

Vibhav Gaur

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Master's in mechanical engineering with a specialization in Dynamic Systems and Controls with a strong interest in autonomous vehicles and robotics. Looking for full-time positions in related fields.

Education

Year	Degree	Institution	Performance
May 2020	M.S. Mechanical Engineering (Dynamic Systems & Controls)	The University of Texas at Austin	GPA: 3.8/4.0
2017	B.S. Mechanical Engineering	University of California, Los Angeles	GPA: 3.35 / 4.0

Work Experience

THE MATHWORKS, Application Support Engineer (EDG) (July 2020 – Present)

- Monte Carlo Localization, Visual Odometry with a differential drive robot model in a simulated ROS environment (Gazebo)
- Wrote MATLAB & C++ code for image filtering algorithms with a focus on optimization and parallel computation
- Nonlinear System Identification using Deep Learning networks and autoencoders
- Provided robust and detailed solutions for customer issues with MathWorks products like MATLAB and Simulink

CUMMINS, Controls Test Engineering Internship (June 2019 – August 2019)

- Created a C++ library of methods for the handling of J1939 messages on the CAN bus for the ECM Fault Reduction project
- Automated test procedures for the ECM using NI TestStand
- Conducted several test procedures on the Engine Control Module (ECM) using Cummins Calterm
- Performed low-level analysis of CAN bus messages using CANalyzer, PCANview, and oscilloscopes

Relevant Coursework

Estimation & Control of Ground Vehicle Systems	Advanced Estimation Theory	Optimal Control	Digital Control of Discrete Systems	Stochastic Estimation & Control	Time Series Analysis	Introduction to Computer Science I & II
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Optimal Control for Spacecraft Orbit raising maneuver (Spring 2019) – Compared the system performance of a 4th order spacecraft model during an orbit raising maneuver for a Linear Quadratic Regulator (LQR), Linear Quadratic Tracker (LQT), and a Luenberger Observer optimizing for a minimum time performance index.

Research Experience

MOBILITY SYSTEMS LABORATORY, UT Austin – Prof. Junmin Wang (August 2019 – Present)

- Master's Thesis: Cruden® 6-DOF Motion Base Driving Simulator
- Automatic optimal steering: developing control strategy and algorithm that inverts vehicle dynamics to generate the steering input required to track a given trajectory
- Developed a model-free controller for the system which applied Algebraic Derivative Estimation of the states for real-time performance
- Hardware-in-the-loop (HiL) simulation using dSPACE SCALEXIO platform

MECHATRONICS & CONTROLS LAB, UCLA – Prof. Tsu-Chin Tsao (July 2017 – June 2018)

- Quadcopter Drill Project
- Motor Control Project
- Collected vibration data and designed a passive damper to reduce pump vibrations onboard
- Designed quick-release mechanism for the tool carriage on the quadcopter
- Conducted experiments to determine the deflection of quadcopter in various load cases
- Reverse-engineered the signal schematics for AC Induction motor in a motion stage
- Developing control strategy for velocity control

Extracurricular Activities

FORMULA SAE April 2014 – December 2016 (UCLA), September 2018 – January 2019 (UT, Austin)

- Traction control system (UT Austin)
- Drivetrain Subsystem (UCLA)
- Launch Control, reduction of wheel-spin
- Maintaining optimal slip ratio
- Drivetrain Subsystem Lead
- Designed and Optimized the differential mounts using SolidWorks FEA simulation

Skills and Abilities

Computer program/skills	Selected projects
MATLAB and Simulink	<ul style="list-style-type: none">Automotive Simulation Models (ASM by dSPACE)Automatic steering control
ROS, OpenCV, Python	<ul style="list-style-type: none">Self-taught, Visual OdometryVisual Simultaneous Localization & Mapping (V-SLAM)
dSPACE ModelDesk, ControlDesk, Automotive Simulation Models (ASM)	<ul style="list-style-type: none">HiL Simulation of vehicle dynamicsAutomatic steering control algorithm development
CANalyzer, PCAN-View, J1939 Protocol	<ul style="list-style-type: none">Low-level analysis of CAN messagesC++ library for processing message data on Cummins ECMs
C++, Arduino	<ul style="list-style-type: none">Cummins ECM Fault Reduction ProjectMechanical Engineering Senior Design – Controls