RUIHANG CHU

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EDUCATION

The Chinese University of Hong Kong, Hong Kong *August 2020 - Now*
Deep Vision Lab
Ph.D. Student (Supervised by Prof. Jiaya Jia and Prof. Chi-Wing Fu),
Department of Computer Science and Engineering

Beihang University, Beijing, China *September 2017 - July 2020*
Human-Robot Interaction Lab
Master of Science in Engineering (Supervised by Prof. Yuru Zhang),
Robotics Institute

Beihang University, Beijing, China *September 2013 - July 2017*
Mechatronic Engineering
Bachelor of Science (Ranking 3/209),
School of Mechanical Engineering and Automation

Politecnico di Torino, Tsinghua University, HKUST, Seoul National University
Visiting Study

RESEARCH EXPERIENCE

Research on 3D Processing: In this research, we mainly explore how to **segment individual 3D instances** of point cloud scenes/objects. **To exploit the good representation**, we reformulate 3D instance segmentation as a per-point classification problem, where the instance classes are automatically modeled according to their spatial positions. Then we apply a single-step classification pipeline to segment an unknown number of 3D instances. **To leverage large unlabeled data**, we design a new self-training framework to address 3D instance segmentation in a semi-supervised setting. Two kinds of pseudo labels are considered for semantic- and instance-level supervisions, respectively. We leverage their inherent correlations for mutual enhancement to promote the pseudo-label qualities. **To facilitate downstream applications**, we develop algorithms on using instance recognition priors *i)* to understand the articulation structures of general articulated objects (*e.g.*, cabinets, laptops) for shape manipulations and *ii)* to accurately predict 6-DoF grasp poses for robotic tasks.

Research on Image Retrieval: We focus on tackling the extreme viewpoint-variation problem (up to 180 degrees) for vehicle/person re-identification. Inspired by the behavior in human's recognition process, we propose a novel viewpoint-aware metric learning approach. It learns two metrics for similar viewpoints and different viewpoints in two feature spaces, respectively.

SELECTED PUBLICATIONS

(Sorted by date. Google Scholar for full publications)

1. **TWIST: Two-Way Inter-label Self-Training for Semi-supervised 3D Instance Segmentation**
   Ruihang Chu, Xiaoqing Ye, Zhengzhe Liu, Xiao Tan, Xiaojuan Qi, Chi-Wing Fu, Jiaya Jia
   IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2022

2. **ICM-3D: Instantiated Category Modeling for 3D Instance Segmentation**
   Ruihang Chu, Yukang Chen, Lu Qi, Tao Kong, Lei Li
   IEEE Robotics and Automation Letters (RA-L), 2021

3. **Simultaneous Multi-task Learning for 6-DoF Grasp Pose Estimation**
   Yiming Li, Tao Kong, **Ruihang Chu**, Yifeng Li, Peng Wang, Lei Li
   IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2021

4. **Co-actuation: A Method for Achieving High Stiffness and Low Inertia for Haptic Devices**
   Ruihang Chu, Yuru Zhang, Hongdong Zhang, Weiliang Xu, Jee-Hwan Ryu, Dangxiao Wang
   IEEE Transactions on Haptics (ToH), 2020

5. **Vehicle Re-identification with Viewpoint-aware Metric Learning**
   Ruihang Chu, Yifan Sun, Yadong Li, Zheng Liu, Chi Zhang, Yichen Wei
   IEEE International Conference on Computer Vision (ICCV), 2019

PAPERS IN SUBMISSION

1. **Anonymous Submission**
   Ruihang Chu, Zhengzhe Liu, Xiaoqing Ye, Xiao Tan, Xiaojuan Qi, Chi-Wing Fu, Jiaya Jia
   Submitted to CVPR 2023

2. **Anonymous Submission**
   Tao Hu, Xiaogang Xu, **Ruihang Chu**, Jiaya Jia
   Submitted to CVPR 2023

SELECTED HONORS AND AWARDS

CUHK Vice-Chancellor Scholarship **2020**
National Scholarship **2019**
The 3rd Prize of National College Robot Competition (Twice) **2015,2016**

WORKING EXPERIENCE

Vision Intelligence Group, Baidu. *May 2021 - June 2022*
Worked with Dr. Xiaoqing Ye. Computer Vision Research Internship

AI Lab, ByteDance. *Dec 2019 - April 2021*
Worked with Dr. Tao Kong and Prof. Lei Li. Computer Vision Researcher Internship

Video Research Group, Megvii (Face++) *Sep 2018 - Nov 2019*
Worked with Dr. Yifan Sun. Computer Vision Research Internship

ACADEMIC ACTIVITIES

Serve as the reviewer for CVPR, ICCV, ECCV, AAAI, 3DV, and RA-L.

TECHNICAL STRENGTHS

Software & Tools LaTeX, SOLIDWORKS, MatLab
Deep Learning Framework PyTorch, TensorFlow