YONGPENG CAO

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EDUCATION

The University of Tokyo, Tokyo, Japan *Oct. 2022 - Sept. 2025*
Ph.D. in Mechanical Engineering/Yamakawa Laboratory

The University of Tokyo, Tokyo, Japan *Sept. 2020 - Sept. 2022*
M.Eng. in Mechanical Engineering/Yamakawa Laboratory

Beijing University of Chemical Technology, Beijing, China *Sept. 2016 - Jun. 2020*
B.Eng. in Mechanical Design, Manufacturing and Automation (ME)

TECHNICAL SKILLS

Programming: Python (Proficient, 5 years), C++ (Proficient, 5 years)
Tools: **ML:** Torch, W&B, MLflow **Robotics:** OpenCV, ROS1/2, Docker **Dev:** Git, Matlab, LaTeX
Softwares & Others: Solidworks, AutoCAD, Keil, IAR. **Robot Arms**: UR5e/UR10e, Franka Panda.

PROJECTS

Semantic Information-aware Human Action Recognition for Real-time Sports Training *Oct. 2023 - present*
- Extracted sub-action semantics to utilize the semantic information and benefit the human action understanding.
- Enable GCN-based framework to recognize partial actions (up to 25%) for seamless robot assistance.

Markerless Kendo Motion Prediction Using High-speed Vision System (Master Thesis) *Dec. 2020 - Sept. 2022*
- Integrated the high-speed vision system and OpenPose to detect and track the human joints in 120 Hz.
- Implemented attack segmentation and attack pattern prediction using LSTM method.

WORK EXPERIENCE

Intern, **Hitachi Research & Development, Tokyo, Japan** *Sept. 2024 - Nov. 2024*
-Implemented caption-based frame aggregation, segmentation, and comparison.
-Achieved zero-shot detection and localization of anomalous actions using VLM. Achieved 62% accuracy.

Technical Assistant, **Tokyo University of Science, Tokyo, Japan** *Nov. 2023 - Mar. 2024*
-Achieved stable real-time 3D gaze estimation. Error is under 3 cm in 2.5 m distance.

Robotics Intern, **Sony AI, Tokyo, Japan** *Mar. 2023 - Aug. 2023*
-Robot arm benchmarking (UR, Panda), motion planning on ROS1/2.
-Implemented dynamic velocity/linear controller for RL team.

The University of Tokyo, Tokyo, Japan
Research Assistant Yamakawa Laboratory *Jun. 2024 - Feb. 2025*
-Achieved deformable linear object motion tracking and prediction using FEM + CPD + Bayesian Optimization.

Technical Assistant Ishikawa Group Laboratory *Jun. 2022 - Feb. 2023*
-Tobii Eye-tracker based Mobile Assistive Sensors System for People with Disabilities on ROS.

Technical Assistant Ishikawa Group Laboratory *Jun. 2021 - Feb. 2022*
-Utilized high-speed vision and force feedback to improve human performance on a bimanual coordination system.

PUBLICATIONS

- **Yongpeng Cao**, Masahiro Hirano, Hyuno Kim, Yuji Yamakawa: Sub-Action Semantics-Integrated Multi-Modal Fusion for Skeleton-Based Human Action Recognition (under review)
- **Yongpeng Cao***, Shouren Huang*, Sune Lundø Sørensen, Yuji Yamakawa, Masatoshi Ishikawa : A Wearable Real-Time 2D/3D Gaze Interface to Realize Robot Assistance for Quadriplegics (under review)
- Sune Lundø Sørensen, Shouren Huang, **Yongpeng Cao**, Mikkel Baun Kjærgaard: Perceptual Anchoring for Gaze-Tracking Wearables and Robot-Mounted Sensors, UR2024 Proceedings, (2024)
- Shouren Huang, **Yongpeng Cao**, Kenichi Murakami, Masatoshi Ishikawa, Yuji Yamakawa: Human-Robot Interaction and Collaboration Utilizing Voluntary Bimanual Coordination, SMC2023 Proceedings. (2023)
-**Yongpeng Cao** and Yuji Yamakawa: Marker-less Kendo Motion Prediction Using High-speed Dual-camera System and LSTM Method, AIM2022 Proceedings, pp.159-164 (2022)

LANGUAGE PROFICIENCY & OTHERS

- TOEFL: 101 - GRE: 320 - JLPT N1: 122 (pass)