Jinhyung (David) Park

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RESEARCH INTERESTS

Fields: Computer Vision, Robotics, Reinforcement Learning, Machine Learning
Topics: Joint 2D/3D Perception, Multi-Modal Representation Learning

EDUCATION

Carnegie Mellon University Aug 2022 - Present
Ph.D in Robotics (Advisor: Prof. Kris Kitani) GPA: 4.0/4.0

Carnegie Mellon University Aug 2018 - May 2022
Bachelor of Science in Artificial Intelligence GPA: 4.0/4.0

PUBLICATIONS

[1] Flexible Depth Completion via Affinity-Based Correction for Sparse and Varying Point Densities
Jinhyung Park, Yu-Jhe Li, Kris Kitani
In Submission, 2023

[2] Azimuth Super-Resolution for FMCW Radar in Autonomous Driving
Yu-Jhe Li, Shawn Hunt, **Jinhyung Park**, Matthew O'Toole, Kris Kitani
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2023

[3] Time Will Tell: New Outlooks and A Baseline for Temporal Multi-View 3D Object Detection
Jinhyung Park*, Chenfeng Xu*, Shijia Yang, Kurt Keutzer, Kris Kitani, Masayoshi Tomizuka, Wei Zhan
International Conference on Learning Representations (ICLR), 2023
Oral (Top 5% of accepted papers)

[4] DetMatch: Two Teachers are Better Than One for Joint 2D and 3D Semi-Supervised Object Detection
Jinhyung Park, Chenfeng Xu, Yiyang Zhou, Masayoshi Tomizuka, Wei Zhan
European Conference on Computer Vision (ECCV), 2022

[5] Modality-Agnostic Learning for Radar-Lidar Fusion in Vehicle Detection
Yu-Jhe Li, **Jinhyung Park**, Matthew O'Toole, Kris Kitani
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2021

[6] Multi-Modality Task Cascade for 3D Object Detection
Jinhyung Park, Xinshuo Weng, Yunze Man, Kris Kitani.
The 32nd British Machine Vision Conference (BMVC), 2021

[7] Crack Detection and Refinement via Deep Reinforcement Learning
Jinhyung Park, Yi-Chun Chen, Yu-Jhe Li, Kris Kitani
IEEE International Conference on Image Processing (ICIP), 2021
[Best Industry Impact Award]

[8] All-in-One Drive: A Large-Scale and Comprehensive Perception Dataset with High-Density Long-Range Point Cloud
Xinshuo Weng, Yunze Man, Dazhi Cheng, **Jinhyung Park**, Matthew O'Toole, Kris Kitani
In Submission, 2020

[9] Protecting User Privacy: Obfuscating Discriminative Spatio-Temporal Footprints
Jinhyung Park, Erik Seglem, Eric Lin, Andreas Zufle
ACM SIGSPATIAL Workshop on Recommendations for Location-based Services and Social Networks, 2017

[10] Real-Time Bayesian Micro-Analysis for Metro Traffic Prediction
Eric Lin, **Jinhyung Park**, Andreas Zufle
ACM SIGSPATIAL Workshop on Smart Cities and Urban Analytics, 2017

RESEARCH EXPERIENCE

Carnegie Mellon University - The Robotics Institute Jan 2020 - Present
Advisor: Prof. Kris Kitani

- Investigating parameter-efficient adaptation for continual learning on large, pre-trained vision models, with applications in 2D detection and 3D perception.
- Developing a generalizable human NeRF pipeline enabling rendering from novel views and poses from a monocular video.
- Built an adaptive framework for depth prediction that addresses the divergence between methods for monocular depth estimation and those for sparse depth completion.
- Proposed a novel teacher-student consistency framework that encourages multimodal fusion and is more robust under adverse weather conditions and severe failure of one modality.
- Developed bidirectional, recursive fusion between semantic RGB features and geometric point cloud features for cascaded 2D segmentation and 3D detection.
- Proposed a two-stage framework for iteratively refining segmentation predictions using an A3C-trained RL agent. Our agent preserves overall structure while closing gaps and refining details.
- Extensively investigated the impacts of varying LiDAR sensor noise, range, and sampling patterns on 3D detection methods for the development of a large-scale synthetic driving dataset.

UC Berkeley - Mechanical Systems Control Lab Jul 2021 - Oct 2022
Advisors: Prof. Tomizuka Masayoshi & Dr. Wei Zhan

- Investigated long-term temporal fusion for more accurate object localization and proposed a history duration and image resolution trade-off for stronger multi-view stereo localization potential.
- Leveraged box-level consistency constraints between objects detected in 2D RGB and 3D LiDAR to generate more accurate pseudo-labels for multi-modality semi-supervised object detection.

George Mason University May 2017 - Sep 2017
Advisor: Prof. Andreas Zufle

- Identified geolocation tags most discriminative of a twitter user's identity using entropy of location patches and minimally obfuscated Twitter user location traces to protect their identities.

INDUSTRY EXPERIENCE

Meta Jun 2023 - Aug 2023
Research Scientist Intern

- Developed a novel query-based 2D-to-3D panoptic integration and refinement pipeline. Established a new speed-performance Pareto frontier for joint 3D reconstruction and panoptic segmentation.

Zensors Inc., Computer Vision Startup May 2019 - Dec 2019
Software Development & Machine Learning Intern

- Created a framework for deploying ML models to production on AWS Kubernetes with scaling on demand. Built 2D detection and human keypoint models using the Detectron repository.

TEACHING EXPERIENCE

Computer Vision (16-720), CMU; Singapore. May 2022 - Current
Instructors: Prof. Kris Kitani, Prof. Matthew O'Toole

Introduction to Deep Learning (11-785), CMU. Dec 2019 - May 2022
Instructor: Prof. Bhiksha Raj

AWARDS & HONORS

NSF GRFP Fellowship	2023
University Honors and School of Computer Science Honors	2022
Undergraduate Honors Thesis: *Cross-Modality Supervised Learning for 3D Object Detection*	2022
CRA Undergraduate Researcher Award Honorable Mention	2022
Best Industry Impact Award from ICIP	2021
Goldwater Scholarship	2021

PROFESSIONAL SERVICE

Reviewer: CVPR, ICCV, NeurIPS, ICLR, AAAI, TPAMI

SKILLS

Languages: Python, Java, Matlab, C, C++, R, Javascript, React, SMLNJ
Frameworks: PyTorch, TensorFlow, AWS, Docker, Kubernetes, GraphQL, PostgreSQL, RabbitMQ