Jinhyung (David) Park

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RESEARCH INTERESTS

Fields: Computer Vision, Robotics, Machine Learning
Topics: 3D Perception, Human Shape and Motion Modeling, Multi-Modal 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] Leveraging Temporal Cues for Semi-Supervised Multi-View 3D Object Detection
Jinhyung Park, Navyata Sanghvi, Hiroki Adachi, Yoshihisa Shibata, Shawn Hunt, Shinya Tanaka, Hironobu Fujiyoshi, Kris Kitani
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2024

[2] Generalizable Neural Human Renderer
Mana Masuda, **Jinhyung Park**, Shun Iwase, Rawal Khirodkar, Kris Kitani
Meeting on Image Recognition and Understanding (MIRU), 2024

[3] Flexible Depth Completion for Sparse and Varying Point Densities
Jinhyung Park, Yu-Jhe Li, Kris Kitani
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2024

[4] Multi-Person 3D Pose Estimation from Multi-View Uncalibrated Depth Cameras
Yu-Jhe Li, Yan Xu, Rawal Khirodkar, **Jinhyung Park**, Kris Kitani
In Submission, 2023

[5] 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

[6] 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)

[7] 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

[8] 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

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

[10] 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]

[11] 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

[12] 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

[13] 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 3D point-based latent diffusion modeling of diverse outdoor scenes.
- Leveraged temporal consistency and forward-backward ensembling for improving semi-supervised learning in camera-based 3D object detection.
- Developed 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

Applied Intuition November 2024 - Present
Research Scientist Intern

- Developed a sparse, query-based pipeline for modeling the 3D voxel world in a streaming fashion.

- Our framework achieves new state-of-the-art in camera-based occupancy prediction with 4.5x faster FPS compared to prior art, achieving real-time performance.

Meta May 2024 - November 2024
Research Scientist Intern at Reality Labs

- Built a novel parametric body model with explicit decoupling of body shape and skeleton.
- Our model enables fine-grained customization and transfer of external and internal body attributes and incorporates realistic non-linear and sparse pose correctives.

Meta Jun 2023 - Aug 2023
Research Scientist Intern at XR Scene

- 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 - May 2023
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