Gunjan Sethi

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EDUCATION

Carnegie Mellon University – School of Computer Science (The Robotics Institute)	Pittsburgh, PA
Master of Science in Robotic Systems Development GPA: 4.17/4.33	May 2023
Relevant Coursework: Computer Vision, Deep Learning, Geometry-based Vision	
REVA University	Bangalore, India
Bachelor of Technology in Computer Science and Engineering GPA: 8.87/10	Jul 2018
SKILLS	

Python, C++, PyTorch, Tensorflow, CUDA/TensorRT, TensorBoard, Wandb, Git, Docker, Kubernetes, AWS, Linux

EXPERIENCE

Raven Industries (CNH Industrial) Research Engineer 2

- June 2023-Present Proposed and led a team of 3 to prototype/implement a multimodal (camera + LiDAR) semantic segmentation model for terrain traversability ٠ estimation; iterated architectures and trained PointTransformerv3-based model on in-house simulation and real dataset to achieve 0.815 mIOU
- Productionized and deployed a real-time, multi-threaded inference engine service for an image-based driveable area segmentation model using TensorRT, C++; performed end-to-end testing and documentation
- Developed a C++ service for communication between ISOBUS/CAN and publisher/subscriber middleware on a real-time system; tested and supported integration efforts on and off -field

Argo AI

Software Engineer Intern, Deep LiDAR

- Proposed a probabilistic 3D object detection pipeline for estimating uncertainties in bounding box detections to the Deep LiDAR team
- Developed and iterated over model architectures and loss functions for direct modeling of bounding box parameters as distributions using Tensorflow
- Created frame-wise BEV (bird's eye view) and pointcloud visualizations for bounding box parameter uncertainties as ellipsoids, cuboids, and arcs using Open3D and Python3

Comofi MedTech

Computer Vision Engineer

- Proposed and implemented an ensemble method for 3D segmentation algorithm in Python utilizing connected components; improved performance metrics by 20%
- Implemented region-growing algorithm for segmentation of organs on CT scan (3D) data with 85% accuracy in Python
- Built a pointcloud preprocessing pipeline with Intel Realsense, PCL and ROS in C++ for filtering and downsampling incoming pointcloud data MagikEye Inc. Bangalore, India

Software Engineer

OtPi Robotics

Product Engineer

- Deployed web service on Amazon EC2 with Docker containers as SLURM nodes for customer support and testing
- Conducted performance optimization on RaspberryPi Zero using QPULib by enabling non-blocking GPU load and stores for repeated mathematical operations in convolutions
- Wrote production-level, low-latency Python and C++ ROS packages for depth sensor; extended existing SDK to support ROS

Aug 2018-June 2020

Carnegie Mellon University | Feb 2023

Carnegie Mellon University | Dec 2021

Carnegie Mellon University | Jan 2022 - Dec 2022

Bangalore, India

Jul 2020-Dec 2020

Led a team of 4 for development of an autonomous scaled-down simulation of a digital supply chain utilizing ESP32, RFID, IR sensors, Firebase, and an interactive dashboard for Robert Bosch

ACADEMIC PROJECTS

3D Representation Learning from Single View, Link

Implemented learning-based encoder-decoder architectures to predict 3D representations (voxel, mesh, pointcloud) from a single RGB image using PyTorch3D; achieved 90+ F1 scores

Autonomous Reaming for Hip Replacement Surgery, Link

Led the development of Perception and Sensing subsystem- implemented pose tracking and error detection for dynamic compensation of robot arm using Atracsys SpryTrack in C++, integrated with Planning and Controls via ROS

Better Interest Point Detection Using Deformable Convolutions (Deformable SuperPoint), Link Carnegie Mellon University | Dec 2022 Proposed use of deformable convolutions for improved interest point detection for learning-based detectors; Improved interest point detector

- repeatability score on MSCOCO by 7.4% within 1/2 number of iterations; showed boosted performance in homography estimation and SfM **Utterance to Phoneme Mapping** Carnegie Mellon University | Mar 2022
- Developed CNN+LSTM-based framework with CTCLoss and decoder for mapping sequence of utterance features to phonemes using PyTorch; achieved Levenshtein distance of 5.75

Multi-View Reconstruction

Implemented complete 3D reconstruction pipeline on "temple" dataset: 8-point algorithm, 7-point algorithm, triangulation, epipolar correspondence matching and bundle adjustment using Python and NumPy

Boston, MA

Pittsburgh, PA

Bangalore, India Jan 2021-Jul 2021

May 2022-Aug 2022