Liu Zihua

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SUMMARY

Ph.D candidate with expertise in computer vision, deep learning, and 3D vision. Experienced in research, algorithm development, and internship roles. Proficient in Python, PyTorch, CUDA, and C++.

EXPERIENCE

Machine Learning Engineer

Woven by Toyota **August 2025 - November 2025, Tokyo**

- Work for Woven by Toyota's Woven City Projection, dealing with video perception and image processing.
- Engineered and deployed computer vision pipelines utilizing advanced neural networks to enhance real-time object detection accuracy for Woven City.

R&D Research Internship

Sony Semiconductor Solutions **January 2025 - March 2025, Tokyo, Osaki**

- Using multi-modal information like LiDAR, images, bounding boxes and textual prompts to train a multi-view diffusion model for street-view and BEV mapgenerations for an autonomous perception system.
- Engineered a data processing pipeline that synchronizes and preprocesses multi-sensor datasets, enabling downstream model training for advanced perception tasks in autonomous vehicle applications.

R&D Research Internship

Preferred Networks **August 2024 - October 2024, Tokyo**

- During my time at PFN, I conducted research on background generation using Diffusion Models, focusing on generating foregrounds in various artistic styles.
- Benchmarked the developed diffusion-based methodology against established models on industry-standard datasets, demonstrating broad applicability to various artistic foreground generation scenarios.

Computer Vision Internship

Sensetime Japan **June 2023 - November 2023, Tokyo**

- As a research intern, I co-developed VSRD, a method for monocular 3D object detection with weak 2D supervision, bypassing 3D labels.
- Ourapproach generates pseudo labels via multi-view auto-labeling and uses Instance-aware Volumetric Silhouette Rendering to optimize 3D boundingboxes.
- This work has been accepted at CVPR 2024.

Computer Vision Internship

Megvii Shanghai Research Institue **February 2022 - April 2022, Shanghai**

- Focused on parking slot detection and segmentation for autonomous driving.
- Introduced an angle constraint for parking slot corners, boostingdetection recall by 10%.
- Developed a novel data augmentation strategy to maximize limited training data, significantly improving detection in challenging areas such asimage edges and occluded regions.
- The solution was adopted by Megvii as part of their IPM pipeline for automatic parking algorithms.

EDUCATION

Bachelor of Engineering

South China University of Technology (SCUT) • 09/2016 - 06/2020 • 3.78/4.00

Master of Engineering

Institute of Science Tokyo (Tokyo Institute of Technology) • 04/2021 - 03/2023 • 4.00/4.50

Ph.D candiates

Institute of Science Tokyo (Tokyo Institute of Technology) • 03/2023 - 03/2026

AWARDS & HONORS

South China University of Technology Scholarship

12/2019

SCIE Award(The Society of Instrument and Control Engineering)
03/2023

Program for Development of Next-Generation Front-Runners with Comprehensive Knowledge and Humanity (Science Tokyo SPRING)
Japan Science and Technology Agency • 2023

PUBLICATIONS

Digging Into Normal Incorporated Stereo Matching
ACM International Conference on Multimedia(ACMMM 2022) • 2022

Global Occlusion-Aware Transformer for Robust Stereo Matching
Proceedings of the IEEE/CVF Winter Conference onApplications of Computer Vision(WACV 2024) • 2024

CFDNet: A Generalizable Foggy Stereo Matching Network with Contrastive Feature Distillation
InternationalConference on Robotics and Automation (ICRA2024) • 2024

VSRD: Volumetric Silhouette Rendering for Weakly Supervised 3D Object Detection
Proceedings of the IEEE/CVFComputer Vision and Pattern Recognition. (CVPR 2024) • 2024

SKILLS

Python, PyTorch, CUDA, C++, Linux, Git, Accelerate, Docker

Computer Vision Algorithms, 3D Vision (Stereo Matching, Optical Flow Estimation, SfM), Diffusion Models (DDPM, Stable Diffusion), NeRF, 3D Gaussian Splatting (3DGS), differential rendering techniques

English, Japanese