

VENKAT NARAYANAN BALACHANDRAN

venkatnarayanan107@gmail.com | 864-624-6068 | Clemson, SC, 29631 | [linkedin.com/in/venkat-balachandran](https://www.linkedin.com/in/venkat-balachandran) | github.com/VenkatNarayanan11

SUMMARY

A self-motivated graduate student specializing in control systems design and an AV enthusiast. Worked on projects including but not limited to Model Predictive Control (MPC), Controller design, Image/Point cloud processing, Object detection, and Systems engineering. Knowledge in Motion planning, Kalman filter, Signal processing, ROS, Python, C++

EXPERIENCE

Mechanical Engineer, Maruti Suzuki, India

Jan 2017 - Jan 2018

- Performed root cause analysis and helped to resolve 90% of the technical faults in the vehicle.
- Led a team of ten technicians, educated them with management principles, and reduced time-quality trade-offs by 50%.
- Handled ten vehicles per day with 98% On Time Delivery (OTD) without compromising the quality.
- Achieved monthly goals with customer focus and increased the revenue by 20%.
- Collaborated with engineers, technicians, and final inspectors - to assure 100% customer satisfaction.

Graduate Engineer Trainee, Tractors and Farm Equipment Limited, India

Sep 2016 - Dec 2016

- Improved workplace efficiency by implementing Six Sigma, lean principles, JIT approach, and 5S principles.
- Performed time studies on the shop floor, reduced idle-time, and improved production efficiency by 30%.
- Collaborated with executives and engineers in problem-solving, critical thinking, data analysis, verification & validation.

PROJECTS

LiDAR Point cloud processing and Image processing (Spring 2021)

- Processed and visualized the LiDAR Point cloud from the 3D Velodyne HDL-64E LiDAR using MATLAB. [\[Link\]](#)
- Performed image processing techniques using OpenCV and Python to detect the parking lot in an image. [\[Link\]](#)

Autonomous Lane-keeping using Model Predictive Control (Fall 2020)

- Implemented an MPC control algorithm for a simulated autonomous vehicle using MATLAB 2019b and Simulink.
- Predicted and controlled the acceleration and the steering angle of the simulated vehicle using MPC. [\[Link\]](#)

Lateral and Longitudinal control design for self-driving vehicles (Fall 2020)

- Leveraged a Kinematic bicycle model to model the lateral and longitudinal dynamics of the self-driving vehicle.
- Designed the controller using Python, PID, and Stanley controller and simulated using the Carla simulator.

Object Detection System for Autonomous vehicles (Fall 2020)

- Implemented an object detection system for a self-driving car using OpenCV, Python, and darknet framework.
- Pre-trained the YOLOv3 neural network to detect vehicles, traffic signals, and pedestrians in a recorded video. [\[Link\]](#)

Road Signs recognition using Deep Learning (Spring 2020)

- Implemented a region-based convolutional neural network to detect the stop signs and school zone signs.
- Pre-trained the Cifar10Net model to train the neural network and tested it on a recorded video. [\[Link\]](#)

Lane Detection on Greenville-Atlanta Highway (Spring 2020)

- Implemented a computer vision algorithm using OpenCV and Python to detect the lanes on a recorded highway video.
- Leveraged image processing, canny edge detection, region-masking, and Hough transform for the algorithm. [\[Link\]](#)

Systems Engineering: Subsystem design (Fall 2019)

- Worked on the material extraction subsystem design using RTM, PFMEA, V&V, WBS, and TRIZ matrix.
- Developed technology assessment and maturation strategies, feasibility study, MOEP, and budget analysis.

Design and Optimization: Frisbee (Fall 2019)

- Designed and optimized the shape of the frisbee to minimize the drag forces by 10% to maximize its flying range.
- Modeled the frisbee using SolidWorks and CFD analysis is done using ANSYS Fluent.
- Identified the optimum shape that has minimum drag force and maximum lift force using an optimizer.

EDUCATION

Master of Science, Mechanical engineering
Clemson University

Aug 2019 - May 2021
GPA: 3.5

Bachelor of Engineering, Mechanical engineering
KCG College of Technology, Anna University, India

Jun 2012 - May 2016
GPA: 8.2/10

SKILLS

Programming language: Python, C++, MATLAB/Simulink

Development environments: VSCode, Linux, Robot operating system (ROS), Jupyter notebook

Control algorithm: PID, observed-based feedback, MPC, LQR

Motion/path planning algorithm: A*, D*, RRT, RRT*

Other: AutoCAD, SolidWorks, ANSYS, Microsoft office suite, Minitab, Tableau, TensorFlow, PyTorch