

# Neeraj Panse

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## Education

### Carnegie Mellon University, Robotics Institute

August 2022 – December 2023

Master of Science in Computer Vision - GPA: 4.0/4.0

Pittsburgh, USA

**Coursework:** Visual Learning and Recognition, Learning for 3D Vision, Computer Vision, Machine Learning, Robot Learning, Geometry Based Vision, Computational Photography

**Teaching Assistant:** 11603 - Python for Data Science, 11632 - Data Science Capstone

## Experience

### Lucid Motors | Perception Software Engineer

January 2024 - Present

- Leading the research and deployment of learning based Lidar object detection in the ADAS-Perception team at Lucid. Improved precision of existing models in **adverse weather conditions (rain, fog, snow)** from **94% to 96%**.
- Working on BEV based multi-camera object detection models for the next generation of Lucid EVs. Increased performance of current object detection from **56 mAP to 64 mAP** using SOTA BEV techniques such as **PETR and DD3D**.

### Airlab, CMU | Research Collaborator advised by Prof. Sebastian Scherer

January 2023 - December 2023

- Worked on **Real-Time Multi-layer Semantic 3D Mapping** of indoor environments using images and lidar point clouds.
- Built strong baselines using lightweight **2D and 3D instance segmentation** architectures such as **RangeNet++** and **SOLOv2**.
- Investigated the use of pillar encoder networks such as **PointPillars** and **PiFeNet** for **3D object detection** in indoor settings.

### Zillow Group | Machine Learning Engineering Intern

May 2023 - August 2023

- Worked in the **AI Photography** at Zillow to create **on-device, real-time, 3D floor plans** from panoramic images.
- Improved top down room shape representations from individual panoramas through efficient inference pipelines in **C++**.
- Developed algorithms that eliminated **96% of undesired overlaps** in room shapes by merging upstream panoramic representations, leading to highly interpretable and interactive 3D floor plans for enhanced visual user experience.

### Adagrad AI | Research Scientist, Computer Vision

August 2020 - June 2022

- Led the product R&D of **GateGuard** an edge based **Boom Barrier Automation system** using **Number Plate Recognition**.
- Developed data collection, training and deployment pipelines for lightweight object detection models: **Yolo-X** and **Yolo-v5**.
- Achieved accuracy of **97%** for four-wheelers and **95%** for two-wheelers with **50 fps throughput** on Nvidia Jetson-TX2
- Built real-time video pipelines in C++ using **DeepStream-TensorRT**. **Deployed at 200+ sites for access control and analytics**.
- Designed online analytics, inference and monitoring services using **Django, Kafka, Celery, Redis, ONNX, Triton and DALI**.

## Publications/Projects

### S2RF: Semantic Stylizing Neural Radiance Fields | [Project Page](#) |

March 2023 - July 2023

- Paper Publication** – Neeraj P., Moneish K., & Dishani L., S2RF: Semantically Stylized Radiance Fields., **ICCV 2023 workshop on AI for 3D Content Creation**. Paris, France
- Built techniques to transfer custom styles to custom objects and also maintain 3D consistency in neural 3D reconstructions.
- Designed style transfer methods in **Pytorch** by combining the **NNFM loss** and object masks from SOTA models (DETR, Segment Anything). Made use of **Plenoxels** to optimize radiance fields and get high quality and efficient 3D rendering.

### 3D Ken Burns Effect using Dual Pixel Sensors | [Project Video](#) |

August 2023 - December 2023

- Won the best project award for the Computational Photography course (15-663) at CMU amongst 26 graduate students.**
- Designed and implemented a novel algorithm for the 3D Ken Burns effect using traditional techniques and deep learning.
- Built pipelines for creating the 3D Ken Burns effect using depth from dual pixels and SOTA image inpainting techniques.

### Computer Vision Based Offside Detection In Soccer | [Paper](#) |

January 2020 - August 2020

- Paper Publication** – Neeraj P. & Ameya M., "A Dataset & Methodology for Computer Vision based Offside Detection in Soccer.", **2020 ACM Multimedia, Multimedia Content Analysis in Sports (MMSports)**, Seattle, Washington.
- Improved major drawbacks of current, real-world soccer offside decision-making by developing a Computer Vision and Image Processing based pipeline for providing accurate, fast, and explainable offside decisions.