

BHARGAV SOOTHRAM

College Park, MD • +1 (240)-906-4081 • bhargav.soothram@gmail.com • [LinkedIn](#) • [GitHub](#) • [Website](#)

EDUCATION

University of Maryland, College Park, MD

May 2023

Master of Engineering, Robotics

Selected Coursework: Computer Vision, Foundations of Deep Learning, Numerical Optimization

Mahindra University, Hyderabad, India

May 2019

Bachelor of Technology, Mechanical Engineering

SKILLS

Programming Languages: Python, C++, MATLAB

Frameworks and Tools: Pytorch, OpenCV, ROS, Git, Google Cloud Platform

EXPERIENCE

Engineer, Data Science

Aug 2019 - May 2021

Mahindra & Mahindra, Pune, India

- Developed Mahindra Truck and Bus Division's first big-data telematics framework on Google Cloud Platform, processing and analyzing data from 6,000+ vehicles.
- Processed data using Python and Cloud Functions, applying estimation methods like the Kalman filter to handle data gaps. Developed efficient vectorized code for large-scale data processing and analysis.
- Implemented a "wisdom of crowds" approach using regression models of vehicle KPIs (torque, air flow, etc.) to identify anomalous behavior with 80% accuracy.
- Automated report generation in Tableau via SQL queries to BigQuery. Observed a reduction in vehicle downtime by about 15% due to this project.

PROJECTS

Numerical Optimization | [Github](#)

- Developed a custom autograd framework inspired by Pytorch, enabling automatic differentiation with forward and backpropagation functionalities.
- Implemented various optimization algorithms from scratch, including Gradient Descent, Nesterov's Method and Barzilai Borwein Method.
- Implemented Proximal and Lagrangian methods to tackle non-differentiable, constrained optimization problems.

3D Reconstruction and Scene Rendering: Structure From Motion and NeRF | [Github](#)

- Simultaneously reconstructed 3D scene (Mapping) and extracted camera pose (Localization) from camera correspondences using (Non) Linear triangulation - (Non) Linear PnP - Bundle Adjustment pipeline.
- Developed a Python implementation for the original NeRF paper by Mildenhall et al. using PyTorch.

Boundary Detection and Object Recognition | [Github](#)

- Implemented the Pb-lite boundary detection method which incorporates texture properties of images and surpasses traditional techniques in performance.
- Developed and fine-tuned ResNet, ResNeXt, and DenseNet architectures for object recognition on the CIFAR-10 dataset. Achieved a maximum test accuracy of 90% with the ResNeXt model.

Human Detection Module | [Github](#)

- Developed a C++ package that uses YOLOv3 to detect and localize humans in the robot frame.
- Implemented Agile Iterative Process with Doxygen documentation and unit testing using Gtest.
- Ensured code quality through continuous integration using TravisCI and code coverage using Coveralls.

AutoPano | [Github](#)

- Created seamless panoramas by stitching images using traditional feature point methods. Employed cylindrical reprojections for efficient handling of large image sets.

Lane Detection | [Github](#)

- Detected lanes and estimated road curvature using probabilistic Hough Transforms and sliding-window approach. Improved image contrast through histogram equalization.