ISAAC KASAHARA

Research Engineer

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PERSONAL PROFILE

An innovative and self-motivated computer vision engineer. Recently graduated with a Masters in Robotics with a background in computer science. Looking for new and challenging opportunities in computer vision.

PUBLICATIONS

Self-Supervised Driver Gaze Estimation

- **ECCV 2022 ORAL** with Professor Hyun Soo Park and in collaboration with Toyota Research Institute.
- Collected a large state of the art dataset and implemented a novel self-supervised method in order to improve driver gaze estimation as well as road scene saliency.
- Skills learned include 3D camera geometry, camera calibration, synchronization, gaze estimation methods, OpenCV, self-supervised networks, PyTorch, and PyTorch Lightning.

Paper:
https://www.ecva.net/papers/eccv_2022/papers_ECCV/papers/136730128.pdf

RICo: Rotate-Inpaint-Complete for Generalizable Scene Reconstruction

- **Pending Publication** with Samsung AI Center NYC.
- Developed a novel algorithm to leverage large visual-language models to perform state of the art 3D scene reconstruction.
- Skills learned include 3D reconstruction, normal estimation, depth completion, inpainting, and image generation.

Paper:
http://arxiv.org/abs/2307.11932

Real-time Simultaneous Multi-Object 3D Shape Reconstruction, 6DoF Pose Estimation and Dense Grasp Prediction

- **IROS 2023** with Samsung AI Center NYC.
- Developed a novel deep network algorithm to predict shape, pose, and grasp proposals for multiple objects at real-time.
- Skills learned include real-time inference, autoencoders, grasp evaluation, and multi-stage training of neural networks.

Paper:
http://arxiv.org/abs/2305.09510

CAREER HISTORY

RESEARCH ENGINEER

Samsung AI Center NYC, Internship Aug 2022 - Apr 2023
Research Engineer Apr 2023 - Present

- Worked in Python to develop models and train deep learning models for robotic perception tasks.
- Utilized PyBullet and PyRender to generate synthetic data for training state of the art shape reconstruction models.
- Implemented machine learning models for detecting and locating objects in a real world robotic setting.
- Became versed in current state of large language models for text-to-3D algorithms.
- Contributed to novel 6D pose estimation/grasp estimation algorithm for robotics.
- Leveraged the generalization capabilities of Large Visual-Language Models for 3D scene reconstruction.

SOFTWARE ENGINEER

Cirrus Aircraft, Internship May 2019 - Aug 2019
Engineer I Jan 2020 - May 2020

- Programmed in C++ and Python using Microsoft Visual Studio.
- Developed software requirements for aircraft avionics components.
- Worked on developing algorithms in C++ for experimental sensors on the SF50 Jet using transformation matrices in three dimensional space.

ACADEMIC HISTORY

UNIVERSITY OF MINNESOTA

Master of Science in Robotics, Sep 2020 - May 2022

- GPA of 3.9
- Research Assistant for Professor Hyun Soo Park 2021 - 2022
- Graduate Assistant for the University of Minnesota Robotics Master's program 2020 - 2021

Bachelor of Science in Computer Science, Sept 2017 - Dec 2019
Emphasis in Robotics and Artificial Intelligence

- Graduated in 2.5 years with a 3.6 GPA
- Dean's List Fall 2017 & Spring 2019

SKILLS AND ABILITIES

Experienced:
- Python
- PyTorch
- MATLAB
- Linux
- Git/Github
- Camera Calibration
- Stereo Depth Estimation
- NumPy, OpenCV, SciPy
- Visual Studio Code
- Linear Algebra

Familiar:
- TensorFlow
- Keras
- Pytorch Lightning
- Stereo Depth Estimation
- PyBullet
- PyRender
- 3D Shape Reconstruction
- Large Language Models
- 3D Multiview Geometry
- Physics/Calculus

RELEVANT COURSEWORK

Multiview 3D Geometry in Computer Vision, Data Mining, Discrete Structures, Algorithms & Data Structures, Probability & Statistics, Physics I & II, Advanced Programming Principles, Applied Linear Algebra, Artificial Intelligence I & II, Operating Systems, Programming Design & Development, Graphics & Games, Intro to Machine Learning, Machine Learning, Intro to Robotic Systems, Computer Vision, Signals and Controls, Image Processing, Sensing and Estimation, VR and 3D Interaction, Robot Vision