Yutian Lei

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Education

Carnegie Mellon University — Pittsburgh, PA
M.S. in Robotics, GPA 4.19/4.00 — *September 2020 - December 2022*

Chinese University of Hong Kong, Shenzhen — Guangdong, China
B.E. in Computer Science and Engineering, GPA 3.89/4.00 — *Sep 2015 - June 2020*

Research Experience

DeLight Lab, Carnegie Mellon University — Pittsburgh, PA
Research Assistant — *June 2021 - December 2022*

- **Project: Aligned Dense Supervision for Full-Range Monocular Detection** - Addressed challenges in body mesh detection with monocular RGB cameras by introducing Aligned Dense Supervision (ADS), which leverages locally body-aligned ROIs and globally augmented locations. Successfully implemented ADS within multiple state-of-the-art mesh detection architectures, resulting in an 8.9% improvement in Average MPJPE.
- **Project: Person-in-WiFi - Fine-grained Person Perception using WiFi** - Developed a novel algorithm to increase the robustness of WiFi perception, reducing its sensitivity to the positioning of antennas and environmental noise. This led to the construction of a real-time, portable WiFi perception system on NVIDIA Jetson.

Robotics and AI Laboratory, Chinese University of Hong Kong — Guangdong, China
Research Assistant — *June 2018 – June 2020*

- **Project: Calligraphy Robot** - Pioneered a GAN-based algorithm capable of generating unique Chinese fonts, achieving 93% accuracy in style imitation. This enabled the robot to emulate diverse handwriting styles. In addition, fine-tuned the control parameters of the robot to ensure smooth, human-like movements during the writing process, using C# and ROS, leading to a more authentic calligraphy experience.

Professional Experience

Baidu USA — Sunnyvale, CA
Research Software Engineer — *February 2023 – present*

- **Optimized** the Pangu system by integrating advanced perception algorithms (MixFormer, BEVFusion, SemAttNet, YOLOv8). This significantly **enhanced** real-time payload tracking, 3D object detection, depth completion, and object detection capabilities, leading to substantial **increases** in operational efficiency and reliability.
- **Led Development** of Robot GPT Platform: A cutting-edge system designed for controlling the Panda robotic arm via Multimodal Large Language Models (LLMs), enhancing precision and adaptability in robotic manipulations. Highlight achievements include:
  - **System Design**: Spearheaded the system architecture, enabling precise robotic manipulations.
  - **Algorithmic Innovations**: Directed the research and implementation of novel algorithms by our team, notably: **1)** **VIHE**: Transformer-Based 3D Manipulation with Virtual In-Hand View. **2)** **Reasoning Grasp**: Innovated a model for verbal cue-based robotic grasping and established a benchmark dataset, elevating robots' grasp reasoning capabilities. **3)** **RLingua**: Boosting Reinforcement Learning efficiency in robotic manipulations with LLM.

UBTECH Robotics — Guangdong, China
Research Engineer Intern — *March 2019 – June 2019*

- **Developed** a multimodal emotion recognition algorithm using acoustic and facial features in video data, thereby **enhancing** emotion recognition accuracy to 60.12% on the MELD dataset.

PUBLICATIONS

Weiyao Wang, **Yutian Lei**, et al. "VIHE: Transformer-Based 3D Object Manipulation Using Virtual In-Hand View." Submitted to IEEE/RSJ International Conference on Intelligent Robots and Systems **(IROS 2024)**.
Jin, Shiyu, Jinxuan Xu, **Yutian Lei**, and Liangjun Zhang. "Reasoning Grasping via Multimodal Large Language Model." Submitted to Proceedings of Robotics: Science and Systems (**RSS**) and available on arXiv.
Liangliang Chen, **Yutian Lei**, et al. "RLingua: Improving Reinforcement Learning Sample Efficiency in Robotic Manipulations With Large Language Models." Submitted to IEEE Robotics and Automation Society (**RAL**).
Yutian Lei, et al. "Learning and Generation of Personal Handwriting Style Chinese Font". In Proceedings of the IEEE **ROBIO**, December, 2018