KARTHIK PYTHIREDDI

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EDUCATION

Stanford University — Expected to Graduate in December 2026
Master of Science in Electrical Engineering: *AI & Robotics* — ***GPA: 3.37//4.00***

Rochester Institute of Technology — Graduated in December 2017
Master of Science in Electrical Engineering: *Control Systems* — ***GPA: 3.73/4.0***

Gitam University — Graduated in August 2014
Bachelor of Technology in Electronics and Communication Engineering — ***GPA: 3.1/4.0***

PROJECTS AND COURSEWORK (github.com)

Lane-Keeping of an Autonomous Vehicle using an iLQR-initialized Model Predictive Control We implemented the lane-keep for an autonomous vehicle using MPC initialized through a reference trajectory generated by an iterative Linear Quadratic Regulator (iLQR). Our approach is to make use of a single nonlinear bicycle model as the dynamics, with the iLQR algorithm generating the reference state and control trajectories. We use these reference trajectories to initialize the MPC which optimizes the lateral control within the specified constraints. The overall goal of this project to evaluate the system's effectiveness in performing the lane keep during the curvy and complex roads.

Evaluating Extended Kalman Filter in Dead Reckoning Scenarios using IMU and Star Tracker: Demonstrated the state estimation for a ground robot using inertial measurement units (IMUs) and a star tracker. After reviewing the current state-of-the-art state estimation algorithms through a literature review, modeled an autonomous rover and implemented the Extended Kalman Filter (EKF) to compare its benefits and drawbacks.

Animal Rescue Mission: Using a Turtle Bot in ROS, we designed a gazebo environment to mimic a Zoo. The goal of the robot is to explore the map using a set of waypoints. We used a CNN detector to detect the animals, implemented A* algorithm for Path Planning of the robot. Implemented two controllers for trajectory tracking and pose stabilization. Used RViz, Plot Juggler for GUI & parameter tuning.

Coursework: Principles of Robot Autonomy, State Estimation and Filtering for Robotic Perception, Decision Making under Uncertainty, Robotics and Automation, Convex Optimization, Learning based Optimal Control, Programming Abstractions, Programming Methodology, Classical Controls, Modern Control Theory, Digital Controls, Non-Linear Controls, Systems Modelling.

TECHNICAL SKILLS

Python, Safety Critical Systems, Data Analysis, Maglev, RADAR, LIDAR, Drive Debugger (DDB), JAMA, C++, MATLAB & Simulink, GitHub, JIRA, Confluence, SLAM, Kalman Filter, State Estimation, MPC, iLQR, Linux, dSPACE, CAN, Jenkins

WORK EXPERIENCE

08/2021 - Present **NVIDIA** Santa Clara, CA

Senior Software Validation Engineer – Autonomous Driving

- Worked on L2&L3 Autonomy for Highway and Urban bring up and evaluated the Software in Simulation.
- Worked on the System Integration of the Error Handling and Safety supported work in designing the different use cases as well as evaluating those on the Simulation and In-Car.
- Validated the degradation of the sensor modules like Camera and Radar and made standard procedure document for teams in other regions.
- Also worked on Validation of Automatic Parking, UX Design View and Regulatory Recorders.
- Worked on the System Integration and Platform validation for Nvidia DRIVE products.
- Reviewing requirements in JAMA from OEM Customers and validating them on the platform.

04/2021 – 08/2021 **DIDI Labs** Mountain View, CA

Autonomous Driving Systems Engineer

- Worked on Autonomy feature test cases for Planning and Controls.
- Defining the metrics and simulation requirements for certain Autonomy Features.
- Wrote scripts to automate some of the data analysis process on the offboard monitors.

02/2018 – 04/2021 **Motional (Previously Hyundai – Aptiv Autonomous Driving Joint Venture)** Boston, MA

Autonomous Driving Systems Test & Verification Engineer

***Motion Planning & Controls*:**

- Worked on developmental testing of High-Level Controller and Planning related features by executing multiple experiments in simulation and In-Vehicle in a private open space, also written Test Plans to execute the Test Cases.
- Stress tested multiple features like executing a U-turn, Biasing for Parked Vehicles, Circumvention and lane change features in the Las Vegas Strip before officially handing over the stable product to Operations which is the current Partnership with Lyft.
- Worked on Highway Testing of the Planning and Controls features and tested those features on the freeway by driving from Las Vegas to California-Nevada Border Autonomously in a BMW Platform.
- Worked on Planning and Controls related developmental testing for L4+ autonomy on public roads and closed course.

Simulation:

- Created and maintained the test cases and scenarios for Boston Testing team and also supported the simulation for every software release process in Boston.
- Supported Planner-Controller based simulations using Vehicle Dynamics Model/Kinematics Model
- Written Python Scripts to extract parameters like lateral/longitudinal/vertical accelerations from cloud Simulations which will be used as KPIs for the Comfort Acceleration.
- Ran Multi-Ego Simulations on cloud with multiple Actors and Real-world behavior.

***Vehicle Systems and Integration*:**

- Supported the Bring up of Autonomous System Stack on 2 different Platforms (BMW and Pacifica) and currently working on the 3rd vehicle platform.
- Updating the firmware on the sensors like Lidar and Low-Level controller and analyzing the CAN Data from the controller.
- Sensor Calibration for Lidar and Camera for Intrinsic and Extrinsic Parameters both manual and automated calibration using checkerboard.

06/2017- 08/2017 **Walt Disney Imagineering** Glendale, CA

Ride Controls Engineering Intern - Hardware

- Worked on an Open house project for Disney's R&D department for which I prepared Bill of Materials (BOM), Reviewed Electrical designs, participated in Equipment procurement, assisted in Electrical wiring and took part in hands-on Assembling of the Automated Guided Vehicle (AGV).
- Upheld ride engineering policies and procedures at a department level and reviewed hardware designs for Disney's ride control systems apart from using plc in the automation of ride control systems for future **Walt Disney World** attraction Marceline.

01/2017 – 06/2017 **Berry Global** Macedon, NY

Robotic Engineer Intern

- Led the Converting Department Personal Care (PC) robot repair and maintenance activities.
- Coordinated the documentation of programming for the FANUC Robot.

09/2016 – 12/2016 **ON Semiconductor** East Greenwich, RI

Product Engineer Intern

- Reviewed yield, failure analysis reports, 8D report analysis, 5 Why? analysis and semiconductor defect mechanisms; electronic circuit and block diagram analysis of automotive semiconductor devices.