# Gunjan Sethi

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## EDUCATION

**Carnegie Mellon University – School of Computer Science**                                          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

## EXPERIENCE

**Robots Perceiving and Doing Lab, Link**                                                            Pittsburgh, PA
*Research Assistant, Advised by Prof. David Held*                                                    Sep 2022-Present
- Developing LiDAR object detection pipelines with keypoint-based representations

**Argo AI**                                                                                          Pittsburgh, PA
*Software Engineer Intern, Deep LiDAR*                                                            May 2022-Aug 2022
- Proposed a probabilistic 3D object detection pipeline for estimating uncertainties in bounding box detections; performed in-depth literature review; presented to the team
- Developed loss functions and model architecture upgrades to optimize and learn parameters for direct modeling of bounding box parameters as distributions using Tensorflow
- Created frame-wise BEV and pointcloud visualizations for bounding box parameter uncertainties as ellipsoids, cuboids, and arcs using Open3D and Python3

**Comofi MedTech**                                                                                   Bangalore, India
*Computer Vision Engineer*                                                                          Jan 2021-Jul 2021
- Proposed and implemented an ensemble method for 3D segmentation algorithm in Python utilizing connected components; improved performance 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*                                                                                Jul 2020-Dec 2020
- 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

**QtPi Robotics**                                                                                    Bangalore, India
*Product Engineer*                                                                                Aug 2018-June 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
- Conceptualized design elements for website's UI/UX on AdobeXD to highlight key product USPs with, increasing customer engagement and session duration

## ACADEMIC PROJECTS

**Autonomous Reaming for Hip Replacement Surgery, Link**                  Carnegie Mellon University | Jan 2022 – Dec 2022
- 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**                                                      Carnegie Mellon University | Dec 2021
- 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

**Bag of Visual Words**                                                            Carnegie Mellon University | Sep 2021
- Built a recognition system with Harris Corner Detector, spatial pyramid matching for feature extraction of scenes with 80% accuracy; implemented deep feature extractor (VGG-16) using PyTorch and compared results

## SKILLS

Python, C++, ROS, OpenCV, NumPy, SciPy, PyDicom, PyTorch, Tensorflow, Git, Docker, Linux, MATLAB