Xiangyi Jia

ETH Zurich, Zurich, Switzerland
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Education

ETH Zurich Sept 2023 – Present
Master's Degree in Electrical Engineering and Information Technology

Harbin Institute of Technology Sept 2019 – Jun 2023
Bachelor's Degree in Automation, Minor in Artificial Intelligence
Major GPA: 92.19/100, Minor GPA: 90.5/100

KTH Royal Institute of Technology Jan 2022 - Jan 2023
Exchange student in School of Electrical Engineering and Computer Science

Research Experience

Egocentric Video-Based Learning of Dexterous Manipulation Priors for Robotics Sept 2024 – Present
Supervisor: Professor Marc Pollefeys, Department of INFK, ETH Zurich

- Developed a pipeline to extract pseudo-label of contact points for robot dexterous manipulation, combining hand-object segmentation, fingertip position extraction, and backward contact point tracking from egocentric videos.
- Integrated LLaVa-1.6 to enhance the robot's semantic understanding and classification of surrounding objects.
- Decreased self-detection failure cases by 90% through implementing Florence-2 and SAM 2 in the pipeline.
- Eliminated premature contact cases by 75% with video depth estimation in adaptive hand-object interaction regions.
- Led to a top-tier conference submission (under review).

Multimodal Learning with Incomplete Data for Brain Age Prediction Feb 2024 – Jun 2024
Supervisor: Professor Ender Konukoglu, Department of ITET, ETH Zurich

- Designed a Cycle-Consistent Disentangled Autoencoder model based on the U-Net to decompose the encoded brain features into site and site-unrelated components through an adversarial training strategy.
- Achieved disentanglement in site effect while efficiently preserving age information of both 2-dimensional and 3-dimensional brain MRI scans in the OpenBHB Challenge.

Grasping Control Algorithm of Manipulator Based on Deep Learning Feb 2023 – Jun 2023
Supervisor: Professor Weiyang Lin, School of Astronautics, Harbin Institute of Technology

- Developed an industrial robotic pipeline for autonomous optical fiber connector identification and insertion/removal.
- Designed and annotated a dataset for scattered fiber optic connectors collected by Basler acA1440-220uc camera and trained a YOLOv7 object detection framework to recognize the orientation of each fiber optic connector.
- Segmented and generated grasping points based on watershed segmentation.
- Implemented a servo system based on Image-Based Visual Servoing (IBVS) and realized the grasping task on a real 3-DOF robot arm for industrial applications.

Semantic Segmentation based on Breast Ultrasound Video Oct 2022 – May 2023
Supervisor: Professor Hengda Cheng, Department of Computer Science, Utah State University

- Combined optical flow and transfer learning with Fuzzy U-Net model to extract latent features in adjacent frames.
- Improved accuracy according to Dice and mIoU coefficients (0.79 and 0.87) over baseline (0.76 and 0.85).
- Conducted downstream segmentation tasks on thyroid ultrasound images and achieved Dice coefficient of 0.92.

Honors & Awards

- People's Scholarship (2019, 2020, 2021)
- Second-Class Award, Mathematics Competition of Chinese College Students (2020)
- Outstanding Student Leader Award (top 5%, 2021)
- Outstanding Graduates of Harbin Institute of Technology (top 10% among all graduates, 2023)

Language & Skills

- **Languages:** Chinese (Native); English (Fluent, IELTS 7.5, GRE 152+167+3.5)
- **Software:** Python, MATLAB, C, C++, Linux, VHDL, Arduino, LaTeX, PyTorch, TensorFlow, Keras
- **Hardware:** Able to combine machine learning methods with electrical circuits such as Arduino and FPGA.