Vinit Talele

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Education

- **Clemson University | Greenville | USA**
  Masters | Automotive Engineering **Aug 2022 – Aug 2024**
- **Dr. Vishwanath Karad MIT World Peace University | Pune | India**
  Bachelors | Mechanical Engineering **June 2018 - June 2022**

Automotive Experience

Deep Orange | Clemson University | USA **Jan 2023 – Aug 2024**
VIPR-GS funded - Intern | Vehicle Dynamics and Control

- Developing predictive ride control for semi-active suspension using LiDAR road profile inputs following ISO 2631-1-1997 standards.
- Developing steering control strategies whilst integrating autonomous steering capability and safe driver handover.
- Designed independent front suspension and steering kinematics.
- Tasked with implementing an electro-hydraulic steering system run through a High Voltage pump of 400V.
- Developing a full vehicle model on Adams Car for co-simulation with MATLAB Simulink to perform ride, steering and braking maneuver simulations.
- Experience with Raptor ECU for developing and performing hardware in-loop tests of low-level control logic for semi-active dampers.

Graduate Research Assistant | Clemson University | USA **Aug 2023 – Dec 2023**
Research Professor – Dr. Chris Paredis

- Enhanced the control system of a hybrid tracked autonomous reconnaissance vehicle to incorporate a safe mode for manual low-speed operations.
- Integrated CAN-based joystick controller and mapped the track velocities to two joysticks: one for straight-line speed control and the other for yaw control. Additionally, implemented a rate limiter to allow fine speed control and also limited the vehicle velocity.
- Configured joystick controller to display system faults and operation instructions on the controller display.
- Enhanced a Feedforward and Proportional Integral Derivative controller to ensure smooth operation of the traction motors.
- Validated control system modifications through vehicle tests.

Automotive Projects – Clemson University

Active suspension control for a half-car model using LMI-MPC based Approach | Vehicle Dynamics **Oct 2023 – Dec 2023**

- Utilized Linear Matrix Inequality (LMI) theorems to generate optimal weight terms Q and R for Model Predictive Control (MPC) at each timestep.
- Minimized vertical acceleration and pitch motion due to road disturbances to improve ride comfort.
- Compared the performance of the LMI-MPC approach with the MPC-only-based approach, demonstrating improved ride comfort with few input constraint violations.

Transient temperature control of Diesel engine after-treatment system | Powertrain **Oct 2023 – Dec 2023**

- Integrated GT-Suite with MATLAB Simulink for the control model.
- Implemented Model Predictive Control (MPC) and Feedforward + error-based Active Disturbance Rejection Controller (ADRC) and benchmarked against a Proportional Integral Derivative (PID) controller.
- Reduced the disturbances by 70% caused by the transient data input for a WHT Cycle simulated on a 6-cylinder 5.76 heavy-duty diesel engine.
- Achieved an RMS error of 8.3% and 11.11% in temperature tracking performance using MPC and Feedforward + error-based ADRC, respectively.

Data Acquisition and Data Processing for Volvo S90 | Vehicle Dynamics **Nov 2023 – Dec 2023**

- Set up the vehicle with Siemens SCADAS DAQ, diagnosed and troubleshot issues with various sensors.
- Tested the vehicle at ITIC Greenville, SC, gathering data for 360º turns, slaloms and braking events at various vehicle velocities.
- Acquired vehicle data like slip angle, yaw rate, roll rate, pitch rate, steering wheel angles, vehicle g-forces and GPS.
- Calculated understeer gradient, lateral load transfer gradient and vehicle response for various tire pressures and vehicle occupant loads.

Sliding Mode Controller-based Active Roll Stabilization | Vehicle Dynamics **Mar 2023 – Apr 2023**

- Integrated CarSim with MATLAB Simulink for a yaw and roll dynamics coupled control model.
- Implemented a Sliding Mode Controller and compared body roll reduction against the Proportional Integral Derivative controller.
- Simulated the SUV at various velocities for Double Lane Change, Fishhook Maneuver, and an aggressive Off-road drive cycle.
- Additionally, optimized the front and rear body roll distribution for yaw stabilization using a Fuzzy Logic controller.

Technical Skills

Design: AutoCAD, Fusion 360, Solidworks, Siemens NX, Creo
Simulation Software: MATLAB/Simulink, Ansys, CarSim, AMEsim, Lotus Shark, MSC Adams, GT-Suite, Autodesk Eagle, NI Multisim
Hardware: Kvaser CanKing, CANdb++, Siemens Testlab