Ashwin Nehete

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Education

- **Carnegie Mellon University** — Pittsburgh, PA
  Master of Science in Mechanical Engineering - Research; GPA: 4.0/4.0 — *August 2020 - Present*
  Courses: *Computer Vision, Artificial Intelligence & ML, Robot Localization & Mapping, Planning & Decision Making in Robots*
- **Indian Institute of Technology Kharagpur** — Kharagpur, India
  Bachelor of Technology (Honors) in Manufacturing Science and Engg.; GPA: 8.61/10 — *July 2016 - June 2020*

Skills

- **Languages** Python, C++
- **Software/OS** ROS, MATLAB, ANSYS, COMSOL, AutodeskFusion, SOLIDWORKS
- **Libraries** Numpy, OpenCV, Pandas, Tensorflow, Pytorch

Graduate Research

- **Computational Engineering and Robotics Lab** — Pittsburgh, PA
  Research Assistant (Master's Thesis) — *September 2020 - Present*
  - Conducting research for **Depowdering & Metrology for Additive Mfg. Post Processing** sponsored by NASA
  - Developing a model-based scan path plan for line laser scanner using over-segmented 3D point clouds
  - Currently working on motion planning for DENSO robotic arm and turntable for scanning of 3D objects
  - Attained scanned region visualization of an object rotating on a turntable as scanned by robotic arm in gazebo
  - Integrated linear stage actuator with ROS and arduino deploying MoveIt! and ROS Control

Course Projects

- **Motion planning for Precise Scanning of 3D Printed Parts** — *Planning & Decision Making in Robots*
  - Implemented PRM algorithm to develop a motion planner to traverse an ordered set of scan path waypoints
  - Currently working on planning for simultaneous motion of the DENSO robot and turntable for scanning.
- **Lucas Kanade Template Tracking Optimization** — *Engineering Optimization*
  - Evaluated the performance of Steepest Descent, Gauss-Newton, BFGS, Levenburg-Marquardt optimization methods on Lucas-Kanade template tracking in a video sequence
- **Comparative Analysis of SLAM Algorithms in ROS** — *Robot Localization & Mapping*
  - Leveraged ROS to study visual-lidar SLAM methods; evaluated on benchmark datasets using pose error metrics
  - Analyzed performance of algorithms on outdoor data imported via ROS-Bridge from CARLA autonomous driving sim
- **Projecting Future Carbon Emissions with ML Classifiers** — *Artificial Intelligence & ML*
  - Implemented several classifiers to model the effects of future changes in U.S. light-duty vehicles on carbon emission levels
  - Accomplished significant reduction in the execution time while maintaining 90% accuracy by using feature engineering

Undergraduate Research

- **Laser Material Processing Lab** — Kharagpur, India
  Research Assistant (Bachelor's Thesis) — *August 2019 - June 2020*
  - Aimed at modelling effects of powder deposition strategies on warping that occur during laser metal deposition process
  - Proposed a 2D model to predict the heat affected zone & residual stresses at the clad-substrate interface for 1^{st} clad layer
  - The thesis titled **Thermo-Mechanical Modelling of Multi-track Laser Cladding** nominated for Best BTP Award
- **Autonomous Ground Vehicle Research Group** — Kharagpur, India
  Mechanical Team Lead — *March 2017 - June 2020*
  - Studied design elements to oversee structural analysis & simulation of sensor mounts for Mahindra Rise Prize Challenge
  - Designed CAD model on Solidworks and conducted structural analysis on ANSYS of Eklavya 6.0 chassis manufacturing
  - Significantly reduced mechanical vibrations induced in the chassis during its driverless run

Work Experience

- **Carnegie Mellon University** — Pittsburgh, PA
  Teaching Assistant — *February 2021 - Present*
  - 24787 : Artificial Intelligence and Machine Learning for Engineers | 24678 : Computer Vision for Engineers
- **William Control - Curtiss Wright** — Pune, India
  Summer Internship — *May 2019 - July 2019*
  - Reduced part rejection % by optimization of the automated inspection system for job assembly using image processing
  - Studied root cause analysis and comprehensive documentation of a complaint regarding abnormal accelerator pedal

Publication

- Paper: A. Nehete, G. R. K. Kiran et al., ***Design and Implementation of Autonomous Ground Vehicle for Constrained Environments***, 2019 Third IEEE International Conference on Robotic Computing (IRC), 2019, pp. 236-239, doi: 10.1109/IRC.2019.00043

Honors and Awards

- Awarded the **MechE Summer 2021 Research Fellowship**, Carnegie Mellon University
- Represented IIT Kharagpur at **IGVC (AutoNav Challenge) 2018**, Oakland University; secured podium position