressure.

2023 – 2024 **Modelling and analysis of soft fiber-reinforced bending actuators (Independent Research)**
We presented two methods for modeling the soft fiber-reinforced bending actuators, where one used the nonlinear machine learning algorithms combined with the finite element method, and the other employed fluid-structure interaction analysis.

Advised by Associate Fellow Dongdong Du in Zhejiang University

International Conference

2024 **Yongkai Ye (Oral Presentation)** and Dongdong Du. *ASABE 2024 Annual International Meeting*, July 28, 2024, Anaheim, America.

Publications

1. **Y. Ye**, C. Han, and D. Du, "Fluid-structure interaction modelling and analysis of soft fiber-reinforced bending actuator (under review)," *International Journal of Mechanical Sciences*, 202x.
2. **Y. Ye**, C. Han, R. B. Scharff, *et al.*, "Development of a novel variable-curvature soft gripper used for orientating broccoli in the trimming line (decision in process)," *Computers and Electronics in Agriculture*, vol. 225, p. 109 267, 2024. url: https://doi.org/10.1016/j.compag.2024.109267.
3. **Y. Ye**, R. B. Scharff, S. Long, C. Han, and D. Du, "Modelling of soft fiber-reinforced bending actuators through transfer learning from a machine learning algorithm trained from fem data," *Sensors and Actuators A: Physical*, p. 115 095, 2024. url: https://doi.org//10.1016/j.sna.2024.115095.
4. D. Du, **Y. Ye**, D. Li, *et al.*, "Nondestructive evaluation of harvested cabbage texture quality using 3d scanning technology," *Journal of Food Engineering*, vol. 378, p. 112 123, 2024. url: https://doi.org/10.1016/j.jfoodeng.2024.112123.
5. J. Luo, J. Guo, Z. Zhu, Y. Du, and **Y. Ye**, "Optimal feature extraction from multidimensional remote sensing data for orchard identification based on deep learning methods," *Journal of Applied Remote Sensing*, vol. 18, 2024. url: https://doi.org/10.1117/1.jrs.18.014514.
6. J. Guo, J. Bai, **Y. Ye**, C. Han, and W. Zhang, "A dataset of multi-source and multi-temporal remote sensing data of cash crop planting structure in yangling agricultural demonstration zones," *China Scientific Data*, vol. 8, 2023. url: https://doi.org/10.11922/11-6035.noda.2022.0002.zh.
7. **Y. Ye**, K. Yu, and Y. Zhao, "The development and application of advanced analytical methods in microplastics contamination detection: A critical review," *Science of The Total Environment*, vol. 818, p. 151 851, 2022. url: https://doi.org//10.1016/j.scitotenv.2021.151851.
8. Y. Zhao, S. Fang, **Y. Ye**, and K. Yu, "Chemometric development using portable molecular vibrational spectrometers for rapid evaluation of avc (valsa mali miyabe et yamada) infection of apple trees," *Vibrational Spectroscopy*, vol. 114, p. 103 231, 2021. url: https://doi.org//10.1016/j.vibspec.2021.103231.

Skills

Languages English (Proficient in reading and writing and Fluent in speaking) Mandarin Chinese (Native)

Coding Python, Matlab, C++, C, LabVIEW, LaTeX, …

Software SolidWorks (Mechanical Design), Prusa Slicer (3D Printing), Beam Studio (Laser Cutting), Abaqus and Ansys (Simulation), Origin (Data Analysis)…

Awards and Honors

2021 – 2022 2022 The Mathematical Contest in Modeling (**Honorable Mention**)

2020 – 2021 **National Scholarship**
12th China Undergraduate Mathematical Final Contest (The Third Prize, National Award)

2019 – 2020 **National Scholarship** 12th China Undergraduate Mathematical Preliminary Contest (The First Prize)

2018 – 2019 **President Scholarship** 2019 China Robot Competition (**The First Prize**)
11th China Undergraduate Mathematical Preliminary Contest (The First Prize)

Referee

Yanru Zhao
Associate Professor of Northwest A & F University
22 Xinong Road, Yangling, China
yrzhao@nwsuaf.edu.cn

Dongdong Du
Associate Fellow of Zhejiang University
866 Yuhangtang Road, Hangzhou, China
dudd@zju.edu.cn