

Prateek Sharma

(864)-569-6373 | prateek@clemson.edu | www.prateek-sharma.me | linkedin.com/in/prateeks977/ | github.com/prateeks97

HIGHLIGHTS

- Research experience in Path Planning, Trajectory Optimization, and applications of Graph Search
- Scaled Autonomous Vehicle Racing: IEEE's 8th F1TENTH Las Vegas Grand Prix, IROS 2020
- Experience in Software Development tools, Object-Oriented Programming, C++, Python
- Specializing in Robotics, Motion Planning, Behavior Planning, Vehicle Control, State Estimation, and Filtering

WORK EXPERIENCE

Clemson University, SC, USA, Research Intern at GRAIL	Jan 2021 – Present
<ul style="list-style-type: none">• Explored graph search techniques for complex maintenance tasks Use cases- US Navy	
Clemson University, SC, USA, Autonomous Driving Software Developer of Team iCart	Aug 2020 – Oct 2020
<ul style="list-style-type: none">• Developed and deployed performance-sensitive racing algorithms for Scaled Autonomous Vehicles• Implemented and evaluated optimal control algorithms like MPC, Pure Pursuit, and Stanley	
CNH Industrial, Noida, India, Manufacturing Engineering Intern	Jan 2019 – Apr 2019
<ul style="list-style-type: none">• Led Kaizen Convention 2019 for CNH Industrials Ranked 1st in APAC region in Advance Kaizen category• Developed 'Gold Gallery (Tracking of Gold)' Best Practice that got accepted at World level among WCM plants	
Continental Pvt. Ltd, Meerut, India, Plant Engineering Intern	Dec 2017 – Jan 2018
Ezenith Education, Ahmedabad, India, Automobile Development Internship (A.D.I)	Jun 2016 – Jun 2016

SKILLS

Programming Skills	: C++, Python, MATLAB, Simulink
Software Experience	: Git, ROS, Gazebo, V-REP, Docker, NX, CarSim Operating System: Linux, Windows
Hardware Experience	: F1/10 th (RC car), Turtlebot 3, Lidar, Camera, Nvidia Jetson, Arduino IDE, Raspberry Pi

RESEARCH EXPERIENCE

Curvature Optimization and Path Smoothing for RRT Algorithm	(Motion Planning Trajectory Optimization)
<ul style="list-style-type: none">• Designed a trajectory optimization algorithm to smoothen the path obtained from RRT with non-holonomic constraints• Reduced the average curvature by 90% and path length by 50%, with only a 10% increase in the overhead time• Compared motion planning algorithms like A*, Dijkstra, PRMs, RRTs, RRT*• Implemented various local planners like Dubins curves, Reeds Shepp curves, POSQ	

PROJECT EXPERIENCE

Deep Reinforcement Learning for Autonomous Driving on F1/10th Vehicle	(Python ROS Deep Learning)
<ul style="list-style-type: none">• Implemented reinforcement learning to enable autonomous driving with obstacle avoidance capabilities• Modified the rewards to maximize the vehicle velocity Used Lidar for perception and ROS to interface with the car	
Controlling an End Effector of a Differentially Driven Wheeled Mobile Manipulator	(MATLAB VREP)
<ul style="list-style-type: none">• Developed Open Loop controller and performed Redundancy Resolution using three different techniques• Developed Joint-Space and Task-Space controller and simulated the robot and manipulators in a custom GUI	
Adaptive Cruise Control and Autonomous Lane-keeping for Scaled F1/10th Vehicle	(C/C++ Arduino IDE ADAS)
<ul style="list-style-type: none">• Implemented Kalman filter and piece-wise calibration function to improve the reliability of ultrasonic sensors• Increased robustness of the longitudinal control by using Pulse-Width-Modulation (PWM)	
Hardware Implementation of Autonomous Driving Algorithms and Behavior Planning	(Python Embedded System)
<ul style="list-style-type: none">• Developed multiple autonomous driving modules on ROS and implemented them on a Turtlebot 3 Burger• Tested and integrated algorithms for Obstacle Avoidance, Human detection, and tracking, line-following, etc.• Increased code robustness by implementing finite-state-machine for decision making and behavior control	
Advanced Rollover Warning: Computation/Estimation of (TTR) Time-to-Rollover	(MATLAB Control Systems)
<ul style="list-style-type: none">• Improved model fidelity by integrating the yaw-roll model with the lateral load transfer prediction model• Performed model validation on CarSim to test critical ISO maneuvers like double-lane change, J-turn, and Fish-hook	

EDUCATION

Master of Science in Automotive Engineering Clemson University, USA GPA: 3.84/4.0	Aug 2019 – Aug 2021
<u>Relevant Coursework:</u> Motion Planning, Scaled Autonomous Vehicles, Robotic Mobility and Manipulation, Analysis of Tracking Systems, Automotive Stability, and Safety Systems, HPC for Vehicles Autonomy Modeling and Simulation	
Bachelor of Technology in Mechanical Engineering SRM University, India GPA: 4.0/4.0	Aug 2015 – May 2019
<u>Relevant Coursework:</u> Advanced Calculus and Algebra, Probability and Statistics, Basic Electrical Engineering	